Annex I1 Impacts of individual recommended Marine Conservation Zones (Option 1 Balanced Seas)

1 Introduction

1.1.1 This annex sets out the direct impacts of each of the Balanced Seas recommended Marine Conservation Zones (rMCZs) being proposed **only** for designation in Option 1 of the Impact Assessment.

1.1.2 Four sets of tables are provided for each rMCZ as follows:

- Table 1 – sets out an ecological description of the site, and specifies what ecological features are to be protected by the rMCZ and their conservation objectives;
- Table 2 – sets out the cost impacts of the rMCZ by sector.
- Table 3 – lists the sectors that have activities currently occurring within or near to the rMCZ but for which no mitigation is required and therefore no cost impacts are anticipated.
- Table 4 – sets out the contribution to the Ecological Network Guidance undertaken by the Statutory Nature Conservation Bodies (SNCBs)
- Table 5 – sets out the beneficial impacts to ecosystem services of the rMCZ

2 Impact Assessment

2.1.1 The remainder of this document sets out the individual rMCZ and rMCZ Reference Area assessments.

rMCZ 2, Reference Area 22 North Mistley **Site area (km^2): 1.44**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts				**rMCZ 2, Reference Area 22 North Mistley**
1a. Ecological description				
This recommended Marine Conservation Zone Reference Area encompasses a small intertidal bay on the northern shore of the Stour Estuary in Suffolk, opposite Mistley on the southern bank. It is recommended specifically for the population of the nationally scarce brackish water species, the starlet sea anemone *Nematostella vectensis* which is found here, as well as intertidal mud which is found throughout the site. It has also been recommended for blue mussel beds, although there is some doubt about the validity of the record for this feature. This site lies within the Stour Estuary Site of Special Scientific Interest, Stour and Orwell Estuaries Special Protection Area, and Stour and Orwell Estuaries Ramsar site. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact of the MCZ**
Broad-scale Habitats				
A2.3 Intertidal mud	1.09 km^2		Unfavourable condition	Recover to reference condition
Habitats of Conservation Importance				
Blue mussel beds	0.07		Unfavourable condition	Recover to reference condition
Species of Conservation Importance				
Starlet Sea Anemone (*N.vectensis*)	-	1 record	Unfavourable condition	Recover to reference condition

Site-specific costs arising from the effect of the rMCZ on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	**rMCZ 2, Reference Area 22 North Mistley**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Neolithic and bronze-age tools have been found within the site (English Heritage, 2012). English Heritage has indicated that this site is likely to be of interest for	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional

Table 2a. Archaeological heritage	rMCZ 2, Reference Area 22 North Mistley
archaeological excavation in the future as it is relevant to its National Heritage Protection Plan (theme 3A1.2) (English Heritage, pers. comm., 2012).	cost in one licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). 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, it is not costed in the Impact Assessment. 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.

Table 2b. Commercial fisheries — **rMCZ 2, Reference Area 22 North Mistley**

Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1**

Closure of entire site to all gear types.

Summary of all fisheries: The rMCZ Reference Area, lying in rMCZ 2 Stour and Orwell Estuaries, is primarily intertidal. Local Group discussions indicate that potting occurs in the rMCZ Reference Area, although this is not apparent from the MCZ Fisheries Model. It is not known how many vessels use this rMCZ Reference Area (MCZ Fisheries Model). More detail on the approach used for the fisheries method is provided in Annexes H7 and N4.

Estimated annual value of landings from the rMCZ Reference Area: £310/yr (MCZ Fisheries Model).

(Due to resolution issues of the MCZ Fisheries Model and the small size of many rMCZ Reference Areas in the Balanced Seas region, some fisheries landings values may be inaccurate. They have been included as a precautionary measure and to avoid underestimating the economic impact of a site.)

Baseline description of UK commercial fisheries	Costs of impact of rMCZ on UK commercial fisheries under Policy
Bottom trawls: It is unknown how many vessels use bottom trawls in the rMCZ Reference Area but level of vessel use is very low if it occurs at all.	Estimated annual value of UK vessel landings affected: *£m/yr* — Scenario 1 Value of landings affected — <0.001
Nets: It is unknown how many vessels use nets in the rMCZ Reference Area but level of vessel use for this site is low.	Estimated annual value of UK vessel landings affected: *£m/yr* — Scenario 1 Value of landings affected — <0.001
Pots and traps: It is unknown how many vessels use pots and traps in the	Estimated annual value of UK vessel landings affected:

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries</th><th>rMCZ 2, Reference Area 22 North Mistley</th></tr>
<tr><td colspan="2">rMCZ Reference Area but information from stakeholders indicates that potting occurs.

Estimated total value of landings from the rMCZ Reference Area: £0.000m/yr (MCZ Fisheries Model).</td><td><table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td>0.000</td></tr></table>
This is likely to be an underestimate as it was indicated in Suffolk/Essex Local Group meetings that potting does occur within this rMCZ Reference Area.</td></tr>
<tr><th colspan="2">Total direct impact on UK commercial fisheries under Policy Option 1</th><th></th></tr>
<tr><td colspan="2"></td><td>Estimated annual value of UK vessel landings and gross value added (GVA) affected:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Best estimate</td></tr><tr><td>Value of landings affected</td><td><0.001</td><td>0.000</td></tr><tr><td>GVA affected</td><td>0.000</td><td>0.000</td></tr></table>
The best estimate is based on an assumption on the likelihood of the lowest and highest cost scneario occuring, and an assumption that 75% of value is displaced to other areas. This is based upon an assumption of average displacement across all rMCZs, and may be an under- or over-estimate for this site.</td></tr>
<tr><th colspan="2">Baseline description of non-UK fisheries</th><th>Costs of impact of rMCZ on non-UK commercial fisheries</th></tr>
<tr><td colspan="2"></td><td>None.</td></tr>
</table>

<table>
<tr><th colspan="2">Table 2c. Flood and coastal erosion risk management (coastal defence)</th><th>rMCZ 2, Reference Area 22 North Mistley</th></tr>
<tr><td colspan="3">Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Increase in costs of assessing environmental impacts for future licence applications for maintenance work for the coastal defence scheme (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).</td></tr>
<tr><th colspan="2">Baseline description of activity</th><th>Costs of impact of rMCZ on the sector under Policy Option 1</th></tr>
<tr><td colspan="2">The shoreline management policies in the vicinity of the site include a combination of Advance The Line/Hold The Line/Managed Realignment/No Active Intervention. The Environment Agency is working with local community groups to trial the use of routinely dredged material from the estuary channel port and marinas as a soft coastal defence, thus keeping the material within the estuary system. The sediment would be placed in areas of eroding salt marsh to encourage re-growth. This work is in its early</td><td>No additional costs for mitigation of impact are anticipated (Natural England and Environment Agency Flood and Coastal Erosion Risk Management Workshop for the Balanced Seas Project Area, 17 November 2011).

As a result of the rMCZ Reference Area, it is anticipated that additional costs will be incurred in assessing environmental impacts in support of future licence applications for Flood and Coastal Erosion Risk Management (FCERM)</td></tr>
</table>

Table 2c. Flood and coastal erosion risk management (coastal defence)	rMCZ 2, Reference Area 22 North Mistley
stages and the sites where sediment will be deposited are not yet known, but there is a possibility that they could overlap with the rMCZ Reference Area and impact areas of intertidal mud (Natural England and Environment Agency Flood and Coastal Erosion Risk Management Workshop for the Balanced Seas Project Area, 17 November 2011). An environmental assessment, permissions and licences will be required to carry out this work.	schemes. For each licence application these costs are expected to arise as a result of approximately 0.5–1 day of additional work, in most cases, although there may be cases where further additional consultant time is needed (Environment Agency, pers. comm., 2012). It has not been possible to obtain information on the likely number of licence applications that will be made over the 20 year period of the IA or estimates of the potential increase in costs.

Table 2d. Ports, harbours, shipping and disposal sites — **rMCZ 2, Reference Area 22 North Mistley**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management scenario 1: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for navigational dredging that takes place within 1km of the rMCZ. It is anticipated that the entire site will be closed to navigational and maintenance dredging. The Balanced Seas project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the rMCZ Reference Area will be needed relative to the mitigation provided in the baseline

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for navigational dredging and all port and harbour developments within 5 km of the rMCZ. Also, additional costs to update the existing Maintenance Dredging Protocol (MDP). It is anticipated that the entire site will be closed to navigational and maintenance dredging, and additional mitigation of impacts on features protected by the rMCZ Reference Area will be needed for proposed future port and harbour developments relative to the mitigation provided in the baseline.

Baseline description of activity

Navigational dredge areas: The south-east corner of this rMCZ Reference Area overlaps with maintenance dredging in the Mistley Channel. The channel is maintained by Harwich Haven Authority (HHA) and used by vessels and craft going to Mistley Marine and Leisure (slipway, work boats, yacht storage facility and mud berths), Mistley Quay (used by small coasters trading in agricultural products, stone, timber and other commodities) and the Stour Sailing Club (Harwich Haven Authority, 2011). The small port of Mistley handles a wide variety of cargoes within its 6 berths which include 2 deepwater berths. 0.03% of all foreign and domestic traffic in the UK and 0.06% of ship arrivals in the UK use Mistley Quay. Maximum size of vessels is 3,500 tonnes.The port employs approximately 300 people in the three wards around Mistley (Haven Gateway, 2010 berths; TWL Logistics Ltd, 2012),

Costs of impact of rMCZ on the sector under Policy Option 1

£m/yr	Scenario 1	Scenario 2
Cost to the operator	0.003	0.003*

* This estimate for additional cost in future licence applications for port developments arising as a result of this rMCZ is not used to estimate the total costs for the IA. It is based on different assumptions to those used to estimate costs at a regional level and for the entire suite of sites. Also, this figure assumes that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal (every 3 years). It does not include the cost of incorporating MCZ features in the existing MDP. It is likely to over-estimate the cost of Scenario 2 for rMCZs with ports within 5km that have MDPs because of the savings in future costs provided by an MDP. See Annex H for further information

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 2, Reference Area 22 North Mistley
The Mistley Channel is dredged 3–4 times a year by HHA, which moves about 1,000 metres^3 per session (Harwich Haven Authority, 2011). The dredged material is used elsewhere in the Stour and Orwell Estuary in habitat projects and for maintenance of coastal defences and environmental processes (Harwich Haven Authority, 2011). It is assumed that each dredge area's marine licence is renewed once every 3 years. As this navigational dredge area is covered by an existing MDP, it is assumed that the assessment of environmental impact is not changed over the 20 year period of the IA. ***Port development:*** Within 5km of the rMCZ there is only the Port of Mistley, which may undergo development at some point in the future (Ports & Harbours UK, 2012). This may not represent a full list of all ports and harbours that could be impacted on by the site. No port developments are known to be planned within the 20 year period of the Impact Assessment (IA).	***Closure of site to maintenance and navigational dredging in Scenarios 1 and 2:*** It is anticipated that closure of the site to maintenance dredging of the main navigation channel to the Port of Mistley would lead ultimately to closure of the port (HHA, pers. comm., 10 February 2012). Because of the importance of the port, the IA assumes that the dredging would continue and the impacts on the MCZ features would not be mitigated. The cost is assessed in the impact assessment (IA) in terms of the cost to the operator of providing environmental benefit that is equivalent to the impact that the navigational dredging causes to the rMCZ Reference Area. In the event that an activity impacts on achieving the conservation objectives of an MCZ's features, this would be required under Section 126(7) of the Marine and Coastal Access Act 2009. The cost of this has not been assessed because the following are not known: the magnitude of the damage that would be caused; and how equivalent environmental benefit would be provided and what it would cost. 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. It is understood that the advice suggests that the site boundary 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. ***Scenario 1:*** If the navigational dredge in the rMCZ Reference Area continues following designation, as described above, impacts on the MCZ's features will need to be considered in applications for renewal of the licence for the dredge. To avoid under-estimation of the costs, the additional costs that would be incurred are included in this Scenario.. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11). ***Scenario 2:*** Future licence applications for navigational dredging and port and harbour development plans or proposals within 5km of this site will need

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 2, Reference Area 22 North Mistley
	to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11). Also, additional costs will arise in updating the existing MDP as this will need to consider the potential effects of activities on the features protected by the rMCZ Reference Area. The anticipated additional cost in ther MDP is estimated to be a one-off cost of £8438.

Table 2e. Recreational angling	rMCZ 2, Reference Area 22 North Mistley
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of the entire site to all recreational angling.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
StakMap interviews indicated that areas used for recreational angling (shore fishing, charter boats and boat fishing) overlap with the rMCZ Reference Area (7 interviewees who represented 3 local clubs, with combined membership totalling 230 users). Charter boat operators interviewed stated that they used this small area and represented a total of 425 anglers/yr (StakMap 2010). Species taken include bass and mixed species. For both shore fishing and boat-based fishing activities, the rMCZ Reference Area only represents a small proportion of the overall area over which stakeholders indicated that they fished. Recreational boat angling occurs through the mid-water channel within the site near the seaward boundary (Balanced Seas Essex Sites Meeting Report, July 2011).	Because the rMCZ Reference Area represents only a small proportion of the area where anglers fish, it is anticipated that they may respond to the closure to angling by fishing elsewhere in this area.

Table 2f. Recreational bait collection	rMCZ 2, Reference Area 22 North Mistley
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of entire site to all bait collection.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Bait digging occurs in the Reference Area rMCZ (Balanced Seas Essex Sites Meeting Report, July 2011). An angler who fishes in the area	Since the site is used extensively for bait collection in summer (when it is not subject to the voluntary closure), the rMCZ Reference Area is likely to have an

Table 2f. Recreational bait collection	rMCZ 2, Reference Area 22 North Mistley
explained that it is an important source of bait, partly because of the easy access (T. Pinborough, local angler, pers. comms., January 2012). The rMCZ Reference Area is part of a larger bait digging area, used in the summer (April to September) by local anglers and at least 3 professional bait diggers who supply 3 tackle shops (in Ipswich, Walton-on-the-Naze and Colchester). The Stour and Orwell has a voluntary code of conduct that closes sections of the estuaries to bait digging during the winter (November to April), which was negotiated with local stakeholders via the Stour and Orwell Estuary Management Group (M. Sessions, local angler, pers. comms., February 2012).	impact on local anglers and the three professional bait diggers (licensed by The Crown Estate) who use it, and indirectly on the three tackle shops which buy bait from these suppliers. It has not been possible to obtain quantitative information about the level of bait digging within the site or the availability of alternative sites for bait collection outside and therefore costs have not been calculated.

Table 2g. Recreational Wildfowling	rMCZ 2, Reference Area 22 North Mistley
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Closure of the entire site to wildfowling.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Wildfowling has taken place within this rMCZ Reference Area as a traditional activity for at least 100 years. The area is now mainly used by the Grove Shooting Club (established in the early 1980s) (British Association for Shooting and Conservation (BASC), pers. comm., January 2012). The Grove Shooting Club has a sporting rights agreement from The Crown Estate which expires in 2025, and a notice of consent from Natural England to carry out wildfowling which expires in 2020. The licensed area completely overlaps the rMCZ Reference Area and is one of several licensed areas within the Stour Estuary. Under the club's Crown Estate management plan, shooting is allowed only within 100 metres of the sea wall (i.e. not throughout the rMCZ Reference Area). The club has a no-shooting zone towards the Stutton Mill side of the rMCZ Reference Area, which incorporates some of the mussel beds (BASC, pers. comm., January 2012).	The rMCZ Reference Area covers a large proportion of the area used for wildfowling within the estuary and its closure to wildfowling could have a significant impact, particularly on wildfowlers who shoot with the Grove Shooting Club. Wildfowlers have said that areas outside the rMCZ Reference Area are of a significantly lower quality for this activity. It is therefore anticipated that the closure would have a significant impact on the people who wildfowl in the site. It has not been possible to further assess the costs of the impact on wildfowling because the club did not wish to disclose information about its membership and activity.

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 2, Reference Area 22 North Mistley
Disposal site; use of disposal site 'River Stour Water Column 3 (TH201)' (though this is within is within 500m of the rMCZ at its closest point, it is a 'beneficial use' disposal site , which feeds dredged material back in to the estuary to offset impacts associated with navigational dredging. It is not anticipated that mitigation of impacts would be required (Natural England, e-mail., 10 July 2012)). Recreation (except for the activities listed above in table 2) Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

This rRAs sits within an rMCZ. For information on how this reference areas contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath BS 02 Stour and Orwell. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 4a. Fish and shellfish for human consumption	rMCZ 2, Reference Area 22 North Mistley	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. Intertidal mud provides habitat for fish of commercial importance and blue mussel beds which occurred here in the past potentially provide a commercial food source (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. The costs of this are set out in Table 2b. Achievement of the conservation objectives may improve	Anticipated direction of change: ⇧ Confidence:

Table 4a. Fish and shellfish for human consumption	rMCZ 2, Reference Area 22 North Mistley	
are in in favourable condition and some are in unfavourable condition (see rMCZ 2 Table 1 for details)Given the intertidal nature of the site, there is very little commercial fishing in it. A description of on-site fishing activity and the value derived from it is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits that derive from the intertidal mud habitats.	the contribution of the habitats to the provision of fish and shellfish for human consumption. Closure of the rMCZ Reference Area to fishing activity will reduce the on-site fishing mortality of species, but as the site is small it is unclear whether this would benefit stocks of mobile commercial finfish species. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	Low

Table 4b. Recreation	rMCZ 2, Reference Area 22 North Mistley	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Intertidal mud provides habitat for fish of commercial importance (Fletcher and others, 2011) which may also have recreational value. The Stour Estuary has important nursery areas for fish caught recreationally, including bass (Balanced Seas Final Recommendations Report, 2011). However, it is not known to what extent nursery areas occur within the rMCZ Reference Area. The generally high biodiversity due to the intertidal habitats within the site may support on-site and off-site fisheries. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in in favourable condition and some are in unfavourable condition (see rMCZ 2 Table 1 for details). A number of anglers use the rMCZ Reference Area and a description of on-site angling activity it is set out in Table 2e but it has not been possible to estimate the value derived from this. It has not been possible to estimate the proportion of the value derived	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation	rMCZ 2, Reference Area 22 North Mistley	
from angling off-site that results from the potential spawning and nursery area.		
Diving: Diving does not take place in the site.	N/A	N/A
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services. Mussel beds are an important food source for birds and intertidal mud is an important habitat for bird watching (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in in favourable condition and some are in unfavourable condition (see rMCZ 2 Table 1 for details). The north side of the Stour has particularly high biodiversity and abundant fish populations which support a number of internationally important foraging birds. Bird watching is popular in the nearby RSPB Stour Estuary Reserve and this activity probably extends into the rMCZ Reference Area. It has not been possible to estimate the value derived from wildlife watching in the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The recovery of the features to reference condition may improve their functioning as support for fish and bird populations, potentially benefiting wildlife watching within the rMCZ Reference Area. In addition, an improvement in the condition of site features and any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation		rMCZ 2, Reference Area 22 North Mistley
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services. The north side of the Stour Estuary lies within the Suffolk Coast and Heaths Area of Outstanding Natural Beauty and the Stour and Orwell Path runs very close to the rMCZ Reference Area (Long Distance Walkers Association website; Stour & Orwell Estuaries Management Strategy, 2010). Sailing is popular within the wider rMCZ and recreational vessels may transit through the site. It has not been possible to estimate the value derived from other recreation in the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The rMCZ Reference Area is fully contained within rMCZ 2 for which the benefits of other recreation have been assessed (see above). It is not possible to identify whether the Reference Area will have additional benefits over and above this but this seems unlikely. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4c. Research and education		rMCZ 2, Reference Area 22 North Mistley
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. Research is carried out in the surrounding larger rMCZ by the Stour and Orwell Estuaries Management Group (Stour & Orwell Estuaries Management Strategy, 2010) and may include the rMCZ Reference Area, but no details are available. The Harwich Haven Authority regulators group regularly surveys the area (Natural England Impact Assessment questionnaire, 16 November 2011). It has not been possible to estimate the value derived from research activities associated with the rMCZ Reference Area.	As an rMCZ Reference Area, the site will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services.	MCZ Reference Area designation may provide an opportunity to use the site for education about the marine environment. Designation may aid the development of additional local (to the	Anticipated direction of change:

Table 4c. Research and education	rMCZ 2, Reference Area 22 North Mistley	
No known education activities occur within the site, although such activities take place within the surrounding larger rMCZ and potentially may involve the rMCZ Reference Area. It has not been possible to estimate the value derived from education activities associated with the rMCZ Reference Area.	rMCZ Reference Area) education activities (e.g. events and interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ Reference Area contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	⇧ Confidence: Moderate

Table 4d. Regulating services	rMCZ 2, Reference Area 22 North Mistley	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: Blue mussel beds, if they occur, would contribute to the bioremediation of waste and water purification. Intertidal mud contributes to sequestration of carbon (Fletcher and others, 2011). ***Environmental resilience:*** The features of the site are not known to contribute to the resilience and continued regeneration of marine ecosystems. ***Natural hazard protection:*** Blue mussel beds, if they occur, and intertidal mud would contribute to local flood and storm protection (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of intertidal mud, blue mussel beds and starlet sea anemone *Nematostella vectensis* and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4e. Non-use and option values	rMCZ 2, Reference Area 22 North Mistley	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence	Anticipated direction of change: ⇧

Table 4e. Non-use and option values		rMCZ 2, Reference Area 22 North Mistley
It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect both the features and the option to benefit from the services in the future from the risk of future degradation.	Confidence: Moderate

rMCZ 2, Reference Area 24 Harwich Haven **Site area (km^2): 1.01**

- This site has been proposed for designation under Policy Option only.

Table 1. Conservation impacts	**rMCZ 2, Reference Area 24 Harwich Haven**

1a. Ecological description

This recommended Marine Conservation Zone (rMCZ) Reference Area is an intertidal and subtidal area within the mouth of the Stour and Orwell Estuaries in rMCZ 2, and contains several extremely rare features. Low energy intertidal rock is a regionally scarce broad-scale habitat and this is the only place in the Balanced Seas Project Area that could be identified as a potential rMCZ Reference Area for this habitat. This site is one of only two sites where the honeycomb worm *Sabellaria alveolata* reef biotope has been recorded in the Balanced Seas Project Area and where both Ross worm *Sabellaria spinulosa* reef and the honeycomb worm *Sabellaria alveolata* reef biotopes have been recorded together. The site is also notable for the occurrence of Harwich Stone Band ('cement stone') (a type of the habitat Feature of Conservation Importance 'estuarine rocky habitats') which supports interesting algal communities, known only from the Stour, Orwell and Deben Estuaries; the record at this location is designated an Important Plant Area. Subtidal sands and gravels also occur here.

Source: Balanced Seas Final Recommendations (2011).

1b. Baseline condition of MCZ features and impact of the MCZ

Feature	Area of feature (km2)	No. of occurrences	Baseline	Impact of the MCZ
Broad-scale Habitats				
A1.3 Low energy intertidal rock	0.07	-	Unfavourable condition	Recover to reference condition
A2.1 Intertidal coarse sediment	0.02	-	Unfavourable condition	Recover to reference condition
Habitats of Conservation Importance				
Ross worm *Sabellaria spinulosa* reef	0.4	-	Unfavourable condition	Recover to reference condition
Honeycomb worm *Sabellaria alveolata* reef	0.02	-	Unfavourable condition	Recover to reference condition
Subtidal sands and gravels	0.11	-	Unfavourable condition	Recover to reference condition

Site-specific costs arising from the effect of the rMCZ on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	**rMCZ 2, Reference Area 24 Harwich Haven**

Source of costs of the recommended Marine Conservation Zone (MCZ) under Policy Option 1

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.

Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**

Table 2a. Archaeological heritage	rMCZ 2, Reference Area 24 Harwich Haven
Potentially 16 listed buildings abut this rMCZ Reference Area. HMS *Gipsy* (lost 1939) is recorded here; there is an Anglo Saxon mint and Beacon Hill Battery; and Viking and Anglo Saxon artefacts have been recorded within this rMCZ Reference Area ().	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost in one licence application could be in the region of £500 to £10,000, depending on the size of the MCZ (English Heritage, pers. comm., 2012). 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 Impact Assessment. 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.

Table 2b. Commercial fisheries	rMCZ 2, Reference Area 24 Harwich Haven
Source of costs of the recommended Marine Conservation Zone (MCZ) **under Policy Option 1** Closure of entire site to all gear types.	
Summary of all fisheries: The rMCZ Reference Area, lying within rMCZ 2 Stour and Orwell Estuaries, is primarily intertidal and there is little if any overlap with commercial fishing. It is unknown how many vessels fish in the rMCZ Reference Area. More detail on the approach used for the fisheries method is provided at Annexes H7 and N4. Estimated annual value of landings from the rMCZ Reference Area: £0.001m/yr (MCZ Fisheries Model). (Due to resolution issues of the MCZ Fisheries Model and the small size of many rMCZ Reference Areas in the Balanced Seas region, some fisheries landings values may be inaccurate. They have been included as a precautionary measure and to avoid underestimating the economic value of a site.)	
Baseline description of UK commercial fisheries	**Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1**
Bottom trawls: It is unknown how many vessels use bottom trawls in the rMCZ Reference Area.	Estimated annual value of UK vessel landings affected: *£m/yr* | Scenario 1

Table 2b. Commercial fisheries	rMCZ 2, Reference Area 24 Harwich Haven
	Value of landings affected: <0.001
Nets: It is unknown how many vessels use nets in the rMCZ Reference Area.	Estimated annual value of UK vessel landings affected: *£m/yr* | Scenario 1 Value of landings affected | <0.001
Total direct impact on UK commercial fisheries under Policy Option 1	
	Estimated annual value of UK vessel landings and gross value added (GVA) affected: *£m/yr* | Scenario 1 | Best estimate Value of landings affected | 0.000 | 0.000 GVA affected | 0.000 | 0.000 The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occuring, and an assumption that 75% of value is displaced to other areas. This is based upon an assumption of average displacement across all rMCZs, and may be an under- or over-estimate for this site.
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries**
	None.

Table 2c. Flood and coastal erosion risk management (coastal defence)	rMCZ 2, Reference Area 24 Harwich Haven
Source of costs of the recommended Marine Conservation Zone (MCZ) under Policy Option 1	
Increase in costs of assessing environmental impacts for future licence applications for maintenance work for the coastal defence scheme (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).	

Table 2c. Flood and coastal erosion risk management (coastal defence)	rMCZ 2, Reference Area 24 Harwich Haven
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
The coastal defence policies in place include a combination of Advance The Line/Hold The Line/Managed Realignment/No Active Intervention. The Environment Agency is working with local community groups to trial the use of routinely dredged material from the estuary channel port and marinas, keeping it within the estuary system and placing the sediment in areas of eroding saltmarsh to encourage re-growth. This will also provide a soft coastal defence. This work is in its early stages and we do not know exact locations at this time. There is a possibility that it could overlap with this rMCZ Reference Area and impact areas of intertidal course sediment (Natural England and Environment Agency Flood and Coastal Erosion Risk Management Workshop for the Balanced Seas Project Area, 17 November 2011). An environmental assessment, permissions and licences will be required to carry out this work.	No additional costs for mitigation of impact are anticipated (Natural England and Environment Agency, pers. comm., 2012). As a result of the rMCZ Reference Area, it is anticipated that additional costs will be incurred in assessing environmental impacts in support of future licence applications for Flood and Coastal Erosion Risk Management (FCERM) schemes. For each licence application these costs are expected to arise as a result of approximately 0.5–1 day of additional work, in most cases, although there may be cases where further additional consultant time is needed (Environment Agency, pers. comm., 2012). It has not been possible to obtain information on the likely number of licence applications that will be made over the 20 year period of the IA or estimates of the potential increase in costs.

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 2, Reference Area 24 Harwich Haven

Source of costs of the recommended Marine Conservation Zone (MCZ) under Policy Option 1

Management scenario 1: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for navigational dredging and for known specific plans or proposals for port and harbour developments within 1km of the rMCZ Reference Area. It is anticipated that the entire site will be closed to navigational dredging, and future mitigation of impacts on features protected by the rMCZ will be needed for proposed future port and harbour developments relative to the mitigation provided in the baseline.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for navigational dredging and all port and harbour developments within 5 km of the rMCZ. Also, additional costs to update the existing Maintenance Dredging Protocol (MDP). It is anticipated that the entire site will be closed to navigational dredging, and future mitigation of impacts on features protected by the rMCZ will be needed for proposed future port and harbour developments relative to the mitigation provided in the baseline

Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Navigational dredge areas: Two maintenance and navigational dredge areas overlap with this rMCZ Reference Area: the Felixstowe Berths and Approach, and the Navigation House Jetty.	

£m/yr	Scenario 1	Scenario 2
Cost to the operator	0.003	0.003*

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 2, Reference Area 24 Harwich Haven
Maintenance dredging is undertaken at the Harwich Haven Authority Navigation House Jetty and pontoons in the north of the site 4–6 times a year. Dredging is undertaken to maintain the published berth depths of 2.5 metres to 3.5 metres, and about 1,000m^3 is removed per session. In addition, about 1,500m^3 per year is moved from under the pontoons (Harwich Haven Authority (Harwich Haven Authority), 2011). The main approach channel to the Haven ports, at 14.5 metres deep, is the deepest in all UK container ports, and is dredged at 10–12 week intervals. Each main session removes approximately 400,000–600,000m^3 of silty material (Harwich Haven Authority, 2011), of which a proportion is taken from the rMCZ Reference Area. The dredged material is used elsewhere in the Stour and Orwell Estuaries in habitat projects and for maintenance of coastal defences and environmental processes (Harwich Haven Authority, 2011). It is assumed that each dredge area's marine licence is renewed once every 3 years. As these navigational dredge areas are covered by an MDP, it is assumed that the assessment of environmental impact is not changed over the 20 year period of the IA ***Port development**:* Within 5km of the rMCZ there are 4 ports and harbours which may undergo development at some point in the future: Harwich Haven, Harwich International, Harwich Navyard and Felixstowe (Ports & Harbours UK, 2012). This may not represent a full list of all ports and harbours that could be impacted on by the site. It is not currently known whether future developments may impact on features in the site. The Haven Hub Master Plan aims to provide around 8 million twenty-foot equivalent units (TEUs) of container-handling capacity within the Harwich Haven by 2030, including Berths 8 and 9 (Felixstowe South Phase 1), the planned deep-water capability of Phase 2 of the Felixstowe South development (due in 2018) and the subsequent development of the (fully consented) Harwich International Container Terminal at Bathside Bay (Port of Felixstowe, 2011). The Haven ports are integral to Britain's transport	* This estimate for additional cost in future licence applications for port developments arising as a result of this rMCZ is not used to estimate the total costs for the IA. It is based on different assumptions to those used to estimate costs at a regional level and for the entire suite of sites. Also, this figure assumes that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal (every 3 years). It does not include the cost of incorporating MCZ features in the existing MDP. It is likely to over-estimate the cost of Scenario 2 for rMCZs with ports within 5km that have MDPs because of the savings in future costs provided by an MDP. See Annex H for further information ***Closure of site to maintenance and navigational dredging in Scenarios 1 and 2:*** It is anticipated that closure of the site to maintenance and navigational dredging would lead to cessation of Harwich Haven port activities (HHA, pers. comm., 12 February 2012). Cessation of dredging at Harwich Haven Authority Navigation House Jetty would stop the operation of the pilot and harbour launches and thus operations of HHA itself (HHA, pers. comm., 12 February 2012). Because of the importance of the ports to the UK economy, the IA assumes that the dredging would continue and the impacts on the MCZ features would not be mitigated. The cost is assessed in the impact assessment (IA) in terms of the cost to the operator of providing environmental benefit that is equivalent to the impact that the navigational dredging has on the features protected by the rMCZ Reference Area. In the event that an activity impacts on achieving the conservation objectives of an MCZ's features, this would be required under Section 126(7) of the Marine and Coastal Access Act 2009. The cost of this has not been assessed because it is not yet known how equivalent environmental benefit would be provided and what it would cost. 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

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 2, Reference Area 24 Harwich Haven
infrastructure and are close to major sea lanes, providing minimum deviation (Harwich Haven Authority (HHA), 2011). The Port of Felixstowe handles over 40% of all UK containerised traffic. It is the largest container port in Britain and is the only port in the UK that can handle the new large container ships (Port of Felixstowe, 2011). The development described in the Haven Hub Master Plan will significantly increase the value of exports that pass through the port (currently estimated at £60,000m/yr) (Hutchinson Ports, 2011).	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. ***Scenario 1:*** Future licence applications for known port or harbour development plans or proposals within 1km of this site will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11). If the navigational dredges in the rMCZ Reference Area continues following designation, as described above, impacts on the MCZ's features will need to be considered in applications for renewal of the licences for the dredges. To avoid under-estimation of the costs, the additional costs that would be incurred are included in this Scenario Future mitigation of impacts on features protected by the rMCZ will be needed for proposed future port and harbour developments relative to the mitigation provided in the baseline. Unknown potentially significant costs of mitigation could arise. ***Scenario 2:*** Future licence applications for navigational dredging and known port and harbour development plans or proposals within 5km of this site will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11). Also, additional costs will arise in the updating of the existing MDPs to consider the potential effects of activities on the features protected by the rMCZ. The anticipated additional cost in the MDP is estimated to be a one-off cost of £8438. Future mitigation of impacts on features protected by the rMCZ will be needed for proposed future port and harbour developments relative to the mitigation provided in the baseline. Unknown potentially significant costs of mitigation could arise.

Table 2e. Recreational anchoring	rMCZ 2, Reference Area 24 Harwich Haven

Table 2e. Recreational anchoring	rMCZ 2, Reference Area 24 Harwich Haven

Source of costs of the recommended Marine Conservation Zone (MCZ) under Policy Option 1

Closure of entire site to all recreational anchoring (except in emergency circumstances), including anchoring of racing marks.

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
StakMap interviews showed that recreational vessels may anchor for 1–2 hrs in this rMCZ Reference Area before entering the estuaries. Local stakeholders do not consider this to be an important or popular anchorage as it is very exposed and not in a particularly attractive area. In addition, there are 6 unlicensed moorings above the stone pier but fewer than 5 vessels moor here at any one time. The moorings are used all year round but only sporadically depending on weather (Natural England Stakeholder Interview for rMCZ Reference Area 24 Harwich Haven, November 2011). In addition, the shelf area within the rMCZ Reference Area is used regularly throughout the season for dinghy racing. Race marker buoys are laid for the racing. There is no equivalent area nearby for this activity (RYA BS IA 3rd Tranche Feedback, February 2012).	Since anchoring is at a very low level in the site, the recreational boating sector is unlikely to be greatly impacted by the rMCZ Reference Area. However, maintenance of the existing moorings would not be allowed within the rMCZ Reference Area and so they would have to be removed and replacement eco-moorings provided outside the site. Using the approach developed and costs calculated for eco-mooring installation in Studland Bay (Marina Projects, 2011), capital costs for the installation of six eco-moorings are estimated to total £0.103m (See Annex N12 for the assumptions used in the calculations), a one-off cost assumed to occur in the first year after designation (2013). Operating costs, including maintenance of the eco-moorings and collection of mooring fees, are estimated to total £0.068m/yr. It is assumed that a fee for use of the eco-mooring would be required to cover continued maintenance costs. For 6 eco-moorings, the total cost to visiting boats of such fees would be £0.068m/yr. The total cost of eco-moorings is taken to be the sum of the mooring fees and capital costs, plus any operating costs not covered by the mooring fees. The present value of the costs is £1.069m. In addition, prohibiting anchoring of racing marks would cause the cessation of local club's racing activities.This would significantly impact on people who race in the site as there is no alternative area for racing nearby, resulting in a lower quality of recreational opportunity (RYA BS IA 3rd Tranche Feedback, February 2012). It could also impact indirectly on local businesses through reduced expenditure by the dinghy racers.

Table 2f. Recreational angling	rMCZ 2, Reference Area 24 Harwich Haven

Table 2f. Recreational angling	rMCZ 2, Reference Area 24 Harwich Haven
Source of costs of the recommended Marine Conservation Zone (MCZ) under Policy Option 1 Closure of the entire site to all recreational angling.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Thirteen StakMap interviews indicated that areas used for recreational angling (shore fishing, charter boats and boat fishing) overlap with the rMCZ Reference Area. The interviews included representatives of 3 local clubs (combined membership totalling 162). Charter boat operators interviewed, representing a total of 425 anglers/yr (StakMap, 2010), stated that they used this small area,. With the exception of one shore fisher, for both shore fishing and boat-based fishing activities, the rMCZ Reference Area represents only a small proportion of the overall area over which stakeholders indicated that they fished. About 3 shore anglers a day are thought to use the area when conditions are good and the site is used all year round (Natural England Stakeholder Interview for rMCZ Reference Area 24 Harwich Haven, November 2011). A local angler said that private boat anglers fish for cod along the ledges within the site (M. Sessions, local angler, pers. comms., February 2012). Charter boats use the site as it is a safe place to take anglers when strong winds are blowing outside the harbour.	Because the rMCZ Reference Area represents only a small part of the total area around Harwich Haven used by anglers, it is likely that anglers would respond to the closure by fishing at other locations. Shore anglers are likely to be most impacted (M. Sessions, local angler, pers. comms., February 2012).

Table 2g. Recreational fossil collection	rMCZ 2, Reference Area 24 Harwich Haven
Source of costs of the recommended Marine Conservation Zone (MCZ) under Policy Option 1 Closure of entire site to all fossil collection.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Under appropriate weather conditions, the site is popular, particularly with children, for collecting sharks' teeth. Local people consider this to be the only place for collecting fossils of this kind in the area (M. Sessions, local angler, pers. comms., February 2012). The number of people who collect fossils from the site is not known.	The closure to fossil collection would impact on those who collect fossils from the site. The same kind of fossils can be collected from nearby the site in Walton, which is a drive away (Natural England, SNCB 3rd Tranche Feedback, May 2012)

Table 2h. Recreation – Walking (including dog walking)	rMCZ 2, Reference area 24 Harwich Haven
Source of costs of the MCZ under Policy Option 1Management scenario 1 (uniform management): People walking through the rMCZ Reference Area will be encouraged to use marked routes; dog walkers will be required to dispose of dog faeces in provided facilities.	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
There are a number of walkers (numbers not specified) who use the rMCZ Reference Area but relatively few walk on the rock and beach. The majority walk along the promenade which bounds the site (Natural England Stakeholder Interview for rMCZ Reference Area 24 Harwich Haven, November 2011). Dog walking occurs every day of the year (numbers unspecified) (Natural England Stakeholder Interview for rMCZ Reference Area 24 Harwich Haven, November 2011). There is no Dog Control Order in place.	Given that walking would still be allowed in the site, impacts are likely to be negligible. Visitors would be encouraged to use routes around the features protected by the rMCZ Reference Area to avoid adverse effects. A Dog Control Order would need to be put in place to include the entire area of the rMCZ Reference Area. Dog walkers would be required to remove and dispose of dog faeces in provided facilities. Impacts would include the cost of putting the Dog Control order in place and notifying visitors of the need to remove dog faeces and of the location of the nearest disposal facility (the costs of which are assessed in the IA as part of costs of management measures).

Human activities in the site that are not negatively affected by the MCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (MCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 2, Reference Area 24 Harwich Haven
Disposal site: use of disposal site 'River Stour Area 1 Subtidal S (TH211)' (though this is within is within 250m of the rMCZ at its closest point, it is a 'beneficial use' disposal site, which feeds dredged material back in to the estuary to offset impacts associated with navigational dredging. It is not anticipated that mitigation of impacts would be required (Natural England, e-mail, 10 July 2012)) Recreation (except for the activities listed above in table 2) Research and education Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

This rRAs sits within an rMCZ. For information on how this reference areas contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath BS 02 Stour and Orwell. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 4a. Fish and shellfish for human consumption	**rMCZ 2, Reference Area 24 Harwich Haven**	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. Intertidal rock habitats are important sources of larval plankton upon which commercially important fish species feed, including mussels and larval fish of plaice and mackerel. In addition, fish scavenge in coarse sediment intertidal areas, and therefore this habitat has a beneficial ecosystem service related to commercial fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in in favourable condition and some are in unfavourable condition (see rMCZ 2 Table 1 for details). The wider rMCZ in which this site is found is an important fish nursery area but no information is available as to whether the rMCZ Reference Area also contains fish nursery areas. The generally high biodiversity due to the intertidal habitats within the site may support on-site and off-site fisheries. The intertidal nature of the rMCZ Reference Area means that there is little commercial fishing within it. A description of on-site fishing activity and the value derived from it is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits that	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. The costs of this are set out in Table 2b. Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption. Closure of the rMCZ Reference Area to fishing activity will reduce the on-site fishing mortality of species, but as the site is small it is unclear whether this would benefit stocks of mobile commercial finfish species. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	Anticipated direction of change: ⇧ Confidence: Low

Table 4a. Fish and shellfish for human consumption	rMCZ 2, Reference Area 24 Harwich Haven	
derive from any spawning and nursery areas present.		

Table 4b. Recreation	rMCZ 2, Reference Area 24 Harwich Haven	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Intertidal rock habitats are important sources of larval plankton upon which a number of fish species feed, including mussels and larval fish of plaice and mackerel. In addition, fish scavenge in coarse sediment intertidal areas, and therefore this habitat has a beneficial ecosystem service related to recreational fisheries (Fletcher and others, 2011). The Stour Estuary has important nursery areas for fish caught recreationally, including bass (Balanced Seas Final Recommendations Report, 2011). However, it is not known to what extent nursery areas occur within the rMCZ Reference Area. The generally high biodiversity due to the intertidal habitats within the site may support on-site and off-site fisheries. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in in favourable condition and some are in unfavourable condition (see rMCZ 2 Table 1 for details). A small number of anglers use the site. A description of on-site angling activity is set out in Table 2f but it has not been possible to estimate the value derived from this. It has not been possible to estimate the proportion of the value derived from angling off-site that results from the potential spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Anticipated direction of change: ⇧ Confidence: Low
Diving: Diving does not take place in the site.	N/A	N/A
Wildlife watching: Fletcher and others (2011) identify that the features	If the conservation objectives of the features are achieved, the	Anticipated

Table 4b. Recreation	rMCZ 2, Reference Area 24 Harwich Haven	
to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services. Intertidal coarse sediment provides feeding sites for wading birds at the strandline (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in in favourable condition and some are in unfavourable condition (see rMCZ 2 Table 1 for details). The rMCZ is not known to be a popular wildlife watching spot itself but the wider rMCZ is extremely popular. It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	features will be recovered to reference condition. The recovery of the features to reference condition may improve their functioning as support for fish and bird populations, potentially benefiting wildlife watching within the rMCZ Reference Area. In addition, an improvement in the condition of site features and any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	direction of change: ⇧ Confidence: Low
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services. Sailing and dinghy racing, beachcombing and coastal walking are popular throughout the rMCZ Reference Area (RYA Third Tranche Feedback, 2012). A small number of swimmers use the area (Natural England Impact Assessment questionnaire, 16 November 2011). It has not been possible to estimate the value derived from other recreation in the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The rMCZ Reference Area is fully contained within rMCZ 2 for which the benefits of other recreation have been assessed. It is not possible to identify whether the Reference Area will have additional benefits over and above this but this seems unlikely. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4c. Research and education	rMCZ 2, Reference Area 24 Harwich Haven	
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. Research is carried out in the surrounding larger rMCZ by the Stour and Orwell Estuaries Management Group and by the Harwich Haven Authority (Stour & Orwell Estuaries Management Strategy, 2010) and may include the rMCZ Reference Area, but no details are available. It has not been possible to estimate the value derived from research activities associated with the rMCZ Reference Area.	As an rMCZ Reference Area, the site will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. No known education activities occur within the site, although such activities take place within the surrounding larger rMCZ and potentially may involve the rMCZ Reference Area. It has not been possible to estimate the value derived from education activities associated with the rMCZ Reference Area.	MCZ Reference Area designation may provide an opportunity to use the site for education about the marine environment. Designation may aid the development of additional local (to the rMCZ Reference Area) education activities (e.g. events and interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ Reference Area contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Moderate

Table 4d. Regulating services	rMCZ 2, Reference Area 22 Harwich Haven	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: The features of the site, in particular subtidal sands and gravels, contribute to the sequestration of carbon (Fletcher and others, 2011). ***Environmental resilience:*** The features of the site, in particular intertidal rock, contribute to the resilience and continued regeneration of	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of intertidal rock, intertidal coarse sediments and subtidal sands and gravels and closure to fishing could increase the site's benthic biodiversity and biomass, improving the	Anticipated direction of change: ⇧

Table 4d. Regulating services		rMCZ 2, Reference Area 22 Harwich Haven
marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** Intertidal coarse sediments would contribute to local flood and storm protection (Fletcher and others, 2011).It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	regulating capacity of its habitats. Designating the recommended Marine Conservation Zone Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Confidence: Low

Table 4e. Non-use and option values		rMCZ 2, Reference Area 24 Harwich Haven
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 3 Reference Area 1 Colne Point

Site area (km^2): 0.95

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts				**rMCZ 3, Reference Area 1 Colne Point**
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) Reference Area lies within rMCZ 3 (Blackwater, Crouch, Roach and Colne Estuaries) and was selected specifically for the protection of three intertidal broad-scale habitats: intertidal sand and muddy sand; intertidal mud; and intertidal mixed sediments (for this last feature, it is the only rMCZ Reference Area identified within the Balanced Seas Project Area), although other broad-scale habitats also occur. It is also proposed for blue mussel beds and the native oyster. The wider rMCZ in which this site falls is important for spawning grounds for various fish species and foraging grounds for birds to which this smaller rMCZ Reference Area may contribute. The blue mussel beds are already managed through the existing Essex Estuaries Special Area of Conservation. The rMCZ Reference Area also lies within the Colne Estuary Site of Special Scientific Interest. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A2.2 Intertidal sand and muddy sand	863.43 m^2	-	Unfavourable condition	Recover to reference condition
A2.4 Intertidal mud	0.19	-	Unfavourable condition	Recover to reference condition
A2.4 Intertidal mixed sediments	0.05	-	Unfavourable condition	Recover to reference condition
A5.2 Subtidal sand	-	-	Unfavourable condition	Recover to reference condition
A5.3 Subtidal mud	-	-	Unfavourable condition	Recover to reference condition
A5.4 Subtidal mixed sediment	-	-	Unfavourable condition	Recover to reference condition
Habitats of Conservation Importance				
Blue mussel beds	0.034	-	Unfavourable condition	Recover to reference condition
Species of Conservation Importance				
Native Oyster *Ostrea edulis*	No data available	-	Unfavourable condition	Recover to reference condition

Site-specific costs arising from the effect of the rMCZ on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	**rMCZ Reference Area 1, Colne Point**

Table 2a. Archaeological heritage	**rMCZ Reference Area 1, Colne Point**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Seven named and dated British wrecks are recorded within this site, plus peat records (English Heritage, 2012).	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost in one licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). 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 Impact Assessment. 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.

Table 2b. Commercial fisheries	**rMCZ Reference Area 1, Colne Point**
***Source of costs of the recommended Marine Conservation Zone (rMCZ)* under Policy Option 1**	
Closure of entire site to all gear types.	
Summary of all fisheries: The rMCZ Reference Area is coastal and lies in rMCZ 3 Blackwater, Crouch, Roach and Colne Estuaries. The rMCZ Reference Area represents only a small portion of the local fishing ground and the intertidal part of it does not overlap with commercial fishing interests. The sub-tidal portion overlaps with the grounds of the Colchester Oyster Company which owns the lease for the Colne Estuary water column and seabed, as well as potentially overlapping with some other commercial fishing activities as described below. . More detail on the approach used for the fisheries method is provided at Annexes H7 and N4. Estimated annual value of landings from the rMCZ Reference Area: £0.001m/yr (MCZ Fisheries Model). (Due to resolution issues of the MCZ Fisheries Model and the small size of many rMCZ Reference Areas in the Balanced Seas region, some fisheries	

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ Reference Area 1, Colne Point</th></tr>
<tr><td colspan="2">landings values may be inaccurate. They have been included as a precautionary measure and to avoid underestimating the economic impact of a site.)</td></tr>
<tr><th>Baseline description of UK commercial fisheries</th><th>Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1</th></tr>
<tr><td>Bottom trawls: Vessel numbers unknown

Estimated total value of landings from the rMCZ Reference Area: £230/yr (MCZ Fisheries Model).</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><td>Dredges: Vessels from the Blackwater Oystermen’s Association and Leigh Fisherman’s Cooperative operate in an area overlapping with the rMCZ Reference Area and target oysters (towed dredges) and cockles (suction dredges) (FisherMap Data 2010). In addition, the Colchester Oyster Fishery, which owns the lease for the Colne Estuary water column and seashore, targets oysters in the sub-tidal area (Balanced Seas Final Recommendations Report, 2011).

Estimated total value of landings from the rMCZ Reference Area: £450/yr (MCZ Fisheries Model).</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><td>Nets: Vessel numbers unknown.</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><td>Mid-water trawls: Vessel numbers unknown.

Estimated total value of landings from the rMCZ Reference Area: no estiamte (MCZ Fisheries Model).</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td>No estimate</td></tr></table></td></tr>
<tr><td>Pots and traps: Three stakeholders (one from the Leigh-on-Sea Shellfish Association) have indicated that their area of operation overlaps with the rMCZ Reference Area. Target species are nephrops, crabs and whelks (MCZ Fisheries Model and associated FisherMap Data 2010).</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
</table>

Table 2b. Commercial fisheries — **rMCZ Reference Area 1, Colne Point**

Total direct impact on UK commercial fisheries	
	Estimated annual value of UK vessel landings and gross value added (GVA) affected: *£m/yr* — Scenario 1: 0.000 — Best estimate: 0.000 Value of landings affected — 0.000 — 0.000 GVA affected — 0.000 — 0.000 The best estimate is based on an assumption on the likelihood of the lowest an highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas. This is based upon an assumption of average displacement across all rMCZs, and may be an under- or over-estimate for this site.
Baseline description of non-UK fisheries under Policy Option 1	**Costs of impact of rMCZ on non-UK commercial fisheries**
	None.

Table 2c. Ports, harbours, shipping and disposal sites — **rMCZ Reference Area 1, Colne Point**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management scenario 1: Not applicable to this site.

Management scenario 2: Increase in costs of assessing environmental impacts for all port and harbour developments within 5 km of the rMCZ.

The Balanced Seas project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the rMCZ will be needed relative to the mitigation provided in the baseline

Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Port development: There is one harbour (Brightlingsea – Ports & Harbours UK, 2012) within 5km of the rMCZ Reference Area which potentially could undergo development at some point in the future. (This may not represent a full list of all ports and harbours impacted by the site.) No port developments are known to be planned within the 20 year period of the Impact Assessment (IA).	*£m/yr* — Scenario 1 — Scenario 2 Cost to the operator — N/A — 0.000 ***Scenario 1:*** Not applicable to this site. ***Scenario 2:*** Future licence applications for port or harbour development plans and proposals within 5km of this rMCZ Reference Area will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be

Table 2c. Ports, harbours, shipping and disposal sites	rMCZ Reference Area 1, Colne Point
	incurred as a result (a breakdown of these by activity is provided in Annex N11.) Sufficient information is not available to identify what additional mitigation of impacts on features protected by the rMCZ Reference Area will be needed for proposed future port and harbour developments relative to the mitigation provided in the baseline. Unknown potentially significant costs of mitigation could arise.

Table 2d. Recreational anchoring	rMCZ Reference Area 1, Colne Point
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of entire site to all recreational anchoring (except in emergency circumstances).	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Although it was initially thought that the rMCZ Reference Area was a popular anchoring area and recreational craft are dragged across the foreshore for launching purposes (Balanced Seas Essex Sites Meeting Report, July 2011), subsequent information indicates that only 1 or 2 boats anchor at the Point at weekends, mainly in the summer, and that anchoring is generally limited as the area is quite exposed and there is a more popular anchoring area to the north in the Colne (Natural England Stakeholder Interview for rMCZ Reference Area 1 Colne Point, November 2011).	Assuming there is a low level of anchoring and given the presence of a nearby popular anchoring spot, the closure of the rMCZ Reference Area to recreational anchoring is unlikely to impact the recreational sectors and no significant costs are expected.

Table 2e. Recreational angling	rMCZ Reference Area 1, Colne Point
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of entire site to all recreational angling.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Seventeen StakMap interviews indicated that recreational angling (shore fishing, charter boats and boat fishing) overlaps with the rMCZ Reference Area. The shore and boat fishing interviews covered 3 individuals, 2 locally based clubs and 2 informal groups (representing 72 users), and charter boat operators represented 1,750 individuals/yr_. For most boat-based	The closure would be likely to impact on local residents who fish from the shore. The rMCZ Reference Area is not visited often by anglers from further away. Because the rMCZ Reference Area is a small part of the area where boat-based anglers fish, they may respond by fishing in other locations.

Table 2e. Recreational angling	rMCZ Reference Area 1, Colne Point
fishing, the rMCZ Reference Area represents only a small proportion of the overall area over which this activity takes place. Shore angling occurs along less than 200 metres of the coastline of the rMCZ Reference Area, but this small section is nevertheless important to those who use it (T. Pinborough, local angler, pers. comms., January 2012).	A local angler has suggested that, if the boundaries could be moved by about 300 metres, shore anglers would not be impacted (T. Pinborough, local angler, pers. comms., January 2012).

Human activities in the site that are not negatively affected by the MCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ Reference Area 1 Colne Point
Flood and coastal erosion risk management (coastal defence)	
Recreation (except for the activities listed above in table 2)	
Research and education	
Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Contribution Network

This rRAs sits within an rMCZ. For information on how this reference areas contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath BS 03 Blackwater, Crouch, Roach and Colne. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 4a. Fish and shellfish for human consumption	rMCZ 3, Reference Area 1 Colne Point	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can	If the conservation objectives of the features are achieved, the features will be recovered to reference condition.	Anticipated direction of

Table 4a. Fish and shellfish for human consumption		rMCZ 3, Reference Area 1 Colne Point
contribute to the delivery of fish and shellfish for human consumption. Intertidal sediments provide habitat for various fish species, including flounder, bass and plaice, which contributes to commercial and recreational fisheries benefits, and subtidal sediment is an important nursery area for many species, so it can be assumed that it is also an important area for commercial fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see rMCZ 3 Table 1 for details). The rMCZ Reference Area includes part of the Colne oyster fishery, but is otherwise little used for commercial fishing. A description of on-site fishing activity and the value derived from it is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits that derive from the spawning and nursery area.	Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. The costs of this are set out in Table 2b. Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption. Closure of the rMCZ Reference Area to fishing activity will reduce the on-site fishing mortality of species but, as the site is small, it is unclear whether this would benefit stocks of mobile commercial finfish species. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	change: ⇧ Confidence: Low

Table 4b. Recreation		rMCZ 3, Reference Area 1 Colne Point
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Intertidal sediments provide habitat for various fish species, including flounder, bass and plaice, which contribute to recreational fisheries benefits, and subtidal sediment is an important nursery area for many species, so it can be assumed that it is also an important area for recreational fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see rMCZ 3 Table 1 for details). A number of anglers use the rMCZ Reference Area and a description of on-site recreational fishing activity is set out in Table 2e, but it has not	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation		rMCZ 3, Reference Area 1 Colne Point
been possible to estimate the value derived from this. It has not been possible to estimate the proportion of the value derived from angling off-site that results from the potential spawning and nursery area.		
Diving: Diving does not take place in the site.	N/A	N/A
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services. Intertidal sediments and mud provide feeding sites for wading birds at the strandline, and for other waterfowl (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see rMCZ 3 Table 1 for details). Bird watching is popular around the Colne and Blackwater Estuaries and Colne Point is a popular spot for local birders (Essex Birdwatching Society website). It has not been possible to estimate the value derived from wildlife watching in the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The recovery of the features to reference condition may improve their functioning as support for fish and bird populations, potentially benefiting wildlife watching within the rMCZ Reference Area. In addition, an improvement in the condition of site features and any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation		rMCZ 3, Reference Area 1 Colne Point
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services. The larger rMCZ within which the rMCZ Reference Area lies is very popular for coastal walking and recreational sailing, both of which extend into the rMCZ Reference Area itself. Caravan parks are situated nearby. It has not been possible to estimate the value derived from other recreation in the rMCZ.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The rMCZ Reference Area is fully contained within rMCZ 3 for which the benefits of other recreation have been assessed. It is not possible to identify whether the Reference Area will have additional benefits over and above this but this seems unlikely. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4c. Research and education		rMCZ 3, Reference Area 1 Colne Point
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. Research activities undertaken by the Essex Wildlife Trust and the University of Colchester in the wider rMCZ in which this rMCZ Reference Area lies may overlap with this area although there is no confirmed information. It has not been possible to estimate the value derived from research activities associated with the rMCZ Reference Area.	As an rMCZ Reference Area, the site will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. No known education activity is focused on the rMCZ Reference Area, although it may be used by Essex Wildlife Trust for such purposes. It has not been possible to estimate the value derived from education	MCZ Reference Area designation may provide an opportunity to use the site for education about the marine environment. Designation may aid the development of additional local (to the rMCZ Reference Area) education activities (e.g. events and interpretation boards), from which visitors to the site would derive benefit.	Anticipated direction of change:

Table 4c. Research and education		rMCZ 3, Reference Area 1 Colne Point
activities associated with the rMCZ Reference Area.	Non-visitors may benefit if the rMCZ Reference Area contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Confidence: Moderate

Table 4d. Regulating services		rMCZ 3, Reference Area 1 Colne Point
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: The features of the site contribute to water purification (native oyster and blue mussel beds) and sequestration of carbon (native oyster) (Fletcher and others, 2011). ***Environmental resilience:*** The features of the site (subtidal sediments and native oyster) contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** The features of the site (intertidal coarse sediments and native oyster) contribute to local flood and storm protection (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of the subtidal sediments, native oyster and blue mussel beds and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4e. Non-use and option values		rMCZ 3, Reference Area 1 Colne Point
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 3, Reference Area 2 South Mersea **Site area (km^2): 0.2**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts				**rMCZ 3, Reference Area 2 South Mersea**
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) Reference Area lies within rMCZ 3 (Blackwater, Crouch, Roach and Colne Estuaries) and would protect a naturally bounded bed of native oysters considered to be one of the best examples in the region in a wider area thought to be the most important for both wild and cultivated native oysters in the Balanced Seas Project Area. The wider rMCZ in which this rMCZ Reference Area lies is also important for spawning grounds for various fish species and foraging grounds for birds to which this smaller rMCZ Reference Area may contribute. Despite the lack of scientific data for this site, the presence of oysters within it is well known by the oyster fishers and other local stakeholders. The oyster bed is naturally bounded by depth and so it was felt that the rMCZ Reference Area did not need to be wider in extent (i.e. it did not need to extend further into the intertidal zone). Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact of the MCZ**
Habitats of Conservation Importance				
Native Oyster beds	No data available	-	Unfavourable condition	Recover to reference condition
Species of Conservation Importance				
Native Oyster *Ostrea edulis*	No data available	-	Unfavourable condition	Recover to reference condition

Site-specific costs arising from the effect of the rMCZ on human activities (over 2013 to 2032 inclusive)

Table 2a. Commercial fisheries	**rMCZ 3, Reference Area 2 South Mersea**
Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1** Closure of entire site to all gear types.	
Summary of all fisheries: This is a coastal site within rMCZ 3 Blackwater, Crouch, Roach and Colne Estuaries and was suggested by the shellfisheries sector as a suitable area for the protection of the native oyster *Ostrea edulis*; if it was designated, the Blackwater Oystermen would cease use of this area (Balanced Seas Final Recommendations Report, 2011). The rMCZ might potentially overlap with other commercial fishing activities as described below but fishing is considered to be a very low level in this small area. . More detail on the approach used for the fisheries method is provided in Annexes H7 and N4.	

Table 2a. Commercial fisheries	rMCZ 3, Reference Area 2 South Mersea

There is no estimated annual value of landings for the rMCZ Reference Area (MCZ Fisheries Model).

(Due to resolution issues of the MCZ Fisheries Model and the small size of many rMCZ Reference Areas in the Balanced Seas region, some fisheries landings values may be inaccurate. They have been included as a precautionary measure and to avoid underestimating the economic impact of a site.)

Baseline description of UK commercial fisheries	Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1
Bottom trawls: The MCZ Fisheries Model shows no landings values for this rMCZ Reference Area. Nine stakeholder interviews for Fishermap indicated that the area of operation of their vessels (including from West Mersea Fishermen's Association and Leigh Fishermen's Cooperative) targeting Dover sole, cod, skate and ray using trawls overlaps with the rMCZ Reference Area (FisherMap Data 2010). In all cases the rMCZ Reference Area would represent only a tiny proportion of the areas of operation of these vessels, if indeed they use the site.	Estimated annual value of UK vessel landings affected: Loss of bottom trawl landings from the site (no estimates of the value are available). *£m/yr* — Scenario 1 Value of landings affected — No estimate
Dredges: The MCZ Fisheries Model shows no landings values for this rMCZ Reference Area. Twelve stakeholder interviews for Fishermap indicated that the area of operation of their vessels overlaps with the site; these include vessels targeting oysters (towed dredges) from the Blackwater Oystermen's Association and vessels targeting cockles (suction dredges) from the Leigh-on-Sea Shellfish Association (FisherMap Data 2010). In all cases the rMCZ Reference Area would represent only a small proportion of the areas of operation.	Estimated annual value of UK vessel landings affected: Loss of dredge landings from the site (no estimates of the value are available). *£m/yr* — Scenario 1 Value of landings affected — No estimate
Pots and traps: The MCZ Fisheries Model shows no landings values for this rMCZ Reference Area. One fisher (Leigh-on-Sea Shellfish Association) targeting whelks indicated in an interview for Fishermap that the rMCZ Reference Area overlaps with his area of operation (FisherMap Data 2010).	Estimated annual value of UK vessel landings affected: Loss of pot landings from the site (no estimates of the value are available). *£m/yr* — Scenario 1 Value of landings affected — No estimate
Mid-water trawls: The MCZ Fisheries Model shows no landings values for this rMCZ Reference Area. One stakeholder interviewed for Fishermap indicated that his area of operation overlaps with this rMCZ Reference Area. The vessel targets herring and sprat using a mid-water paired trawl (FisherMap 2010).	Estimated annual value of UK vessel landings affected: Loss of mid-water trawl landings from the site (no estimates of the value are available). *£m/yr* — Scenario 1

Table 2a. Commercial fisheries	rMCZ 3, Reference Area 2 South Mersea
	Value of landings affected: No estimate
Nets: The MCZ Fisheries Model shows no landings values for this rMCZ Reference Area. Four stakeholders interviewed for Fishermap indicated that their areas of operation overlap with this rMCZ Reference Area. Target species are herring and bass using both drift and gill nets (FisherMap Data 2010).	Estimated annual value of UK vessel landings affected: Loss of net landings from the site (no estimates of the value are available). *£m/yr* — Scenario 1 Value of landings affected — No estimate
Total direct impact on UK commercial fisheries under Policy Option 1	
	Estimated annual value of UK vessel landings and gross value added (GVA) affected: *£m/yr* — Scenario 1 — Best estimate Value of landings affected — No estimate — No estimate GVA affected — No estimate — No estimate
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries**
	None.

Table 2b. Recreational anchoring	rMCZ 3, Reference Area 2 South Mersea
Source of costs of the recommended Marine Conservation Zone (MCZ) under Policy Option 1 Closure of entire site to all recreational anchoring (except in emergency circumstances).	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
One StakMap interviewee (Royal Harwich Yacht Club, representing 60 users a year) indicated that a small proportion of an area where anchoring occurs overlaps with the rMCZ Reference Area. The level of use of the area for anchoring is likely to be low. Local Group discussions indicated that the rMCZ Reference Area is in a location that is not good for anchoring (Essex/North Kent/Thames/Suffolk Local Group, April 2011). More recently collected information has confirmed this; if anchoring does occur, it is usually by accident. No more than 2 vessels at a time have ever been seen anchoring in the site and only in summer or in good weather at weekends (Natural England Stakeholder	Given that the rMCZ Reference Area is not good for anchoring recreational vessels and the intensity of anchoring is low, the rMCZ Reference Area is not expected to significantly impact on recreational vessel users.

Table 2b. Recreational anchoring	rMCZ 3, Reference Area 2 South Mersea
Interview for rMCZ Reference Area 2 South Mersea, November).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (MCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 3, Reference Area 2 South Mersea
Research and education Recreation (except for the activities listed above in table 2) Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Contribution Network

This rRAs sits within an rMCZ. For information on how this reference areas contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath BS 03 Blackwater, Crouch, Roach and Colne. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 4a. Fish and shellfish for human consumption	rMCZ 3, Reference Area 2 South Mersea	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. The baseline quantity and quality of the ecosystem service provided is	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. The costs of this are set out in Table 2a.	Anticipated direction of change: 

Table 4a. Fish and shellfish for human consumption	rMCZ 3, Reference Area 2 South Mersea	
assumed to be commensurate with that provided by the features of the site when in favourable condition (see rMCZ 3 Table 1 for details). The main commercial fishery within the site is cultivation and harvesting of native oysters by the Blackwater Oystermen, which is a high value fishery. Native oysters have been cultivated and harvested in this site since Roman times and have been managed by the Blackwater Oystermen since the early 1980s. The quality of the native oysters is nationally renowned and this species commands a high price (significantly higher than the price for Pacific oysters). There may be very low levels of fishing in the site for cockles, whelks and pelagic and demersal fish. Further details are given in Table 2a, but there are insufficient data to estimate the value of fisheries in the site.	Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption. Closure of the rMCZ Reference Area to fishing activity will reduce the on-site fishing mortality of species, but as the site is small it is unclear whether this would benefit stocks of mobile commercial finfish species. It is, however, anticipated by the Blackwater Oystermen themselves (Balanced Seas Final Recommendations Report, 2011) that closure to oyster dredging would benefit stocks of native oysters. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	Confidence: Low

Table 4b. Recreation	rMCZ 3, Reference Area 2 South Mersea	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Angling is not known to take place in the site.	N/A	N/A
Diving: Diving is not known to take place in the site.	N/A	N/A
Wildlife watching: Wildlife watching is not known to take place in the site.	N/A	N/A
Other recreation: The site is used to a very small extent by recreational boaters who may anchor there.	The site will be closed to recreational anchoring and there will thus be no increased benefit for this sector.	N/A

Table 4c. Research and education	rMCZ 3, Reference Area 2 South Mersea	
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. Research activities undertaken by Essex Wildlife Trust in the wider rMCZ in which this rMCZ Reference Area lies may overlap with this area, although there is no confirmed information. It has not been possible to estimate the value derived from research	This rMCZ Reference Area will provide an opportunity for study of the native oyster and comparison of the population of this species within the rMCZ Reference Area with commercially exploited populations outside. Monitoring of the rMCZ Reference Area will help to inform understanding of how the marine environment is changing and how it is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence:

Table 4c. Research and education	rMCZ 3, Reference Area 2 South Mersea	
activities associated with the rMCZ Reference Area.		High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. No known education activity occurs in the site.	As the rMCZ Reference Area lies just offshore and is relatively inaccessible, no visitor benefits are likely to accrue. Non-visitors may benefit if the rMCZ Reference Area contributes to wider provision of education (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Low

Table 4d. Regulating services	rMCZ 3, Reference Area 2 South Mersea	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: The features of the site (native oysters) contribute to the bioremediation of waste and sequestration of carbon (Fletcher and others, 2011). ***Environmental resilience:*** The features of the site (native oysters) contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** Native oysters would contribute to local flood and storm protection (Fletcher and others, 2011).It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of the native oysters and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the recommended Marine Conservation Zone Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4e. Non-use and option values	rMCZ 3, Reference Area 2 South Mersea	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence	Anticipated direction of change: ⇧

Table 4e. Non-use and option values	rMCZ 3, Reference Area 2 South Mersea	
It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Confidence: Moderate

rMCZ 3 Reference Area 23 Abbots Hall Farm

Site area (km^2): 2.80

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts	**rMCZ 3, Reference Area 23 Abbotts Hall Farm**
1a. Ecological description	
This recommended Marine Conservation Zone (rMCZ) Reference Area lies at the top of Salcott Creek within rMCZ 3 (Blackwater, Crouch, Roach and Colne Estuaries), and comprises the coastal marshes of Abbotts Hall Nature Reserve, headquarters of the Essex Wildlife Trust. It extends from the landward edge of the marshes seawards to the mean low water mark. It contains one of two records for the lagoon sea slug *Tenellia adspersa* found within the larger rMCZ, which is the only location within the Balanced Seas Project Area where this species is found. Essex Wildlife Trust has worked with the Environment Agency to undertake managed realignment of the coastline in this location, breaching the sea wall and creating coastal marshes. The lagoon sea slug typically occurs behind sea walls in the borrow dykes. The nature reserve is privately owned by Essex Wildlife Trust and therefore general access is restricted. It lies within the Essex Estuaries Special Area of Conservation and the Blackwater Estuary Site of Special Scientific Interest. Source: Balanced Seas Final Recommendations (2011).	

1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact of the MCZ**
Species of Conservation Importance				
Lagoon Sea Slug *Tenellia.adspersa*	-	1 record	Unfavourable condition	Recover to reference condition

Site-specific costs arising from the effect of the rMCZ on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	**rMCZ Reference Area 23, Abbots Hall Farm**
Source of costs of the recommended Marine Conservation Zone (MCZ) under Policy Option 1 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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
An iron-age earth mound, associated with salt industry activities, is recorded within the site, plus a sea wall structure dated to 1777 (English Heritage, 2012).	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ Reference Area has been estimated. However, the additional cost in one licence application could be in the region of £500 to £10,000 depending on the size of the rMCZ (English Heritage, pers. comm.,

Table 2a. Archaeological heritage	rMCZ Reference Area 23, Abbots Hall Farm
	2012). 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 Impact Assessment. 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.

Human activities in the site that are not negatively affected by the MCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (MCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 3 Reference Area 23 Abbots Hall Farm
Research and education	
Flood and coastal erosion risk management (coastal defence)	
Recreation	
Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Contribution Network

This rRAs sits within an rMCZ. For information on how this reference areas contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath BS 03 Blackwater, Crouch, Roach and Colne. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 4a. Fish and shellfish for human consumption	rMCZ 3, Reference Area 23 Abbotts Hall Farm	
Baseline	**Beneficial impact under Policy Option 1**	
There are no features to be protected by the recommended Marine Conservation Zone Reference Area that contribute to the delivery of fish and shellfish for human consumption, and no fishing activities take place within the site.	N/A	N/A

Table 4b. Recreation	rMCZ 3, Reference Area 23 Abbotts Hall Farm	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Angling does not take place in the site.	N/A	N/A
Diving: Diving does not take place in the site.	N/A	N/A
Wildlife watching: As a nature reserve, this recommended Marine Conservation Zone (rMCZ) Reference Area is a key site for wildlife watching with regular visitors who come to see a range of species and habitats (Essex Wildlife Trust Website). It is not known whether the lagoon sea slug is promoted by the Essex Wildlife Trust at present as a feature of interest. It has not been possible to estimate the value derived from wildlife watching in the rMCZ Reference Area.	If the conservation objectives of the feature are achieved, the feature will be recovered to reference condition. The recovery of the feature to reference condition may potentially benefit wildlife watching within the rMCZ Reference Area. In addition, an improvement in the condition of site features and any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ Reference Area will protect its feature and the ecosystem services that it provides against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation	rMCZ 3, Reference Area 23 Abbotts Hall Farm	
Other recreation: Fletcher and others (2011) identify that the feature to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services. The rMCZ Reference Area is popular for a range of recreational activities associated with the existing nature reserve, such as walking. It has not been possible to estimate the value derived from other recreation in the rMCZ Reference Area.	If the conservation objectives of the feature are achieved, the feature will be recovered to reference condition. The rMCZ Reference Area is fully contained within rMCZ 3 for which the benefits of other recreation have been assessed. It is not possible to identify whether the Reference Area will have additional benefits over and above this but this seems unlikely. Designating the rMCZ Reference Area will protect its feature and the ecosystem services that it provides against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4c. Research and education	rMCZ 3, Reference Area 23 Abbotts Hall Farm	
Baseline	**Beneficial impact**	
Research: Fletcher and others (2011) identify that the feature to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. Research activities are undertaken by the Essex Wildlife Trust within the rMCZ Reference Area. It has not been possible to estimate the value derived from research activities associated with the rMCZ Reference Area.	As an rMCZ Reference Area, the site will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the feature to be protected by the rMCZ Reference Area can contribute to the delivery of education services. The Essex Wildlife Trust carries out a variety of education activities at their reserve at Abbotts Hall (Essex Wildlife Trust website). It has not been possible to estimate the value derived from education activities associated with the rMCZ Reference Area.	MCZ Reference Area designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ Reference Area) education activities (e.g. events and interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ Reference Area	Anticipated direction of change: ⇧ Confidence: Moderate

Table 4c. Research and education	rMCZ 3, Reference Area 23 Abbotts Hall Farm	
	contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	

Table 4d. Regulating services	rMCZ 3, Reference Area 23 Abbotts Hall Farm	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: N/A	N/A	N/A
Environmental resilience: N/A	N/A	N/A
Natural hazard protection: N/A	N/A	N/A

Table 4e. Non-use and option values	rMCZ 3, Reference Area 23 Abbotts Hall Farm	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its feature and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the feature and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 5 Thames Estuary **Site area (km^2): 132.14**

- This site has been proposed for designation under Policy Option 1 only.
- Based on SNCB advice, the draft conservation objective for a feature in this site has been changed from that established by the Regional Projects. The impacts of this change on management and costs are not reflected in this Impact Assessment.

Table 1. Conservation impacts **rMCZ 5, Thames Estuary**

1a. Ecological description

This recommended Marine Conservation Zone (rMCZ) would protect benthic habitats considered to be critical to the seasonal reproductive migrations of smelt within the estuary and the seaward migration of European eels from the freshwater reaches to the sea and their subsequent recruitment as juvenile elvers into the estuary. Some of the intertidal habitats upstream of West Thurrock are considered to be integral to the lifecycle and ecology of these two species. Mass spawning of smelt takes place in the spring on sub-tidal gravels between Battersea and Wandsworth. The site has the second highest density of eels of all estuaries surveyed by the Environment Agency. The sea bed towards the estuary mouth is made up of a combination of coarse sediments, mixed sediments, sand and mud, some of which the Environment Agency considers may be in near pristine condition and important for preserving marine ecosystem services, especially fisheries. The Lower Thames Estuary also contains numerous location records for sheltered muddy gravels. The rMCZ also has an important population of tentacled lagoon worm at Greenhithe, and may have a permanent population of short-snouted seahorse. Ross worm occurs here and may provide an important function regarding habitat recovery after disruption, as it is tolerant to poor water quality and reefs are able to form on areas of soft sediment after the initial colonisation of a small area of hard substrate. The Thames is considered to be important for Dover sole, river lamprey, sea lamprey, twaite shad, salmon, flounder, bass, whiting, herring, sprat and cod.

Source: Balanced Seas Final Recommendations (2011).

1b. Baseline condition of MCZ features and impact of the MCZ

Feature	Area of feature (km2)	No. of occurrences	Baseline	Impact of the MCZ
Broad-scale Habitats				
A2.2 intertidal sand/muddy sand	3.28	-	Favourable condition	Maintain at favourable condition
A2.4 intertidal mixed sediments	0.08	-	Favourable condition	Maintain at favourable condition
A5.1 subtidal coarse sediment	13.76	-	Favourable condition	Maintain at favourable condition
A5.2 subtidal sand	9.37		Favourable condition	Maintain at favourable condition
A5.3 subtidal mud	19.88		Favourable condition	Maintain at favourable condition
Habitats of Conservation Importance				
Sheltered muddy gravels		21 records	Favourable condition	Maintain at favourable condition

SNCB advice recommends that the conservation objective for sheltered muddy gravels be changed from "Maintain" to "Recover at favourable condition".

Table 1. Conservation impacts				rMCZ 5, Thames Estuary
Species of Conservation Importance				
Tentacled Lagoon Worm (*Alkmaria romijni*)		27 records	Favourable condition	Maintain at favourable condition
European Eel (*Anguilla anguilla*)		476 records	Favourable condition	Maintain at favourable condition
Smelt (*Osmerus eperlanus*)		528 records	Favourable condition	Maintain at favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	rMCZ 5, Thames Estuary
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Increase in costs of assessing environmental impacts for future licence applications (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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Several World War II defence aids/structures are recorded in the site (e.g. pillboxes, anti-aircraft gun sites etc.). Roman, Mesolithic, Viking, Greek, Neolithic and Iron Age artefacts have been recorded in the site and evidence of cup and ring marks, earthworks and burial sites have also been recorded. Wrecked vessels of British, German, Spanish, Norwegian and Irish origin are recorded within the site. There are 3 designated monuments on the boundary of the site – Royal Terrace Pier, Town Pier, Labworth Café - and a record also exists for an archaeological excavation on Vauxhall Foreshore (English Heritage, 2012). English Heritage has indicated that this site is likely to be of interest for archaeological excavation in the future as it is relevant to its National Heritage Protection Plan (theme 3A1.2).	An extra cost would be incurred in the assessment of environmental impact made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost of one licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). No further impacts on activities related to archaeology are anticipated.

Table 2b. Coastal development (excluding ports and harbours)	rMCZ 5, Thames Estuary
Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1**	

Table 2b. Coastal development (excluding ports and harbours)	rMCZ 5, Thames Estuary
Increase in costs of assessing environmental impacts for future licence applications and costs of mitigation of impacts if required for the proposed Thames Estuary airport and the Thames Crossing.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Plans for the Thames Estuary airport are at a very early stage and a number of locations have been suggested. The most recent proposal (the Thames Hub) is for a site that lies within 1km of the rMCZ, and that straddles the land and sea on the Isle of Grain, on the eastern end of the Hoo Peninsula (www.halcrow.com/Thames-Hub/PDF/Thames_Hub_vision.pdf). Plans for the Lower Thames Crossing propose 3 major options to increase capacity downstream of the existing Dartford Crossing (Kent County Council 2010). The first option proposes an additional road crossing at the current Dartford Crossing and removing the old Dartford Crossing tunnels; the second option proposes a new road crossing in the Swanscombe Peninsula area, connecting the A2 near Dartford (south) to the A108, north of Tilbury Docks; and the third option proposes a new road crossing connecting the M2 motorway and M20 motorways in the south with the M25 (Jennings, N, Natural England, pers. comm., 27 March 2012).	Because the proposals for both developments are at an early stage, it is not yet known whether additional costs will be incurred as a result of the rMCZ in assessing environmental impacts for future licence applications and whether additional mitigation of impacts on MCZ features will be needed and if so, what it would entail.

Table 2c. National defence	rMCZ 5, Thames Estuary
Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1** Mitigation of impacts of Ministry of Defence (MOD) activities on features protected by the suite of rMCZs will be provided by additional planning considerations during operations and training. It is not known whether mitigation will be required for features protected by this site. The MOD will also incur costs in revising environmental tools and charts to include MCZs.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
The MOD is known to make use of the rMCZ for surface explosions.	It is not known whether this rMCZ will impact on the MOD's use of the site. Impacts of rMCZs on national defence are assessed in Annex H10 and N9 (they are not assessed for this site alone).

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 5, Thames Estuary

Table 2d. Ports, harbours, shipping and disposal sites **rMCZ 5, Thames Estuary**

Source of costs of the recommended Marine Conservation Zon (rMCZ) **under Policy Option 1**

Management scenario 1: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for navigational dredging and known specific plans or proposals for port and harbour developments within 1km of the rMCZ. It is anticipated that additional mitigation of impacts on features protected by the MCZ will be needed for known port developments or port-related activities relative to the mitigation provided in the baseline.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for disposal of dredged material, navigational dredging and all port and harbour developments within 5 km of the rMCZ. Also, additional costs incurred in updating the existing Maintenance Dredging Protocol (MDP) in order to assess impacts of activities on MCZ features. It is anticipated that additional mitigation of impacts on features protected by the MCZ will be needed for port developments or port-related activities relative to the mitigation provided in the baseline.

Baseline description of activity

Disposal sites: There are no disposal sites within 1km if the site.

There is one disposal site (TH103 Garrison Point) within 5km of the rMCZ. No licence applications were received for this disposal site between 2001 and 2010 but it is not closed to disposal in future (Cefas, pers. comm., 2011).

Navigational dredge areas: There is an extensive network of licensed dredge navigational channels and berths both within the rMCZ and within 1km of the rMCZ which require periodic dredging to maintain their operational depths. There are 167 specific dredge sites in and within 1km of the rMCZ, 36 of which have active licences ((Jenkins, N, email feedback response to first tranche of material, 13 January 2012).). It is assumed that each dredge area's marine licence is renewed once every 3 years, and that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal . As these navigational dredge areas are covered by an existing MDP, it is assumed that the assessment of environmental impact is not changed over the 20 year period of the IA. The MDP, approved by Natural England, has been in place since 2003; the Thames Estuary Partnership Dredging Liaison Group reviews all dredging licences for their environmental impact.

In addition to the dredging sites mentioned above, that also therefore lie within 5km of the rMCZ, there are additional extensive maintenance

Costs of impact of rMCZ on the sector under Policy Option 1

£m/yr	Scenario 1	Scenario 2
Cost to the operator	0.002	0.006*

* This estimate for additional cost in future licence applications for port developments arising as a result of this rMCZ is not used to estimate the total costs for the IA. It is based on different assumptions to those used to estimate costs at a regional level and for the entire suite of sites. Also, this figure assumes that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal (every 3 years). It does not include the cost of incorporating MCZ features in an existing or new MDP. It is likely to over-estimate the cost of Scenario 2 for rMCZs with ports within 5km that have MDPs because of the savings in future costs provided by an MDP. See Annex H for further information

Scenario 1: Future licence applications for navigational dredging and known port or harbour development plans or proposals within 1km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11).

Sufficient information is not available to identify whether any additional mitigation of impacts on features protected by the rMCZ will be needed for proposed future port and harbour developments relative to the mitigation provided in the baseline. Unknown potentially significant costs of mitigation

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 5, Thames Estuary
dredging sites within 5km of the rMCZ under the Port of London Authority. It is assumed that each dredge area's marine licence is renewed once every 3 years. ***Port development:*** There are 5 ports and harbours, and over 80 terminals, within 5km of the rMCZ, which are undergoing or may undergo development at some point in the future: Leigh-on Sea, London, Dartford, Purfleet and Tilbury (Ports & Harbours UK, 2012). This may not represent a full list of all ports and harbours impacted by the site. As part of the London Gateway Development, capital dredging is being carried out to create a terminal capable of handling the largest deep-sea container ships (www.londongateway.com) which will be completed before any MCZ designation. The dredging and reclamation programme, on the Essex bank of the Thames, including dredging of the approaches to the terminal site is within the rMCZ and started in March 2010 (PLA, 2011). The Port of London is the UK's second biggest port, generating £3,700m economic value added a year and 46,000 full-time equivalent jobs. Each year, the port handles some 50 million tonnes of cargo and accommodates the movement of 230,000 commercial and leisure vessels (PLA, 2010).	could arise. ***Scenario 2:*** Future licence applications for disposal of dredged material, navigational dredging and port or harbour development plans and proposals within 5km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11). Also, additional costs will arise to the update of the existing MDP as this will need to consider the potential effects of activities on the features protected by the rMCZ. The anticipated additional cost in the MDPs is estimated to be a one-off cost of £8438. Mitigation is not required for the current dredging (Natural England pers. Comm., 2012). Sufficient information is not available to identify what additional mitigation of impacts on features protected by the MCZ will be needed for proposed future port and harbour developments relative to the mitigation provided in the baseline. Unknown potentially significant costs of mitigation could arise.

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the rMCZ under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 5, Thames Estuary
Commercial fisheries (bottom trawls, dredges, hooks and lines, mid-water trawls, nets, pots and traps, collection by hand) Flood and coastal erosion risk management (coastal defence) Generation of electricity on land (power stations) Recreation Research and education Shipping Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[1] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.							rMCZ 5, Thames Estuary	
ENG Feature	**Represen t-ativity**	**Replica tion**	**Adequacy**	**Viability**	**Gaps or shortfalls in relation to ENG minimum guidelines**	**Recommended conservation objective**	**Quantitative considerations at regional MCZ level**	**Ecological Importance at regional MCZ level**	**Ecological Importance at wider scale**
A2.2 Intertidal sand and muddy sand	BSH	✓	✓	✓	None	Maintain			
A2.4 Intertidal mixed sediments	BSH	✓	✓	✓	None	Maintain			
A5.1 Subtidal coarse sediment	BSH	✓	✓	✓	None	Maintain	This BSH is currently only reaching the minimum adequacy target.	The combination of habitats towards the estuary mouth are considered important for ecosystem services particularly fisheries.	

[1] copied from the JNCC and Natural England's advice to Defra on rMCZs

A5.2 Subtidal sand	BSH	✓	✓ * [1]	✓	None	Maintain		The combination of habitats towards the estuary mouth is considered important for ecosystem services particularly fisheries.	
A5.3 Subtidal mud	BSH	✓	✓	✓	None	Maintain		The combination of habitats towards the estuary mouth is considered important for ecosystem services particularly fisheries.	
Sheltered muddy gravels	FOCI Habitat	✓	✓	✓	None	Maintain			BAP habitat
Tentacled lagoon worm *Alkmaria romijni*	FOCI Species	✓	✓	✓	None	Maintain		This is a well-known established population.	Listed on Schedule 5 of the Wildlife and Countryside Act
European eel *Anguilla anguilla*	FOCI Mobile Species	✓	✓	N/A	None	Maintain		The Thames has the second highest density of eel of all estuaries surveyed by the EA and the feature is not protected in existing MPAs.	BAP and OSPAR species

Smelt *Osmerus eperlanus*	FOCI Mobile Species	X * [2]	X	N/A	Minimum replication target not met * [2]	Maintain		The MCZ protects the whole extent of the seasonal seaward migration of smelt.	BAP species

Site considerations	
Connectivity	✓
Geological/Geomorphological features of interest	None
Appropriate boundary	✓
Areas of Additional Ecological Importance	✓ * [3, 4, 5]
Overlaps with existing MPAs	✓

rRA 3 Holehaven Creek (Balanced Seas) (Natural England lead) within rMCZ 05. An overview of features proposed for designation within recommended reference area Holehaven Creek and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale

✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Where an asterisk (*) has been given in the table, more detail is provided in the narrative.

ENG Feature	**Representativity**	**Viability**	**Recommended conservation objective**
A5.3 Subtidal mud	BSH	✓	Recover to reference condition
A2.2 Intertidal sand and muddy sand	BSH	✓	Recover to reference condition
A2.3 Intertidal mud	BSH	✓	Recover to reference conditions
Sheltered muddy gravels	FOCI Habitat	✓	Recover to reference condition
Site considerations			
Appropriate boundary	✓		

Additional comments and site benefits:

- [1] The BSH subtidal sand is close to the lower adequacy target (approx 19%).
- [2] This is the only rMCZ which lists the mobile FOCI species Smelt (*Osmerus eperlanus*) in the region. This is because it is the only site where there is high confidence in the presence of the species, though they may potentially be in other estuaries in the region.
- [3] The site is thought to have a permanent population of FOCI species *Hippocampus hippocampus* (short-snouted seahorse) (Zoological Society of London *pers comm.* (2011).
- [4] The site is considered to be important for fish nursery and spawning grounds for Dover Sole, Lamprey, Bass, Sprat and Herring (Balanced Seas 2011a).
- [5] The site was identified by the South East England Biodiversity Forum as a Key Inshore Biodiversity Area in the Balanced Seas region (South East England Biodiversity Forum (SEEBF) 2010).

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption		**rMCZ 5, Thames Estuary**
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Subtidal coarse sediments, sand and mud and intertidal sand, muddy sand and mixed sediments are important for spawning and nursery grounds. These habitats can provide important nursery grounds for juvenile commercial species such as flatfishes and bass (Fletcher and others, 2011). The Thames Estuary is considered to be an important commercial fish nursery area for several species (including Dover sole and European eel) (Balanced Seas Final Recommendations Report, 2011). As such it is likely to help to support potential on-site and off-site fisheries. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see Table 1 for details). A low level of commercial fishing is conducted within the Outer Estuary and some small licensed skiffs conduct eel fyke netting within the Inner Estuary. Under 15 metres vessels active in this site use dredges, bottom trawls and nets. The total value of landings derived from commercial fisheries within this site is £0.179m/yr (MCZ Fisheries Model). It has not been possible to estimate the value of the off-site benefits that derive from the spawning and nursery area.	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some recovered to favourable condition. No additional management (above that in the baseline situation) of fishing activities is expected. However, maintaining and monitoring the current fishing practices will safeguard the healthy population of commercial fish and ensure no increase in fishing activity occurs or alternative gears are used. No change in feature condition or harvesting of fish and shellfish is anticipated and therefore no impact on on-site or off-site benefits is expected. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇔ Confidence: Moderate

Table 5b. Recreation	rMCZ 5, Thames Estuary	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see Table 1 for details). Subtidal coarse sediments, sand and mud and intertidal sand, muddy sand and mixed sediments are important for spawning and nursery grounds. These habitats can provide important nursery grounds for juvenile commercial species such as flatfishes and bass (Fletcher and others, 2011). The Thames Estuary is an important nursery area for fish caught recreationally (including bass) (Balanced Seas Final Recommendations Report, 2011). Both boat and shore angling for freshwater and marine species takes place throughout the rMCZ. Shore angling is particularly popular with local anglers off the pier at Southend-on-Sea, and charter boats take anglers fishing in the subtidal areas in the Outer Estuary within the site. The system of sand banks and channels in the Outer Thames Estuary outside the rMCZ is popular with boat and charter boat anglers fishing for numerous species including mackerel, dogfish and ray, and this off-site area may benefit from spill-over effects. Therefore, the nursery ground for several fish species within the site is likely to help to support potential on-site and off-site fisheries It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the intertidal and subtidal habitats.	If the conservation objectives of the features are achieved, the features will be maintained in favourable condition. As no additional management of angling is expected, fishers will be able to benefit from any on-site and off-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers. The designation may lead to an increase in angling visits to the site, which may benefit the local economy. This increase might arise from a change in anglers' preferred angling locations rather than an increase at a national scale in days spent angling or the number of anglers.	Anticipated direction of change: ⇔ Confidence: Moderate
Diving: Diving is not known to take place in the rMCZ.	N/A	N/A
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism	If the conservation objectives of the features are achieved, the features will be maintained in favourable condition.	Anticipated direction of

Table 5b. Recreation		rMCZ 5, Thames Estuary
services. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see Table 1 for details). The Thames Estuary is recognised as an important corridor for wildlife due to its transition from marine to fresh water. The diverse habitats within the site support a wide range of fish, birds and marine mammals (Thames Estuary Partnership, pers. comms, 2012). Grey and common seals have been spotted as far up as Teddington and dolphin and porpoise are a regular sight as far up as Tower Bridge (Zoological Society of London website). Seal haul-outs occur in the Lower and Outer Estuary where mudlfats provide the ideal locations and wildfowl and wintering birds are attracted in large numbers by the salt marshes and tidal flats (Stakmap, 2010). Birdwatching is by far the most popular activity. Upstream there is the London Wetland Centre in Barnes, providing viewing platforms out across the wetlands into the estuary (London Wetland Centre website). Other reserves adjacent to the rMCZ are found in the Outer Estuary in the Essex and Kent marshes, such as those run by the RSPB at Rainham Marshes, Northward Hill, Cliffe Pools, Shorne Marshes and Canvey Marshes; all offer opportunities for birdwatching throughout the year (RSPB website). Marine mammal watching is also possible from some these locations (Thames Estuary Partnership, pers. comms. 2012). It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	No change in on-site feature condition is anticipated and therefore no benefits to wildlife watching are expected. However, if the rMCZ is designated this will provide an additional positive aspect about the location that could be promoted by organisations involved with wildlife watching and that would be expected to increase visitation rates and therefore the value of the ecosystem service. An increase in wildlife watching visits to the site may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in wildlife watching trips at the national scale. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	change: ⟺ Confidence: Moderate
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The Thames Estuary is a very popular tourist destination especially for recreational sailing, kayaking, canoeing and coastal/estuarine walking. The Thames Path is a well known walking trail running alongside the river throughout the rMCZ (National Trails website). There are numerous sailing,	If the conservation objectives of the features are achieved, the features will be maintained in favourable condition. No change in on-site feature condition is anticipated and therefore no benefits to tourism are expected. However, the designation of this iconic river as an MCZ is expected to appeal to tourists and leisure users and thus increase recreation in the site.	Anticipated direction of change: ⟺ Confidence:

Table 5b. Recreation		rMCZ 5, Thames Estuary
kayaking and canoeing clubs within the site as well as marinas and docks attracting recreational vessels nationally and internationally (British Waterways website). Tourist trips on larger vessels including old sailing boats such as Thames barges operate throughout the rMCZ during the summer months. Archaeological and historical walks are common along the foreshore at low tide. It has not been possible to estimate the value derived from other recreation in the rMCZ.	Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Moderate

Table 5c. Research and education		rMCZ 5, Thames Estuary
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. Kent and Essex Wildlife Trusts and the RSPB conduct research within the rMCZ (Wildlife Trusts' and RSPB websites). The Port of London Authority (PLA) carries out regular environmental surveys and supports environmental research within the site (PLA website). Other bodies conducting research within the rMCZ include: the Zoological Society of London (ZSL), which monitors elver recruitment into the estuary and collates marine mammal sightings from the public (ZSL website); the Thames Landscape Strategy and the Thames Strategy – Kew to Chelsea (respective websites); universities and colleges within Greater London with an aquatic focus such as UCL, King's College and St Mary's University College (respective websites).	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. Guided walks and educational activities along the banks of the Thames Estuary are undertaken frequently by schools and universities. Numerous educational centres and environmental non-governmental organisations provide outreach services into schools that involve training days on the river, such as Thames21, London Wildlife Trust and Creekside Centre (respective websites).	There is still misconception that the Thames Estuary is not ecologically healthy and due to the high levels of urbanisation, many communities may not realise the resources that the river affords them. MCZ designation will provide an opportunity to reverse this incorrect perception and to expand the focus of education events into the marine environment. Designation may aid additional local (to the rMCZ) provision of education activities (e.g. events, interpretation boards), from which	Anticipated direction of change: ⇧ Confidence: Moderate

Table 5c. Research and education		rMCZ 5, Thames Estuary
	visitors would derive benefit. Non-visitors may benefit if the rMCZ contributes to wider provision of education (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	

Table 5d. Regulating services		rMCZ 5, Thames Estuary
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: the features of the site contribute to the bioremediation of waste (intertidal mud and subtidal sediments) and sequestration of carbon (sheltered muddy gravels) (Fletcher and others, 2011). **Environmental resilience:** the features (sheltered muddy gravels) of the site contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** the features of the site, (intertidal sediments) contribute to local flood and storm protection (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ.	If the conservation objectives of the features are achieved, the features will be maintained in favourable condition. No change in feature condition and management of human activities is expected and therefore no benefit to the regulation of pollution is expected. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⟺ Confidence: Moderate

Table 5e. Non-use and option values		rMCZ 5, Thames Estuary
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the rMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the rMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect both the features and the option to benefit from the services in the future from the risk of future degradation. Examples of these values are shown in (Ranger, Lowe, Sanghera, &	Anticipated direction of change: ⇧ Confidence: Moderate

	Solandt, 2012). Voters in the MCS's 'Your Seas Your Voice' campaign felt that features of the natural environment were strong motivators for reasons why people thought areas within the rMCZ should be protected, with people frequently attaching value to biodiversity and 'spectacular scenery.' Other themes that came up quite frequently were the sentiment that they felt "the whole place is amazing" and a feeling of emotional attachment to the site as well in that they 'mean a great deal to them personally'. Furthermore, maintaining species health was perceived as an important management reason to protect the site particularly fish and shellfish and the importance of the estuary as fish nursery habitat and for bird populations. Regarding non-extractive use value, ease of access and the provision of good facilities were considered important as reasons to protect this site. Source: Ranger et al. (2011)	

rMCZ 5. Reference Area 3 Holehaven Creek

Site area (km^2): 2.09

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts	**rMCZ 5, Reference Area 3 Holehaven Creek**
1a. Ecological description	
This recommended Marine Conservation Zone (rMCZ) Reference Area lies within rMCZ 5 (Thames Estuary) and encompasses the entirety of Holehaven Creek, a tributary of the River Thames. The boundary follows the existing boundary for Holehaven Creek Site of Special Scientific Interest. It is the only rMCZ Reference Area within the Balanced seas Project Area that is recommended for sheltered muddy gravels and has also been identified for the protection of three broad-scale habitats: intertidal sand and muddy sand; intertidal mud; and subtidal mud. The wider rMCZ in which this site falls is an important spawning and nursery ground for various fish species, particularly smelt *Osmerus eperlanus* and European eel *Anguilla anguilla* and so is a biodiversity-rich area to which this smaller rMCZ Reference Area may contribute. Source: Balanced Seas Final Recommendations (2011).	

1b. Baseline condition of MCZ features and impact of the MCZ

Feature	Area of feature (km2)	No. of occurrences	Baseline	Impact
Broad-scale habitats				
A2.2 Intertidal sand and muddy sand	0.01 km^2	-	Unfavourable condition	Recover to reference condition
A2.3 Intertidal mud	1.5 km^2	-	Unfavourable condition	Recover to reference condition
A5.3 Subtidal mud	-	-	Unfavourable condition	Recover to reference condition
Habitats of Conservation Importance				
Sheltered muddy gravels	-	1 record	Unfavourable condition	Recover to reference condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone on human activities (over 2012 to 2032 inclusive)Table 2a. Archaeological heritage	**rMCZ 5, Reference Area 3, Holehaven Creek**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Available records include a 1940 British cargo vessel and a 1915 English	An extra cost would be incurred in the assessment of environmental impacts

Site-specific costs arising from the effect of the recommended Marine Conservation Zone on human activities (over 2012 to 2032 inclusive)Table 2a. Archaeological heritage	rMCZ 5, Reference Area 3, Holehaven Creek
barge on the edge of the rMCZ Reference Area (English Heritage, 2012).	made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost in 1 licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). 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. 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.

Table 2b. Commercial fisheries	rMCZ 5, Reference Area 3, Holehaven Creek
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Closure of entire site to all gear types.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Overview: This rMCZ Reference Area is primarily an intertidal area, and lies within rMCZ 5 Thames Estuary. More detail on the approach used for the fisheries method is provided at Annexes H7 and N4. Estimated total value of landings from the rMCZ Reference Area: £10/yr (MCZ Fisheries Model). (Due to resolution issues of the MCZ Fisheries Model and the small size of many rMCZ Reference Areas in the Balanced Seas region, some fisheries landings values may be inaccurate. They have been included as a precautionary measure and to avoid underestimating the economic impact of a site.)	
Bottom trawls: It is unknown how many vessels use bottom trawls in the rMCZ Reference Area but very low activity is indicated in this site (FisherMap Data 2010).	Estimated annual value of UK vessel landings affected: *£m/yr* — Scenario 1 Value of landings affected — <0.001

Table 2b. Commercial fisheries — **rMCZ 5, Reference Area 3, Holehaven Creek**

Nets: It is unknown how many vessels use nets in the rMCZ Reference Area but very low activity is indicated in this site (FisherMap Data 2010).	Estimated annual value of UK vessel landings affected: *£m/yr* — Scenario 1 Value of landings affected — <0.001* * Negligible
Total direct impact on UK commercial fisheries under Policy Option	
	Estimated annual value of UK vessel landings and gross value added (GVA) affected: *£m/yr* — Scenario 1 — Best estimate Value of landings affected — <0.001 — 0.000 GVA affected — 0.000 — 0.000 The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas. This is based upon an assumption of average displacement across all rMCZs, and may be an under- or over-estimate for this site.
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries**
	None.

Table 2c. Flood and coastal erosion risk management — **rMCZ 5, Reference Area 3, Holehaven Creek**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management scenario 1: no impact arises. This is because changes in the frequency and length of time the tidal barriers will need to be closed and changes in the volume of freshwater pumped into the creek by the pumping station do not arise as a result of climate change, or if they do arise, they do not impact on the MCZ's features.

Management scenario 2: Provision of equivalent environmental benefit by the body that is operating the tidal barriers and the pumping to compensate for

the impact that changes in the operation of these (in response to climate change) has on features protected by the MCZ.

Both management scenarios 1 and 2: An increase in costs of assessing environmental impacts for future licence applications for maintenance work for the coastal defence scheme

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
Holehaven Creek rMCZ Reference Area potentially impacts on 3 policy units in Zone 7 of the Thames Estuary 2100 (TE2100) Flood Risk Management Plan (Natural England and Environment Agency Flood and Coastal Erosion Risk Management Workshop for the Balanced Seas Project Area, 17 November 2011): • Canvey Island (to the south) and Bowers March (to the north) on the east side of the creek. These are covered by policy P4 which assumes it may be necessary to take further action to keep up with climate and land-use change so that flood risk does not increase. • Shellhaven and Fobbing Marshes on the west side of the creek. These are covered by policy P3 which is to continue with the existing or alternative actions to management flood risk at the current level (accepting that flood risk will increase over time from the baseline) but to supplement this with local secondary defences to protect key sites. In addition to defences such as embankments, there are 3 tidal barriers to control flooding of the land surrounding Holehaven Creek: Fobbing Horse on Vange Creek (the northern part of Holehaven Creek); East Haven (in East Haven Creek, which runs into Holehaven Creek and connects with Benfleet Creek north of Canvey Island); and Benfleet (on Benfleet Creek north of Canvey Island). The 3 barriers are closed approximately 10 times a year for about 2 hours at a time, to prevent flooding. If the weather becomes stormier and the frequency of higher tides increases, the frequency and length of time the barriers will need to be closed could increase. This could impact on the amount of time intertidal species in the rMCZ Reference Area are exposed to air higher up the creek as water will be prevented from flowing up the creek due to the barriers being closed	***Scenario 1***: No costs to the operator of activities that manage flood risk other than an increase in costs for future licence applications. ***Scenario 2***: Because of the social and economic importance of the flood risk management that is provided, it is assumed that necessary changes in operation of the tidal barriers and the pumping station in response to climate change will take place. It is assumed that impacts on features protected by the MCZ will not be mitigated. The cost is assessed in the impact assessment (IA) in terms of the cost to the operator of providing environmental benefit that is equivalent to the impact that changes in operation of the tidal barriers and the pumping station have on features protected by the rMCZ. In the event that an activity impacts on achieving the conservation objectives of an MCZ's features, this would be required under Section 126(7) of the Marine and Coastal Access Act (2009). The cost of this has not been assessed because it is not yet known how equivalent environmental benefit would be provided. 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. The operator will also incur additional costs for future licence applications for the flood management activities.

Table 2c. Flood and coastal erosion risk management	rMCZ 5, Reference Area 3, Holehaven Creek
(Natural England and Environment Agency Flood and Coastal Erosion Risk Management Workshop for the Balanced Seas Project Area, 17 November 2011). The east resources that these policies manage flood risk for are as follows: • **Canvey Island**: If the defences were breached or overtopped, this would risk flooding low-lying marsh on the west of Canvey Island, managed by the Royal Society for the Protection of Birds, 12ha of urban land with 4 residential (isolated farms), 23 non-residential properties and 1.8km of A-class road. As there is no secondary defence between this area and the eastern side of Canvey Island, there would be a risk of flooding to the whole of the unit, which would affect a further 15,000 residential properties and an extensive industrial complex with oil and gas storage tanks that have national significance. • **Shell Haven and Fobbing Marshes:** Flooding is most likely to occur through breaching or overtopping of the defences, or through failure of the Fobbing Horse Barrier. The area has 623 residential and 123 non-residential properties, including the Coryton oil refinery and the London Gateway Port at Shell Haven (now formally approved by Department for Transport (DfT) and Communities and Local Government (CLG)). The latter are assets of national significance. Pitsea Pumping Station is operated during high rainfall to prevent upstream flooding. The freshwater is then pumped into the creek system. Climate change could result in a higher frequency of higher rainfall levels resulting in an increase of freshwater being pumped into the creek at Pitsea Pumping Station. This could impact on species found to live in the broad-scale habitats which prefer more saline conditions (Flood and Coastal Erosion Risk Management Workshop for the Balanced Seas Project Area, 17 November 2011).	***Best estimates of impacts of mitigation***: this is midway between Scenarios 1 and 2, assuming that each Scenario has an equal probability of arising ***Scenarios 1 and 2:*** As a result of the rMCZ Reference Area, it is anticipated that additional costs will be incurred in assessing environmental impacts in support of future licence applications for Flood and Coastal Erosion Risk Management (FCERM) schemes. For each licence application these costs are expected to arise as a result of approximately 0.5–1 day of additional work, in most cases, although there may be cases where further additional consultant time is needed (Environment Agency, pers. comm., 2012). It has not been possible to obtain information on the likely number of licence applications that will be made over the 20 year period of the IA or estimates of the potential increase in costs.

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 5, Reference Area 3, Holehaven Creek

Table 2d. Ports, harbours, shipping and disposal sites **rMCZ 5, Reference Area 3, Holehaven Creek**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management scenario 1: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for navigational dredging that takes place within 1km of the rMCZ Reference Area. It is anticipated that the entire site will be closed to navigational and maintenance dredging.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for navigational dredging and all port and harbour developments within 5 km of the rMCZ. Also, additional costs in updating the existing Maintenance Dredging Protocol (MDP) in order to assess impacts of activities on rMCZ Reference Area features. It is anticipated that the entire site will be closed to navigational and maintenance dredging and additional mitigation of impacts on features protected by the rMCZ Reference Area will be needed for proposed future port and harbour developments relative to the mitigation provided in the baseline.

Baseline description of activity

Navigational dredge areas: The Port of London Authority (PLA) periodically undertakes maintenance dredging of the berths in Pitsea Creek, although this has not been necessary for several years due to natural scouring by the tide (PLA, 2011). However, the PLA needs to retain the option to carry out maintenance dredging for safety reasons and in case of any changes brought about by the capital dredge in the Outer Estuary. The PLA is currently receiving requests from operators to widen/deepen channels within the site (Natural England, pers.comm., November 2011). The berths, which are used by small vessels, provide significant benefits to the local economy and there are few alternative berths for small vessels in the area (Gibson, C, Natural England, pers. comm., 2012). It is assumed that each dredge area's marine licence is renewed once every 3 years, and that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal. As these navigational dredge areas are covered by an existing MDP, it is assumed that the assessment of environmental impact is not changed over the 20 year period of the IA.

Port development: There is 1 harbour (Leigh-on-Sea - Ports & Harbours UK, 2012) within 5km of the rMCZ Reference Area, which potentially could undergo development at some point in the future. (This may not represent a full list of all ports and harbours impacted by the site.) No port developments are known to be planned within the 20 year period of the Impact Assessment (IA).

Costs of impact of rMCZ on the sector under Policy Option 1

£m/yr	Scenario 1	Scenario 2
Cost to the operator	0.003	0.003*

* This estimate for additional cost in future licence applications for port developments arising as a result of this rMCZ is not used to estimate the total costs for the IA. It is based on different assumptions to those used to estimate costs at a regional level and for the entire suite of sites. Also, this figure assumes that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal (every 3 years). It does not include the cost of incorporating MCZ features in an existing or new MDP. It is likely to over-estimate the cost of Scenario 2 for rMCZs with ports within 5km that have MDPs because of the savings in future costs provided by an MDP. See Annex H for further information.

Closure of site to navigational dredging in Scenarios 1 and 2: It is anticipated that closure of the site to navigational dredging could eventually result in closure of the berths for small vessels in Pitsea Creek. Because there are few alternative berths in the area, this could impact on vessel safety. Closure of the berths would result in significant impacts on the local businesses that provide services to the berth users. Because of the importance of the berths, the IA assumes that the dredging would continue and the impacts of this on the MCZ features would not be mitigated.

The cost is assessed in the impact assessment (IA) in terms of the cost to the operator of providing environmental benefit that is equivalent to the impact that the navigational dredging has on the features protected by the rMCZ Reference Area. In

	the event that an activity impacts on achieving the conservation objectives of an MCZ's features, this would be required under Section 126(7) of the Marine and Coastal Access Act 2009. The cost of this has not been assessed because it is not yet known how equivalent environmental benefit would be provided and what it would cost. 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. ***Scenario 1:*** If the navigational dredge in the rMCZ Reference Area continues following designation, as described above, impacts on the MCZ's features will need to be considered in applications for renewal of the licence for the dredge. To avoid under-estimation of the costs, the additional costs that would be incurred are included in this Scenario. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11). ***Scenario 2:*** Future licence applications for navigational dredging and port developments within 5km of this rMCZ Reference Area will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11). Also, additional costs will be incurred to update the existing MDP to consider the potential effects of activities on the features protected by the rMCZ. The anticipated additional cost in the MDP is estimated to be a one-off cost of £8438. Sufficient information is not available to identify whether any additional mitigation of impacts on features protected by the MCZ will be needed for proposed future port and harbour developments relative to the mitigation provided in the baseline. Unknown

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 5, Reference Area 3, Holehaven Creek
	potentially significant costs of mitigation could arise.

Table 2e. Recreational anchoring	rMCZ 5, Reference Area 3, Holehaven Creek
Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1** Closure of entire site to all recreational anchoring (except in emergency circumstances) and installation of eco-moorings outside the rMCZ Reference Area.	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
Recreational vessels anchor mainly at weekends and during holidays. Normally, no more than 20 visiting boats anchor at any one time; they anchor in order to unload, pick up passengers, shelter from bad weather and re-fuel the vessel opposite The Lobster Smack pub, which is also a favourite establishment amongst visitors. The mouth of the estuary is the busiest area in the rMCZ Reference Area. It has 28 moorings and a mixture of commercial fishing boats and charter boats anchor. However, during angling competitions up to 60 vessels anchor in the area. There are approximately 35 moorings near Wat Tyler Country Park, where there is a Royal Yachting Association (RYA) training school. Maintenance of the 28 moorings at the mouth of the creek occurs every 2 to 3 years and involves pulling the moorings out (Natural England Stakeholder Interview for rMCZ Reference Area 3 Holehaven Creek, November 2011, and M. Sharp, Local Group Angling Representative, email, 13th January, 2012)	Closure to anchoring will impact on a number of recreational users, particularly anglers during competitions. It may also impact on local businesses. To reduce the impacts of this, the IA assumes that eco-moorings would be installed outside the rMCZ Reference Area. The costs of this are included in the costs of the management scenario for the site though it is uncertain whether it installation of eco-moorings would be feasible. Using the approach developed and costs calculated for eco-mooring installation in Studland Bay (Marina Projects, 2011), capital costs for the installation of 30 eco-moorings (a number suggested by the project team) outside Holehaven Creek is estimated to total £0.187m (see Annex N12 for the assumptions used in the calculations), a one-off cost assumed to occur in the first year after designation (2013). This figure would allow for removal of existing moorings. Operating costs, including maintenance of the eco-moorings and collection of mooring fees, are estimated to total £0.068m/yr. (See Annex N12 for the assumptions used in the calculations.) It is assumed that a fee for use of the eco-mooring would be required to cover continued maintenance costs. For 30 eco-moorings, the total cost to visiting boats of such fees would be £0.068m/yr. The total cost of eco-moorings is taken to be the sum of the mooring fees and capital costs, plus any operating costs not covered by the mooring fees. The present value of the costs is £1.150m. There are probably a limited number of suitable places for installing eco-moorings outside the rMCZ Reference Area because of the busy nature of this part of the Thames Estuary. However, it might be possible to place the eco-moorings immediately outside the seaward boundary of the rMCZ Reference

Table 2e. Recreational anchoring	rMCZ 5, Reference Area 3, Holehaven Creek
	Area but within the boundary of the Holehaven Site of Special Scientific Interest which is south of the site.

Table 2f. Recreational angling	rMCZ 5, Reference Area 3, Holehaven Creek
Source of costs of the recommended Marine Conservation Zone (rMCZ) ***under Policy Option 1***	
Closure of entire site to all recreational angling.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Shore angling takes place in the rMCZ Reference Area, particularly from the seawall between the long jetty and The Lobster Smack pub, where competitions are often held involving 40 to 60 anglers. Also, 15 members of Canvey Island Angling Club fish in the rMCZ Reference Area on average 4 times a year, mostly from January to May (Natural England Stakeholder Interview for rMCZ Reference Area 3 Holehaven Creek, November 2011). Local youngsters are introduced to the sport at this site as it is close to the Canvey Island community and has safe/easy access. Young anglers fishing with Canvey Island Angling Club use the disused concrete wharf just north of the disused jetty (M. Sharp, Local Group Angling Representative, email, 13th January, 2012).	The closure will impact on local people, particularly young people, who fish in the site. Anglers may respond by fishing at other locations, which is likely to increase their travel costs and could impact on local business (tackle shops and other amenities). If young anglers respond to the closure by fishing on Canvey Island this could increase the risks to their safety. This is because the river-facing seawall that runs the length of Canvey Island is quite steep and not easily accessible in places (M. Sharp, Local Group Angling Representative, email, 13th January, 2012).

Table 2g. Recreational bait collection	rMCZ 5, Reference Area 3, Holehaven Creek
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of entire site to all bait collection.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Some crab collecting occurs on the east side of the creek in May to July (Natural England Stakeholder Interview for rMCZ Reference Area 3 Holehaven Creek, November 2011).	It is anticipated that bait diggers would respond to the closure by collecting bait from other coastal areas. They may incur higher travelling costs as a result.

Table 2h. Recreational motorised boating	rMCZ 5, Reference Area 3, Holehaven Creek
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of the rMCZ Reference Area to motor boats except in designated areas of passage, in order to mitigate the impacts from scour and wash on sensitive features.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
A total of 17 StakMap interviews indicated that 19 areas which overlap with the rMCZ Reference Area are used for recreational motorised boating (15 areas were used for motor cruising, 3 for powerboats, 1 for personal watercraft (PWC)). The rMCZ Reference Area only represents a small proportion of the entire area used. A total of 5,193 individuals (629 users/yr) from 17 clubs are represented by the stakeholders who were interviewed, from clubs across Essex and north Kent, including those based locally. PWC users and water skiers use the estuary often and launch from specific areas within the site. The Port of London Authority (PLA) recreation guide shows Wat Tyler Country Park Fobbing Creek Launch at Pitsea Hall County Park, which is within the site, as 1 of only 3 designated launch areas for PWCs in the Thames as a whole (Natural England Stakeholder Interview for rMCZ Reference Area 3 Holehaven Creek, November 2011 and PLA Recreational User's Guide). An existing PLA PWC Code of Conduct limits speeds for PWCs and jet skis and sets out restrictions at low tides to mitigate against damages to sea-floor features (PWC Code of Conduct, 2012).	It has not been possible to assess the impacts of creating zoned areas for passage of motorised boats. In the view of the PLA, further mitigation of impacts on sea-floor features is not necessary (PLA, pers. comm., March 2012).

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the MCZ under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 5, Reference Area 3 Holehaven Creek
Recreation (except for the activities listed above in table 2) Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath BS 05 Thames Estuary. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 4a. Fish and shellfish for human consumption	**rMCZ 5, Reference Area 3 Holehaven Creek**	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. Intertidal mud provides habitat for fish of commercial importance and subtidal mud can provide important nursery grounds for juvenile commercial species such as flatfish and bass (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see rMCZ 5 Table 1 for details). The wider rMCZ in which this site falls is an important spawning and nursery ground for various fish species, particularly smelt *Osmerus eperlanus* and European eel *Anguilla anguilla* and so is a biodiversity-rich area to which this smaller rMCZ Reference Area may contribute. There is currently very little fishing in the rMCZ Reference Area. A description of on-site fishing activity and the value derived from it is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits that derive from the spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. The costs of this are set out in Table 2b. Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption. Closure of the rMCZ Reference Area to fishing activity will reduce the on-site fishing mortality of species but, as the site is small, it is unclear whether this would benefit stocks of mobile commercial finfish species. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation	rMCZ 5, Reference Area 3 Holehaven Creek	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Intertidal mud provides habitat for fish of recreational importance and subtidal sediments can provide important nursery grounds for juvenile species such as flatfish and bass (Fletcher and others, 2011) which are important for recreational fisheries. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see rMCZ 5 Table 1 for details). The wider rMCZ in which this site falls is an important spawning and nursery ground for various fish species, particularly smelt *Osmerus eperlanus* and European eel *Anguilla anguilla* and so is a biodiversity-rich area to which this smaller rMCZ Reference Area may contribute (Balanced Seas Final Recommendations Report, 2011). However, it is not known to what extent nursery areas occur within the rMCZ Reference Area. Angling is an important activity currently in this rMCZ Reference Area and is described in Table 2f. However, it has not been possible to estimate the value derived from this. It has not been possible to estimate the proportion of the value derived from angling off-site that results from the potential spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Anticipated direction of change: ⇧ Confidence: Low
Diving: Diving does not take place in the site.	N/A	N/A
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The recovery of the features to reference condition may	Anticipated direction of change:

Table 4b. Recreation		rMCZ 5, Reference Area 3 Holehaven Creek
Intertidal mud is a very important habitat for birds, and is particularly used by migrating birds for feeding (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see rMCZ 5 Table 1 for details). Bird watching is very popular within the rMCZ Reference Area. RSPB conducts regular walks around Canvey Island and Holehaven Creek for bird watchers and there is a visitor centre for the South Essex Marshes at the Wat Tyler Country Park which lies on the banks of the site (RSPB website). It has not been possible to estimate the value derived from wildlife watching in the rMCZ Reference Area.	improve their functioning as support for fish and bird populations, potentially benefiting wildlife watching within the rMCZ Reference Area. In addition, an improvement in the condition of site features and any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	⇧ Confidence: Low
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services. The rMCZ Reference Area is a popular destination for walking and the Thames Path runs around it. Recreational sailing and personal watercraft use the site (StakMap 2010; Natural England Impact Assessment questionnaire, 8 December 2011), and caravan and camping sites can be found nearby on Canvey Island. It has not been possible to estimate the value derived from other recreation in the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. If the rMCZ Reference Area is designated this will provide an additional positive aspect about the location that could be promoted by the tourism and leisure industry and that might be expected to increase visitation rates. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4c. Research and education		rMCZ 5, Reference Area 3 Holehaven Creek
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. Research activities undertaken by the Essex Wildlife Trust and RSPB in the wider rMCZ in which this rMCZ Reference Area lies may overlap	As an rMCZ Reference Area, the site will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human	Anticipated direction of change: ⇧

Table 4c. Research and education	rMCZ 5, Reference Area 3 Holehaven Creek	
with this area although there is no confirmed information. The Port of London Authority (PLA) carries out regular environmental surveys and supports environmental research throughout the Thames Estuary and tributaries (PLA website) including the rMCZ Reference Area. The Thames Estuary Partnership has been monitoring birds in the creek in relation to proposed development at Pitsea (Natural England Impact Assessment questionnaire, 8 December 2011). It has not been possible to estimate the value derived from research activities associated with the rMCZ Reference Area.	activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. The RSPB South Essex Marshes team have dedicated education staff and provide education days for schools and families (in the summer holidays) at their Discovery Zone within Wat Tyler Country Park (RSPB website). It is likely that some of the many organisations that carry out educational activities throughout the Thames Estuary are also active in the rMCZ Reference Area. It has not been possible to estimate the value derived from education activities associated with the rMCZ Reference Area.	MCZ Reference Area designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ Reference Area) education activities (e.g. events and interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ Reference Area contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Moderate

Table 4d. Regulating services	rMCZ 5, Reference Area 3 Holehaven Creek	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: The features of the site contribute to the bioremediation of waste (intertidal mud and subtidal mud) and sequestration of carbon (sheltered muddy gravels) (Fletcher and others, 2011). ***Environmental resilience:*** A feature (sheltered muddy gravels) of the site contributes to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011).	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of the features and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future	Anticipated direction of change: ⇧ Confidence:

Table 4d. Regulating services		rMCZ 5, Reference Area 3 Holehaven Creek
Natural hazard protection: A feature of the site (intertidal mud) contributes to local flood and storm protection (Fletcher and others, 2011).It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	degradation from pressures caused by human activities.	Low

Table 4e. Non-use and option values		rMCZ 5: Reference Area 3 Holehaven Creek
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 7, Reference Area 4 Westgate Promontory

Site area (km^2): 0.23

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts			**rMCZ 7, Reference Area 4 Westgate Promontory**	
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) Reference Area lies within rMCZ 7 (Thanet Coast) and was identified as one of only two locations in the Balanced Seas Project Area containing survey records for the kaleidoscope jellyfish *Haliclystus auricula.* The site would also protect intertidal mud and moderate energy intertidal rock, and two habitat Features of Conservation Importance: littoral chalk communities and subtidal sands and gravels. This site is contained within the Thanet Coast Site of Special Scientific Interest and the Thanet Coast Special Area of Conservation. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A1.2 Moderate energy intertidal rock	0.11	-	Unfavorable condition	Recover to reference condition
A2.3 Intertidal mud	0.03	-	Unfavorable condition	Recover to reference condition
A3.2 Moderate energy infralittoral rock	-	-	Unfavorable condition	Recover to reference condition
A5.2 Subtidal sand	-	-	Unfavorable condition	Recover to reference condition
Habitats of Conservation Importance				
Littoral chalk communities	0.11	-	Unfavorable condition	Recover to reference condition
Subtidal sands and gravels	0.02		Unfavorable condition	Recover to reference condition
Species of Conservation Importance				
Kaleidoscope jellyfish *Haliclystus.auricula*	-	1 record	Unfavorable condition	Recover to reference condition

Site-specific costs arising from the effect of the rMCZ on human activities (over 2013 to 2032 inclusive)

Table 2a: Ports, harbours, shipping and disposal sites	**rMCZ 7, Reference Area 4 Westgate Promontory**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Management scenario 1: Not applicable to this site.	
Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for all port and harbour developments within 5 km of the rMCZ. The Balanced Seas regional MCZ project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the MCZ that will be needed relative to the mitigation provided in the baseline.	

Table 2a: Ports, harbours, shipping and disposal sites	rMCZ 7, Reference Area 4 Westgate Promontory
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Port development: There is one port within 5km of the rMCZ Reference Area (Margate) which may undergo development at some point in the future (Ports & Harbours UK, 2012). This may not represent a full list of all ports and harbours impacted by the site. No port developments are known to be planned within the 20 year period of the Impact Assessment (IA).	<table><tr><td>*£m/yr*</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Cost to the operator</td><td>N/A</td><td>0.000</td></tr></table> ***Scenario 1:*** Not applicable to this site. ***Scenario 2:*** Future licence applications for port or harbour development plans and proposals within 5km of this rMCZ Reference Area will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity are provided in N11).

Table 2b: Recreational anchoring	rMCZ 7, Reference Area 4 Westgate Promontory
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of entire site to all recreational anchoring (except in emergency circumstances).	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Forty-nine Stakmap interviewees (representing clubs throughout south-east England and a combined total of 13,713 individuals (3,663 users/yr)) indicated that their yachting interests overlap with the rMCZ Reference Area, but none mentioned that they anchor there. The only anchoring known to occur is that of 1 or 2 vessels a month in July and August, because the substrate is largely unsuitable for anchoring (Natural England Stakeholder Interview for rMCZ Reference Area 4 Westgate Promontory, November 2011).	Because the substrate is unsuitable for anchoring and the intensity of anchoring is very low, closure to anchoring is expected to have a negligible impact on recreational vessel users.

Table 2c: Recreational angling	rMCZ 7, Reference Area 4 Westgate Promontory
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of entire site to all recreational angling.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**

Table 2c: Recreational angling	rMCZ 7, Reference Area 4 Westgate Promontory
Five Stakmap interviewees indicated that areas used for recreational angling (including charter boat operators who use the area and represent 1,200 anglers/yr), shore fishing and boat fishing (two clubs comprising 210 individuals) overlap with the rMCZ Reference Area. However, the rMCZ Reference Area represents a small proportion of the overall area over which stakeholders indicated that they fished.	The rMCZ Reference Area was developed in conjunction with the Regional Stakeholder G group recreational sea angling representative and local Nayland Boat Sea Fishing Club so that it would have minimal impact on their activities. It is understood that if the rMCZ Reference Area were designated, Nayland Boat Sea Fishing Club and their members would agree to halt any angling that currently takes place in the rMCZ Reference Area. Because the rMCZ Reference Area is a small proportion of the wider area where anglers fish, it is anticipated that anglers may respond to the closure by fishing at other locations. This may increase their travel costs.

Table 2d: Recreational bait collection	rMCZ 7, Reference Area 4 Westgate Promontory
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Closure of entire site to all recreational bait collection.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
It was reported at the Essex Sites meeting in July 2011 that lugworm digging may occur in the site. Nayland Boat Sea Fishing Club members said that they do not dig for bait in the area but bait collection does occur by shore anglers at very low levels (T. Hills, RSG Angling Representative, pers. comms., April 2012).	Development of the boundaries of this site was informed by a meeting between the recreational sea angling Regional Stakeholder Group (RSG) representative and local Nayland Boat Sea Fishing Club so that it has minimal impact on the Club's activities, including bait digging (Balanced Seas Final Recommendation Report, 2011). Due to the low level of activity, the site is not expected to impact bait diggers significantly, and any activity could be displaced to other areas of the coast.

Table 2e. Recreation – Rockpooling	rMCZ 7, Reference area 4 Westgate Promontory
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 ***Management scenario 1:*** No removal of material from the site by people who are rock-pooling.	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
Over the summer (June – September) an estimated 6 people rock pool each day in the rock pools in this rMCZ Reference Area. They turn over	Given that rock pooling will still be allowed in the site, the prohibition on removal of material is likely to have a negligible effect on people using the site.

Table 2e. Recreation – Rockpooling	rMCZ 7, Reference area 4 Westgate Promontory
stones but the features that have been recommended for protection in the site are unlikely to be collected (Natural England Stakeholder Interview for rMCZ Reference Area 4 Westgate Promontory, November 2011).	Costs will be incurred in notifying visitors that no material can be removed from the site (which are considered as part of the costs of managing the site).

Table 2f. Recreation – Walking (including dog walking)	rMCZ 7, Reference area 4 Westgate Promontory
Source of costs of the MCZ under Policy Option 1	
Management scenario 1 People walking through the rMCZ will be encouraged to use marked routes; dog walkers will be required to dispose of dog faeces in provided facilities.	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
Walkers tend to stick to the Promenade, which forms part of the Viking Coastal Trail, and is above the rMCZ rather than come down on to the foreshore (Natural England Stakeholder Interview for rMCZ Reference Area 4 Westgate Promontory, November 2011). An estimated 24 people walk dogs within the rMCZ every day of the year. A. About half of the dog walkers leave faeces, but a Dog Exclusion Order is in place in part of the site, up to the groyne (dogs are not allowed on the main Westgate beach between 10.00 and 18.00 from 1 May to 30 September (The Dogs Exclusion (Thanet District Council) (No 1) Order 2009; http://www.thanet.gov.uk/environment__planning/dog_byelaws.aspx; Natural England Stakeholder Interview for rMCZ Reference Area 4 Westgate Promontory, November 2011; Tony Childs Thanet Coast Project,e-mail, 15/6/12).	Given that walking would still be allowed in the site, impacts are likely to be negligible. Visitors would be encouraged to use marked routes to avoid affecting features protected by the rMCZ. Dog walkers would be required to remove and dispose of dog faeces in provided facilities. Impacts would include the cost of notifying visitors of the need to stay to designated paths, to remove dog faeces and of the location of the nearest disposal facility (which are considered as part of the costs of managing the site).

Table 2g: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 7, Reference Area 4 Westgate Promontory
Oil and gas related activities (including carbon capture and storage)	
This rMCZ Reference Area overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 27th Seaward Licensing Rounds). However, it is unlikely that any oil and gas (including carbon capture and storage) infrastructure will be proposed in future in this rMCZ Reference Area due to its location and size (DECC, pers. comm., 2012). Impacts of rMCZ Reference Areas on oil and gas related activities are	

assessed in the Evidence Base, Annex H11 and Annex N 10 (they are not assessed for this site alone).

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3: Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ 7, Reference Area 4 Westgate Promontory**
Flood and coastal erosion risk management (coastal defence)	
Recreation (except the activities listed above in table 2)	
Research and education	
Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath BS 07 Thanet Coast. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 4a. Fish and shellfish for human consumption	**rMCZ 7, Reference Area 4 Westgate Promontory**
Baseline	**Beneficial impact under Policy Option 1**

Table 4a. Fish and shellfish for human consumption		rMCZ 7, Reference Area 4 Westgate Promontory
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. Intertidal mud provides habitat for fish of commercial importance. Infralittoral rock is a suitable habitat for inshore commercial fisheries species, particularly lobster and crab (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMCZ 7 Table 1). There is no evidence of any commercial fishing taking place in the site (Stakmap 2010) and given the intertidal nature of the rMCZ Reference Area, it is unlikely to occur. It has not been possible to estimate the value of the off-site benefits that derive from any spawning and nursery areas that might occur in the site.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption. Closure of the rMCZ Reference Area to fishing activity will not reduce the on-site fishing mortality of species due to lack of this activity and, as the site is small, it is unclear whether this would benefit stocks of mobile commercial finfish species in general. If stocks did improve commercial fishers may benefit from spillover effects from the site.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation		rMCZ 7, Reference Area 4 Westgate Promontory
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Intertidal mud provides habitat for fish of commercial importance, and infralittoral rock is a suitable habitat for inshore commercial fisheries species (Fletcher and others, 2011) so it can be assumed that these habitats may also be an important area for recreational fisheries. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMCZ 7 Table 1). Angling takes place in this rMCZ Reference Area at a very low level and	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation		rMCZ 7, Reference Area 4 Westgate Promontory
a description of this activity is set out in Table 2c. However, it has not been possible to estimate the value derived from this. It has not been possible to estimate the proportion of the value derived from angling off-site that results from any spawning and nursery areas that might occur in the site.		
Diving: Diving is not known to take place in the site.	N/A	N/A
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services. Macroinvertebrates are an essential link between high trophic levels (e.g. fish and birds) and low trophic levels (e.g. algae) on intertidal rock habitat (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMCZ 7 Table 1). The whole of the Thanet Coast is important for wintering birds and the coastline is accessible, and therefore it can be assumed that this rMCZ Reference Area will be used by bird watchers. Rockpooling is popular along this coast and the habitat in the rMCZ Reference Area affords the opportunity for this activity; about six people a day go rockpooling in the site from June to September (Natural England Reference Area questionnaire, 29 November 2011) It has not been possible to estimate the value derived from wildlife watching in the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The recovery of the features to reference condition may improve their functioning as support for fish and bird populations, potentially benefiting wildlife watching within the rMCZ Reference Area. The kaleidoscope jellyfish is particularly attractive and, provided the activity is adequately controlled, many people would probably like to see it. In addition, an improvement in the condition of site features and any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change:  Confidence: Low

Table 4b. Recreation	rMCZ 7, Reference Area 4 Westgate Promontory	
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services. The rMCZ Reference Area is popular for walking (at least 24 dogs are walked along the shore every day) (Natural England Reference Area questionnaire, 29 November 2011). It has not been possible to estimate the value derived from other recreation in the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The rMCZ Reference Area is fully contained within rMCZ 7 for which the benefits of other recreation have been assessed. It is not possible to identify whether the Reference Area will have additional benefits over and above this but this seems unlikely. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4c. Research and education	rMCZ 7, Reference Area 4 Westgate Promontory	
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. Research activities are undertaken by Kent Wildlife Trust and the Thanet Coast Project in the wider rMCZ in which this rMCZ Reference Area lies and may overlap. The Thanet Coast Project has been monitoring the spread of the invasive Pacific oyster *Crassostrea gigas* for the past three years. As a result of the research undertaken a new management approach for controlling marine invasive species is being trialled for the first time within the wider rMCZ and this activity may extend into the rMCZ Reference Area. It has not been possible to estimate the value derived from research activities associated with the rMCZ Reference Area.	As an rMCZ Reference Area, the site will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. The Thanet Coast Project, Kent Wildlife Trust and Wildwood Trust all undertake educational activities for schools, individuals, clubs and	MCZ Reference Area designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ Reference Area) education activities (e.g. events and	Anticipated direction of change: ⇧

Table 4c. Research and education	rMCZ 7, Reference Area 4 Westgate Promontory	
societies in the broader rMCZ and a number of these may overlap with the rMCZ Reference Area. For example, Seashore Safaris (an educational activity run by the Thanet Coast Project two or three times a year, with some 50 to 60 people on each safari) visit the rMCZ Reference Area (Natural England Reference Area questionnaire, 29 November 2011) It has not been possible to estimate the value derived from education activities associated with the rMCZ Reference Area.	interpretation boards), from which visitors to the site would derive benefit. Activities such as Seashore Safaris which discourage the removal of any material from the site would be able to continue and expand. Non-visitors may benefit if the rMCZ Reference Area contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Confidence: Moderate

Table 4d. Regulating services	rMCZ 7, Reference Area 4 Westgate Promontory	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: The features of the site, in particular subtidal sands and gravels, contribute to the bioremediation of waste and sequestration of carbon (Fletcher and others, 2011). ***Environmental resilience:*** The features of the site, in particular intertidal rock, contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** Intertidal mud would contribute to local flood and storm protection (Fletcher and others, 2011).It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of the intertidal and subtidal broad-scale habitats and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the recommended Marine Conservation Zone Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4e. Non-use and option values	rMCZ 7, Reference Area 4 Westgate Promontory	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the	Anticipated direction of change: ⇧

Table 4e. Non-use and option values	rMCZ 7, Reference Area 4 Westgate Promontory	
	features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Confidence: Moderate

rMCZ 7, Reference Area 5 Turner Contemporary

Site area (km^2): 0.38

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts	**rMCZ 7 Reference Area 5 Turner Contemporary**
1a. Ecological description	
This site falls within recommended Marine Conservation Zone 7 (Thanet Coast) and captures the only regional record of the St John's jellyfish *Lucernariopsis cruxmelitensis.* The site lies within an area of high biodiversity and algal richness (benthic biotope and benthic species richness) which is underpinned by the habitat complexity captured within the boundaries. Other features identified for specific protection are littoral chalk communities, subtidal chalk and subtidal sands and gravels, as well as seven broad-scale habitats listed in the table below. This site falls within the Thanet Coast Site of Special Scientific Interest and the Thanet Coast Special Area of Conservation. Source: Balanced Seas Final Recommendations (2011).	

1b. Baseline condition of MCZ features and impact of the MCZ

Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A1.2 Moderate energy intertidal rock	0.07	-	Unfavorable condition	Recover to reference condition
A2.2 Intertidal sand and muddy sand	4.4 m^2	-	Unfavorable condition	Recover to reference condition
A2.3 Intertidal mud	0.04	-	Unfavorable condition	Recover to reference condition
A3.2 Moderate energy infralittoral rock	-	-	Unfavorable condition	Recover to reference condition
A4.2 Moderate energy circalittoral rock	-	-	Unfavorable condition	Recover to reference condition
A5.2 Subtidal sand	-	-	Unfavorable condition	Recover to reference condition
A5.4 Subtidal mixed sediments	-	-	Unfavorable condition	Recover to reference condition
Habitats of Conservation Importance				
Littoral chalk communities	0.08	-	Unfavorable condition	Recover to reference condition
Subtidal chalk	0.04	-	Unfavorable condition	Recover to reference condition
Subtidal sands and gravels	0.02	-	Unfavorable condition	Recover to reference condition
Species of Conservation Importance				
St John's jellyfish *Lucernariopsis cruxmelitensis*	-	1 record	Unfavorable condition	Recover to reference condition

Site-specific costs arising from the effect of the rMCZ on human activities (over 2013 to 2032 inclusive)

Table 2a: Archaeological heritage	**rMCZ 7, Reference Area 5 Turner Contemporary**

Table 2a: Archaeological heritage	rMCZ 7, Reference Area 5 Turner Contemporary
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
The available records indicate the presence of an unidentified wrecked vessel and two features that abut the site, the Stone Pier and Droit House, which are identified as Listed Buildings (English Heritage, 2012).	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known, so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost of one licence application could be in the region of £500 to £10,000 depending on the size of the rMCZ (English Heritage, pers. comm., 2012). 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. It is not possible to predict when or how often this may occur, so it is not costed in the Impact Assessment. If archaeological excavations do not take place as a result of these restrictions, this will prevent interpretation of archaeological evidence from the site, which will decrease acquisition of historical knowledge of past human communities from the site, thus resulting in a cost to society.

Table 2b: Commercial fisheries	rMCZ 7, Reference Area 5 Turner Contemporary
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of entire site to all gear types.	
Summary of all fisheries: The rMCZ Reference Area is coastal and lies within rMCZ 7 Thanet Coast. It is primarily intertidal and therefore does not overlap significantly with commercial fishing interests. It is unknown how many vessels use this rMCZ Reference Area. The MCZ Fisheries Model suggests that bottom trawls, dredges, pots and traps and nets are used at very low levels in the rMCZ but this is likely to be an over-estimate given that the site is largely intertidal. More detail on the approach used for the fisheries method is provided at Annexes H7 and N4. Estimated annual value of landings from the rMCZ Reference Area: £420/yr (MCZ Fisheries Model). (Due to resolution issues of the MCZ Fisheries Model and the small size of many rMCZ Reference Areas in the Balanced Seas MCZ, some fisheries landings values may be inaccurate. They have been included as a precautionary measure and to avoid underestimating the economic value of the site.)	

<table>
<tr><th>Table 2b: Commercial fisheries</th><th>rMCZ 7, Reference Area 5 Turner Contemporary</th></tr>
<tr><th>Baseline description of UK commercial fisheries</th><th>Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1</th></tr>
<tr><td>Bottom trawls: It is unknown how many vessels use bottom trawls in the rMCZ Reference Area, but it was indicated that there was a low level of activity (MCZ Fisheries Model).</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><td>Dredges: It is unknown how many vessels use dredges in the rMCZ Reference Area, but it was indicated that there was a low level of activity (MCZ Fisheries Model).</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><td>Pots and traps: It is unknown how many vessels use pots and traps in the rMCZ Reference Area, but it was indicated that there was a low level of activity (MCZ Fisheries Model).</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><td>Nets: It is unknown how many vessels use nets in the rMCZ Reference Area, but it was indicated that there was a low level of activity (MCZ Fisheries Model).</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><th>Total direct impact on UK commercial fisheries under Policy Option 1</th><th></th></tr>
<tr><td></td><td>Estimated annual value of UK vessel landings and gross value added (GVA) affected:
<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Best estimate</td></tr><tr><td>Value of landings affected</td><td><0.001</td><td>0.000</td></tr><tr><td>GVA affected</td><td>0.000</td><td>0.000</td></tr></table>
The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas. This is based upon an assumption of average</td></tr>
</table>

Table 2b: Commercial fisheries	rMCZ 7, Reference Area 5 Turner Contemporary
	displacement across all rMCZs, and may be an under- or over-estimate for this site.
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries**
	None.

Table 2c: Ports, harbours, shipping and disposal sites **rMCZ 7, Reference Area 5 Turner Contemporary**

Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1**

Management scenario 1: Not applicable to this site.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for all port and harbour developments within 5 km of the rMCZ. No port developments are known to be planned within the 20 year period of the Impact Assessment (IA).

Baseline description of activity

Port development: There are 2 harbours within 5km (Margate and Broadstairs) of the rMCZ Reference Area, which may undergo development at some point in the future (Ports & Harbours UK, 2012). This may not represent a full list of all ports and harbours impacted by the site and it is possible that mitigation options may need to be considered in the future.

Costs of impact of rMCZ on the sector under Policy Option 1

£m/yr	Scenario 1	Scenario 2
Cost to the operator (port development)	N/A	0.000

Scenario 1: Not applicable to this site.

Scenario 2: Future licence applications for port or harbour development plans and proposals within 5km of this rMCZ Reference Area will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in N11).

Table 2d: Recreational anchoring **rMCZ 7, Reference Area 5 Turner Contemporary**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Closure of entire site to all recreational anchoring (except in emergency circumstances).

Description of activity and its impact on interest features	Costs of effect of rMCZ on the sector under Policy Option 1

Table 2d: Recreational anchoring	rMCZ 7, Reference Area 5 Turner Contemporary
Fifty-one Stakmap interviewees (representing clubs throughout south-east England and a combined total of 15,893 individuals (6,675 users/yr)) indicated that yachting interests overlap with the rMCZ Reference Area but the rMCZ Reference Area represents a small proportion of the total area used by sailing boats. In addition, within the site, boats are launched from slipways: the Royal National Lifeboat Institution launches its boat twice a week, all year round, and the local Yacht Club launches up to 30 boats twice a week from June to September. However, none of these activities result in significant anchoring, and it is thought that only 1 to 2 vessels anchor per month in the site and only do so from June to August (Natural England Stakeholder Interview for rMCZ Reference Area 5 Turner Contemporary, November 2011).	As only 1 to 2 boats anchor in the site at weekends in the summary, the closure of the site to anchoring is expected to have a negligible impact on recreational vessel users

Table 2e: Recreational angling	rMCZ 7, Reference Area 5 Turner Contemporary
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Closure of entire site to all recreational angling.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Six Stakmap interviewees indicated that areas used for recreational angling (charter boats, shore fishing and boat fishing) overlap with the rMCZ Reference Area. The interviewees represent two clubs, based on the North Kent coast (comprising 61 users/yr), and charter boat operators representing a total of 1,200 anglers per year. The rMCZ Reference Area only represents a small proportion of the overall area over which stakeholders indicated that they fished.	Given the low numbers of anglers involved, the impact of the site is likely to be localised and small. The site was developed in conjunction with local anglers and the boundaries were designed such that the rMCZ Reference Area excludes areas used to access ramps for boat launching. It is expected that anglers who fish in the site will respond by fishing at alternative locations along the coast, which they will be able to travel to at very little extra cost. It is anticipated that there will be a negligible impact on local tackle shops and other amenities.

Table 2f. Recreation – boat launching	rMCZ 7, Reference area 5 Turner Contemporary
Source of costs of the MCZ under Policy Option 1 ***Management scenario 1:*** no additional management because launching of boats is not found to impact on the MCZ's features. ***Management scenario 2:*** launching of personal water craft and boats in the site is restricted to the slipway (except the lifeboat on active service) to mitigate impacts on the MCZ's features.	

Table 2f. Recreation – boat launching	rMCZ 7, Reference area 5 Turner Contemporary
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
Vehicles are used to launch both personal water craft (PWC) and sailing dinghies from along the shore in the site. Throughout the summer (June – September), there are up to 10 vehicle movements every weekend. The Royal National Lifeboat Institution (RNLI) also uses its quad bike twice a week to launch its lifeboat; there is no marked route but the boat is launched across the sand, and the quad bikes are unlikely to damage the features of the rRA (Natural England Stakeholder Interview for rMCZ Reference Area 5 Turner Contemporary, November 2011)	***Scenario 1:*** if boat launching does not impact on achieving the conservation objectives of the MCZ's features, no mitigation will be required and no costs will arise. ***Scenario 2:*** if boat launching impacts on the achieving the conservation objectives of the MCZ's features, launching of boats would need to be restricted to the slipway (except for the lifeboat on active service) to mitigate impacts. It is not known whether this will impact significantly on vessel users but they will still be able to launch vessels from the slip way. Costs will include notifying vessel owners of the restriction and providing signs if necessary (which are included in the assessment of costs of managing the site). ***Best estimate of impact:*** this is the midpoint between scenarios 1 and 2 assuming that there is an equal probability of each scenario arising.

Table 2g. Recreation – Rockpooling	rMCZ 7, Reference area 5 Turner Contemporary
Source of costs of the MCZ under Policy Option 1 ***Management scenario 1:*** No removal of material from the site by people who are rock-pooling.	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
Throughout the summer and autumn (June –November), 2 to 3 people rock pool in the rock pools in the rMCZ Reference Area. They are unlikely to damage features of the site as they are largely removing crabs. (Natural England Stakeholder Interview for rMCZ Reference Area 5 Turner Contemporary, November 2011).	Given that rockpooling will still be allowed in the site, impacts are likely to be negligible. Impacts will include the costs of notifying visitors that no material can be removed from the site (which are included in the costs of managing the site).

Table 2h. Recreation – Walking (including dog walking)	rMCZ 7, Reference Area 5 Turner Contemporary
Source of costs of the MCZ under Policy Option 1 ***Management scenario 1:*** People walking through the rMCZ will be encouraged to use marked routes; dog walkers will be required to dispose of dog faeces in	

Table 2h. Recreation – Walking (including dog walking)	rMCZ 7, Reference Area 5 Turner Contemporary
provided facilities.	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
Throughout the summer (June – September), around 50 people a day have been estimated to walk within the rMCZ Reference Area. This may increase now that the Turner Gallery is open. Other walkers use the Promenade directly above the site. An estimated 24 dogs are walked in the rMCZ Reference Area every day. About half of the dog walkers leave faeces. There is no Dog Control Order (Natural England Stakeholder Interview for rMCZ Reference Area 5 Turner Contemporary, November 2011; Tony Childs,Thanet Coast Project, e-mail 15th June 2012).	Visitors would be encouraged to use existing routes through or around the features protected by the rMCZ to avoid adverse effects. Given that walking would still be allowed in the site, impacts on users of the site are likely to be negligible. Impacts would include the cost of notifying visitors of the need to stay to designated paths (which are considered as part of the management of the site). A Dog Control Order would need to be put in place for the entire area of the rMCZ Reference Area. Dog walkers would be required to remove and dispose of dog faeces in provided facilities. Impacts would include the cost of putting the Dog Control order in place and notifying visitors of the need to remove dog faeces and of the location of the nearest disposal facility (which are considered as part of management of the site).

Table 2i: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 7, Reference Area 5 Turner Contemporary
Oil and gas related activities (including carbon capture and storage)	
This rMCZ Reference Area overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 27th Seaward Licensing Rounds). However, it is unlikely that any oil and gas (including carbon capture and storage) infrastructure will be proposed in future in this rMCZ Reference Area due to its location and size (DECC, pers. comm., 2012). Impacts of rMCZ Reference Areas on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3: Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 7, Reference Area 5 Turner Contemporary

Flood and coastal erosion risk management (coastal defence) Recreation (except the activities listed above in table 2) Research and education Water abstraction, discharge and diffuse pollution*.

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath BS 07 Thanet Coast. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 4a. Fish and shellfish for human consumption	**rMCZ 7, Reference Area 5 Turner Contemporary**	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. Subtidal mixed sediments, sand and mud are important for spawning and nursery grounds. These habitats can provide important nursery grounds for juvenile commercial species such as flatfish and bass (Fletcher and others, 2011). Circalittoral and infralittoral rock are important locations for commercial inshore fishing activity, particularly crab and lobster (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. The costs of this are set out in Table 2b. Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption. Closure of the rMCZ Reference Area to fishing activity will reduce the on-site fishing mortality of species but, as the site is small, it is unclear whether this would benefit stocks of mobile commercial	Anticipated direction of change: ⇧ Confidence: Low

Table 4a. Fish and shellfish for human consumption	rMCZ 7, Reference Area 5 Turner Contemporary	
condition (see rMCZ 7 Table 1). There is a small amount of fishing in the rMCZ Reference Area. A description of on-site fishing activity and the value derived from it is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits that derive from the potential spawning and nursery area.	finfish species. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	

Table 4b. Recreation	rMCZ 7, Reference Area 5 Turner Contemporary	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Subtidal mixed sediments, sand and mud are important for spawning and nursery grounds. These habitats can provide important nursery grounds for juvenile commercial species such as flatfish and bass which are also popular recreational fish (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMCZ 7 Table 1).. A very small amount of angling takes place in this rMCZ Reference Area, as described in Table 2e. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the potential spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Anticipated direction of change: ⇧ Confidence: Low
Diving: Diving is not known to take place in the site.	N/A	N/A
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the	If the conservation objectives of the features are achieved, the features will be recovered to reference condition.	Anticipated direction of

Table 4b. Recreation	rMCZ 7, Reference Area 5 Turner Contemporary	
delivery of recreation and tourism services. Macroinvertebrates are an essential link between high trophic levels (e.g. fish and birds) and low trophic levels (e.g. algae) on intertidal rock habitat (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMCZ 7 Table 1).The Thanet coast is important for wintering birds and the coastline is accessible, and therefore it can be assumed that this rMCZ Reference Area will be used by bird watchers. Rockpooling is popular along the coast and the habitat here affords the opportunity for this activity; two or three people a day use the site for rockpooling in the summer months (Natural England Reference Area questionnaire, 29 November 2011). It has not been possible to estimate the value derived from wildlife watching in the rMCZ Reference Area.	The recovery of the features to reference condition may improve their functioning as support for fish and bird populations, potentially benefiting wildlife watching within the rMCZ Reference Area. The St John's jellyfish is particularly attractive and, provided the activity is adequately controlled, many people would probably like to see it. In addition, an improvement in the condition of site features and any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	change: ⇧ Confidence: Low
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services. The area is popular for walking, with about 24 dog walkers using the foreshore each day, and 50 walkers a day in general using the site in the summer months. A variety of small recreational vessels use the area (for launching and surface navigation) (Natural England Reference Area questionnaire, 29 November 2011). It has not been possible to estimate the value derived from other recreation in the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The rMCZ Reference Area is fully contained within rMCZ 7 for which the benefits of other recreation have been assessed. It is not possible to identify whether the Reference Area will have additional benefits over and above this but this seems unlikely. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4c. Research and education	rMCZ 7, Reference Area 5 Turner Contemporary

Table 4c. Research and education	rMCZ 7, Reference Area 5 Turner Contemporary	
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. Research activities are undertaken by Kent Wildlife Trust and the Thanet Coast Project in the wider rMCZ in which this rMCZ Reference Area lies and may overlap. The Thanet Coast Project has been monitoring the spread of the invasive Pacific oyster *Crassostrea gigas* for the past three years. As a result of the research undertaken a new management approach for controlling marine invasive species is being trialled for the first time within the wider rMCZ, which may also involve the rMCZ Reference Area. It has not been possible to estimate the value derived from research activities associated with the rMCZ Reference Area.	As an rMCZ Reference Area, the site will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. The rMCZ Reference Area is used for training Coastal Wardens for the Thanet Coast Project two or three times a year, with about 25 people taking part in the training each time (Natural England Reference Area questionnaire, 29 November 2011). Kent Wildlife Trust and Wildwood Trust both undertake educational activities for schools, individuals, clubs and societies in the broader rMCZ and a number of these may overlap with the rMCZ Reference Area. It has not been possible to estimate the value derived from education activities associated with the rMCZ Reference Area.	MCZ Reference Area designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ Reference Area) education activities (e.g. events and interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ Reference Area contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Moderate

Table 4d. Regulating services	rMCZ 7, Reference Area 5 Turner Contemporary
Baseline	**Beneficial impact under Policy Option 1**

Table 4d. Regulating services	rMCZ 7, Reference Area 5 Turner Contemporary	
Regulation of pollution: The features of the site contribute to the bioremediation of waste (subtidal sediments) and sequestration of carbon (subtidal sands and gravels) (Fletcher and others, 2011). ***Environmental resilience:*** The features of the site are not known to contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** A feature of the site (infralittoral rock) contributes to local flood and storm protection (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of the subtidal sediments and infralittoral rock and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the recommended Marine Conservation Zone Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4e. Non-use and option values	rMCZ 7, Reference Area 5 Turner Contemporary	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 8, Goodwin Sands **Site area (km^2): 276.91**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts				**rMCZ 8, Goodwin Sands**
1a. Ecological description				
The main feature of this site is the Goodwin Sands, a large, constantly changing area of subtidal sand and coarse sediments that is regularly exposed at low tide. The subtidal coarse sediment is of particularly high biodiversity. The site contains Ross worm reefs and a subtidal blue mussel bed in the same area; both features are dependent on the underlying broad-scale habitat and it has been suggested that together they could stabilise the sediment if their distribution and density were to increase. Part of the English Channel Outburst Flood Feature lies in the site, which is geomorphological evidence of a megaflood which occurred circa. 200,000 years ago when a huge glacial lake in the North Sea burst through the Dover Straits Isthmus, thus separating England from mainland Europe. The rMCZ is one of two primary seal haul-out sites in the Balanced Seas project area, with an estimated 1,000 seals, two thirds of which are grey seals and the rest harbour seals. Haul-out sites are likely to be close to hot-spots for fish and crustaceans on which the seals feed. Surveys have indicated the importance of this area for benthic species taxonomic distinctness, benthic species richness, regular pelagic seasonal fronts, areas of additional pelagic ecological interest, great cormorant and black-legged kittiwake foraging ranges (RSPB), and fulmar and gannet seasonal foraging areas. This site is not associated with any existing designation. There are a number of protected wrecks. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact of the MCZ**
Broad-scale Habitats				
A3.2 mod energy infralittoral rock	0.65	-	Favourable condition	Maintain at favourable condition
A4.2 mod energy circalittoral rock	0.58	-	Favourable condition	Maintain at favourable condition
A5.1 subtidal coarse sediment	115.55	-	Favourable condition	Maintain at favourable condition
A5.2 subtidal sand	159.97		Favourable condition	Maintain at favourable condition
Habitats of Conservation Importance				
Blue mussel beds	312.57 m^2		Favourable condition	Maintain at favourable condition
Ross worm *(Sabellaria spinulosa)* reef	625.29 m^2		Favourable condition	Maintain at favourable condition

Site-specific costs arising from the effect of the rMCZ on human activities (over 2013 to 2032 inclusive)

Table 2a: Archaeological heritage	**rMCZ 8, Goodwin Sands**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Increase in costs of assessing environmental impacts for future licence applications. It is not anticipated that any additional mitigation of impacts on features	

Table 2a: Archaeological heritage	rMCZ 8, Goodwin Sands
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. However, restrictions could also be placed upon anchoring in areas of vulnerable MCZ features in the site, including *Sabellaria* reef.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Wrecked vessels of British, Norwegian, Dutch, Irish, Swedish, Belgian, Danish and German origin have been recorded within the site. The following wrecks are designated under the Protection of Wrecks Act 1973: *Restoration* and *Northumberland*, *Stirling Castle*, *Rooswijk* and the *Admiral Gardner* (English Heritage, 2012).	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known, so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost of one licence application could be in the region of £500 to £10,000, depending on the size of the rMCZ (English Heritage, pers. comm., 2012). No further impacts on activities related to archaeology are anticipated. If archaeologists respond to restrictions on anchoring over areas of *Sabellaria* reef by undertaking alternative archaeological excavations in another locality, this could result in additional costs to the archaeologists. It is not possible to predict when or how often this may occur, so it is not costed in the Impact Assessment. If archaeological excavations do not take place as a result of these restrictions, this will prevent interpretation of archaeological evidence from the site, which will decrease acquisition of historical knowledge of past human communities from the site, thus resulting in a cost to society.

Table 2b: National defence	rMCZ 8, Goodwin Sands
Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1** Mitigation of impacts of Ministry of Defence (MOD) activities on features protected by the suite of sites will be provided by additional planning considerations during operations and training. It is not known whether mitigation will be required for features protected by this site. MOD will also incur costs in revising environmental tools and charts to include Marine Conservation Zones.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
MOD is known to make use of the rMCZ for towed array (surveillance system).	It is not known whether this rMCZ will impact on MOD's use of the site. Impacts of rMCZs on national defence are assessed in Annex

Table 2b: National defence	rMCZ 8, Goodwin Sands
	H10 and N9 (they are not assessed for this site alone).

Table 2c: Renewable energy-wind energy	rMCZ 8, Goodwin Sands
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Management Scenario 1: Increase in costs of assessing environmental impacts for licence applications (it is not anticipated that any additional mitigation of impacts on features protected by the MCZ will be needed relative to the mitigation provided in the baseline).	
Management Scenario 2: Increase in costs of assessing environmental impacts for licence applications and increase in cable protection installation costs for power export cables and inter-array cables (relative to the mitigation provided in the baseline).	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
An estimated 16km of operational power export cable routes from the Thanet wind farm may overlap with the rMCZ (estimated using the length of rMCZ).	The estimated cost to renewable energy developers operating in this rMCZ is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Cost to the operator | 0.001 | 0.809 GVA affected | 0.001 | 0.809 ***Scenario 1:*** The licence application for the Thanet wind farm export cable route will need to consider the potential effects of the development on achieving the conservation objectives of the rMCZ's features. This is expected to result in an additional one-off cost of £0.012m in 2022 (for extra consultant/staff time) with a present value cost of £0.009m.. ***Scenario 2:*** In addition to the increased costs for assessment set out under Scenario 1, under Scenario 2 costs of additional mitigation are anticipated. This additional mitigation entails use of alternative cable protection for export cables and inter-array cables that have not yet been consented. This is expected to result in an additional one-off cost of £16.160m in 2022 (based on estimated additional cost of £1m/km for yet-to-be-consented power export cable route only) with a present value cost of £11.465m. These costs are included in Scenario 2 to reflect uncertainty over whether this additional mitigation will be required. Inter-array cables are not expected to be proposed for installation within this rMCZ. Therefore, no additional cost to install alternative cable protection for inter-array cabling is anticipated. JNCC and Natural England (pers. comm., 2012) state that the likelihood of the cost in Scenario 2 occurring is very low. Further details are provided in Annex H14. The impacts that are assessed in both scenarios are based on JNCC and Natural England's

	advice on the mitigation that could be required.

Table 2d: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	**rMCZ 8, Goodwin Sands**
Oil and gas related activities (including carbon capture and storage)	
This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3: Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ 8, Goodwin Sands**
Cables (existing interconnectors and telecom cables) Commercial fisheries (bottom trawls, dredges, hooks and lines, mid-water trawls, nets, pots and traps) Recreation Research and education Shipping (For information on aggregates, please see Annex F and the national evidence base)	

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[2] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.	rMCZ 8: Goodwin Sands

[2] copied from the JNCC and Natural England's advice to Defra on rMCZs

ENG Feature	Represent-ativity	Replication	Adequacy	Viability	Gaps or shortfalls in relation to ENG minimum guidelines	Recommended conservation objective	Quantitative considerations at regional MCZ level	Ecological Importance at regional MCZ level	Ecological Importance at wider scale
A3.2 Moderate energy infralittoral rock	BSH	✓	✓	✓	None	Maintain	This site has the greatest contribution to the adequacy target		
A4.2 Moderate energy circalittoral rock	BSH	✓	✓	✓	None	Maintain			
A5.1 Subtidal coarse sediment	BSH	✓	✓	✓	None	Maintain	This BSH is currently only reaching the minimum adequacy target.	This site has the greatest contribution to the adequacy target	
A5.2 Subtidal sand	BSH	✓	✓	✓	None	Maintain	This site has the greatest contribution to the adequacy target		
Blue mussel *Mytilus edulis* beds	FOCI Habitat	✓	✓	✓	None	Maintain			OSPAR habitat and BAP habitat - UK obligation, decline, functional

									habitat
Ross worm *Sabellaria spinulosa* reef	FOCI Habitat	✓	✓	✓	None	Maintain			BAP and OSPAR habitat
Site considerations									
Connectivity		✓							
Geological/Geomorphological features of interest		English Channel Outburst Flood Features * [1]							
Appropriate boundary		✓							
Areas of Additional Ecological Importance		✓ * [2]							
Overlaps with existing MPAs		X							

rRA 6 Goodwin Knoll (Balanced Seas) (Natural England lead) within rMCZ 08. An overview of features proposed for designation within recommended reference area Goodwin Knoll and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale

✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Where an asterisk (*) has been given in the table, more detail is provided in the narrative.

ENG Feature	**Representativity**	**Viability**	**Recommended conservation objective**
A5.1 Subtidal coarse sediment	BSH	✓	Recover to reference condition
A5.2 Subtidal sand	BSH	✓	Recover to reference condition
Site considerations			
Appropriate boundary	✓		

Additional comments and site benefits:

[1] Part of the geological feature English Channel Outburst Flood Features occurs within the site forming the deep channel running through the eastern part of the site. This geomorphological feature is evidence of a megaflood which occurred some 200,000 years ago when huge glacial lakes in the North Sea burst through the Dover Straits Isthmus which contained it, thus separating England from mainland Europe. Sonar evidence of the seabed reveals deeply gouged channels where the floodwaters broke through (Gupta, et al. 2007).

[2] The site provides foraging grounds for Sandwich tern, great cormorant, fulmar, gannet and black-legged kittiwake, and nursery and spawning grounds for commercially important fish such as cod, sand eel and plaice.

This site is an area of high biodiversity, high benthic species taxonomic distinctiveness and richness (Defra n.d.).

This is a Key Inshore Biodiversity Area advised by the SEEBF.

One of two primary seal haul-out sites in the south and south-east England regions. This site is the most important for grey seals (Bramley and Lewis 2004; Lewis, 2006). Haul-out sites are assumed to be close to biodiversity hot-spots for a range of fish and crustacean species (Pers.Comms).

Important area for benthic species taxonomic distinctness, benthic species richness and regular pelagic seasonal front (Defra n.d.), area of additional pelagic ecological interest (Kent Wildlife Trust Pers. Comms).

Frequent sightings of Thornback Rays laying eggs mainly in Spring and September, which could mean that this site is an established spawning ground for species.

Commercial fish species such as cod, whiting, red mullet, squid, plaice, Dover sole and Dogfish also occur in the area

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption		**rMCZ 8, Goodwin Sands**
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Subtidal coarse sediments and sand are important for spawning and nursery grounds for juvenile commercial species such as flatfishes and bass. Circalittoral and infralittoral rock are important locations for commercial inshore fishing activity, particularly crab and lobster (Expert opinion in Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see Table 1 for details). A relatively high level of commercial fishing is conducted within the subtidal areas of the site. The UK under 10 metre commercial fishing fleets from Ramsgate and Deal use mainly static and drift fishing gear in the site, targeting mainly Dover sole and bass as well as lobster fished from among the wrecks. The total value of landings derived from commercial fisheries within this site is £0.134m/yr (MCZ Fisheries Model). It has not been possible to estimate the value of the off-site benefits that derive from the spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be maintained in favourable condition. No additional management (above that in the baseline situation) of fishing activities is expected. However, maintaining and monitoring the current fishing practices will safeguard the population of commercial fish and ensure no increase in fishing activity occurs or alternative gears are used. No change in feature condition or harvesting of fish and shellfish is anticipated and therefore no impact on on-site or off-site benefits is expected. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇔ Confidence: Moderate

Table 5b. Recreation	rMCZ 8, Goodwin Sands	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. Subtidal coarse sediments and sand are important for spawning and nursery grounds for juvenile commercial species such as flatfishes and bass (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see Table 1 for details). Goodwin Sands has very high biodiversity due to the diverse bathymetry and substrate and is thought to be a spawning ground for thornback ray. This high biodiversity attracts fish caught recreationally (including whiting, bass, smooth hound and mackerel) (Balanced Seas Final Recommendations Report, 2011), and is likely to help to support potential on-site and off-site fisheries. Private boat and charter boat angling for bass, thornback ray, smooth hound, mullet, cod and whiting takes place throughout the rMCZ, particularly around the numerous wrecks within the site (StakMap, 2010). It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the subtidal habitats.	If the conservation objectives of the features are achieved, the features will be maintained in favourable condition. As no additional management of angling is expected, fishers will be able to benefit from any on-site and off-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers. The designation may lead to an increase in angling visits to the site, which may benefit the local economy. This increase might arise from a change in anglers' preferred angling locations rather than an increase at a national scale in days spent angling or the number of anglers.	Anticipated direction of change: ⟺ Confidence: Moderate
Diving: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation services. Diving is popular within the rMCZ due to the numerous wrecks found there. Both the archaeological interest and the increased biodiversity known to be around the wrecks, due to their function as an artificial habitat, attract divers to the area (StakMap, 2010). Most clubs within easy reach of the area dive here.	If the conservation objectives of the features are achieved, the features will be maintained in favourable condition. If the rMCZ is designated it may result in an increase in dive trips to the area, which may have beneficial effects on the local economy. This increase may represent a redistribution of dive location preferences rather than an overall increase in diving.	Anticipated direction of change: ⟺ Confidence:

Table 5b. Recreation		rMCZ 8, Goodwin Sands
It has not been possible to estimate the value derived from diving in the rMCZ.		Moderate
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. *Sabellaria* reefs increase the habitat complexity of the surrounding environment and provide microhabitats for other organisms in crevices and cavities; mussel beds are an important food source for birds; and subtidal coarse sediments, sand and mud are important for spawning and nursery grounds. These habitats can provide important nursery grounds for juvenile commercial species such as flatfishes and bass (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see Table 1 for details). Goodwin Sands is popular for wildlife watching as it is one of two primary haul-out sites in the Balanced Seas project area for grey seals. The rMCZ is also an important foraging area for great cormorant and black-legged kittiwake. The presence of both marine mammals and birds in this offshore site indicates the high biodiversity of the area. Charter boats from Ramsgate and Dover conduct wildlife watching trips within the site. The site occurs within an area of the Channel used by ferries, which may carry wildlife watchers, particularly those interested in marine mammals. It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	If the conservation objectives of the features are achieved, the features will be maintained in favourable condition. No change in on-site feature condition is anticipated and therefore no benefits to wildlife watching are expected. Charter boat clients and visitors in transit across the Channel may benefit from any increased biodiversity through more regular sightings of birds and marine mammals. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⟺ Confidence: Moderate
Other recreation: Other recreation is not known to take place in the rMCZ.	N/A	N/A

Table 5c. Research and education	rMCZ 8, Goodwin Sands
Baseline	**Beneficial impact under Policy Option 1**

Table 5c. Research and education		rMCZ 8, Goodwin Sands
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. As a result of their shifting nature and the risk this poses to shipping, the Goodwin Sands are surveyed at regular intervals by the UK Hydrographic Office; the 2009 survey consisted of a full survey of the whole area, the results of which are shown in UK Hydrographic Office (2010). Seasearch, co-ordinated by Kent Wildlife Trust, is very active in the area, conducting sea-floor surveys regularly. Archaeological research and monitoring are also carried out on a regular basis.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. No known education activity occurs in this rMCZ.	As the rMCZ is approximately 5km offshore and therefore relatively inaccessible, no benefits are likely to arise from direct use of the site for education. Non-visitors may benefit if the rMCZ contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Low

Table 5d. Regulating services		rMCZ 8, Goodwin Sands
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: the features of the site contribute to the bioremediation of waste (subtidal sediments) and sequestration of carbon (subtidal sediments) (Fletcher and others, 2011). ***Environmental resilience:*** the features of the site (subtidal sediments) contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** the features of the site (subtidal sediments), contribute to local flood and storm protection (Fletcher and others, 2011); although the site is offshore, the Goodwin Sands play a very important role in relation to coastal dynamics.	If the conservation objectives of the features are achieved, the features will be maintained in favourable condition. No change in feature condition and management of human activities is expected and therefore no benefit to the regulation of pollution is expected. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇔ Confidence: Moderate

Table 5d. Regulating services		rMCZ 8, Goodwin Sands
It has not been possible to estimate the value derived from regulating services associated with the rMCZ.		

Table 5e. Non-use and option values		rMCZ 8, Goodwin Sands
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the rMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the rMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect both the features and the option to benefit from the services in the future from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 8, Reference Area 6 Goodwin Knoll

Site area (km^2): 23.18

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts				**rMCZ 8, Reference Area 6 Goodwin Knoll**
1a. Ecological description				
This site lies within recommended Marine Conservation Zone (rMCZ) 8 (Goodwin Sands) and has been identified to protect subtidal sand and subtidal coarse sediment. It incorporates the North Goodwin Sands Bank, a drying area at low tide, where there is a lower level of human activity. Environment Agency data indicate that this is a good area for biodiversity; it is also highly dynamic due to the nature of the shifting sands, and important as a seal haul-out spot (North Sand Bank) and sea bird foraging ground. The rMCZ Reference Area contains numerous wrecks and is thus of high interest for its heritage and archaeology. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A5.1 Subtidal coarse sediment	0.85	-	Unfavorable condition	Recover to reference condition
A5.2 Subtidal sand	22.32	-	Unfavorable condition	Recover to reference condition

Site-specific costs arising from the effect of the rMCZ on human activities (over 2013 to 2032 inclusive)

Table 2a: Archaeological heritage	**rMCZ 8, Reference Area 6 Goodwin Knoll**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
The available information identifies a 'named location' for this site, which includes 674 records including British, Norwegian, Dutch, Irish, Swedish, Belgian, Danish and German wrecked vessels. Identified within the rMCZ Reference Area are a World War I German U-Boat (U 48, lost 1917); a cargo vessel lost 1721; an English Brig lost 1832; and the wreck of a barge lost 1924. The following sites are designated under the Protection of Wrecks Act 1973: *Admiral Garner*, *Northumberland*, *Restoration*, *Stirling Castle* and *Rooswijk*, and are located very	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known, so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost in one licence application could be in the region of £500 to £10,000 depending on the size of the rMCZ (English Heritage, pers. comm., 2012). If

Table 2a: Archaeological heritage	rMCZ 8, Reference Area 6 Goodwin Knoll
close to the rMCZ Reference Area (English Heritage, 2012).	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. It is not possible to predict when or how often this may occur, so it is not costed in the Impact Assessment. If archaeological excavations do not take place as a result of these restrictions, this will prevent interpretation of archaeological evidence from the site, which will decrease acquisition of historical knowledge of past human communities from the site, thus resulting in a cost to society. Prohibition of surface recovery and excavation of a protected wreck in an rMCZ could result in the loss of archaeological features that would otherwise be protected. This would result in a loss of benefits of those archaeological features to society (English Heritage, pers. comm., 2012). As a result of the rMCZ, English Heritage may incur additional costs in its condition assessment of the protected wreck, which would have significant implications for protected wrecks that are considered to be 'heritage at risk'.

Table 2b: Commercial fisheries	rMCZ 8, Reference Area 6 Goodwin Knoll
Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1** Closure of entire site to all gear types.	
Description of activity and its impact on interest features	**Costs of impact of rMCZ on the sector under Policy Option 1**
Summary of all fisheries: The rMCZ Reference Area is non coastal and lies within rMCZ 8 Goodwin Sands within the 6nm limit. FisherMap indicates low fishing activity (this rMCZ Reference Area coincides largely with the 'drying area' of the Goodwin Sands where the water is often very shallow), with the use of occasional static gear and light trawling effort. A number of commercial fishing restrictions are already in existence (listed in Annex E1). More detail on the approach used for the fisheries method is provided at Annexes H7 and N4. Estimated annual value of landings from the rMCZ Reference Area: £0.017m/yr. (Due to resolution issues of the MCZ Fisheries Model and the small size of many rMCZ Reference Areas in the Balanced Seas region, some fisheries landings values may be inaccurate. They have been included as a precautionary measure and to avoid underestimating the economic impact of a site.)	
Baseline description of UK commercial fisheries	**Costs of impact of rMCZ on UK commercial fisheries**

<table>
<tr><th>Table 2b: Commercial fisheries</th><th>rMCZ 8, Reference Area 6 Goodwin Knoll</th></tr>
<tr><td>Bottom trawls: Numbers not known</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><td>Dredges: It is unknown how many vessels use this rMCZ Reference Area but stakeholders interviewed for Fishermap indicated that no vessels use this rMCZ Reference Area (FisherMap Data 2010).</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001*</td></tr></table>* Negligible</td></tr>
<tr><td>Mid-water trawls: It is unknown how many vessels fish in this rMCZ Reference Area (FisherMap Data 2010).</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><td>Hooks and lines: Vessel numbers unknown.

Estimated total value of landings from the rMCZ Reference Area: £0.017m/yr (MCZ Fisheries Model).</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.017</td></tr></table></td></tr>
<tr><td>Nets: Vessels from the Thanet Fishermen’s Association fish with drift and gill nets in areas that are reported to overlap with the rMCZ Reference Area (FisherMap Data 2010). Species targeted include bass, dover sole, cod, skates and rays.

Estimated value of landings from the rMCZ Reference Area: £0.017m/yr (MCZ Fisheries Model).</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.017</td></tr></table></td></tr>
<tr><td>Pots and traps: One stakeholder (from the Thanet Fishermen’s Association) who was interviewed targets whelks and lobster in an area overlapping with this rMCZ Reference Area FisherMap Data 2010).</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><td>Total direct impact on UK commercial fisheries under Policy Option 1</td><td></td></tr>
</table>

Table 2b: Commercial fisheries	rMCZ 8, Reference Area 6 Goodwin Knoll
	Estimated annual value of UK vessel landings and gross value added (GVA) affected: £m/yr: Scenario 2 — Value of landings affected: 0.017; GVA affected: 0.008 Scenario 1 / Best estimate — Value of landings affected: 0.004; GVA affected: 0.002 The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas. This is based upon an assumption of average displacement across all rMCZs, and may be an under- or over-estimate for this site.
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries**
	None.

Table 2c: Recreational angling	rMCZ 8, Reference Area 6 Goodwin Knoll
Source of costs of the recommended Marine Conservation Zone (rMCZ) Reference Area under Policy Option 1	
Closure of the entire site to all recreational angling.	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
Three StakMap interviewees (2 representing charter boat fishing, 1 representing boat anglers in a single club) indicated that their areas of activity overlap with the rMCZ Reference Area. For the boat anglers, the area of overlap is substantial. As well as fishing, some recreational anglers anchor in the site. At the local group meeting in November 2010, participants said that vessels anchor up from the current and drift bait down over the wrecks. StakMap showed that charter boat operators take some 1,060 people/yr angling in this rMCZ Reference Area. At the Essex/Kent Local Group meeting in November 2010, participants said that the wrecks in the area are heavily fished by recreational anglers. According to a local charter boat operator (D. Hancock, Regional Stakeholder Group (RSG) charter boat representative, email, 5th December, 2011), a total of 26 vessels (3 based	Anglers and charter boat operators may respond to the closure by angling other areas nearby if the weather or fish movements allow. However, there are times when the rMCZ Reference Area is the only suitable site for angling in the area (D. Hancock, RSG charter boat representative, pers. comms., January, 2012). One charter boat operator has indicated that the closure would have a major impact on his activities (D. Hancock, Regional Stakeholder Group (RSG) charter boat representative, email, 5th December,). To avoid underestimation of costs, the IA assumes that charter boat operators will lose all revenue from angling trips. Since the estimate of 150 days use of the site (D. Hancock, RSG charter boat representative) is considered an over-estimate, the IA is assuming that a third (15 days) of this number is more realistic, given the charter boats' use of a number of sites, and allowing for displacement of some of their activity to alternative locations. Consequently,

Table 2c: Recreational angling	rMCZ 8, Reference Area 6 Goodwin Knoll
at Dungeness, 7 at Dover, 2 at Folkestone, 8 at Ramsgate, 3 at Rye and 3 beach-launched vessels at Deal) probably fish within the site due to its proximity to their launch ports. They can take up to 8 anglers per trip. The same operator estimated that these vessels could fish in this inshore site for up to 150 days a year. The Balanced Seas project team consider that this is an over estimate as charter boats typically work a total 200 days a year (as indicated by StakMap interviews) and visit a number of sites. The estimated average revenue per charter vessel is £300/day (D. Hancock, Regional Stakeholder Group (RSG) charter boat representative, pers. comms., January, 2012).	Balanced Seas estimates that on average each of the 26 vessels loses revenue of £300/day for 50 days a year. Since the charter vessels using this site may be capable of fishing elsewhere nearby,depending on the weather and fish movements, the value of actual revenue lost may nevertheless be lower than the estimate that is provided here. *£m/yr* — Scenario 1 Loss of revenue — 0.390 GVA affected — 0.183

Table 2d: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 8, Reference Area 6 Goodwin Knoll
Oil and gas related activities (including carbon capture and storage) This rMCZ Reference Area overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 27th Seaward Licensing Rounds). However, it is unlikely that any oil and gas (including carbon capture and storage) infrastructure will be proposed in future in this rMCZ Reference Area due to its location and size (DECC, pers. comm., 2012). Impacts of rMCZ Reference Areas on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N 10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3: Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 8, Reference Area 6 Goodwin Knoll
Recreation (except for the activities listed above in table 2) Research and education Shipping	

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath BS 08 Goodwin Sands. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 4a. Fish and shellfish for human consumption	**rMCZ 8, Reference Area 6 Goodwin Knoll**	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. Subtidal coarse sediments and sand are important for spawning and nursery grounds for juvenile commercial species such as flatfish and bass (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see rMCZ8 Table 1 for details). There is only a low level of fishing in the rMCZ Reference Area as this is the drying area of the Goodwin Sands. A description of on-site fishing activity and the value derived from it is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits that derive from the spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. The costs of this are set out in Table 2b. Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption. Closure of the rMCZ Reference Area to fishing activity will reduce the on-site fishing mortality of species but, as the site is small, it is unclear whether this would benefit stocks of mobile commercial finfish species. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation	**rMCZ 8, Reference Area 6 Goodwin Knoll**	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Subtidal coarse sediments and sand are important for spawning and	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of	Anticipated direction of change: ⇧

Table 4b. Recreation	rMCZ 8, Reference Area 6 Goodwin Knoll	
nursery grounds for juvenile commercial species such as flatfish and bass (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see rMCZ8 Table 1 for details). Goodwin Sands has very high biodiversity due to the diverse bathymetry and substrate and it is thought to be a spawning ground for thornback ray. This high biodiversity attracts fish caught recreationally (including whiting, bass, smooth hound and mackerel) (Balanced Seas Final Recommendations Report, 2011), and is likely to help to support potential on-site and off-site fisheries. However, it is not known to what extent nursery areas occur within the rMCZ Reference Area. The generally high biodiversity due to the intertidal habitats within the site may also support on-site and off-site fisheries. Angling is an important activity in this rMCZ Reference Area, as described in Table 2c. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the potential spawning and nursery area.	the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Confidence: Low
Diving: Diving may occur around the wrecks in the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The recovery of the features to reference condition may improve their functioning as support for fish and other marine wildlife (including increases in size and diversity of species), potentially benefiting diving within the rMCZ Reference Area. Any increase may represent a redistribution of dive location preferences rather than an overall increase in diving.	Anticipated direction of change: ⇧ Confidence: Low
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition.	Anticipated direction of change:

Table 4b. Recreation		rMCZ 8, Reference Area 6 Goodwin Knoll
Subtidal coarse sediments and sand are important for spawning and nursery grounds for juvenile flatfish and bass (Fletcher and others, 2011) which will potentially be foraged by sea birds and mammals. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see rMCZ8 Table 1 for details). This rMCZ Reference Area lies within a popular wildlife watching spot and incorporates one of the primary seal haul-outs in the South-East. Also, it is important for foraging birds. Charter boats from Ramsgate and Dover conduct wildlife watching trips within the site. The site occurs within an area of the Channel used by ferries, which may carry wildlife watchers, particularly those interested in marine mammals. It has not been possible to estimate the value derived from wildlife watching in the rMCZ Reference Area.	The recovery of the features to reference condition may improve their functioning as support for fish and bird populations, potentially benefiting wildlife watching within the rMCZ Reference Area. In addition, an improvement in the condition of site features and any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	⇧ Confidence: Low
Other recreation: Other recreation is not known to take place in the site.	N/A	N/A

Table 4c. Research and education		rMCZ 8, Reference Area 6 Goodwin Knoll
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. Research is carried out in the wider rMCZ by the UK Hydrographic Office; the 2009 survey consisted of a full survey of the whole area, the results of which are shown in UK Hydrographic Office (2010). Seasearch, co-ordinated by Kent Wildlife Trust, is very active in the area, conducting sea-floor surveys regularly. Archaeological research and monitoring are also carried out on a regular basis. These activities will almost certainly also involve the rMCZ Reference Area.	As an rMCZ Reference Area, the site will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High

Table 4c. Research and education	rMCZ 8, Reference Area 6 Goodwin Knoll	
It has not been possible to estimate the value derived from research activities associated with the rMCZ Reference Area**.**		
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. No known education activity occurs in the site.	As the rMCZ Reference Area is about 7km offshore and is therefore relatively inaccessible, no benefits are likely to arise from direct use of the site for education. Non-visitors may benefit if the rMCZ Reference Area contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Low

Table 4d. Regulating services	rMCZ 8, Reference Area 6 Goodwin Knoll	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: A feature of the site (subtidal sediments) contributes to the bioremediation of waste and sequestration of carbon (Fletcher and others, 2011). ***Environmental resilience:*** A feature of the site (subtidal sediments) contributes to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** A feature of the site (subtidal sediments) contributes to local flood and storm protection (Fletcher and others, 2011); although the site is offshore, as part of the Goodwin Sands it plays a very important role in relation to coastal dynamics (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of the subtidal sediments and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the recommended Marine Conservation Zone Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4e. Non-use and option values	rMCZ 8, Reference Area 6 Goodwin Knoll
Baseline	**Beneficial impact under Policy Option 1**

Table 4e. Non-use and option values		rMCZ 8, Reference Area 6 Goodwin Knoll
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with therpMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

Site area (km^2): 252.49

rMCZ 9 Offshore Foreland

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts				**rMCZ 9, Offshore Foreland**
1a. Ecological description				
The site contains high energy infralittoral rock, high and moderate energy circalittoral rock, subtidal coarse sediment and subtidal sand. Various species of flatfishes (e.g. plaice, sole and undulate ray) are likely to be present, and thus there might be spawning and nursery grounds within the site. The site overlaps the very northern section of the English Channel Outburst Flood Feature, which runs from the southern North Sea along the Solent Paleochannel and is geomorphological evidence of a megaflood which occurred some 200,000 years ago when a huge glacial lake in the North Sea burst through the Dover Straits Isthmus, thus separating England from mainland Europe. The north of the site exhibits the top 10% of benthic species taxonomic distinctness in the region. The boundaries of the site have been drawn so that the site abuts the French Banc de Flandres Special Area of Conservation and Special Protection Area (SPA) in the north-east, which has the same broad-scale habitats, and Cap Gris Nez SPA in the south-west. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact of the MCZ**
Broad-scale Habitats				
A3.1 high energy infralittoral rock	3.10	-	Unfavourable condition	Recover to favourable condition
A4.1 high energy circalittoral rock	72.86	-	Unfavourable condition	Recover to favourable condition
A4.2 mod energy circalittoral rock	12.68	-	Unfavourable condition	Recover to favourable condition
A5.1 subtidal coarse sediment	93.65	-	Favourable condition	Maintain at favourable condition
A5.2 subtidal sand	68.61	-	Favourable condition	Maintain at favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone (rMCZ) on human activities (over 2013 to 2032 inclusive)

Table 2a. Commercial fisheries	**rMCZ 9, Offshore Foreland**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of commercial fishing gear will be required for certain features protected by this rMCZ. Therefore, two scenarios have been employed in the Impact Assessment (IA) for these fisheries to reflect this uncertainty. Should the site be designated, the management that will be required will fall somewhere within this range.	

Table 2a. Commercial fisheries **rMCZ 9, Offshore Foreland**

Management scenario 1: No additional management (SNCB informed scenario).

Management scenario 2: Zoned closure of the western half of the rMCZ to bottom trawls and dredges to protect areas of high energy infralittoral rock and high/moderate energy circalittoral rock (Balanced Seas informed scenario based on stakeholder recommendations).

Management scenario 3: Closure of entire rMCZ to bottom trawls and dredges and 50% reduction in activity of lines, nets, pots and traps to protect areas of high energy infralittoral rock and high/moderate energy circalittoral rock (SNCB informed scenario).

Summary of all fisheries: The rMCZ lies between 6 nautical miles (nm) and 12nm. The French and Belgian commercial fleet have historical fishing rights between 6nm and 12nm for demersal species and herring and actively fish in this rMCZ. Germany has historic fishing rights for herring, but it is not known if the fleet uses this rMCZ. UK vessels, both under and over below 15 metres use this rMCZ and are involved in bottom trawling, scallop dredging, potting, set netting and long lining activity including local fleets from Folkestone. Larger UK beam trawlers may fish the area when moving between North Sea and English Channel grounds. Trawlers and netters land a variety of fish from this rMCZ including sole plaice, dab, bass, cod, herring, sprat and thornback rays. Other vessels fish scallops, oysters, whelks, lobster and, to a lesser extent, mussels and crab from this rMCZ (information from FisherMap questionnaires). A number of commercial fishing restrictions are already in existence (listed in Annex E1). More detail on the approach used for the fisheries model is provided in Annexes H7 and N4.

Estimated annual value of landings from the rMCZ: £0.071m/yr.

Baseline description of UK commercial fisheries	**Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1**
Bottom trawls: Include both under and over 15 metre vessels. Number of vessels unknown. Estimated total value of landings from the rMCZ: £0.005m/yr (MCZ Fisheries Model).	The estimated annual value of UK bottom trawl landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 | Scenario 3 Value of landings affected | 0.000 | 0.002 | 0.005
Dredges: Number of vessels unknown. Estimated total value of landings from the rMCZ: £0.002m/yr (MCZ Fisheries Model).	The estimated annual value of UK dredge landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 | Scenario 3 Value of landings affected | 0.000 | 0.002 | 0.002
Hooks and lines: Number of vessels unknown. Estimated total value of landings from the rMCZ: £0.002m/yr (MCZ	The estimated annual value of UK hook and line landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 | Scenario 3

<table>
<tr><th colspan="2">Table 2a. Commercial fisheries</th><th colspan="2">rMCZ 9, Offshore Foreland</th></tr>
<tr><td>Fisheries Model).</td><td colspan="3"><table><tr><td>Value of landings affected</td><td>0.000</td><td>0.000</td><td>0.002</td></tr></table>In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with hooks and lines at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Nets: Number of vessels unknown

Estimated total value of landings from the rMCZ: £0.003m/yr (MCZ Fisheries Model).</td><td colspan="3">The estimated annual value of UK net landings affected is expected to fall within the following range of scenarios:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td><td>Scenario 3</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.000</td><td>0.003</td></tr></table>In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with nets at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Pots and traps: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £450/yr (MCZ Fisheries Model)..</td><td colspan="3">The estimated annual value of UK pot and trap landings affected is expected to fall within the following range of scenarios:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td><td>Scenario 3</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.000</td><td><0.001*</td></tr></table>*£450

In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with pots and traps at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Total direct impact on UK commercial fisheries under Policy Option 1</td><td colspan="3"></td></tr>
</table>

<table>
<tr><th colspan="2">Table 2a. Commercial fisheries</th><th>rMCZ 9, Offshore Foreland</th></tr>
<tr><td colspan="2"></td><td>The estimated annual value of UK landings and gross value added (GVA) affected is expected to fall within the following range of scenarios:
<table>
<tr><th>£m/yr</th><th>Scenario 1</th><th>Scenario 2</th><th>Best Estimate</th></tr>
<tr><td>Value of landings affected</td><td>0.000</td><td>0.0012</td><td>0.001</td></tr>
<tr><td>GVA affected</td><td>0.000</td><td>0.006</td><td>0.001</td></tr>
</table></td></tr>
<tr><th colspan="2">Baseline description of non-UK fisheries</th><th>Costs of impact of rMCZ on non-UK commercial fisheries</th></tr>
<tr><td colspan="2">The rMCZ is fished by French and Belgian beam trawlers and trawlers, most heavily in the north-eastern half of the site.

Activity by vessels from France:

• Haute Normandie fleet: 4 French trawlers over 20 metres and 2 trawlers over 80 metres use this rMCZ and target whiting and herring, accounting for 70% of their turnover ((Viera,, A., IA questionnaire for International Stakeholders, 8 August 2011).).

• Nord Pas de Calais/Picardie fleet: this rMCZ is used intensively by vessels from Boulogne-sur-Mer including trawlers who use it from September to January, accounting for 25–70% of their turnover and 2 line fishing vessels under 15 metres that use the rMCZ from March to December ; 50–100 trawlers 8–25 metres in size also use the site throughout the year; 9 netters under 15 metres from Calais use the eastern part of the rMCZ from September to October to May (French Department of Maritime Fishing and Aquaculture. 2012; Viera,, A., IA questionnaire for International Stakeholders, 8 August 2011).

Vessels from the Netherlands: have historical rights for herring and to use beam trawling in a small part of the area; there is active fishing but no information is available on number of vessels or gear types used, although low impact sumwing gear is used at least part of the time (Balanced Seas Final Recommendations Report, 2011).</td><td>Scenario 1: No impacts are anticipated under Scenario 1.

Scenario 2: Non-UK vessels using bottom trawls and dredges in the western half of the site (notably French and Belgian vessels) will be affected by this management scenario for the rMCZ. The value of French landings affected under this scenario has not been estimated. No information on the effect on other non-UK vessels is available; the Dutch representative on the regional stakeholder group considered that there would be less impact on the Dutch fleet through a zonation scheme such as this rather than closure of the entire site to certain gears.

Scenario 3: Non-UK vessels using bottom trawls and dredges throughout the site (notably French and Belgian vessels) will be affected by this management scenario for the rMCZ. The estimated value of French landings affected will be: £0.757m/yr (£0.754m/yr (bottom trawls/dredges), and 0.003/yr (static gears)) (Direction des Pêches Maritimes et de l' Aquaculture, 2011). No information on the effect on other non-UK vessels is available.</td></tr>
</table>

Table 2a. Commercial fisheries	rMCZ 9, Offshore Foreland
Vessels from Belgium: have historical rights for demersal species and herring; the Belgian fleet fishes the area heavily with beam trawls (more in the east than the west because of the harder ground in the latter) (Balanced Seas Final Recommendations Report, 2011). Vessels from Germany: Germany has historical rights in the area for herring fishing but there is no information as to whether this activity takes place within the rMCZ . Estimated value of landings from the rMCZ by French vessels: bottom trawls/dredges: £0.754m/yr; static gears: £0.003m/yr (Direction des Pêches Maritimes et de l' Aquaculture, 2011). Estimates for value of landings are not available for other countries.	

Table 2b. National defence	rMCZ 9, Offshore Foreland
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Mitigation of impacts of Ministry of Defence (MOD) activities on features protected by the suite of rMCZs will be provided by additional planning considerations during operations and training. It is not known whether mitigation will be required for features protected by this site. The MOD will also incur costs in revising environmental tools and charts to include MCZs.	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
The MOD is known to make use of the rMCZ for towed array (surveillance system).	Cost of impact to sector: It is not known whether this rMCZ will impact on the MOD's use of the site. Impacts of rMCZs on national defence are assessed in Annex H10 and N9 (they are not assessed for this site alone).

Table 2c: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 9, Offshore Foreland
Oil and gas related activities (including carbon capture and storage)	
This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the rMCZ (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ 9, Offshore Foreland**
Cables (existing interconnectors and telecom cables) Commercial fisheries (mid-water trawls) Recreation Shipping	

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[3] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.								rMCZ 9: Offshore Foreland	
ENG Feature	**Represent-ativity**	**Replication**	**Adequacy**	**Viability**	**Gaps or shortfalls in relation to ENG minimum guidelines**	**Recommended conservation objective**	**Quantitative considerations at regional MCZ level**	**Ecological Importance at regional MCZ level**	**Ecological Importance at wider scale**
A3.1 High energy infralittoral rock	BSH	✓	✓	✓	None	Recover	This site has the greatest contribution to the adequacy target		
A4.1 High energy circalittoral rock	BSH	✓	✓	✓	None	Recover			

[3] copied from the JNCC and Natural England's advice to Defra on rMCZs

A4.2 Moderate energy circalittoral rock	BSH	✓	✓	✓	None	Recover			
A5.1 Subtidal coarse sediment	BSH	✓	✓	✓	None	Maintain	This site significantly contributes to the adequacy target	This feature is at the lower end of the adequacy target.	
A5.2 Subtidal sand	BSH	✓	✓	✓	None	Maintain			

Site considerations	
Connectivity	✓
Geological/Geomorphological features of interest	English Channel outburst flood features * [1]
Appropriate boundary	✓
Areas of Additional Ecological Importance	✓ * [2, 3]
Overlaps with existing MPAs	X

Additional comments and site benefits:

[1] Part of the geological feature English Channel outburst flood features occurs within the site forming the deep channel running through the eastern part of the site. This geomorphological feature is evidence of a megaflood which occurred some 200,000 years ago when huge glacial lakes in the North Sea burst through the Dover Straits Isthmus which contained it, thus separating England from mainland Europe (Gupta, et al. 2007, Balanced Seas 2011a).

[2] The site provides foraging grounds for great cormorant, Sandwich tern and black-legged kittiwake (Pers. Comms. Kent Ornithology Society), and nursery grounds for commercially important fish such as Dover Sole and Plaice (Balanced Seas 2010b). It is also thought to be a spawning ground for certain flatfish species (Balanced Seas 2011a).

[3] The north of the site exhibits the top 10% of benthic species taxonomic distinctness in the region (Defra n.d.).

Commercial fish species such as Dover Sole, Plaice, Cod and Mackerel also occur in the area (Balanced Seas Conservation Aims May 2011).

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption		**rMCZ 9, Offshore Foreland**
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Offshore sand and coarse sediment habitats (the two dominant habitats in the rMCZ) support internationally important fish and shellfish fisheries (Fletcher and others, 2011). The rMCZ is potentially a spawning and nursery ground for flatfishes, including Dover sole and plaice (Balanced Seas Final Recommendations Report, 2011) and thus may help to support potential on-site and off-site fisheries. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see Table 1 for details). There is currently a relatively high on-site value derived from fish and shellfish services, principally through trawling activity. A description of on-site fishing activity and the value derived from it is set out in Table 2a. It has not been possible to estimate the value of the off-site benefits that derive from the spawning and nursery area.	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some recovered to favourable condition. New management of fishing activities is expected (above the baseline situation), the costs of which are set out in Table 2a, which may reduce the impacts on fish and shellfish habitats and harvesting of stocks. As most of the commercial species targeted by fishers in this area are mobile flatfish, it is unclear whether the scale of habitat recovered and the magnitude of reduced (on-site) harvesting will be enough to have any significant positive impact on commercial stocks. Potential benefits may arise on-site, for fishers permitted to fish within the rMCZ, and off-site from spill-over benefits.	Anticipated direction of change: ⇧ Confidence: Low

Table 5b. Recreation	**rMCZ 9, Offshore Foreland**
Baseline	**Beneficial impact under Policy Option 1**

Table 5b. Recreation		rMCZ 9, Offshore Foreland
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. Offshore sand and coarse sediment habitats (the two dominant habitats in the rMCZ) support internationally important fish and shellfish fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see Table 1 for details). The rMCZ is not popular with private angling boats, but may be used for fishing by charter vessels on their way over to fish French waters. The Varne Bank just to the south of the rMCZ is extremely popular. The potential spawning ground for flatfishes and generally high biodiversity due to the complex habitats within the site are likely to help to support potential on-site and off-site fisheries. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the potential spawning and nursery area.	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the broad scale habitats to favourable condition may improve their functioning as a nursery area, potentially benefiting fisheries exploited within and outside the rMCZ (see Table 4a). As no additional management of angling is expected, fishers will be able to benefit from any on-site and off-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers. The designation may lead to an increase in angling visits to the site, which may benefit the local economy. This increase is likely to arise from a change in anglers' preferred angling locations rather than an increase in days spent angling or the number of anglers at a national scale. The adjacent popular angling spot, the Varne Bank, may benefit from possible spill-over effects.	Anticipated direction of change: ⇧ Confidence: Low
Diving: Diving is not known to take place in the rMCZ.	N/A	N/A
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see Table for details). Due to its offshore location, the rMCZ has not been identified as a popular area for wildlife watching. However, the site has particularly high biodiversity and abundant fish populations which support a	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the broad scale habitats to favourable condition may improve their functioning as support for fish, bird and marine mammal populations. Any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service.	Anticipated direction of change: ⇧ Confidence: Low

Table 5b. Recreation		rMCZ 9, Offshore Foreland
number of foraging birds and potentially marine mammals. The site occurs within an area of the Channel used by ferries, which may carry wildlife watchers, particularly those interested in marine mammals. It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in wildlife watching trips at the national scale. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	
Other recreation: Tourism is not known to take place in the rMCZ	N/A	N/A

Table 5c. Research and education		rMCZ 9, Offshore Foreland
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. No known formal research activities are currently carried out in the rMCZ. However, ferries crossing the Channel may be used by marine mammal observers whose data contribute to national databases.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits could be more robust data through increased marine mammal sightings. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. No known education activity is focused on the area of the rMCZ.	As the rMCZ is approximately 12km offshore and therefore relatively inaccessible, no benefits are likely to arise from direct use of the site for education. Non-visitors may benefit if the rMCZ contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Low

Table 5d. Regulating services		rMCZ 9, Offshore Foreland
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: the features of the site contribute to the sequestration of carbon (subtidal sediments) (Fletcher and others, 2011). ***Environmental resilience:*** the features of the site (subtidal sediments) contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** as the site is offshore, its features are not thought to contribute to the delivery of this service (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ.	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (circalittoral rock) recovered to favourable condition. Recovery of the circalittoral rock and a potential reduction in the use of bottom towed fishing gear may increase the site's benthic biodiversity and biomass, improving the regulating capacity its habitats. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 5e. Non-use and option values		rMCZ 9, Offshore Foreland
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the rMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the rMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect both the features and the option to benefit from the services in the future from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 10 The Swale Estuary **Site area (km^2):** 51.05

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts				**rMCZ 10, Swale Estuary**
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) has been identified for protection of subtidal habitats (mud and mixed sediments) in the main channel of the Swale Estuary to complement the intertidal habitats that are already protected. Subtidal sands and gravels have also been recommended for protection at The Street in Whitstable and on the boundary of the site where the Swale joins with the Medway. The Swale Estuary is in general a highly biodiverse area with large areas of salt marshes that support breeding wildfowl, and provide feeding grounds for migratory species as they move to wintering grounds further south. The site also contains intertidal and subtidal blue mussel beds and native oysters; although these populations are not currently considered to be in good condition, they are thought to have potential for recovery if the overall conditions are allowed to improve. Other features of conservation interest are peat and clay exposures (specifically of London clay), Ross worm reef, good examples of sheltered muddy gravels, rare algal communities on shingle, peacock worm and sea squirt beds. The estuary is considered an important spawning and nursery ground for various fish species. This site overlaps The Swale Site of Special Scientific Interest and Special Protection Area (SPA), the Outer Thames Estuary SPA, and two Ramsar sites: The Swale, and Thanet Coast and Sandwich Bay. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A1.3 low energy intertidal rock	0.61	-	Favourable condition	Maintain at favourable condition
A3.3 low energy infralittoral rock	0.96	-	Favourable condition	Maintain at favourable condition
A5.2 subtidal sand	9.23	-	Favourable condition	Maintain at favourable condition
A5.3 subtidal mud	6.65	-	Favourable condition	Maintain at favourable condition
A5.4 subtidal mixed sediments	13.53	-	Favourable condition	Maintain at favourable condition
Habitats of Conservation Importance				
Blue mussel beds	0.21	-	Unfavourable condition	Recover to favourable condition
Peat and clay exposure	0.74	-	Favourable condition	Maintain at favourable condition
Rossworm (*Sabellaria spinulosa*) reef	625.67m^2	-	Unfavourable condition	Recover to favourable condition
Subtidal sands and gravels	0.24	-	Favourable condition	Maintain at favourable condition
Sheltered muddy gravels	-	11 records	Favourable condition	Maintain at favourable condition
Species of Conservation Importance				
Native Oyster (*Ostrea edulis*)	-	2 records	Favourable condition	Maintain at favourable condition

Table 1. Conservation impacts				rMCZ 10, Swale Estuary
European Eel (*Anguilla anguilla*)	n/a	-	Favourable condition	Maintain at favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	rMCZ 10, The Swale Estuary
Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1** Increase in costs of assessing environmental impacts for future licence applications (it is not anticipated that any additional mitigation of impacts on features protected by the MCZ 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. However, restrictions could also be placed upon: • Anchoring in areas of vulnerable MCZ features in the site, including Ross worm *Sabellaria spinulosa* reef • Archaeological excavation in areas of peat and clay exposures in the site.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
There have been 87 named and dated wrecks reported within this site and several other unidentified wrecks. These are made up of vessels, landing crafts and barges. A World War II anti-aircraft battery is reported within the site, although it is not stated whether it is still present. Roman-age artefacts have been found within the site (English Heritage, 2012).	An extra cost would be incurred in the assessment of environmental impact made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost in 1 licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). No further impacts on activities related to archaeology are anticipated. If archaeologists respond to restrictions on excavation in areas of peat and clay exposures and restrictions on anchoring over areas of Ross worm *Sabellaria spinulosa* reef by undertaking alternative archaeological excavations 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. If archaeological excavations do not take place as a result of these restrictions this will prevent interpretation of archaeological evidence from the site, which will decrease acquisition of historical knowledge of

Table 2a. Archaeological heritage	rMCZ 10, The Swale Estuary
	past human communities from the site, resulting in a cost to society.

Table 2b. Coastal development (excluding ports and harbours)	rMCZ 10, The Swale Estuary
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Increase in costs of assessing environmental impacts for future licence applications and costs of mitigation of impacts if required for the proposed Thames Estuary airport.	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
Plans for the Thames Estuary airport are at a very early stage and a number of locations have been suggested. The most recent proposal (the Thames Hub) is for a site that lies within 1km of the rMCZ, and that straddles the land and sea on the Isle of Grain, which is the eastern end of the Hoo Peninsula. Proposed road and rail links and plans for a terminal fall within 1km of the rMCZ (www.halcrow.com/Thames-Hub/PDF/Thames_Hub_vision.pdf).	Because the proposals are at an early stage, it is not yet known whether additional costs will be incurred as a result of the rMCZ in assessing environmental impacts for future licence applications and whether additional mitigation of impacts on MCZ features will be needed.

Table 2c. Commercial fisheries	rMCZ 10, The Swale Estuary
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of commercial fishing gears will be required for certain features protected by this rMCZ. Therefore, two scenarios have been employed in the Impact Assessment (IA) for these fisheries to reflect this uncertainty. Should the site be designated, the management that will be required will fall somewhere within this range. ***Management scenario 1:*** Closure of entire rMCZ to bottom trawls and dredges to protect areas of Ross worm reef *Sabellaria spinulosa* (Statutory Nature Conservation Bodies (SNCB) informed scenario). Zoned closure is not possible without verification of the distribution of ross worm reef. ***Management scenario 2:*** Closure of entire rMCZ to bottom trawls, dredges, lines, nets, pots and traps to protect blue mussel beds and areas of Ross worm reef *Sabellaria spinulosa* (SNCB informed scenario).	
Summary of all fisheries: The rMCZ is entirely within the 6 nautical mile (nm) limit and is fished only by UK vessels. Most fishing vessels are from Queenborough, Whitstable and Faversham. Under 15 metre vessels are engaged in bottom trawling, oyster dredging and potting activity (information from Fishermap questionnaires). Mussel seed dredging occurs in the northern section of the site (Natural England feedback response to first tranche of material, 13 January 2012.). Cockle suction dredgers from Leigh-on-Sea occasionally fish the north-eastern part of the site in the mud/sand if cockle beds are present.	

Table 2c. Commercial fisheries **rMCZ 10, The Swale Estuary**

FisherMap indicates that no vessels over 15 metres are operating in the site. A number of commercial fishing restrictions are already in existence (listed in Annex E1). More detail on the approach used for the fisheries method is provided at Annexes H7 and N4.

Estimated annual value of landings from the rMCZ: £0.097m/yr.

<table>
<tr><th>Baseline description of UK commercial fisheries</th><th>Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1</th></tr>
<tr><td>Bottom trawls: Number of vessels unknown.

Estimated value of UK net landings from the rMCZ: £0.010m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK bottom trawl landings affected is expected to fall within the following range of scenarios:

<table>
<tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr>
<tr><td>Value of landings affected</td><td>0.010</td><td>0.010</td></tr>
</table>
A Whitstable vessel owner (IA questionnaire response from Whitstable vessel owner, August 2011) indicated that closure of the entire rMCZ to bottom trawls would affect trawlers, in particular vessels from Whitstable (7 trawlers) and Faversham (1 trawler), resulting in an approximate 50% loss of earnings. He shared the view that displacement was not a non-viable alternative as: (i) all other fishing grounds have existing users and any increased effort within them could lead to conflict, and (ii) all available species are already fished using appropriate gears. Because of this, closure of the site to bottom trawls may result in major loss of revenue, which would lead to fishers leaving the fleet (see Annex J3a for more detail). The Whitstable vessel owner said that this could lead to the loss of 14 jobs if both this rMCZ and rMCZ 7 are closed, which would result in an important social cost for the local fishing communities. There would also be a secondary impact in that local fish markets, restaurants, fish retailers, and activities linked to the fishing fleet such as repairs, fuel services and gear suppliers would be affected.</td></tr>
<tr><td>Dredges: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £0.082m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK dredge landings affected is expected to fall within the following range of scenarios:

<table>
<tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr>
<tr><td>Value of landings affected</td><td>0.082</td><td>0.082</td></tr>
</table></td></tr>
<tr><td>Nets: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £0.004m/yr (MCZ</td><td>The estimated annual value of UK net landings affected is expected to fall within the following range of scenarios:

<table>
<tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr>
</table></td></tr>
</table>

<table>
<tr><th colspan="2">Table 2c. Commercial fisheries</th><th colspan="2">rMCZ 10, The Swale Estuary</th></tr>
<tr><td>Fisheries Model).</td><td colspan="3"><table><tr><td>Value of landings affected</td><td>0.000</td><td>0.004</td></tr></table>In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with nets at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Pots and traps: Number of vessels unknown

Estimated total value of landings from the rMCZ: £0.002m/yr (MCZ Fisheries Model).</td><td colspan="3">The estimated annual value of UK pot and trap landings affected is expected to fall within the following range of scenarios:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.002</td></tr></table>In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with pots and traps at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Total direct impact on UK commercial fisheries</td><td colspan="3"></td></tr>
<tr><td></td><td colspan="3">The estimated annual value of UK landings and gross value added (GVA) affected is expected to fall within the following range of scenarios:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td><td>Best estimate</td></tr><tr><td>Value of landings affected</td><td>0.023</td><td>0.097</td><td>0.023</td></tr><tr><td>GVA affected</td><td>0.011</td><td>0.045</td><td>0.011</td></tr></table>The best estimate is based on an assumption on the likelihood of the highest and lowest cost scenario occurring, and an assumption that 75% of value is displaced to other areas. This is based upon an assumption of average displacement across all rMCZs, and may be an under- or over-estimate for this site.</td></tr>
<tr><td>Baseline description of non-UK fisheries</td><td colspan="3">Costs of impact of rMCZ on non-UK commercial fisheries</td></tr>
<tr><td></td><td colspan="3">None.</td></tr>
</table>

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 10, The Swale Estuary

Table 2d. Ports, harbours, shipping and disposal sites **rMCZ 10, The Swale Estuary**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management scenario 1: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for navigational dredging that takes place within 1km of the rMCZ. The Balanced Seas regional MCZ project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the MCZ that will be needed relative to the mitigation provided in the baseline.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for disposal of dredged material, navigational dredging and all port and harbour developments within 5 km of the rMCZ. Also, additional costs in updating the Maintenance Dredging Protocol (MDP) that is being developed by Medway Ports. The Balanced Seas regional MCZ project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the MCZ that will be needed relative to the mitigation provided in the baseline.

Baseline description of activity

Disposal sites: There are no disposal sites either in or within 1km of rMCZ 10 and so Scenario 1 will not apply.

There are 2 disposal sites (TH103 Garrison Port and TH073 Whitstable C) within 5km of the rMCZ which are likely to be used by Faversham Port and Whitstable Harbour. For 1 of the disposal sites (Garrison Port) no licence applications were received between 2001 and 2010 but it is not closed to disposal in future (Cefas, pers. comm., 2011). The average number of licence applications received for the remaining disposal site disposal site (Whitstable C) is 0.2 per year (based on number of licence applications received between 2001 and 2010 (Cefas, pers. comm., 2011).

Navigational dredge areas: There are licensed maintenance and navigational dredge channels within 1km of this rMCZ associated with Faversham Port and the Whitstable Harbour Board. It is assumed that each dredge area's marine licence is renewed once every 3 years, and that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal.

There are licensed maintenance and navigational dredge channels within 5km of this rMCZ associated with Faversham Port and the Whitstable Harbour Board. It is assumed that each dredge area's

Costs of impact of rMCZ on the sector under Policy Option 1

£m/yr	Scenario 1	Scenario 2
Cost to the operator	0.002	0.004*

* This estimate for additional cost in future licence applications for port developments arising as a result of this rMCZ is not used to estimate the total costs for the IA. It is based on different assumptions to those used to estimate costs at a regional level and for the entire suite of sites. Also, this figure assumes that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal (every 3 years). It does not include the cost of incorporating MCZ features in an existing or new MDP. It is likely to over-estimate the cost of Scenario 2 for rMCZs with ports within 5km that have MDPs because of the savings in future costs provided by an MDP. See Annex H for further information

Scenario 1: Future licence applications for navigational dredging within 1km of this site will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11).

Scenario 2: Future licence applications for disposal of material, navigational dredging and port or harbour development plans and proposals within 5km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 10, The Swale Estuary
marine licence is renewed once every 3 years, and that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal. Some navigational dredge areas mill be covered by the MDP being prepared by Medway Ports, and for this it is assumed that the assessment of environmental impact is not changed over the 20 year period of the IA. It is assumed that an MDP will not be required for Faversham and Whitstable. ***Port development:*** There are 3 ports and harbours within 5km of the rMCZ, which may undergo development at some point in the future: Faversham, Whitstable and Ridham Dock (Ports & Harbours UK, 2012 – This may not represent a full list of all ports and harbours impacted by the site). No port developments are known to be planned within the 20 year period of the Impact Assessment (IA).	breakdown of these by activity is provided in Annex N11). Also, additional costs will be incurred to update the Maintenance Dredging Protocol (MDP) being developed by Medway Ports as this will need to consider the potential effects of activities on the features protected by the rMCZ. The anticipated additional cost in the Medway MDP is estimated to be a one-off cost of £8438.

Table 2e. Recreation al anchoring)	rMCZ 10, The Swale Estuary
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Creation of a no-anchoring zone (except in emergency circumstances) over Ross worm *Sabellaria spinulosa* reef.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
The Swale Estuary is popular for recreational boating. There are 5 yacht clubs, 3 boat-based sea angling clubs and 2 registered charter vessels within the Swale and many more associated with the Medway that also use the area. Vessels anchor in good weather on approach into and within the mouth of the main channel because of the attractive scenery, and the estuary is a haven for small craft in bad weather (RYA BS IA 1st Tranche Feedback, January, 2012). Project data show that *Sabellaria* occurs within a few metres of the seaward boundary of the rMCZ where the Thames Estuary meets the Swale Estuary. Nautical charts do not show any designated anchorage areas overlapping the feature. Stakmap shows that 1 club anchors within the Swale, in an area covering the western half of the approach into the estuary which overlaps with *Sabellaria*. Because of the proximity of the	Due to the relatively low level of anchoring over the feature, the creation of a no-anchoring zone over the small areas of *Sabellaria* is not expected to impact on recreational vessel users extensively (RYA BS IA 1st Tranche Feedback, January, 2012) and no significant costs are expected. Local Group and Regional Stakeholder Group members felt there was low confidence in the data records for *Sabellaria* and believe it does not exist within the site (Balanced Seas North Kent Sites meeting report, July 2011). The groups recommended that a survey is undertaken before designation, as if *Sabellaria* is found to be more widespread then recreational users may be significantly impacted and provision of eco-moorings may be needed. Survey costs have been included in monitoring costs in Annex N12.

Table 2e. Recreation al anchoring)	rMCZ 10, The Swale Estuary
area of *Sabellaria* to Whitstable Harbour and the entrance to the Swale Estuary, anchoring of other vessels may also occur in this area.	

Table 2f: Renewable energy-wind energy — **rMCZ 10, The Swale**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management Scenario 1: Increase in costs of assessing environmental impacts for licence applications (it is not anticipated that any additional mitigation of impacts on features protected by the MCZ will be needed relative to the mitigation provided in the baseline).

Management Scenario 2: Increase in costs of assessing environmental impacts for licence applications and increase in cable protection installation costs for power export cables and inter-array cables (relative to the mitigation provided in the baseline).

Baseline description of activity

An estimated 12km of consented and under construction power export cable routes from the London Array wind farm may overlap with the rMCZ (estimate based on the length of the rMCZ).

Costs of impact of rMCZ on the sector under Policy Option 1

The estimated cost to renewable energy developers operating in this rMCZ is expected to fall within the following range of scenarios:

£m/yr	Scenario 1	Scenario 2
Cost to the operator	0.001	0.607
GVA affected	0.001	0.607

Scenario 1: The licence application for the London Array wind farm export cable route will need to consider the potential effects of the development on achieving the conservation objectives of the rMCZ's features. This is expected to result in an additional one-off cost of £0.012m in 2022 (for extra consultant/staff time) with a present value of £0.009m.

Scenario 2: In addition to the increased costs for assessment set out under Scenario 1, under Scenario 2 costs of additional mitigation are anticipated. This additional mitigation entails use of alternative cable protection for export cables and inter-array cables that have not yet been consented. This is expected to result in an additional one-off cost of £12.120m in 2022 (based on estimated additional cost of £1m/km for yet-to-be-consented power export cable route only) with a present value cost of £8.601m. These costs are included in Scenario 2 to reflect uncertainty over whether this additional mitigation will be required. Inter-array cables are not expected to be proposed for installation within this rMCZ. Therefore, no additional cost to install alternative cable protection for inter-

	array cabling is anticipated. JNCC and Natural England (pers. comm., 2012) state that the likelihood of the cost in Scenario 2 occurring is very low. Further details are provided in Annex H14. The impacts that are assessed in both scenarios are based on JNCC and Natural England's advice on the mitigation that could be required.

Table 2g: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	**rMCZ 10, The Swale**
Oil and gas related activities (including carbon capture and storage) This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the rMCZ under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ 10, the Swale**
Aquaculture Commercial fisheries (mid-water trawls, collection by hand) Flood and coastal erosion risk management (coastal defence) Recreation (except for the activities listed above in table 2) Research and education Shipping Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[4] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.								rMCZ 10: The Swale Estuary	
ENG Feature	**Represent-ativity**	**Replication**	**Adequacy**	**Viability**	**Gaps or shortfalls in relation to ENG minimum guidelines**	**Recommended conservation objective**	**Quantitative considerations at regional MCZ level**	**Ecological Importance at regional MCZ level**	**Ecological Importance at wider scale**
A1.3 Low energy intertidal rock	BSH	✓	✓	✓	None	Maintain			
A3.3 Low energy infralittoral rock	BSH	✓ * [1]	✓	✓	None	Maintain	This BSH is currently only reaching the minimum replication target		
A5.2 Subtidal sand	BSH	✓	✓	✓	None	Maintain			
A5.3 Subtidal mud	BSH	✓	✓	✓	None	Maintain			

[4] copied from the JNCC and Natural England's advice to Defra on rMCZs

A5.4 Subtidal mixed sediments	BSH	✓	✓	✓	None	Maintain			
Blue mussel *Mytilus edulis*	FOCI Habitat	✓	✓	✓	None	Recover		This feature is considered to have potential for recovery if the overall conditions are allowed to improve.	BAP and OSPAR habitat
Peat clay exposure	FOCI Habitat	✓	✓	✓	None	Maintain		Best example of exposed London Clay at several locations in the site.	BAP habitat
Ross worm *Sabellaria spinulosa* reef	FOCI Habitat	✓	✓	✓	None	Recover			BAP and OSPAR habitat
Subtidal sands and gravels	FOCI Habitat	✓	✓	✓	None	Maintain			BAP habitat
Sheltered muddy gravels	FOCI Habitat	✓	✓	✓	None	Maintain			BAP habitat
Native oyster	FOCI	✓	✓	✓	None	Maintain			BAP and OSPAR

Ostrea edulis	Species								species
European eel *Anguilla anguilla*	FOCI Mobile Species	✓	✓	N/A	None	Maintain		Not protected by existing designations at RP and biogeographical level.	BAP and OSPAR species

Site considerations	
Connectivity	✓
Geological/Geomorphological features of interest	None
Appropriate boundary	✓
Areas of Additional Ecological Importance	✓ * [2]
Overlaps with existing MPAs	✓

Additional comments and site benefits:

[1] This is one of only two sites containing the BSH Low energy infralittoral rock in the region.

[2] SPA birds, overlaps with The Swale SPA, important spawning and nursery ground for several fish species including cod, herring, mackerel, plaice and sole, peacock worm (*Sabella pavonina*) and important sea squirt beds (refer to BS SAD)

The Swale is a highly biodiverse area and has been identified as a Key Inshore Biodiversity Areas by the South-East England Biodiversity Forum (South East England Biodiversity Forum (SEEBF) 2010).

Site presents a good opportunity for shellfish recovery if protected.

The EA found the sheltered muddy gravels to be particularly biodiverse (Balanced Seas 2011a).

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption	**rMCZ 10, Swale Estuary**
Baseline	**Beneficial impact under Policy Option 1**

Table 5a. Fish and shellfish for human consumption		rMCZ 10, Swale Estuary
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Subtidal sand, mud and mixed sediments are important for spawning and nursery grounds. These habitats can provide important nursery grounds for juvenile commercial species such as flatfishes and bass. Infralittoral rock is a suitable habitat for inshore commercial fisheries species, particularly lobster and crab. Intertidal rock habitats are important sources of larval plankton on which commercially important fish species feed, including mussels and larval fish of plaice and mackerel (Fletcher and others, 2011). Stakeholders consider the Swale Estuary to have spawning and nursery grounds but no specific information is available on individual species of fish. The estuary is historically very important for its cockle and mussel beds, which still exist in a reduced form and are considered important for reseeding (Balanced Seas Final Recommendations Report, 2011). As such it is likely to help to support potential on-site and off-site fisheries. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The Swale Estuary is fished by vessels from Queenborough, Whitstable, Faversham and Leigh-on-Sea that target commercial fish, oysters (there are four private oyster fisheries as well as a public fishery) and other shellfish (Balanced Seas Final Recommendations Report, 2011), particularly mussel seed in the northern section of the site (Natural England, pers. comm., 2012) and cockles in the north-eastern part of the site in the mud/sand if cockle beds are present. A description of on-site fishing activity and the value derived from it is set out in Table 2c. It has not been possible to estimate the value of the off-site benefits	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (*Sabellaria* and blue mussel beds) recovered to favourable condition. New management of fishing activities is expected (above the baseline situation), the costs of which are set out in Table 2c, which may reduce the impacts on fish and shellfish habitats and harvesting of stocks. As most of the commercial species targeted by fishers in this rMCZ are shellfish, it is unclear whether the scale of habitat recovered and the magnitude of reduced (on-site) harvesting will be enough to have any significant positive impact on commercial stocks. For reasons that are currently unknown, the native oyster and blue mussel fisheries have declined considerably over recent decades in the Swale Estuary, ((Balanced Seas Final Recommendations Report, 2011). However, maintaining and monitoring the current level of potting practices and restricting other fishing practices over certain features may safeguard current populations of shellfish and by ensuring no increase in fishing activity occurs or alternative gears used, it is expected that the shellfish and other fish species population may increase over time. Potential benefits may arise on-site, for fishers permitted to fish within the rMCZ, and off-site from spill-over benefits. As new management is expected, some fishers will be able to benefit from both on-site and off-site beneficial effects, whilst others will only benefit from off-site beneficial effects. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: Confidence: Low

Table 5a. Fish and shellfish for human consumption		rMCZ 10, Swale Estuary
that derive from the spawning and nursery areas.		

Table 5b. Recreation		rMCZ 10, Swale Estuary
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. Subtidal sand and mud and intertidal sand, muddy sand and mixed sediments are important for spawning and nursery grounds. These habitats can provide important nursery grounds for juvenile commercial species such as flatfishes and bass (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition some are in favourable condition and some are in unfavourable condition (see Table 1 for details). Stakeholders consider the Swale Estuary to have spawning and nursery grounds but no specific information is available on individual species of fish (Balanced Seas Final Recommendations Report, 2011). The Swale Estuary is an important nursery area for fish caught recreationally (including bass) (Balanced Seas Final Recommendations Report, 2011). Both boat and shore angling for bass, thornback ray, smooth hound, grey mullet, cod and whiting takes place mainly in the mouth of the Swale Estuary as navigation round the back of the Isle of Sheppey is very tide dependent (StakMap, 2010). Shore angling is popular with local clubs organising competitions on a regular basis. Being close to London, the Swale's recreational sea fisheries also attract visitors from further away (StakMap, 2010). The system of sand banks and channels in the Outer Thames Estuary outside the rMCZ is popular with boat and charter boat anglers fishing for numerous species including mackerel, dogfish and ray, and this off-site area may benefit from spill-over effects (StakMap, 2010). Therefore, the nursery ground for several fish species within the site is likely to help to support potential on-site and off-site fisheries.	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (*Sabellaria* and blue mussel beds) recovered to favourable condition. As no additional management of angling is expected, fishers will be able to benefit from any on-site and off-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers. The designation may lead to an increase in angling visits to the site, which may benefit the local economy. This increase might arise from a change in anglers' preferred angling locations rather than an increase at a national scale in days spent angling or the number of anglers.	Anticipated direction of change: ⇧ Confidence: Low

Table 5b. Recreation		rMCZ 10, Swale Estuary
It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the intertidal and subtidal habitats.		
Diving: Diving is not known to take place in the rMCZ.	N/A	N/A
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The Swale Estuary is a very popular tourist destination especially for recreational sailing, kayaking, canoeing and coastal/estuarine walking. There are numerous sailing, kayaking and canoeing clubs within the site as well as marinas and docks. Racing events take place and training for novices is available from many of the clubs (StakMap, 2010). Walking opportunities are available along the banks of the estuary. It has not been possible to estimate the value derived from other recreation in the rMCZ.	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (*Sabellaria* and blue mussel beds) recovered to favourable condition. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities. If the rMCZ is designated this will provide an additional positive aspect about the location that could be promoted by the tourism and leisure industry and that would be expected to increase visitation rates.	Anticipated direction of change: ⇧ Confidence: Low
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. Subtidal coarse sediments, sand and mud and intertidal sand, muddy sand and mixed sediments are important for spawning and nursery grounds. These habitats can provide important nursery grounds for juvenile species such as flatfishes and bass, thus supporting an important level of the food chain. Mussel beds are an important food source for birds (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The Swale Estuary is popular for wildlife watching due to extensive salt marshes and a generally high biodiversity supporting large populations of migratory species and wildfowl (Balanced Seas Final Recommendations, 2011). Kent Wildlife Trust manages Oare Marshes and Elmley Marshes, which are adjacent to the rMCZ and provide shelters and hides for	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (*Sabellaria* and blue mussel beds) recovered to favourable condition. An improvement in the condition of site features and any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities. If the rMCZ is designated this will provide an additional positive	Anticipated direction of change: ⇧ Confidence: Low

Table 5b. Recreation		rMCZ 10, Swale Estuary
birdwatchers (Kent Wildlife Trust website). It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	aspect about the location that could be promoted by the tourism and leisure industry and that would be expected to increase visitation rates.	

Table 5c. Research and education		rMCZ 10, Swale Estuary
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. The Medway Swale Estuary Partnership promotes and supports research in the estuary (Visit Medway website). Kent Wildlife Trust and Kent and Essex Inshore Fisheries and Conservation Authority conduct research in the estuary (North Kent site meeting, 2011). Research is also conducted by Kent County Council in order to inform the Kent Coastal Network initiative (Kent Coastal Network website). It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. The Medway Swale Estuary Partnership organises educational activities (Medway Swale Estuary Partnership website). Kent Wildlife Trust also organises educational activities, particularly in the reserves adjacent to the rMCZ. It also provides practical and theoretical learning opportunities that may relate to the rMCZ, either as taught lessons at its centres or as outreach in schools from pre-school to young adults (Kent Wildlife Trust website). It has not been possible to estimate the value derived from education activities associated with the rMCZ.	MCZ designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ) education activities (e.g. events, interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Moderate

Table 5d. Regulating services		rMCZ 10, Swale Estuary
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: the features of the site contribute to the bioremediation of waste (Blue Mussel beds, Native oyster, subtidal sediments), water purification (Blue Mussel beds, Native oysters and *Sabellaria*) and sequestration of carbon (Blue Mussel beds, *Sabellaria,* intertidal rock and subtidal sediments) (Fletcher and others, 2011). ***Environmental resilience:*** the features of the site (Blue Mussel beds, *Sabellaria*, intertidal rock and sheltered muddy gravels) contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** the features of the site, (Blue Mussel beds, *Sabellaria* and Native oysters) contribute to local flood and storm protection (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ.	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (*Sabellaria* and Blue Mussel beds) recovered to favourable condition. Recovery of the *Sabellaria* and Blue Mussel beds and a potential reduction in the use of bottom towed fishing gear may increase the site's benthic biodiversity and biomass, improving the regulating capacity its habitats. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 5e. Non-use and option values		rMCZ 10, Swale Estuary
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the pMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the rMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the pMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation. Examples of these values are shown in (Ranger, Lowe, Sanghera, & Solandt, 2012). Voters in the MCS's 'Your Seas Your Voice' campaign felt that features of the natural environment were strong motivators for reasons why people thought that some	Anticipated direction of change: ⇧ Confidence: Moderate

Table 5e. Non-use and option values	rMCZ 10, Swale Estuary	
	areas within the rMCZ should be protected, with people frequently attaching value to biodiversity and areas that 'appear unspoilt'. Furthermore, respondents felt that the area was important for bird populations particularly the Marsh Harrier. Furthermore, there was a perception that the area is 'under threat' from 'damage caused by jet skiing' and trawling and static netting (the latter comments came from a commercial fisherman). Source: Ranger et al. (2011)	

rMCZ 11.1, Dover to Deal — Site area (km^2): 10.40

- This site has been proposed for designation under Policy Option 1 only.
- Based on SNCB advice, draft conservation objectives for some features have been changed from those established by the Regional Projects. The impacts of these changes on management and costs are not reflected in this Impact Assessment.

Table 1. Conservation impacts	rMCZ 11.1, Dover to Deal
1a. Ecological description	
This site protects what is considered to be the best example of wave-cut intertidal chalk in the region. It includes a narrow band of intertidal and subtidal chalk which forms reefs, ledges and gullies, and which is part of an almost continuous chalk reef between Kingsdown, Deal in the north-east and Folkestone Warren in the south-west, lying below the well known white cliffs. The chalk is in the form of a gently sloping platform, incised with gullies (up to 2 metres deep) and rock pools, on the seaward side, supporting a huge diversity of marine plants and animals and superb examples of littoral chalk communities. Species found there include sponges, anemones, bryozoans, sea squirts, hydroids, molluscs, crustaceans, echinoderms and fish. The chalk foreshore at St Margaret's Bay is considered to have the richest algal community in the Balanced Seas project area. The site also has very good regional examples of intertidal underboulder communities at all levels of the shore from near high water mark where large boulders provide shaded, cave-like conditions for unusual algae, through the mid-shore seaweed (wrack) zones where mobile animals such as porcelain crabs and brittlestars shelter among sponge and bryozoan crusts, to the very low shore kelp zones where crusts of sponges, bryozoans and ascidians grow. Well developed Ross worm reefs are found where sand fringes the edge of the chalk foreshore reef, a type of community that is very rare in Kent and unrecorded in the rest of the UK. Some of the best stocks of intertidal blue mussel beds in Kent and Essex are found here on rock mixed with the Ross worm reef. The Ross worm reef occurs in a long, continuous clump providing habitat and shelter for numerous other species. Towards the seaward side of the site, these habitats grade into subtidal sand, subtidal coarse sediment and subtidal mixed sediments. There is a strong north-east to south-west geological gradient from upper to lower chalks through grey marly chalk to gault clay. The high complexity of the habitat contributes to the high species richness. Source: Balanced Seas Final Recommendations (2011).	

Table 1. Conservation impacts				rMCZ 11.1, Dover to Deal
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A1.2 Moderate energy intertidal rock	0.02	-	Favourable condition	Maintain at favourable condition
A2.1 Intertidal coarse sediments	0.02	-	Favourable condition	Maintain at favourable condition
A2.3 Intertidal mud	0.02	-	Favourable condition	Maintain at favourable condition
A3.1 High energy infralittoral rock	2.06	-	Unfavourable condition	Recover to favourable condition
SNCB advice recommends that the conservation objective for high energy infralittoral rock is changed from "Recover" to "Maintain at favourable condition".				
A3.2 Moderate energy infralittoral rock	0.63	-	Unfavourable condition	Recover to favourable condition
SNCB advice recommends that the conservation objective for moderate energy infralittoral rock is changed from "Recover" to "Maintain at favourable condition".				
A5.1 Subtidal coarse sediment	1.80	-	Favourable condition	Maintain at favourable condition
A5.4 Subtidal mixed sediments	5.17	-	Favourable condition	Maintain at favourable condition
Habitats of Conservation Importance				
Blue mussel beds	1,089 m^2	-	Favourable condition	Maintain at favourable condition
Intertidal underboulder communities	-	1 record	Favourable condition	Maintain at favourable condition
Littoral chalk communities	1.35		Favourable condition	Maintain at favourable condition
Rossworm (*Sabellaria spinulosa*) reef	2,580 m^2	-	Unfavourable condition	Recover to favourable condition
SNCB advice recommends that the conservation objective for Rossworm (*Sabellaria spinulosa*) reef is changed from "Recover" to "Maintain at favourable condition".				
Subtidal chalk	0.06		Unfavourable condition	Recover to favourable condition
SNCB advice recommends that the conservation objective for subtidal chalk is changed from "Recover" to "Maintain at favourable condition".				

Site-specific costs arising from the effect of the recommended Marine Conservation Zone on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	rMCZ 11.1, Dover to Deal
Source of costs of the recommended Marine Conservation Zone (MCZ) under Policy Option 1	
Increase in costs of assessing environmental impacts for future licence applications (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. However, restrictions could also be placed on anchoring in areas of vulnerable MCZ features in the site, including *Sabellaria* reef.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Several World War II defence structures are present within the site, e.g.	An extra cost would be incurred in the assessment of environmental impact

Table 2a. Archaeological heritage	rMCZ 11.1, Dover to Deal
gun emplacements, observation posts and pillboxes. Bronze-age and Neolithic artefacts have been found in the site. Wrecks of British, Norwegian, French, Greek and German origin are recorded in the site. One of these wrecks is protected under the Protection of Wrecks Act 1973 (the Langdon Bay wreck) by a 150 metre exclusion zone. British and German World War II aircraft wrecks have also been recorded in the site (English Heritage, 2012). English Heritage has indicated that this site is likely to be of interest for archaeological excavation in the future as it is relevant to its National Heritage Protection Plan (theme 3A1.2).	made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost in one licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). No further impacts on activities related to archaeology are anticipated. If archaeologists respond to restrictions on anchoring over areas of *Sabellaria* reef by undertaking alternative archaeological excavations 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 Impact Assessment. If archaeological excavations do not take place as a result of this restriction, this will prevent interpretation of archaeological evidence from the site, which will decrease acquisition of historical knowledge of past human communities from the site, resulting in a cost to society.

Table 2b. Commercial fisheries	rMCZ 11.1, Dover to Deal

Source of costs of the recommended Marine Conservation Zone (MCZ) under Policy Option 1

The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of commercial fishing gears will be required for certain features protected by this rMCZ. Therefore, two scenarios have been employed in the Impact Assessment for these fisheries to reflect this uncertainty. Should the site be designated, the management that will be required will fall somewhere within this range.

Management scenario 1: Closure of entire rMCZ to bottom trawls and dredges to protect areas of Ross worm *Sabellaria spinulosa* reef (Statutory Nature Conservation Bodies (SNCB) informed scenario)*.

Management scenario 2: Closure of entire rMCZ to bottom trawls, dredges, lines, nets, pots and traps to protect areas of high and moderate energy infralittoral rock, Ross worm *Sabellaria spinulosa* reef and sub-tidal chalk (SNCB informed scenario).

*****NB. The Regional Stakeholder Group agreed to the recommendation for this rMCZ with closure to bottom trawls only.

The conservation objective was changed to maintain based on the Fisheries Standardisation work showing low levels of exposure and this was also supported by stakeholder feedback about the absence of trawling in this area. Whilst the method paper assumes that there will be no management for commercial fisheries because of the maintain CO, it is actually anticipated that a Gentlemen's agreement to stop all trawling within Dover to Deal would be

implemented if this package of sites go ahead.

Summary of all fisheries: The rMCZ is wholly within the 6nm (nautical mile) limit and is fished only by UK vessels. The main commercial fishing fleet operating in the rMCZ is based in Folkestone, with the rest in Dover and Ramsgate. There are some beach-based vessels at Deal. The main fishery within the site is static netting closely followed by potting (MCZ Fisheries Model). Some Ramsgate-based static gear vessels visit the area. The only local trawlers are based in Folkestone. There is an important trawling ground outside the rMCZ and nomadic trawlers from the Thames Estuary and Channel ports occasionally skirt the southern boundary of the site but generally the ground within the site is unsuitable for towed gear. Several small rod-and-line boats fish in the site targeting bass. A number of commercial fishing restrictions are already in existence (listed in Annex E1). More detail on the approach used for the fisheries method is provided in Annexes H7 and N4.

Estimated total value of landings from the rMCZ: £0.008m/yr.

Baseline description of UK commercial fisheries	Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1
Bottom trawls: Number of vessels unknown. There is a 'gentlemen's agreement' between the trawling and potting sectors that, although the area up to 1km from the shore is mainly a potting ground, trawlers can request that static gear is taken up to allow them to operate when fish that are valuable to them are in the area (Balanced Seas Final Recommendations Report, 2011). Estimated total value of landings from the rMCZ: £0.001m/yr (MCZ Fisheries Model).	The estimated annual value of UK bottom trawl landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.001 | 0.001 If the rMCZ were to be designated, the local trawlers have said that they would no longer trawl within the rMCZ provided that the zoning and management areas that they proposed for rMCZ 26 are adhered to (assuming that rMCZ 26 is also designated). As this management scenario would involve closure to trawling only (and not dredging) it does not directly equate to either Scenarios 1 or 2.
Dredges: Number of vessels unknown.	The estimated annual value of UK dredge landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | <0.001 | <0.001
Nets: Number of vessels unknown. Estimated total value of landings from the rMCZ: £0.005m/yr (MCZ Fisheries Model).	The estimated annual value of UK net landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.000 | 0.005 In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with nets at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover'

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 11.1, Dover to Deal</th></tr>
<tr><td></td><td>conservation objectives. As such, it is anticipated that if additional management is required it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Pots and traps: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £0.002m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK pot and trap landings affected is expected to fall within the following range of scenarios:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.002</td></tr></table>In establishing the draft conservation objectives, the site’s features may have been assessed as having low vulnerability to fishing with pots and traps at current levels and, where this is the case, this activity was not the primary reason for assigning the ‘recover’ conservation objectives. As such, it is anticipated that if additional management is required it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Total direct impact on UK commercial fisheries under Policy Option 1</td><td></td></tr>
<tr><td></td><td>The estimated annual value of UK landings and gross value added (GVA) affected is expected to fall within the following range of scenarios:
<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td><td>Best estimate</td></tr><tr><td>Value of landings affected</td><td>0.001</td><td>0.008</td><td>0.001</td></tr><tr><td>GVA affected</td><td>0.000</td><td>0.004</td><td>0.000</td></tr></table>The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occuriing, and an assumption that 75% of value is displaced to other areas. This is based upon an assumption of average displacement across all rMCZs, and may be an under- or over-estimate for t his site.</td></tr>
<tr><td>Baseline description of non-UK fisheries</td><td>Costs of impact of rMCZ on non-UK commercial fisheries</td></tr>
<tr><td></td><td>None.</td></tr>
</table>

Table 2c. Ports, harbours, shipping and disposal sites	rMCZ 11.1, Dover to Deal
Source of costs of the recommended Marine Conservation Zone (MCZ) under Policy Option 1	
Management scenario 1: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for navigational dredging and future licence applications for known specific plans or proposals for port and harbour developments within 1km of the rMCZ. It is	

anticipated that additional mitigation of impacts on features protected by the rMCZ will be needed for port developments or port-related activities relative to the mitigation provided in the baseline.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for disposal of dredged material, navigational dredging and all port and harbour developments within 5 km of the rMCZ. Also, additional costs incurred in including MCZ features in a potential new MDP for Dover. It is anticipated that additional mitigation of impacts on features protected by the rMCZ will be needed for port developments or port-related activities relative to the mitigation provided in the baseline.

Baseline description of activity

Disposal sites: There are no disposal sites either in or within 1 km of the rMCZ and so Scenario 1 will not apply.

There are two disposal sites (DV010 Dover and DV011 Dover Emergency site) within 5km of the rMCZ. The average number of licence applications received for both of these disposal sites is 2.1 per year (based on number of licence applications received between 2001 and 2010 (Cefas, pers. comm., 2011).

Navigational dredge areas: There are various licensed dredging areas in or within 1km of this rMCZ associated with Dover Harbour Board (DHB). It is assumed that each dredge area's marine licence is renewed once every 3 years, and that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal.

There are various licensed dredging areas within 5km of this rMCZ associated with Dover Harbour Board (DHB). It is assumed that each dredge area's marine licence is renewed once every 3 years, and that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal. As these navigational dredge areas will be covered by a potential new MDP, it is assumed that the assessment of environmental impact is not changed over the 20 year period of the IA.

Port development: There is one port within 5km of the rMCZ: Dover.

To cater for expected expansion, Dover Harbour Board (DHB) has developed a 30-year master plan for Dover Port (DHB, 2010). Dover Port is Europe's busiest ferry port, handling £80,000m of trade each year and supporting 22,000 jobs, over 90% of which are in Kent. It also has national and international importance as a gateway for trade between the UK and continental Europe and over the past 20–30 years has seen sustained long-term growth of around 3–4% per annum

Costs of impact of rMCZ on the sector under Policy Option 1

£m/yr	Scenario 1	Scenario 2
Cost to the operator	0.002	0.019

Scenario 1: Future licence applications for navigational dredging and port or harbour development plans or proposals within 1km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11).

Sufficient information is not available to identify what additional mitigation of impacts on features protected by the rMCZ will be needed for proposed future port and harbour developments relative to the mitigation provided in the baseline. Unknown potentially significant costs of mitigation could arise.

Scenario 2: Future licence applications for disposal of material, navigational dredging and port or harbour development plans and proposals within 5km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11).

Also, additional costs will be arise to include MCZ features protected by the rMCZ in a potential new MDP to consider the potential effects of activities on the features protected by the rMCZ. The anticipated additional cost in the potential new MDP is estimated to be a one-off cost of £8438.

Sufficient information is not available to identify what additional mitigation of impacts on features protected by the MCZ will be needed for proposed future port and harbour developments relative to the mitigation provided in the baseline. Unknown potentially significant costs of mitigation could arise.

Table 2c. Ports, harbours, shipping and disposal sites	rMCZ 11.1, Dover to Deal
(www.doverport.co.uk). Detailed forecasting by both DHB and the UK Government indicates that traffic is expected to grow at around 2% per annum for the next 20–30 years due to the macro economics of Europe, linked to GDP and population growth (www.doverport.co.uk). A Harbour Revision Order was approved in November 2011 that allows for development of a second ferry terminal (Terminal 2) within the harbour, commencing in 3 years' time (http://www.dft.gov.uk/publications/dover-terminal-2). The Terminal 2 expansion will remain within the current footprint of the port and will therefore not directly overlap the footprint of the rMCZ, although the MCZ's features could potentially be impacted on by capital dredges that take place outside the site if these are required as part of the development. Other future development may also be required.	

Table 2d: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 11.1, Dover to Deal
Oil and gas related activities (including carbon capture and storage)	
This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (MCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 11.1, Dover to Deal
Cables (existing interconnectors and telecom cables) Commercial fisheries (collection by hand, mid-water trawls) Flood and coastal erosion risk management (coastal defence) Recreation Research and education Shipping Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[5] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.								rMCZ 11.1: Dover to Deal	
ENG Feature	Represent-ativity	Replication	Adequacy	Viability	Gaps or shortfalls in relation to ENG minimum guidelines	Recommended conservation objective	Quantitative considerations at regional MCZ level	Ecological Importance at regional MCZ level	Ecological Importance at wider scale
A1.2 Moderate energy intertidal rock	BSH	✓	✓	✓	None	Maintain	This feature provides the second greatest (joint with site 13.2) contribution to the adequacy target than any other site in the regional project		
A2.1 Intertidal coarse sediment	BSH	✓	✓	✓	None	Maintain			
A2.3 Intertidal mud	BSH	✓	✓	✓	None	Maintain	This site is the only rMCZ with this feature but one of three withinMPAs and	This site provides the greatest contribution to the	

[5] copied from the JNCC and Natural England's advice to Defra on rMCZs

							MCZs.	adequacy target for this feature	
A3.1 High energy infralittoral rock	BSH	✓	✓	✓	None	Recover			
A3.2 Moderate energy infralittoral rock	BSH	✓	✓	✓	None	Recover			
A5.1 Subtidal coarse sediment	BSH	✓	✓	✓	None	Maintain			
A5.4 Subtidal mixed sediments	BSH	✓	✓	✓	None	Maintain			
Blue mussel *Mytilus edulis* beds	FOCI Habitat	✓	✓	✓	None	Maintain			OSPAR habitat and BAP habitat - UK obligation, decline, functional habitat
Intertidal underboulder communities	FOCI Habitat	✓	✓	✓	None	Maintain			BAP habitat - UK obligation, decline, functional habitat
Littoral chalk communities	FOCI Habitat	✓	✓	✓	None	Recover			BAP and OSPAR habitat

Ross worm *Sabellaria spinulosa* reefs	FOCI Habitat	✓	✓	✓	None	Recover		Best regional example of this habitat, found intertidally and subtidally.	BAP and OSPAR habitat
Subtidal chalk	FOCI Habitat	✓	✓	✓	None	Recover			BAP habitat

Site considerations	
Connectivity	✓
Geological/Geomorphological features of interest	None
Appropriate boundary	✓
Areas of Additional Ecological Importance	✓ * [1, 2]
Overlaps with existing MPAs	X

rRA 7 South Foreland Lighthouse (Balanced Seas) (Natural England lead) within rMCZ 11.1. An overview of features proposed for designation within recommended reference area South Foreland Lighthouse and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale

✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Where an asterisk (*) has been given in the table, more detail is provided in the narrative.

ENG Feature	**Representativity**	**Viability**	**Recommended conservation objective**
A1.1 High energy intertidal rock	BSH	X	Recover to reference condition
A1.2 Moderate energy intertidal rock	BSH	X	Recover to reference condition
Intertidal underboulder communities	FOCI Habitat	✓	Recover to reference condition

Littoral chalk communities	FOCI Habitat	X	Recover to reference condition
Subtidal chalk	FOCI Habitat	✓	Recover to reference condition
A3.1 High energy infralittoral rock	BSH	X	Recover to reference condition
A5.4 Subtidal mixed sediment	BSH	X	Recover to reference condition
Site considerations			
Appropriate boundary	✓		

Additional comments and site benefits:

[1]Sea anemone (*Diadumene cincta*), Ross coral (*Pentapora foliacea*), sea squirt beds and the rare stalked jellyfish (*Craterolophus convolvulus)* have all been recorded within this site.

[2] Foraging grounds for Tern and Gull spp. Nursery and spawning grounds for fish.

Highly diverse area with a number of habitat FOCI and additional features of interest including chalk ledges and gullies.

Excellent examples of littoral chalk communities on intertidal and subtidal chalk reefs. The wave-cut intertidal chalk in this site is considered to be the best example of the habitat in the region (Balanced Seas 2011a).

Very good regional examples of intertidal underboulder communities supporting examples of rare sponges.

Excellent example of *Sabellaria spinulosa* reefs.

In between the *Sabelleria* reefs are some of the best stocks of discrete intertidal blue mussels beds on rocks in the Kent and Essex area, forming an area of high heterogeneity (Balanced Seas 2011a).

This site is part of one of the Key Inshore Biodiversity Areas in the Balance Sea Region (South East England Biodiversity Forum (SEEBF) 2010).

An important plant area. The intertidal chalk supports a variety of algae and St Margarets is considered to be the richest algal community in south-east England (Tittley 1986, Brodie, et al. 2007).

This site is very diverse and has high benthic biotope richness.

This site is well studied.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption		**rMCZ 11.1, Dover to Deal**
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Intertidal rock habitats are important sources of larval plankton upon which commercially important fish species feed, including mussels and larval fish of plaice and mackerel. Fish scavenge in coarse sediment intertidal areas. Intertidal mud provides habitat for fish of commercial importance. Subtidal coarse sediments and mixed sediments, sand and mud are important for spawning and nursery grounds. These habitats can provide important nursery grounds for juvenile commercial species such as flatfishes and bass. High energy and moderate energy infralittoral rock are important locations for commercial inshore fishing activity, particularly crab and lobster (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The main fishery within the site is static netting closely followed by potting. Several small rod and line boats fish in the site targeting bass. A description of on-site fishing activity and the value derived from it is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits that derive from spawning and nursery areas.	If the conservation objectives of the features are achieved, some of the features will recover to favourable condition. The rest will be maintained in favourable condition. New management of fishing activities is expected (above the baseline situation), the costs of which are set out in Table 2b, which may reduce the impacts on fish and shellfish habitats and harvesting of stocks. As most of the commercial species targeted by fishers in this area are mobile fish and crustaceans, it is unclear whether the scale of habitat recovered and the magnitude of reduced (on-site) harvesting will be enough to have any significant positive impact on commercial stocks. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change:  Confidence: Low

Table 5b. Recreation		**rMCZ 11.1, Dover to Deal**
Baseline	**Beneficial impact under Policy Option 1**	

Table 5b. Recreation		rMCZ 11.1, Dover to Deal
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The rMCZ is a relatively popular area for private boat angling and charter boat fishing. Access for shore angling is limited because the site lies beneath cliffs. Due to the complex habitats within the site (including chalk gullies) and the generally high biodiversity, it is likely to help to support potential on-site and off-site fisheries. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that result from high biodiversity within the rMCZ.	If the conservation objectives of the features are achieved, some of the features, including the infralittoral rock and subtidal chalk, will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the infralittoral rock and subtidal chalk to favourable condition may improve their functioning as potential nursery areas and increase their biodiversity in general, potentially benefiting angling activities within and outside the rMCZ (see Table 4a). As no additional management of angling is expected fishers will be able to benefit from any on-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers, both on and off-site Designation of this site may lead to an increase in angling visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in angling.	Anticipated direction of change: ⇧ Confidence: Low
Diving: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation services. The rMCZ is used for shore diving, particularly around St Margaret's Bay and Deal. Both locations within the site have easy access, good visibility, short swims to wrecks and reefs with an abundance of wildlife. (www.oceanodyssey.co.uk/kentshoredives.htm). Boat diving for some of the wrecks and abundant marine life in the area may take place throughout the site.	Designation of this site might lead to an increase in diving trips, as a result of publicity about the marine biodiversity and rare species found in the site. If populations of species such as seahorses and stalked jellyfish increase, this could lead to an improved quality of experience for divers, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in diving trips at the national scale.	Anticipated direction of change: ⇧ Confidence: Low

Table 5b. Recreation		rMCZ 11.1, Dover to Deal
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The kelp zones, part of the infralittoral rock, provide shelter and habitat for numerous species and a surface cut by gullies and crevices and overlain by boulders provides diverse localised areas of shelter. Mussel beds are an important food source for birds. The water around the sublittoral habitat is very important for larger animals such as marine mammals and sea birds (Fletcher and others, 2011). Chalk gullies within the subtidal chalk create cave and rock pool habitats (Balanced Seas Final Recommendations, 2011), contributing further to the high biodiversity of the site which is potentially of value to wildlife watching. The rMCZ is mostly inaccessible with few places to get down to the shore. However, coastal paths along the cliffs attract birdwatchers and local charter boats provide wildlife watching trips out of Dover Harbour. Rock-pooling may be popular where access is safe. Wildlife watching cruises between Dover and France are run by DFDS Seaways in association with ORCA (DFDS Seaways website). It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	If the conservation objectives of the features are achieved, some of the features, including the infralittoral rock and subtidal chalk, will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the infralittoral rock and subtidal chalk to favourable condition may improve their functioning as shelter and habitat for numerous species thus increasing the biodiversity of the area and potentially benefitting wildlife watching within the rMCZ. In addition, an improvement in the condition of site features and any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low
Other recreation: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of recreation and tourism services. Coastal walking along the cliffs and accessible parts of the shore is popular and there is a 14km walk that runs the entire length of the rMCZ and includes the Saxon Shore Way and the White Cliffs Country Trail (www.stuart-field.co.uk/kent/coastal/coastal09.html). Other recreational pursuits are not known to occur specifically within the rMCZ; however, recreational traffic will pass through in transit to other destinations or on its way to Dover Harbour (StakMap, 2010).	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities. If the rMCZ is designated this will provide an additional positive aspect about the location that could be promoted by the tourism and leisure industry and that would be expected to	Anticipated direction of change: ⇧ Confidence: Low

Table 5b. Recreation		rMCZ 11.1, Dover to Deal
It has not been possible to estimate the value derived from tourism in the rMCZ.	increase visitation rates.	

Table 5c. Research and education		rMCZ 11.1, Dover to Deal
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of research services. Kent Wildlife Trust is very active in the area, regularly conducting sea-floor and sea-shore surveys through Seasearch and Shoresearch. Research is also conducted by Kent County Council in order to inform the Kent Coastal Network initiative (Kent Coastal Network website). It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. Kent Wildlife Trust provides regular marine-based courses across a range of abilities, from basic introductory levels right through to specialised habitats and species that may relate to the rMCZ (Kent Wildlife Trust website). It has not been possible to estimate the value derived from education activities associated with the rMCZ.	MCZ designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ) education activities (e.g. events, interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Moderate

Table 5d. Regulating services		rMCZ 11.1, Dover to Deal
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: the features of the site contribute to the bioremediation of waste (intertidal mud, subtidal sediments), water filtration (Blue Mussel beds, *Sabellaria*) and sequestration of carbon (intertidal rock, Blue Mussel beds, *Sabellaria*, subtidal sediments)	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (infralittoral rock, *Sabellaria* and subtidal chalk) recovered to favourable condition.	Anticipated direction of change: ⇧

Table 5d. Regulating services		rMCZ 11.1, Dover to Deal
(Fletcher and others, 2011). ***Environmental resilience:*** the features of the site (intertidal rock, Blue Mussel beds and *Sabellaria*) contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** the features of the site, (infralttoral rock, Blue Mussel beds and *Sabellaria*) contribute to local flood and storm protection (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ.	Recovery of the infralittoral rock and *Sabellaria r*eefs and a potential reduction in the use of bottom towed fishing gear may increase the site's benthic biodiversity and biomass, improving the regulating capacity its habitats. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Confidence: Low

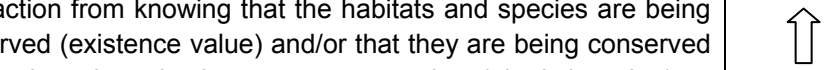
Table 5e. Non-use and option values		rMCZ 11.1, Dover to Deal
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the pMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the rMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation. Examples of these values are shown in (Ranger, Lowe, Sanghera, & Solandt, 2012). Voters in the MCS's 'Your Seas Your Voice' campaign felt that features of the natural environment were strong motivators for reasons why people thought that certain areas within the rMCZ should be protected, with people frequently attaching value to biodiversity and 'a lovely area that needs to be protected.' Other themes that came up quite frequently were the sentiment that they felt "the whole area is precious to local people and visitors alike" and a feeling of emotional attachment to the site. The importance of the area to national heritage and a resource for future generations was stated as well. Regarding	Anticipated direction of change:  Confidence: Moderate

Table 5e. Non-use and option values		rMCZ 11.1, Dover to Deal
	non-extractive use value, ease of access and proximity to 'exciting diving' were considered important as reasons to protect this site. Furthermore, allowing species recovery particularly fish and shellfish was perceived as an important management reason to protect the site for both recreational and commercial users as it 'represents a good potential for marine wildlife in this area of the English channel which is very narrow and used by fisheries and ferries. It would be a good site for stock replenishment/ nursery ground." Source: Ranger et al. (2011).	

rMCZ 11.1, Reference Area 7 South Foreland Lighthouse Site area (km^2): 0.64

- This site has been proposed for designation under Policy Option 1 only

Table 1. Conservation impacts			**rMCZ 11.1, Reference Area 7 South Foreland Lighthouse**	
1a. Ecological description				
This site encompasses intertidal and subtidal areas and lies within recommended Marine Conservation Zone 11.1 (Dover to Deal). It contains very good examples of intertidal underboulder communities and some of the best subtidal chalk and littoral chalk communities in the region. The intertidal underboulder communities resulting from cliff falls from the undefended cliffs above are considered to be very rich. The intertidal and subtidal broad-scale habitats underpin the habitat complexity. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A1.1 High energy intertidal rock	1,117 m^2	-	Unfavourable condition	Recover to favourable condition
A1.2 Moderate energy intertidal rock	0.16	-	Unfavourable condition	Recover to favourable condition
A3.1 High energy infralittoral rock	-	-	Unfavourable condition	Recover to favourable condition
A5.4 Subtidal mixed sediments	-	-	Unfavourable condition	Recover to favourable condition
Habitats of Conservation Importance				
Intertidal underboulder communities	-	1 record	Unfavourable condition	Recover to favourable condition
Littoral chalk communities	0.2	-	Unfavourable condition	Recover to favourable condition
Subtidal chalk	0.02	-	Unfavourable condition	Recover to favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone (rMCZ) on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	**rMCZ 11.1, Reference Area 7 South Foreland Lighthouse**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Within the site are identified: a World War II concrete base for a gun emplacement; the remains of a German schooner (lost 1910); the wreck of a French trawler (*Notre Dame de Lourdes*, lost 1917); a World War II	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not

Table 2a. Archaeological heritage	rMCZ 11.1, Reference Area 7 South Foreland Lighthouse
observation post; (English Heritage, 2012).	known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost in one licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). 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 Impact Assessment. 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.

Table 2b. Commercial fisheries	rMCZ 11.1, Reference Area 7 South Foreland Lighthouse
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Closure of entire site to all gear types.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Overview: This site is primarily intertidal and extends only 500 metres from shore. It lies within rMCZ 11.1 Dover to Deal. There is a small overlap of the area with the local static fishery. Two small static gear boats are based in Dover which work in the small sub-tidal part of the rMCZ Reference Area.. The site represents only a small portion of the local fishing ground. More detail on the approach used for the fisheries method is provided in Annexes H7 and N4. Estimated annual value of landings from the rMCZ Reference Area: £0.001m/yr. (Due to resolution issues of the MCZ Fisheries Model and the small size of many rMCZ Reference Areas in the Balanced Seas region, some fisheries landings values may be inaccurate. They have been included as a precautionary measure and to avoid underestimating the economic value of a site.)	
Bottom trawls: It is unknown how many vessels use this site but four FisherMap interviewees (from Thanet Fishermen's Association, NFFO, Newhaven Fish and Flake Ice Society Ltd) indicated that the rMCZ Reference Area overlaps with the rMCZ Reference Area (FisherMap Data 2010). The vessels target bass and Dover sole using trawls, beam trawls and pair trawls. In all cases the rMCZ Reference Area only represents a tiny proportion of the areas of operation.	Estimated annual value of UK vessel landings affected: *£m/yr* — Scenario 1 Value of landings affected — <0.001

<table>
<tr><th>Table 2b. Commercial fisheries</th><th>rMCZ 11.1, Reference Area 7 South Foreland Lighthouse</th></tr>
<tr><td>Dredges: It is indicated that no vessels operate dredges within the rMCZ Reference Area (FisherMap Data 2010), although the MCZ Fisheries Model gives an estimated total value of landings from the rMCZ Reference Area of £10/yr.</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><td>Pots and traps: It is unknown how many vessels use this site but two boats from Dover are known to work in the subtidal part of the site. Four FisherMap interviewees (two from Thanet Fishermen’s Association) targeting common lobster, cuttlefish and crab indicated that the rMCZ Reference Area overlaps with their area of operation (FisherMap Data 2010), but the rMCZ Reference Area only represents a small proportion of their areas of operation.</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><td>Nets It is unknown how many vessels use this site. 14 FisherMap interviewees (from Thanet Fishermen’s Association and the New Under Ten Fishermen’s Association) indicated that their area of operation overlaps with the rMCZ Reference Area. Target species are cod, skate, ray, bass and Dover sole using trammel, tangle and gill nets (FisherMap Data 2010). In all cases the rMCZ Reference Area only represents a tiny proportion of their areas of operation. Estimated total value of landings from the rMCZ Reference Area: £0.001m/yr (MCZ Fisheries Model).</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td>0.001</td></tr></table></td></tr>
<tr><td>Total direct impact on UK commercial fisheries under Policy Option 1</td><td></td></tr>
<tr><td></td><td>Estimated annual value of UK vessel landings and gross value added (GVA) affected:
<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Best estimate</td></tr><tr><td>Value of landings affected</td><td>0.001</td><td>0.000</td></tr><tr><td>GVA affected</td><td>0.000</td><td>0.000</td></tr></table>
The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas. This is based upon an assumption of average</td></tr>
</table>

Table 2b. Commercial fisheries	rMCZ 11.1, Reference Area 7 South Foreland Lighthouse
	displacement across all rMCZs, and may be an under- or overestimate for this site.
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries under Policy Option 1**
	None.

Table 2c. Ports, harbours, shipping and disposal sites	rMCZ 11.1, Reference Area 7 South Foreland Lighthouse

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management scenario 1: Not applicable to this site.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for all port and harbour developments within 5 km of the rMCZ Reference Area. It is anticipated that additional mitigation of impacts on features protected by the rMCZ Reference Area will be needed for port development and port-related activities relative to the mitigation provided in the baseline.

Baseline description of activity

Port development: There is one port (Dover Port) within 5km of the rMCZ Reference Area (Ports & Harbours UK, 2012).

To cater for expansion, Dover Harbour Board (DHB) has developed a 30-year master plan for Dover Port (DHB, 2010). Dover Port is Europe's busiest ferry port, handling £80,000m of trade each year and supporting 22,000 jobs, over 90% of which are in Kent. It also has national and international importance as a gateway for trade between the UK and continental Europe and over the past 20–30 years has seen sustained long-term growth of around 3–4% per annum (www.doverport.co.uk). Detailed forecasting by both Dover Harbour Board (DHB) and the UK Government indicates that traffic is expected to grow at around 2% per annum for the next 20–30 years due to the macro economics of Europe, linked to GDP and population growth (www.doverport.co.uk). t A Harbour Revision Order was approved in November 2011 that will allow for development of a second ferry terminal (Terminal 2) within the harbour, commencing in 3 years' time (http://www.dft.gov.uk/publications/dover-terminal-2/), The Terminal 2 expansion will remain within the current footprint of the port and will therefore not directly overlap the footprint of the rMCZ Reference

Costs of impact of rMCZ on the sector under Policy Option 1

£m/yr	Scenario 1	Scenario 2
Cost to the operator (port development)	N/A	0.000

Scenario 1: Not applicable to this site.

Scenario 2: Future licence applications for known port developments within 5km of this rMCZ Reference Area will need to consider the potential effects of the activity on the features protected by the rMCZ Reference Area. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11).

Sufficient information is not available to identify what additional mitigation of impacts on features protected by the rMCZ Reference Area will be needed for proposed future port and harbour developments relative to the mitigation provided in the baseline. Unknown potentially significant costs of mitigation could arise.

Table 2c. Ports, harbours, shipping and disposal sites	rMCZ 11.1, Reference Area 7 South Foreland Lighthouse
Area, although the MCZ's features could potentially be impacted on by capital dredges that take place outside the site if these are required as part of the development. Other future development may also be required.	

Table 2d. Recreational angling — **rMCZ 11.1, Reference Area 7 South Foreland Lighthouse**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Closure of the entire site to recreational angling.

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
Four StakMap interviews indicated that charter boats for angling (representing 1,884 anglers/yr) operate in areas that overlap with the rMCZ Reference Area. Their use of the site is seasonal and restricted to winter or is dependent on wind conditions. According to a local charter boat operator (D. Hancock, RSG charter boat representative, pers. comms., January 2012) 26 vessels (3 boats based at Dungeness, 7 at Dover, 2 at Folkestone, 8 at Ramsgate, 3 at Rye and 3 beach-launched vessels at Deal) fish within the site. The high cliffs mean that it is the only site in the general area where shelter can be found during strong tides and bad weather . Vessels can take up to 8 anglers per trip. The same operator estimated that these vessels could fish in this inshore site for up to 150 days a year. Information from the Stakmap interviews indicates that charter boats typically visit a number of sites and work for 200 days a year. Balanced Seas thus considers that 150 days spent in a single small site is an over estimate The estimated average revenue per charter vessel is £300/day (D. Hancock, RSG charter boat representative, pers. comms., January 2012). Shore-based angling does not occur in the rMCZ because access to the intertidal area of undercliffs where the rMCZ Reference Area is sited is very limited (Balanced Seas South Kent Sites meeting report, July 2011)	Anglers and charter boat operators might respond to the closure to angling by angling in other areas nearby if the weather or fish movements allow. However, there are times when the rMCZ Reference Area is the only suitable site for angling in the area (D. Hancock, Regional Stakeholder Group (RSG) charter boat representative, email, 5th December, 2011). To avoid underestimation of costs, the IA assumes that charter boat operators will lose all revenue from angling trips. Since the estimate of 150 days use of the site (D. Hancock, RSG charter boat representative) is considered an over-estimate, the IA is assuming that one sixth of this number of days is more realistic, given the charter boats' use of a number of sites, allowing for displacement of some of their activity to alternative locations. Consequently, Balanced Seas estimates that on average each of the 26 vessels loses revenue of £300/day for 25 days a year. Since the charter vessels using this site may be capable of fishing elsewhere nearby, depending on the weather and fish movements, the value of actual revenue lost may nevertheless be lower than the estimate that is provided here. *£m/yr* — Scenario 1 Estimated value of charter boat revenue affected — 0.195 GVA affected — 0.092

Table 2e: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 11.1, Reference Area 7 South Foreland Lighthouse

Oil and gas related activities (including carbon capture and storage)

This rMCZ Reference Area overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 27th Seaward Licensing Rounds). However, it is unlikely that any oil and gas (including carbon capture and storage) infrastructure will be proposed in future in this rMCZ Reference Area due to its location and size (DECC, pers. comm., 2012). Impacts of rMCZ Reference Areas on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N 10 (they are not assessed for this site alone).

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ 11.1, Reference Area 7 South Foreland Lighthouse**
Flood and coastal erosion risk management (coastal defence) Recreation (except the activities listed above in table 2) Water abstraction discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath BS 11.1 Dover to Deal. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 4a. Fish and shellfish for human consumption	**rMCZ 11.1, Reference Area 7 South Foreland Lighthouse**
Baseline	**Beneficial impact under Policy Option 1**

Table 4a. Fish and shellfish for human consumption	rMCZ 11.1, Reference Area 7 South Foreland Lighthouse	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. Intertidal rock is an important source of larval plankton on which commercially important fish species feed, including mussels and larval fish of plaice and mackerel (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in some are in favourable condition and some are in unfavourable condition (see rMCZ 11.1 Table 1 for details). There is a small amount of fishing using static gears in the rMCZ Reference Area. A description of on-site fishing activity and the value derived from it is set out in Table 2b.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. The costs of this are set out in Table 2b. Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption. Closure of the rMCZ Reference Area to fishing activity will reduce the on-site fishing mortality of species but, as the site is small, it is unclear whether this would benefit stocks of mobile commercial finfish species. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation	rMCZ 11.1, Reference Area 7 South Foreland Lighthouse	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Intertidal rock is an important source of larval plankton on which commercially important fish species feed, including mussels and larval fish of plaice and mackerel (Fletcher and others, 2011), and thus may also benefit recreational fisheries. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMCZ 11.1 Table 1 for details). There is a small amount of angling from charter boats in this rMCZ	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation	rMCZ 11.1, Reference Area 7 South Foreland Lighthouse	
Reference Area, as described in Table 2d. It has not been possible to estimate the value derived from this.		
Diving: The rMCZ Reference Area is used for shore diving (see also Table 4b for rMCZ 11.1, Dover to Deal).	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The recovery of the features to reference condition may improve their functioning as support for fish and other marine wildlife (including increases in size and diversity of species), potentially benefiting diving within the rMCZ Reference Area. Any increase may represent a redistribution of dive location preferences rather than an overall increase in diving.	Anticipated direction of change: ⇧ Confidence: Low
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services. Macroinvertebrates are an essential link between high trophic levels (e.g. fish and birds) and low trophic levels (e.g. algae) on intertidal rock habitat (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in some are in favourable condition and some are in unfavourable condition (see rMCZ 11.1 Table 1 for details). The cliffs above the rMCZ Reference Area are a very popular bird	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The recovery of the features to reference condition may improve their functioning as support for fish and bird populations, potentially benefiting wildlife watching within the rMCZ Reference Area. In addition, an improvement in the condition of site features and any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation	rMCZ 11.1, Reference Area 7 South Foreland Lighthouse	
watching site (see also Table 4b for rMCZ 11.1, Dover to Deal). It has not been possible to estimate the value derived from wildlife watching in the rMCZ Reference Area.	visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities (as, if necessary, mitigation would be introduced, with the associated costs and benefits).	
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services. The cliffs adjacent to the rMCZ Reference Area are very popular for walking (the Frontline Britain Trail is a circular walk around St Margaret's-at-Cliffe, with a series of ten panels to explain about the wildlife and history of the landscape). The South Foreland is the nearest point of Kent to France (a distance of only 34km) (Kent Coast Bulletin, Issue 2, 2004). Rockpooling may be popular where access is safe. It has not been possible to estimate the value derived from other recreation in the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The rMCZ Reference Area is fully contained within rMCZ 11.1 for which the benefits of other recreation have been assessed. It is not possible to identify whether the Reference Area will have additional benefits over and above this but this seems unlikely. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities (because, if necessary, mitigation would be introduced, with the associated costs and benefits).	Anticipated direction of change: ⇧ Confidence: Low

Table 4c. Research and education	rMCZ 11.1, Reference Area 7 South Foreland Lighthouse	
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. Research activities are undertaken by Kent Wildlife Trust in the wider rMCZ in which this rMCZ Reference Area lies and may overlap; the area is surveyed by Seasearch on a regular basis and studies have been undertaken as part of the research associated with the construction of the Channel Tunnel.	As an rMCZ Reference Area, the site will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High

Table 4c. Research and education		rMCZ 11.1, Reference Area 7 South Foreland Lighthouse
It has not been possible to estimate the value derived from research activities associated with the rMCZ Reference Area.		
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. Kent Wildlife Trust provides regular marine-based courses across a range of abilities, from basic introductory levels right through to specialised habitats and species that may relate to the rMCZ Reference Area (Kent Wildlife Trust website). It has not been possible to estimate the value derived from education activities associated with the rMCZ Reference Area.	MCZ Reference Area designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ Reference Area) education activities (e.g. events and interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ Reference Area contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Moderate

Table 4d. Regulating services		rMCZ 11.1, Reference Area 7 South Foreland Lighthouse
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: Subtidal mixed sediments may contribute to the bioremediation of waste and sequestration of carbon (Fletcher and others, 2011). ***Environmental resilience:*** The features of the site, in particular intertidal rock, contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** Intertidal rock provides a natural form of protection from erosion by reducing the wave energy that reaches the shore (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of the broad-scale habitats and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the recommended Marine Conservation Zone Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities (as, if necessary, mitigation would be introduced, with the associated costs and benefits).	Anticipated direction of change: ⇧ Confidence: Low

Table 4e. Non-use and option values	rMCZ 11.1, Reference Area 7 South Foreland Lighthouse

Table 4e. Non-use and option values	rMCZ 11.1, Reference Area 7 South Foreland Lighthouse	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: Confidence: Moderate

rMCZ 11.2, Dover to Folkestone **Site area (km^2): 20.13**

- This site has been proposed for designation under Policy Option 1 only.
- Based on SNCB advice, draft conservation objectives for some features in this site have been changed from those established by the Regional Projects. The impacts of these changes on management and costs are not reflected in this Impact Assessment.

Table 1. Conservation impacts **rMCZ 11.2, Dover to Folkestone**

1a. Ecological description

The inshore part of this site is similar to that described for rMCZ 11.1 as this site is part of the wave-cut intertidal chalk platforms that form an almost continuous reef between Kingsdown, Deal in the north-east and Folkestone Warren in the south-west. The chalk is in the form of a gently sloping platform, incised with gullies (up to 2 metres deep) and rock pools, on the seaward side, and supports a huge diversity of marine plants and animals and superb examples of littoral chalk communities. Species found there include sponges, anemones, bryozoans, sea squirts, hydroids, molluscs, crustaceans, echinoderms and fish. These habitats grade seawards into subtidal coarse sediment and, further out in the seaward extension of the rMCZ, unusual hard rock types including subtidal greensand which forms complex reef structures and supports rich marine life. Intertidal greensand forms ridges with rock pools and boulders over a broad zone, and supports different algal species from those found on chalk. The very soft clay in Folkestone Warren supports different communities of seaweed. This is the only place in Kent where the brown alga *Desmerestia ligulata* occurs. Copt Point, where harder lower greensand rock emerges from below the gault clay, is one of the few places where harder rock is found in the intertidal zone in the Balanced Seas Project Area, and as a result has seaweed species that are unusual for the project area, and more typical of northern and western Britain. Shakespeare Point, within the rMCZ, has the best regional example of intertidal underboulder communities. Ross worm reefs occur intertidally in East Wear Bay, stabilising the mixed-sediment sea bed and providing shelter, attachment points and habitat for other species. The offshore Ross worm reef is the most extensive and intact in the Balanced Seas project area. At Copt Point, there are dense aggregations of intertidal blue mussel beds on intertidal rock mixed with intertidal Ross worm reefs. The site also contains blue mussel beds which extend subtidally, unharvested native oysters and short-snouted seahorses. There is a strong north-east to south-west geological gradient from upper to lower chalks through grey marly chalk to gault clay. The most notable geological feature is Folkestone Warren, a very large, deep-seated coastal landslide about 3km wide, and up to 350 metres in length. This site is adjacent to Folkestone Warren Site of Special Scientific Interest.

Source: Balanced Seas Final Recommendations (2011).

1b. Baseline condition of MCZ features and impact of the MCZ

Feature	Area of feature (km2)	No. of occurrences	Baseline	Impact
Broad-scale habitats				
A1.2 Moderate energy intertidal rock	0.29	-	Favourable condition	Maintain at favourable condition
A2.1 Intertidal coarse sediment	416.12 m^2	-	Favourable condition	Maintain at favourable condition
A3.1 High energy infralittoral rock	1.47	-	Unfavourable condition	Recover to favourable condition
SNCBs advice recommends that the conservation objective for High energy infralittoral rock is changed from "Recover" to "Maintain at favourable condition".				

Table 1. Conservation impacts				rMCZ 11.2, Dover to Folkestone
A3.2 Moderate energy infralittoral rock	0.18	-	Unfavourable condition	Recover to favourable condition
SNCBs advice recommends that the conservation objective for Moderate energy infralittoral rock is changed from "Recover" to "Maintain at favourable condition".				
A5.1 Subtidal coarse sediment	17.50	-	Favourable condition	Maintain at favourable condition
Habitats of Conservation Importance				
Blue mussel beds	3,516 m^2	-	Unfavourable condition	Recover to favourable condition
SNCBs advice recommends that the conservation objective for Blue mussel beds is changed from "Recover" to "Maintain at favourable condition".				
Intertidal underboulder communities		3 records	Favourable condition	Maintain at favourable condition
Littoral chalk communities	0.74		Unfavourable condition	Recover to favourable condition
SNCBs advice recommends that the conservation objective for Littoral chalk communities is changed from "Recover" to "Maintain at favourable condition".				
Peat and clay exposure	660.92 m^2	-	Favourable condition	Maintain at favourable condition
Rossworm (*Sabellaria spinulosa*) reef	625.67 m^2	-	Unfavourable condition	Recover to favourable condition
SNCBs advice recommends that the conservation objective for Rossworm (*Sabellaria spinulosa*) is changed from "Recover" to "Maintain at favourable condition".				
Subtidal chalk	0.13	-	Unfavourable condition	Recover to favourable condition
SNCBs advice recommends that the conservation objective for Subtidal chalk is changed from "Recover" to "Maintain at favourable condition".				
Subtidal sands and gravels	1.25	-	Favourable condition	Maintain at favourable condition
Species of Conservation Importance				
Native Oyster (*Ostrea edulis*)	-	4 records	Favourable condition	Maintain at favourable condition
Short snouted seahorse (*Hippocampus hippocampus*)	-	1 record	Favourable condition	Maintain at favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	rMCZ 11.2, Dover to Folkestone

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Increase in costs of assessing environmental impacts for future licence applications (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.

However, restrictions could be placed on:

- anchoring in areas of vulnerable MCZ features in the site, including *Sabellaria* reef;
- archaeological excavation in areas of peat and clay exposures in the site.

Table 2a. Archaeological heritage	rMCZ 11.2, Dover to Folkestone
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Several World War II defence structures are present within the site, e.g. pillboxes and beach defences. Mesolithic, iron-age, bronze-age and palaeolithic artefacts have been found in the site. Wrecks of British, Canadian, American and Norwegian vessels have been recorded in the site, as well as several unidentified wrecks (English Heritage, 2012). English Heritage has indicated that this site is likely to be of interest for archaeological excavation in the future as it is relevant to its National Heritage Protection Plan (theme 3A1.2).	An extra cost would be incurred in the assessment of environmental impact made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost in one licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). No further impacts on activities related to archaeology are anticipated. If archaeologists respond to restrictions on excavation in areas of peat and clay exposures and restrictions on anchoring over areas of *Sabellaria* reef by undertaking alternative archaeological excavations 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 Impact Assessment. If archaeological excavations do not take place as a result of these restrictions, this will prevent interpretation of archaeological evidence from the site which will decrease acquisition of historical knowledge of past human communities from the site, resulting in a cost to society.

Table 2b. Commercial fisheries	rMCZ 11.2, Dover to Folkestone

Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1**

The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of commercial fishing gears will be required for certain features protected by this rMCZ. Therefore, two scenarios have been employed in the Impact Assessment for these fisheries to reflect this uncertainty. Should the site be designated, the management that will be required will fall somewhere within this range.

Management scenario 1: Closure of the entire rMCZ to bottom trawls and dredges to protect areas of Ross worm *Sabellaria spinulosa* reef (Statutory Nature Conservation Bodies (SNCB) informed scenario*).

Management scenario 2: Closure of entire rMCZ to bottom trawls, dredges, lines, nets, pots and traps to protect areas of high and moderate energy infralittoral rock and Ross worm (*Sabellaria spinulosa*) (SNCB informed scenario).

***** NB. The Regional Stakeholder Group agreed to the recommendation for this rMCZ with closure to bottom trawls only.

Table 2b. Commercial fisheries **rMCZ 11.2, Dover to Folkestone**

The conservation objective was changed to maintain based on the Fisheries Standardisation work showing low levels of exposure and this was also supported by stakeholder feedback about the absence of trawling in this area. Whilst the method paper assumes that there will be no management for commercial fisheries because of the maintain CO, it is actually anticipated that a Gentlemen's agreement to stop all trawling within Dover to Folkestone would be implemented if this package of sites go ahead.

Summary of all fisheries: This site is wholly within the 6nm (nautical mile) limit and is fished only by UK vessels. The rMCZ stretches along the coast from Dover to Folkestone Harbour. The main commercial fishing fleet operating in the rMCZ is based in Folkestone, while others are in Dover and Ramsgate. The most important fishery within the rMCZ is static netting, closely followed by potting (MCZ Fisheries Model). Some Ramsgate-based static gear vessels visit the area and fish here when weather conditions permit. There is an important trawling ground outside the rMCZ and nomadic trawlers from the Thames Estuary and Channel ports occasionally skirt the southern boundary of the site but generally the ground within the site is unsuitable for towed gear. (. A number of commercial fishing restrictions are already in existence (listed in Annex E1). More detail on the approach used for the fisheries method is provided in Annexes H7 and N4. Estimated annual value of landings from the rMCZ: £0.035m/yr.

Baseline description of UK commercial fisheries	Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1
Bottom trawls: Vessel numbers unknown. There is a 'gentlemen's agreement' between the trawling and potting sectors that, although the area up to 1km from the shore is mainly a potting ground, the trawlers can request that static gear is taken up to allow them to operate when fish that are valuable to them are in the area (Balanced Seas Final Recommendations Report, 2011). Estimated total value of landings from the rMCZ: £0.004/yr (MCZ Fisheries Model).	The estimated annual value of UK bottom trawl landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.004 | 0.004 If the rMCZ were to be designated, the local trawlers have said that they would no longer trawl within the rMCZ provided that the zoning and management areas that they proposed for rMCZ 26 are adhered to (assuming that rMCZ 26 is also designated). As this management scenario would involve closure to trawling only (and not dredging) it does not directly equate to either Scenario 1 or 2.
Dredges: Vessel numbers unknown. Estimated total value of landings from the rMCZ: £0.004m/yr (MCZ Fisheries Model).	The estimated annual value of UK dredge landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.002 | 0.002
Nets: Vessel numbers not known. Estimated total value of landings from the rMCZ: £0.023m/yr (MCZ Fisheries Model).	The estimated annual value of UK net landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.000 | 0.023

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 11.2, Dover to Folkestone</th></tr>
<tr><td></td><td>In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with nets at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objectives. As such, it is anticipated that if additional management is required it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Pots and traps: Vessel numbers not known.

Estimated total value of landings from the rMCZ: £0.006m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK pot and trap landings affected is expected to fall within the following range of scenarios:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.006</td></tr></table>In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with pots and traps at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objectives. As such, it is anticipated that if additional management is required it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Total direct impact on UK commercial fisheries under Policy Option</td><td></td></tr>
<tr><td></td><td>The estimated annual value of UK landings and gross value added (GVA) affected is expected to fall within the following range of scenarios:
<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td><td>Best estimate</td></tr><tr><td>Value of landings affected</td><td>0.002</td><td>0.035</td><td>0.003</td></tr><tr><td>GVA affected</td><td>0.001</td><td>0.016</td><td>0.002</td></tr></table>
The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas. This is based upon an assumption of average displacement across all rMCZs, and may be an under- or overestimate for this site.</td></tr>
<tr><td>Baseline description of non-UK fisheries</td><td>Costs of impact of rMCZ on non-UK commercial fisheries</td></tr>
<tr><td></td><td>None.</td></tr>
</table>

Table 2c. Ports, harbours, shipping and disposal sites	rMCZ 11.2, Dover to Folkestone

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management scenario 1: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for disposal of dredged material, navigational dredging and known specific plans or proposals for port and harbour developments within 1km of the rMCZ. It is anticipated that additional mitigation of impacts on features protected by the rMCZ will be needed for port developments or port-related activities relative to the mitigation provided in the baseline.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for disposal of dredged material, navigational dredging and all port and harbour developments within 5 km of the rMCZ. Also, additional costs incurred in including MCZ features in potential new MPDs for Dover and Folkestone. It is anticipated that additional mitigation of impacts on features protected by the rMCZ will be needed for port developments or port-related activities relative to the mitigation provided in the baseline.

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
Disposal sites: There is one site within 1km of the rMCZ just outside the western entrance of Dover Port which is licensed for the disposal of dredging spoil. Continuous maintenance dredging is essential to retain a navigable harbour (Dodridge, 2010). The average number of licence applications received for this disposal site is 0.7 per year (based on number of licence applications received between 2001 and 2010 (Cefas, pers. comm., 2011). There are 7 disposal sites within 5km of the rMCZ used by Dover Port and Folkestone Harbour. The average number of licence applications received for all of these disposal sites is 2.1 per year (based on number of licence applications received between 2001 and 2010 (Cefas, pers. comm., 2011). ***Navigational dredge areas:*** Licensed navigational and maintenance dredge areas occur within 1km of this rMCZ and are associated with Dover Port, including dredging and widening at West Jetty. It is assumed that each dredge area's marine licence is renewed once every 3 years, and that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal. Maintenance and navigational dredging occurs within 5km of the rMCZ associated with Dover Port, including dredging and widening at West Jetty. It is assumed that each dredge area's marine licence is renewed	*£m/yr* — Scenario 1: Total 0.007; Scenario 2: Total 0.019 ***Scenario 1:*** Future licence applications for disposal of material, navigational dredging and known port or harbour development plans and proposals within 1km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11). Sufficient information is not available to identify what additional mitigation of impacts on features protected by the MCZ will be needed for proposed future port and harbour developments relative to the mitigation provided in the baseline. Unknown potentially significant costs of mitigation could arise. ***Scenario 2:*** Future licence applications for disposal of material, navigational dredging and port or harbour development plans and proposals within 5km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11). Also, additional costs will be incurred to include MCZ features protected by the rMCZ in new potential MDPs to consider the potential effects of activities on the features protected by the rMCZ. The anticipated additional cost in a potential new MDP is estimated to be a one-off cost of £8438. Sufficient information is not available to identify what any additional mitigation of

Table 2c. Ports, harbours, shipping and disposal sites	rMCZ 11.2, Dover to Folkestone
once every 3 years, and that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal. As these navigational dredge areas will be covered by potential new MDPs, it is assumed that the assessment of environmental impact is not changed over the 20 year period of the IA. ***Port development:*** There are 2 ports or harbours within 1km of the rMCZ which may undergo development at some point in the future: Dover Port and Folkestone Harbour. To cater for expansion, Dover Harbour Board (DHB) has developed a 30-year master plan for Dover Port (DHB, 2010). Dover Port is Europe's busiest ferry port, handling £80,000m of trade each year and supporting 22,000 jobs, over 90% of which are in Kent. It also has national and international importance as a gateway for trade between the UK and continental Europe and over the past 20–30 years has seen sustained long-term growth of around 3–4% per annum (www.doverport.co.uk). Detailed forecasting by both Dover Harbour Board (DHB) and the UK Government indicates that traffic is expected to grow at around 2% per annum for the next 20–30 years due to the macro economics of Europe, linked to GDP and population growth (www.doverport.co.uk). A Harbour Revision Order (HRO) was approved in November 2011 which allows for development of a second ferry terminal (Terminal 2) within the harbour, commencing in 3 years' time (http://www.dft.gov.uk/publications/dover-terminal-2/). The Terminal 2 expansion will remain within the current footprint of the port and will therefore not directly overlap the footprint of the rMCZ, although the MCZ's features could potentially be impacted on by capital dredges that take place outside the site if these are required as part of the development. Other future development may also be required. The Folkestone Harbour Company commissioned a master plan in 2010 to build on the regeneration work undertaken on the seafront and harbour. In December 2011, updated designs went out for public consultation (Folkestone Seafront, 2012).	impacts on features protected by the MCZ will be needed for proposed future port and harbour developments relative to the mitigation provided in the baseline. Unknown potentially significant costs of mitigation could arise.

Table 2d: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this	rMCZ 11.2, Dover to Folkestone

site alone
Oil and gas related activities (including carbon capture and storage) This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ 11.2 Dover to Folkestone**
Cables (existing interconnectors and telecom cables) Flood and coastal erosion risk management (coastal defence) Commercial fisheries (collection by hand, mid-water trawls) Recreation Research and education Shipping Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[6] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.	rMCZ 11.2: Dover to Folkestone

[6] copied from the JNCC and Natural England's advice to Defra on rMCZs

ENG Feature	Represent-ativity	Replication	Adequacy	Viability	Gaps or shortfalls in relation to ENG minimum guidelines	Recommended conservation objective	Quantitative considerations at regional MCZ level	Ecological Importance at regional MCZ level	Ecological Importance at wider scale
A1.2 Moderate energy intertidal rock	BSH	✓	✓	✓	None	Maintain	This feature provides greater contribution to the adequacy target than any other site in the regional project		
A2.1 Intertidal coarse sediment	BSH	✓	✓	✓	None	Maintain			
A3.1 High energy infralittoral rock	BSH	✓	✓	✓	None	Recover			
A3.2 Moderate energy infralittoral rock	BSH	✓	✓	✓	None	Recover	The feature is close to the minimum adequacy target in the project region.		
A5.1 Subtidal coarse sediment	BSH	✓	✓	✓	None	Maintain			
Blue mussel *Mytilus edulis* beds	FOCI Habitat	✓	✓	✓	None	Recover			OSPAR habitat and BAP habitat - UK obligation, decline, functional habitat
Intertidal underboulder commun-ities	FOCI Habitat	✓	✓	✓	None	Maintain	One of four examples in the region, one	One of the best examples in	BAP habitat - UK obligation, decline,

							example of this feature is already protected by the existing MPA (minimum target is three)	the region	functional habitat
Littoral chalk commun-ities	FOCI Habitat	✓	✓	✓	None	Recover			BAP and OSPAR habitat Well-studied area
Peat clay exposures	FOCI Habitat	✓	✓	✓	None	Maintain			BAP habitat - key species, functional habitat
Ross worm *Sabellaria spinulosa* reefs	FOCI Habitat	✓	✓	✓	None	Recover		One of the best examples in the region.	BAP and OSPAR habitat
Subtidal chalk	FOCI Habitat	✓	✓	✓	None	Recover			BAP habitat Well-studied area
Subtidal sands and gravels	FOCI Habitat	✓	✓	✓	None	Maintain			BAP habitat
Native oyster *Ostrea edulis*	FOCI Species	✓	✓	✓	None	Maintain		This feature is not protected within existing MPAs.	BAP and OSPAR species
Short-snouted seahorse *Hippo-campus hippo-campus*	FOCI Species	✓ * [1]	✓	✓	None	Maintain	This site is one of four for this feature, but there are no records of the feature within the MCZ.		OSPAR species and BAP species - International threat. Listed on Schedule 5 Wildlife and

									Countryside Act

Site considerations	
Connectivity	✓
Geological/Geomorphological features of interest	✓
Appropriate boundary	✓
Areas of Additional Ecological Importance	✓ * [2]
Overlaps with existing MPAs	✓

Additional comments and site benefits:

[1] There are no records of *Hippocampus hippocampus* within the MCZ, but it should be noted they are notoriously difficult to spot.

This site is one of three examples proposed for designation for the feature intertidal underboulder communities. Throughout the region there are only four examples within the MPA network. This site is one of the best examples of this feature in the region.

[2] The site contains Ross coral, Peacock worm, Molgula beds and various sea anemone species. Also FOCI mobile species European eel (*Anguilla anguilla*), Smelt (*Osmerus eperlanus*) and undulate rays (*Raja undulata*) occurs here but they are not identified as a conservation priority.

This site is proposed to protect wave- cut intertidal chalks platforms that form almost a continuous reef between Kingsdown, Deal, in the north-east to Folkstone Warren in the south-east. The wave-cut platforms support a huge diversity of marine plants and animals and are a superb example of littoral chalk communities. Within the wave-cut platform there are gullies that can be 2m in depth.

This is the only place in Kent where the brown alga Desmerestia ligula occurs.

Within the region this site is one of a few places where hard rock forms on the intertidal, and as a result contain seaweed examples that are unusual to the south-east but more typical of the south-west.

Foraging grounds for various tern and gull spp. Nursery and spawning grounds for fish such as sole, undulate ray and herring.

This site is highly diverse with a number of FOCI. It is an area of high benthic biotope and species richness (Balanced Seas 2011a).

Considered to be one of the most important marine biological sites in the south-east (Tittley 1989).

One of the best examples of *Sabellaria spinulosa* reef, intact, in the region. It also unusually occurs intertidally.

A Key Inshore Biodiversity Area as advised by the South-East England Biodiversity Forum (South East England Biodiversity Forum (SEEBF) 2010).

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption		**rMCZ 11.2, Dover to Folkestone**
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Intertidal rock habitats are important sources of larval plankton upon which commercially important fish species feed, including mussels and larval fish of plaice and mackerel. Fish scavenge in coarse sediment intertidal areas. Subtidal coarse sediments are important for spawning and nursery grounds. These habitats can provide important nursery grounds for juvenile commercial species such as flatfishes and bass. High energy and moderate energy infralittoral rock are important locations for commercial inshore fishing activity, particularly crab and lobster (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The main fishery within the site is static netting closely followed by potting. There is also some trawling. A description of on-site fishing activity and the value derived from it is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits that derive from spawning and nursery areas.	If the conservation objectives of the features are achieved, some of the features will recover to favourable condition. The rest will be maintained in favourable condition. New management of fishing activities is expected (above the baseline situation), the costs of which are set out in Table 2b, which may reduce the impacts on fish and shellfish habitats and harvesting of stocks. As most of the commercial species targeted by fishers in this area are mobile fish and crustaceans, it is unclear whether the scale of habitat recovered and the magnitude of reduced (on-site) harvesting will be enough to have any significant positive impact on commercial stocks. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change:  Confidence: Low

Table 5b. Recreation	**rMCZ 11.2, Dover to Folkestone**

Table 5b. Recreation	rMCZ 11.2, Dover to Folkestone	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. Infralittoral rock includes kelp zones visible at low water. It is probable that all the species that are present in kelp as adults utilise it as a nursery area when juveniles (Expert opinion in Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The rMCZ is a popular area for shore and private boat angling and charter boat fishing (StakMap, 2010). Due to the complex habitats within the site (including chalk gullies) and the generally high biodiversity, it is likely to help to support potential on-site and off-site fisheries. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the estuary spawning and nursery area.	If the conservation objectives of the features are achieved, some of the features, including the infralittoral rock and subtidal chalk, will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the infralittoral rock and subtidal chalk to favourable condition may improve their functioning as potential nursery areas and increase their biodiversity in general, potentially benefiting angling activities within and outside the rMCZ (see Table 4a). As no additional management of angling is expected fishers will be able to benefit from any on-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers, both on and off-site Designation of this site may lead to an increase in angling visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in angling.	Anticipated direction of change: ⇧ Confidence: Low
Diving: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation services. The rMCZ is used for shore diving, particularly around the western arm of Dover Harbour. This location within the site has easy access and good visibility, with an abundance of wildlife along the harbour wall itself. (www.oceanodyssey.co.uk/kentshoredives.htm). Boat diving for access to the wrecks and abundant marine life in the area may also occur in the site.	Designation of this site might lead to an increase in diving trips, as a result of publicity about the marine biodiversity and rare species found in the site. If populations of species such as seahorses and littoral chalk communities increase, this could lead to an improved quality of experience for divers, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in diving trips at the national scale.	Anticipated direction of change: ⇧ Confidence: Low

Table 5b. Recreation		rMCZ 11.2, Dover to Folkestone
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The kelp zones, part of the infralittoral rock, provide shelter and habitat for numerous species and a surface cut by gullies and crevices and overlain by boulders provides diverse localised areas of shelter. Mussel beds are an important food source for birds. The water around the sub-littoral habitat is very important for larger animals such as marine mammals and sea birds (Fletcher and others, 2011). Chalk gullies within the subtidal chalk create cave and rock pool habitats (Balanced Seas Final Recommendations, 2011), contributing further to the high biodiversity of the site which in turn supports the foraging birds and marine mammals that frequent it. The rMCZ is mostly inaccessible with few places to get down to the shore. However, coastal paths along the cliffs attract birdwatchers and local charter boats provide wildlife watching trips out of Dover Harbour. Rock-pooling may be popular where access is safe. Wildlife watching cruises between Dover and France are run by DFDS Seaways in association with ORCA (DFDS Seaways website) It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	If the conservation objectives of the features are achieved, some of the features, including the infralittoral rock and subtidal chalk, will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the infralittoral rock and subtidal chalk to favourable condition may improve their functioning as shelter and habitat for numerous species thus increasing the biodiversity of the area and potentially benefitting wildlife watching within the rMCZ. In addition, an improvement in the condition of site features and any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities).	Anticipated direction of change:  Confidence: Low
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. Coastal walking along the cliffs and accessible parts of the shore is popular and there is a 13km walk that runs the entire length of the rMCZ and includes the Warren and the White Cliffs Country Trail (www.walkingclub.org.uk/book_3/walk_13/index.shtml). Other	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change:  Confidence: Low

Table 5b. Recreation		rMCZ 11.2, Dover to Folkestone
recreational pursuits are not known to occur specifically within the rMCZ; however, recreational traffic will pass through in transit to other destinations or on its way to Dover Harbour (StakMap, 2010). It has not been possible to estimate the value derived from tourism in the rMCZ.	If the rMCZ is designated this will provide an additional positive aspect about the location that could be promoted by the tourism and leisure industry and that would be expected to increase visitation rates.	

Table 5c. Research and education		rMCZ 11.2, Dover to Folkestone
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. Kent Wildlife Trust conducts sea-floor and sea-shore surveys through Seasearch and Shoresearch in the area. Research is also conducted by Kent County Council in order to inform the Kent Coastal Network initiative (Kent Coastal Network website). Ferries crossing the Channel and smaller boat trips may be used by marine mammal observers whose data contribute to national databases. It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. Kent Wildlife Trust provides regular marine-based courses that may relate to the rMCZ (Kent Wildlife Trust website). It has not been possible to estimate the value derived from education activities associated with the rMCZ.	MCZ designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ) education activities (e.g. events, interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Moderate

Table 5d. Regulating services	rMCZ 11.2, Dover to Folkestone	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: the features of the site contribute to the bioremediation of waste (intertidal mud, subtidal sediments), water filtration (Blue Mussel beds, *Sabellaria*) and sequestration of carbon (intertidal rock, Blue Mussel beds, *Sabellaria*, subtidal sediments) (Fletcher and others, 2011). ***Environmental resilience:*** the features of the site (intertidal rock, Blue Mussel beds and *Sabellaria*) contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** the features of the site, (infralttoral rock, Blue Mussel beds and *Sabellaria*) contribute to local flood and storm protection (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ.	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (infralittoral rock, littoral chalk communities, subtidal chalk, *Sabellaria* and blue mussel beds) recovered to favourable condition. Recovery of the infralittoral rock, Blue Mussel beds and *Sabellaria* Reefs and a potential reduction in the use of bottom towed fishing gear may increase the site's benthic biodiversity and biomass, improving the regulating capacity its habitats. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 5e. Non-use and option values	rMCZ 11.2, Dover to Folkestone	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the pMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the rMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation. Examples of these values are shown in (Ranger, Lowe, Sanghera, & Solandt, 2012). Voters in the MCS's 'Your Seas Your Voice' campaign felt that features of the natural environment were strong motivators for reasons why people thought that some areas within the pMCZ should be protected, with people	Anticipated direction of change: ⇧ Confidence: Moderate

Table 5e. Non-use and option values		rMCZ 11.2, Dover to Folkestone
	frequently attaching value to biodiversity and national and international importance of the habitat as 'the richest offshore reefs in the area.' The vulnerability of the features and the heavy pressure of activities in the area were also important factors for many. Furthermore, allowing species recovery particularly fish and shellfish was perceived as an important management reason to protect the site for both recreational and commercial users as it 'is a nursery area for local fish and crustacea and would be so easy to enforce and maintain' and the potential for the local economy as angling 'can create more wealth for local areas than any other marine activity. If we protected all inshore areas people from all over the world would come to the UK to fish'. Source: Ranger et al. (2011)	

rMCZ 11.4, Reference Area 25 Flying Fortress — Site area (km^2): 0.99

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts				rMCZ 11.4, Reference Area 25 Flying Fortress
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) Reference Area lies offshore in rMCZ 11.4 (Folkestone Pomerania). It was selected as it contains one of only two occurrences in the Balanced Seas Project Area of honeycomb worm *Sabellaria alveolata* reef. The site also has dense biogenic reefs of Ross worm *Sabellaria spinulosa* on underlying muddy sediment; these reefs are extremely unusual as they contain many of the animals associated with the *Sabellaria spinulosa r*eef biotope, offshore mud biotopes with bivalve molluscs and *Sabellaria alveolata* reef biotope. This mix of biotopes is not known to occur elsewhere in the Balanced Seas Project Area. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A5.1 Subtidal coarse sediment	-	-	Unfavourable condition	Recover to favourable condition
Habitats of Conservation Importance				
Honeycomb worm *Sabellaria alveolata* reef	312.57 m^2	-	Unfavourable condition	Recover to favourable condition
Ross worm *Sabellaria spinulosa* reef	625.35 m^2	-	Unfavourable condition	Recover to favourable condition

Site-specific costs arising from the effect of the rMCZ on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	**rMCZ 11.4, Reference Area 25 Flying Fortress**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
The site is the possible location of a World War II aircraft wreck (B17), an unidentified steam ship and two other unidentified wrecks (English Heritage,., 2012).	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost in one licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). 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 Impact Assessment. 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.

Table 2b. Commercial fisheries	**rMCZ 11.4, Reference Area 25 Flying Fortress**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of entire site to all gear types.	
Summary of all fisheries: The rMCZ Reference Area is non-coastal and within the 6nm (nautical mile) limit. The site is included in rMCZ 11.4 Folkestone Pomerania. The main commercial fishing fleets are based in Folkestone, Hythe, Rye and Dungeness. The main fisheries for vessels under 15 metres are static nets, scallop dredging, bottom trawling and potting (information from Fishermap interviews). Several trawlers over 15 metres have 'grandfather rights' to fish between the 3nm and 6nm limits. More detail on the approach used for the fisheries method is provided at Annexes H7 and N4.	
Estimated annual value of landings from the rMCZ Reference Area: £0.002m/yr.	
(Due to resolution issues of the MCZ Fisheries Model and the small size of many rMCZ Reference Areas in the Balanced Seas region, some fisheries landings values may be inaccurate. They have been included as a precautionary measure and to avoid underestimating the economic impact of a site.)	

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 11.4, Reference Area 25 Flying Fortress</th></tr>
<tr><th>Baseline description of UK commercial fisheries</th><th>Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1</th></tr>
<tr><td>Bottom trawls: The rMCZ Reference Area overlaps with the area of operation of some vessels targeting Dover sole, lemon sole, cod, plaice, whiting, skate and ray using trawls and beam trawls (information from Fishermap interviews). Number of vessels unknown.</td><td>The estimated annual value of UK bottom trawl landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table>If rMCZ 11.4 were to be designated, the local trawlers have said that they would no longer trawl within this area (which includes rMCZ Reference Area 25) provided that the zoning and management areas that they proposed for rMCZ 26 are adhered to (assuming that rMCZ 26 is also designated).</td></tr>
<tr><td>Dredges: Number of vessels unknown.</td><td>The estimated annual value of UK dredge landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><td>Mid-water trawls: . Number of vessels unknown.</td><td>The estimated annual value of UK mid-water trawl landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><td>Nets:. Number of vessels unknown.

Estimated total value of landings from the rMCZ Reference Area: £0.001m/yr (MCZ Fisheries Model)..</td><td>The estimated annual value of UK net landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td>0.001</td></tr></table></td></tr>
<tr><td>Pots and traps: The rMCZ Reference Area overlaps with the areas of operation of vessels targeting common lobster and edible crabs (information from Fishermap interviews). Number of vessels unknown.</td><td>The estimated annual value of UK pot and trap landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><th>Total direct impact on UK commercial fisheries under Policy Option 1</th><th></th></tr>
<tr><td></td><td>The estimated annual value of UK landings and gross value added (GVA) affected:
<table><tr><td>£m/yr</td><td>Scenario 2</td><td>Scenario 1 and Best estimate</td></tr></table></td></tr>
</table>

Table 2b. Commercial fisheries	rMCZ 11.4, Reference Area 25 Flying Fortress
	Value of landings affected: 0.002 / 0.001 GVA affected: 0.001 / 0.000 Local Group discussions indicated that the rMCZ Reference Area would be hard to protect as fishing vessels could cross the site within 2 minutes due to its small size (South Kent Local Group meeting, July 2011). The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas. This is based upon an assumption of average displacement across all rMCZs, and may be an under- or over-estimate for this site.
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries**
	None.

Table 2c. Recreational anchoring	rMCZ 11.4, Reference Area 25 Flying Fortress
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of entire site to all recreational anchoring (except in emergency circumstances).	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
No StakMap interviews indicated that anchoring of recreational sailing vessels occurs in the site. However, angling and scuba diving do take place within the site and therefore private boats and charter boats may anchor within the site either on the sea bed or on the wrecks. Divers use shot weight anchors in this site (these rest on the substrate rather than penetrate it) to ensure that the fragile wreck that is in the site (a plane) is not damaged (Folkestone scuba diver, pers. Comm., April 2012)	Recreational sailing would not be affected as sailing vessels are not known to anchor in the site. However, recreational sea anglers and scuba divers might be affected. The site was developed in conjunction with a local scuba diving club and sea angling representatives who were aware that anchoring of vessels would not be permitted in the site and tried to ensure that the site would have a minimum impact on their sectors. Therefore the site is assumed to have a negligible impact on anchoring of vessels for scuba diving and angling. However, scuba divers are concerned that there would be an impact if the site is closed to shot weight anchors. Costs of closure of the site to the recreational sea angling sector are described in Table 2d. One charter boat operator is very concerned about potential closure of this area to anchoring as he feels this would have a major impact on his activities (D. Hancock, Regional Stakeholder Group (RSG) charter boat representative, email, 5th December, 2011).

Table 2d. Recreational angling	rMCZ 11.4, Reference Area 25 Flying Fortress

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Closure of the entire site to all recreational angling.

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
Six StakMap interviews indicated that areas used for recreational angling (charter boats and boat fishing) overlap with the rMCZ Reference Area. The interviewees represented 4 local clubs (combined membership 191 people) and charter boat operators representing a total of 1,220 anglers per year. The rMCZ Reference Area only represents a small proportion of the overall area over which stakeholders indicated that they fish. According to a local charter boat operator (D. Hancock, Regional Stakeholder Group (RSG) charter boat representative, email, 5th December, 2011 and pers. comms., January 2012) a total of 26 vessels (3 boats based at Dungeness, 7 at Dover, 2 at Folkestone, 8 at Ramsgate, 3 at Rye and 3 beach-launched vessels at Deal) probably fish within the site due to its proximity to their launch port. They can take up to 8 anglers per trip. The same operator estimated that these vessels could fish in this offshore site for up to 50 days during the summer each year (D. Hancock, Regional Stakeholder Group (RSG) charter boat representative, pers. comms., January, 2012). It is anticipated that this is an over estimate given that charter boats typically visit a number of sites. The average estimated revenue for a charter vessel operating in this site is £450/day (D. Hancock, Regional Stakeholder Group (RSG) charter boat representative, pers. comms., January, 2012).	Anglers and charter boat operators might respond to the closure to angling by angling in other areas nearby if the weather or fish movements allow. However, there are times when the rMCZ Reference Area is the only suitable site for angling in the area (D. Hancock, Regional Stakeholder Group (RSG) charter boat representative, email, 5th December, 2011). To avoid underestimation of costs, the IA assumes that charter boat operators will lose all revenue from angling trips. Since the estimate of 150 days use of the site (D. Hancock, RSG charter boat representative) is considered an over-estimate, the IA is assuming that just one a third (15 days) of this number is more realistic, given the charter boats' use of a number of sites, and allowing for displacement of some of their activity to alternative locations. Consequently, Balanced Seas estimates that on average each of the 26 vessels loses revenue of £450/day for 15 days a year. Since the charter vessels using this site may be capable of fishing elsewhere nearby,depending on the weather and fish movements, the value of actual revenue lost may nevertheless be lower than the estimate that is provided here. *£m/yr* — Scenario 1 Estimated value of charter boat revenue affected — 0.176 GVA affected — 0.082

Table 2e: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 11.4, Reference Area 25 Flying Fortress

Oil and gas related activities (including carbon capture and storage)

This rMCZ Reference Area overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 27th

Table 2e: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 11.4, Reference Area 25 Flying Fortress
Seaward Licensing Rounds). However, it is unlikely that any oil and gas (including carbon capture and storage) infrastructure will be proposed in future in this rMCZ Reference Area due to its location and size (DECC, pers. comm., 2012). Impacts of rMCZ Reference Areas on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N 10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 11.4, Reference Area 25 Flying Fortress
Recreation (except for the activities listed above in table 2) Shipping Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath rMCZ BS 11.4 Folkestone Pomerania. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 4a. Fish and shellfish for human consumption	rMCZ 11.4, Reference Area 25 Flying Fortress
Baseline	**Beneficial impact under Policy Option 1**

Table 4a. Fish and shellfish for human consumption		rMCZ 11.4, Reference Area 25 Flying Fortress
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. Subtidal coarse sediment is important for spawning and nursery grounds for juvenile commercial species such as flatfish and bass (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMCZ 11.4 Table 1 for details). A description of on-site fishing activity in the rMCZ Reference Area, which involves a number of gear types, and the value derived from it is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits that derive from the spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. The costs of this are set out in Table 2b. Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption. Closure of the rMCZ Reference Area to fishing activity will reduce the on-site fishing mortality of species but, as the site is small, it is unclear whether this would benefit stocks of mobile commercial finfish species. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	Anticipated direction of change: ⇧ Confidence: Moderate

Table 4b. Recreation		rMCZ 11.4, Reference Area 25 Flying Fortress
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Subtidal coarse sediment is important for spawning and nursery grounds for species such as flatfish and bass (Fletcher and others, 2011) which are of value to recreational fisheries. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMCZ 11.4 Table 1 for details). Private and charter boat angling is an important activity in this rMCZ Reference Area and a description of this activity is set out in Table 2d.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation	rMCZ 11.4, Reference Area 25 Flying Fortress	
It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the potential spawning and nursery area.		
Diving: Diving and snorkelling occur on the wrecks in the rMCZ Reference Area; the wrecked airplane is particularly popular.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The recovery of the features to reference condition may improve their functioning as support for fish and other marine wildlife (including increases in size and diversity of species), potentially benefiting diving within the rMCZ Reference Area. Any increase may represent a redistribution of dive location preferences rather than an overall increase in diving.	Anticipated direction of change: ⇧ Confidence: Low
Wildlife watching: Other wildlife watching is not known to take place in the site.	N/A	N/A
Other recreation: No other recreational activities are known to take place in the site.	N/A	N/A

Table 4c. Research and education	rMCZ 11.4, Reference Area 25 Flying Fortress	
Baseline	**Beneficial impact under Policy Option 1**	
Research: No research is known to be undertaken in this site.	As a recommended Marine Conservation Zone (rMCZ) Reference Area, the site will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: No education activities are known to be undertaken in this site.	As the rMCZ Reference Area is offshore and relatively inaccessible, no benefits are likely to arise from direct use of the site for education.	Anticipated direction of change:

Table 4c. Research and education	rMCZ 11.4, Reference Area 25 Flying Fortress	
	Non-visitors may benefit if the rMCZ Reference Area contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	⇧ Confidence: Low

Table 4d. Regulating services	rMCZ 11.4, Reference Area 25 Flying Fortress	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: A feature of the site (subtidal sediments) contributes to the bioremediation of waste and sequestration of carbon (Fletcher and others, 2011). ***Environmental resilience:*** A feature of the site (subtidal sediments) contributes to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** As the site is offshore, its features are not thought to contribute to the delivery of this service. It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of subtidal sediments and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the recommended Marine Conservation Zone Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities (as, if necessary, mitigation would be introduced, with the associated costs and benefits).	Anticipated direction of change: ⇧ Confidence: Low

Table 4e. Non-use and option values	rMCZ 11.4, Reference Area 25 Flying Fortress	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 13.1 Beachy Head East **Site area (km^2): 193.27**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts **rMCZ 13.1, Beachy Head East**

1a. Ecological description

This recommended Marine Conservation Zone (rMCZ) would protect the chalk coastline to the east of Beachy Head which includes some of the few remaining lengths of undeveloped coast in south-east England. The rMCZ includes two important reef areas: Royal Sovereign Shoals and the Horse of Willingdon Reef (both designated as marine Sites of Nature Conservation Importance). The Shoals is a good example of an offshore sandstone reef, and has outcrops of chalk in the north-west and a wide range of habitat types within a relatively small area. The Horse of Willingdon reef consists of sandstone bedrock and boulders, with patches of cobbles, pebbles and mixed sediment in between. The rMCZ also supports an excellent example of littoral chalk communities which form a continuous extension of the same habitat found on the west side of Beachy Head. Rocky ridges run approximately in line with the cliffs near Eastbourne, creating sheltered pools and lagoons at low tide which are full of seaweeds and other marine life. The blue mussel beds in the rMCZ may be one of the best examples of this habitat in the region. The rMCZ also has peat and clay exposures, Ross worm reef, sea squirt beds, encrustations of ross coral, European eel, short-snouted seahorse, native oyster and black bream. Herring spawning grounds on hard boulder and gravel ground are known in the site, as well as nursery grounds for plaice and Dover sole on a reef just north of the Royal Sovereign Shoals; the Centre for Environment, Fisheries and Aquaculture Science (Cefas) considers this one of the most important places for nursery grounds within 0.25nm (nautical miles) of shore. This site is also a bird foraging ground for the black-headed gull, black-legged kittiwake and common tern. It partially overlaps the Seaford to Beachy Head Site of Special Scientific Interest. The westernmost part of the rMCZ, from the Wish Tower (the Martello Tower at Eastbourne) to the western boundary, overlaps with the Seven Sisters Voluntary Marine Conservation Area.

Source: Balanced Seas Final Recommendations (2011).

1b. Baseline condition of MCZ features and impact of the MCZ

Feature	Area of feature (km2)	No. of occurrences	Baseline	Impact
Broad-scale habitats				
A1.2 High energy intertidal rock	0.02	-	Favourable condition	Maintain at favourable condition
A2.1 Intertidal coarse sediment	0.18		Favourable condition	Maintain at favourable condition
A2.4 Intertidal mixed sediments	0.28		Favourable condition	Maintain at favourable condition
A5.2 Subtidal sand	134.28	-	Unfavourable condition	Recover to favourable condition
A5.4 Subtidal mixed sediments	18.23	-	Unfavourable condition	Recover to favourable condition
Habitats of Conservation Importance				
Blue mussel beds	0.02	-	Unfavourable condition	Recover to favourable condition
Littoral chalk communities	0.04		Favourable condition	Maintain at favourable condition
Peat and clay exposure	312.57 m^2	-	Favourable condition	Maintain at favourable condition
Rossworm (*Sabellaria spinulosa*) reef	312.57 m^2	-	Unfavourable condition	Recover to favourable condition

Table 1. Conservation impacts				rMCZ 13.1, Beachy Head East
Subtidal chalk	7,814 m^2	-	Favourable condition	Maintain at favourable condition
Species of Conservation Importance				
Native Oyster (*Ostrea edulis*)	-	1 record	Unfavourable condition	Recover to favourable condition
Short snouted seahorse (*Hippocampus hippocampus*)	-	1 record	Favourable condition	Maintain at favourable condition
European Eel (*Anguilla Anguilla*)	-	-	Favourable condition	Maintain at favourable condition

Site-specific costs arising from the effect of the rMCZ on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	rMCZ 13.1, Beachy Head East
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Increase in costs of assessing environmental impacts for future licence applications (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. However, restrictions could be placed on: • anchoring in areas of vulnerable MCZ features in the site, including *Sabellaria* reef; • archaeological excavation in areas of peat and clay exposures in the site.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Several World War II defence aids/structures are recorded in the site, e.g. searchlights, road blocks, gun emplacements, pillboxes and anti-aircraft battery. Iron-age and Roman artefacts have been found within the site, including the remnants of a Roman villa and bathhouses. Several World War II aircraft crashes are recorded in the site of both British (Lancaster bomber, Spitfire) and German (Focke-Wulf) origin. Wrecked vessels of British, Greek, French, Prussian, Dutch, Belgian, Spanish, Norwegian, German, Swedish and Italian origin have been recorded within the site. One of these wrecks (the *Amsterdam*) is designated under the Protection of Wrecks Act 1973 with a 100 metre exclusion zone. Crop marks, cup and ring marks and a prehistoric axe factory are all recorded within the site (English Heritage, 2012).	An extra cost would be incurred in the assessment of environmental impact made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost in one licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). No further impacts on activities related to archaeology are anticipated. If archaeologists respond to restrictions on excavation in areas of peat and clay exposures and restrictions on anchoring over areas of *Sabellaria* reef by undertaking alternative archaeological excavations 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 Impact Assessment. If archaeological excavations do not take place as a result of these

Table 2a. Archaeological heritage	rMCZ 13.1, Beachy Head East
	restrictions this will prevent interpretation of archaeological evidence from the site which will decrease acquisition of historical knowledge of past human communities from the site, resulting in a cost to society.

Table 2b. Commercial fisheries	rMCZ 13.1, Beachy Head East

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of commercial fishing gear will be required for certain features protected by this rMCZ. Therefore, two scenarios have been employed in the Impact Assessment (IA) for these fisheries to reflect this uncertainty. Should the site be designated, the management that will be required will fall somewhere within this range.

Management scenario 1: Zoned closure of western part of the rMCZ to bottom trawls to protect areas of Ross worm *Sabellaria spinulosa* reef, and native oyster and blue mussel *Mytilus edulis* beds (Balanced Seas informed scenario).*

Management scenario 2: Closure of entire rMCZ to bottom trawls, dredges, lines, nets, pots and traps to protect areas of infralittoral fine sand, ross worm *Sabellaria spinulosa* reef, native oyster and blue mussel *Mytilus edulis* beds (Statutory Nature Conservation Bodies scenario).

*NB. The Regional Stakeholder Group agreed to the recommendation for this rMCZ only if the static fishery is not impacted.

Summary of all fisheries: The site is largely within the 6nm (nautical mile) limit, although a small area in the south-east is beyond 6nm. The boundary of the rMCZ extends over the 6nm limit because it is linked to navigational buoys to facilitate management. The area within 6nm is fished only by UK vessels. The UK commercial fishing fleet using this rMCZ operates out of Hastings, Rye and Eastbourne, and all vessels are under 15 metres in length. Vessels over 15m may not operate within 6 nm according to Sussex IFCA byelaws (Sussex IFCA, 2011). One vessel has 'grandfather rights' within the rMCZ (FisherMap Data 2010). Static nets are the most common gear used in the rMCZ, targeting cod, plaice and Dover sole. An important activity is potting, closely followed by trawling, and trapping cuttlefish (a non-quota species), which is conducted in the spring by a growing number of vessels. Six trawlers that fish in the site are based at Hastings, and over the last 10 years several beam trawlers and pair trawlers over 10 metres from Newhaven and Shoreham have started to work in the site sporadically. Areas in the site with rock features are not suitable for towed gear. Some trawlers and scallop dredgers from Rye occasionally fish in the eastern part of the rMCZ. Larger nomadic vessels may operate in the small part of the site that extends outside the 6nm limit (IA questionnaire response from Eastbourne vessel owner, 19 August 2011). Seasonal rod and line fishing for bass is a growing activity. Potters target lobster, and brown, velvet and spider crabs. A number of commercial fishing restrictions are already in existence (listed in Annex E1). The following Sussex IFCA byelaws are particularly relevant: trawlers are excluded within ¼ nm of the coast; scallop dredging is excluded within 3 nm of the coast; and oyster dredging is prohibited throughout the site (Sussex IFCA, 2011). More detail on the approach used for the fisheries method is provided in Annexes H7 and N4.

French and Belgian vessels have historical rights to the area beyond 6nm but the area of the site that is beyond 6nm is very small (it extends less than 1km

beyond the 6nm limit) and use by non-UK vessels is not known.

Estimated annual value of landings from the rMCZ: £0.932m/yr.

Baseline description of UK commercial fisheries	**Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1**
Bottom trawls: Number of vessels not known Estimated total value of landings from the rMCZ: £0.146m/yr (MCZ Fisheries Model). This is likely to be an over estimate because the activity of bottom trawls within ¼ nm of the coast is restricted by a Sussex IFCA byelaw (for more details see Annex E1).	The estimated annual value of UK bottom trawl landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.028 | 0.146 These values are likely to be overestimates because of the restrictions under an existing byelaw..
Dredges: Number of vessels unknown. Estimated total value of landings from the rMCZ: £0.065m/yr (MCZ Fisheries Model). This is likely to be an overestimate as the activity of scallop dredges within 3 nm of the coast, and oyster dredges throughout the site is restricted by a Sussex IFCA byelaw (for more details see Annex E1).	The estimated annual value of UK dredge landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.014 | 0.065 These values are likely to be overestimates because of the restrictions under an existing byelaw.
Hooks and lines: Number of vessels unknown. Estimated total value of landings from the rMCZ: £0.015m/yr (MCZ Fisheries Model).	The estimated annual value of UK hook and line landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.000 | 0.015 In establishing the draft conservation objectives, the site's feature may have been assessed as having low vulnerability to fishing with hooks and lines at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objective. As such, it is anticipated that if additional management is required it may be towards the lower end of the range, and is likely to be less restrictive than that required

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 13.1, Beachy Head East</th></tr>
<tr><td></td><td>for other gears.</td></tr>
<tr><td>Nets: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £0.499m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK net landings affected is expected to fall within the following range of scenarios:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.499</td></tr></table></td></tr>
<tr><td>Pots and traps: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £0.554m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK pot and trap landings affected is expected to fall within the following range of scenarios:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.206</td></tr></table></td></tr>
<tr><td>Total direct impact on UK commercial fisheries under Policy Option 1</td><td></td></tr>
<tr><td></td><td>The estimated annual value of UK landings and gross value added (GVA) affected is expected to fall within the following range of scenarios:
<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td><td>Best estimate</td></tr><tr><td>Value of landings affected</td><td>0.011</td><td>0.931</td><td>0.121</td></tr><tr><td>GVA affected</td><td>0.005</td><td>0.422</td><td>0.055</td></tr></table>A vessel owner representing the fishers that use this rMCZ (IA questionnaire response from Eastbourne vessel owner, 19 August 2011) felt that the closure of the entire rMCZ to set netting and potting (particularly cuttlefish trapping) would negatively affect the fleet from Hastings and Eastbourne. Displacement is viewed by most fishers as a non-viable alternative as: all other fishing grounds have existing users and any increased effort within them could lead to conflict; and all available species are already fished using appropriate gears (see Annex J3a for more detail). The affected fishing vessels would be likely to experience a major loss of revenue which could force them to leave the fleet. The local economy in Eastbourne could be affected as a result of the impact on 40 fishers and their families plus associated shore-based jobs, and a similar impact could arise for the local economy in Hastings. Indirect impacts would include impacts on local fish markets, restaurants, fish retailers, and activities linked to the fishing fleet such as repairs, fuel services and gear suppliers (IA questionnaire response from Eastbourne vessel owner, 19 August 2011).</td></tr>
</table>

Table 2b. Commercial fisheries	rMCZ 13.1, Beachy Head East
	The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas. This is based upon an assumption of average displacement across all rMCZs, and may be an under- or overestimate for this site.
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries**
	None.

Table 2c. Flood and coastal erosion risk management (coastal defence) **rMCZ 13.1, Beachy Head East**

Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1**

Management scenario 1: No impact on operations arises. This is because material from the re-nourishment is not found to be impacting on achieving the conservation objective of the rMCZ features.

Management scenario 2: Additional monitoring to establish whether the beach recharge is impacting on the MCZ features. If it is found to be having an impact, it is anticipated that additional costs would be incurred.

Management scenarios 1 and 2: Increase in costs of assessing environmental impacts for future licence applications for maintenance work for the coastal defence scheme.

Baseline description of activity

This rMCZ potentially impacts on three coastal defence schemes. At Pevensey Bay, Bulverhythe and Eastbourne a Hold The Line policy is in place, involving shingle recharge and reprofiling (Natural England and Environment Agency Flood and Coastal Erosion Risk Management Workshop for the Balanced Seas Project Area, 17 November 2011)

- **Pevensey Bay Public Private Partnership scheme:** this protects 9,303 properties (plus 3,600 hectares of Sites of Special Scientific Interest (SSSIs)/Ramsar and Special Areas of Conservation (SACs)). Current flood protection maintenance means that the chances of a flood event occurring is once in 400 years. If this stretch is not maintained this will increase to once in 75 years (0.25% annual risk of flooding if it is maintained, but estimated to increase to 1.3% in approximately 3 years if maintenance is stopped).

Costs of impact of rMCZ on the sector under Policy Option 1

£m	Scenario 1	Scenario 2
Cost of monitoring	0.000	0.010 and unknown costs
NPV of monitoring	0.000	0.010 and unknown costs

Scenario 1: No cost through impacts on operations, as the rMCZ is assumed to have no impact on the beach re-nourishment project.

Scenario 2:To establish whether the shingle recharge and reprofiling is impacting on the MCZ features, additional monitoring will be required as part of the recharge scheme to identify how long pebbles supplied through the shingle recharge and reprofiling remain above mean high water and where they travel. This can be done using shingle tracer (placing a Global

Table 2c. Flood and coastal erosion risk management (coastal defence)	rMCZ 13.1, Beachy Head East
• **Bulverhythe scheme:** this protects 482 properties. If the current flood defence scheme is maintained there will be a 0.5% annual risk of flooding. This is estimated to increase to 1.3% in approximately 5 years if maintenance is not carried out. • **Eastbourne scheme:** this protects approximately 14,000 properties which are at risk with a 0.5% annual risk of flooding. This is estimated to increase to 1.3% within 3 years if the beach maintenance activities cease. The shingle is likely to impact high intertidal rock, moderate energy intertidal rock, intertidal coarse sediment, intertidal mixed sediment, littoral chalk communities and blue mussel (*Mytilus edulis*) beds through abrasion or siltation resulting in smothering of the features. If it is found to be having an impact, this could arise from imported shingle that is part of the flood and coastal erosion risk management scheme or shingle that is part of natural coastal processes. It is also possible that damage may occur through anchoring or vessel drafts contacting the feature during the process. The Environment Agency business case determined that open beach shingle management was the most cost effective, environmentally sensitive and sustainable method of maintaining the current level of protection. Other options included utilising a groyne field or T-neck rock groynes.	Positioning System (GPS) chip in a number of pebbles and tracking the process). This is beyond the scope of the existing Environmental Impact Assessment and is estimated to have a total one-off cost of less than £0.010m (see table above) which gives combined figures for both this rMCZ and 13.2 Beachy Head West (Natural England and Environment Agency Flood and Coastal Erosion Risk Management Workshop for the Balanced Seas Project Area, 17 November 2011). If features were found to be impacted, a discussion with the Environment Agency would be necessary to determine the most sustainable flood defence options. It is not possible to estimate the costs of this as the management options are not known. As indicated in the baseline, a significant increase in flooding would arise if the current coastal defence schemes are not maintained. ***Scenarios 1 and 2:***As a result of the rMCZ, it is anticipated that additional costs will be incurred in assessing environmental impacts in support of future licence applications for Flood and Coastal Erosion Risk Management (FCERM) schemes. For each licence application these costs are expected to arise as a result of approximately 0.5–1 day of additional work, in most cases, although there may be cases where further additional consultant time is needed (Environment Agency, pers. comm., 2012). It has not been possible to obtain information on the likely number of licence applications that will be made over the 20 year period of the IA or estimates of the potential increase in costs.

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 13.1, Beachy Head East
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 ***Management scenario 1:*** Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for disposal of dredged material and navigational dredging that takes place within 1km of the rMCZ. It is assumed that the dredge disposal site DV04 impacts on the MCZ's features and additional mitigation will be required relative to that provided in the absence of the MCZ. The Balanced Seas regional MCZ project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the MCZ will be needed relative to the mitigation provided in the baseline. ***Management scenario 2:*** Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for disposal of dredged material, navigational dredging and all port and harbour developments within 5 km of the rMCZ. It is assumed that the disposal site	

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 13.1, Beachy Head East

DV040 impacts on the MCZ's features and additional mitigation will be required relative to that provided in the absence of the MCZ. The Balanced Seas regional MCZ project is not aware of other activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the MCZ will be needed relative to the mitigation provided in the baseline.

Baseline description of activity

Licence applications for disposal sites: There are 2 disposal sites (DV040 Eastbourne and DV045 Wish Tower) within 1km of the rMCZ which are used by Sovereign Harbour (Eastbourne). For 1 disposal site (DV045 Wish Tower) no licence applications were received for this disposal site between 2001 and 2010 but it is not closed to disposal in future (Cefas, pers. comm., 2011). The average number of licence applications for the remaining disposal site (DV040 Eastbourne) is 0.7 per year (based on number of licence applications received between 2001 and 2010 (Cefas, pers. comm., 2011).

There are 2 disposal sites (DV040 Eastbourne and DV045 Wish Tower) within 5km of the rMCZ which are used by Sovereign Harbour (Eastbourne). For 1 disposal site (DV045 Wish Tower) no licence applications were received for this disposal site between 2001 and 2010 but it is not closed to disposal in future (Cefas, pers. comm., 2011). The average number of licence applications for the remaining disposal site (DV040 Eastbourne) is 0.7 per year (based on number of licence applications received between 2001 and 2010 (Cefas, pers. comm., 2011).

Use of disposal site: The dredging disposal site DV040 Eastbourne located at 50 45.880N and 00 20.000E is within 1km of Eastbourne and is currently used for the disposal of maintenance dredging spoil from Sovereign Harbour. The disposal returns indicate that the marina undertakes a single maintenance dredge campaign each year in March, varying between 34,000 and 82,000 tonnes (average of 56,600 tonnes) (L. English, pers. comm., 2012).

Navigational dredge areas: Maintenance and navigational dredging associated with Premier Marinas and Sovereign Harbour occurs within 1km of this rMCZ. It is assumed that each dredge area's marine licence is renewed once every 3 years, and that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal.

Maintenance and navigational dredging associated with Premier Marinas and Sovereign Harbour occurs within 1km of this rMCZ. It is assumed that each dredge area's marine licence is renewed once every 3 years, and

Costs of impact of rMCZ under Policy Option 1

£m/yr	Scenario 1	Scenario 2
Total	0.046	0.046

Scenario 1: Future licence applications for disposal of material and navigational dredging within 1km of this site will be required to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11).

Although one of the disposal sites in the rMCZ has not been used in the last ten years, it might be used during the 20 year period covered by the IA. Future licence applications for disposal of material in the disposal site will need to consider the potential effects of the activity on the features protected by the rMCZ.

Scenario 2: Future licence applications for disposal of material, navigational dredging and port or harbour development plans and proposals within 5km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11).

Scenario 1 and 2: For the purpose of the IA it is assumed that the dredge disposal site DV04 impacts on the MCZ's features and additional mitigation is required. This is likely to over-estimate the costs as there is uncertainty about whether the disposal site will impact on achieving the MCZ's features conservation objectives and therefore whether mitigation will be required (Natural England, e-mail, 12 July, 2012). Ideally the IA would have incorporated the uncertainty by assuming that mitigation was not required in Scenario 1, was required in Scenario 2 and the best estimate was the midpoint between Scenarios 1 and 2 (based on the assumption that there is an equal probability that each scenario could arise).

In the analysis that is presented here, it is assumed that mitigation is required in both Scenarios 1 and 2. It is assumed that mitigation of the impacts of dredge disposal at site DV040 could be provided by changing the dredging regime so that the dredge is undertaken twice a year (in March and September/October)

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 13.1, Beachy Head East
that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal. ***Port development:*** Eastbourne/Sovereign Harbour is within 1km of the rMCZ and may undergo development at some point in the future. It is possible that mitigation options may need to be considered in the future.	instead of once a year. This would reduce the quantity of dredged material going to the site at any one time and give more time for dispersion (Natural England, e-mail, 2012). This will increase the cost for the marina operators especially if they hire a dredger for the works. For the purpose of the IA the cost of undertaking two instead of one dredge per year has been estimated at £0.039m/yr (Premier Marinas Ltd. 23 Jan 2012). This cost applies in both Scenarios 1 and 2.

Table 2e: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 13.1 Beachy Head East
Oil and gas related activities (including carbon capture and storage) This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 13.1 Beachy Head East
Cables (existing interconnectors and telecom cables) Commercial fisheries (mid-water trawls, collection by hand) Recreation Research and education Shipping Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[7] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.								rMCZ 13.1 Beachy Head East	
ENG Feature	**Repres ent-ativity**	**Replicati on**	**Adequacy**	**Viability**	**Gaps or shortfalls in relation to ENG minimum guidelines**	**Recommended conservation objective**	**Quantitative considerations at regional MCZ level**	**Ecological Importance at regional MCZ level**	**Ecological Importance at wider scale**
A1.1 High energy intertidal rock	BSH	✓	✓	✓	None	Maintain	This BSH is currently only reaching the minimum replication target		
A1.2 Moderate energy intertidal rock	BSH	✓	✓	✓	None	Maintain	This feature overlaps and is already protected by an MPA		
A2.1 Intertidal coarse sediment	BSH	✓	✓	✓	None	Maintain			
A2.4 Intertidal mixed sediments	BSH	✓	✓	✓	None	Maintain			
A5.2 Subtidal sands * [1]	BSH	✓	✓	✓	None	Recover	This feature provides the second greatest contribution to the adequacy target for the region		

[7] copied from the JNCC and Natural England's advice to Defra on rMCZs

A5.4 Subtidal mixed sediments * [1]	BSH	✓	✓	✓	None	Recover			
Blue mussel *Mytilus edulis* beds	FOCI Habitat	✓	X	X	Viability is not met.	Recover		One of the best examples of this habitat in the region	BAP and OSPAR habitat
Littoral chalk communities	FOCI Habitat	✓	✓	✓	None	Maintain		Excellent example of littoral chalk communities which forms a continuous extension of the same habitat found in rMCZ13.2	BAP and OSPAR habitat
Ross worm *Sabellaria spinulosa* reefs	FOCI Habitat	✓	✓	✓ * [2]	None	Recover			BAP habitat
Subtidal chalk	FOCI Habitat	✓	✓	✓	None	Maintain			BAP habitat
Short-snouted seahorse *Hippocampus hippocampus*	FOCI Species	✓	✓	✓	None	Maintain		This feature is not protected within existing MPAs.	BAP and OSPAR species and listed on Schedule 5 of the Wildlife and Countryside Act
Native oyster *Ostrea edulis*	FOCI Species	✓	✓	✓	None	Recover		This feature is not	BAP and OSPAR

								protected within existing MPAs.	species
European eel *Anguilla anguilla*	FOCI Mobile Species	✓	✓	N/A	None	Maintain			BAP and OSPAR species
Peat and clay exposures	FOCI Habitat	✓	✓	✓	N/A	Maintain	N/A	N/A	BAP habitat

Site considerations	
Connectivity	✓
Geological/Geomorphological features of interest	None
Appropriate boundary	✓
Areas of Additional Ecological Importance	✓ * [1]
Overlaps with existing MPAs	✓ * [2]

Additional comments and site benefits:

[1] Herring spawning ground, possible nursery grounds for Plaice and Dover sole. Foraging ground for black-headed gulls, black-legged kittiwake and the common tern. Subtidal chalk ledges and peat and clay exposure support littoral chalk communities, *Sabellaria spinulosa* reefs, sea squirt (Mogula) beds and encrustations of Ross coral (R. Irving 1996, Brodie, et al. 2007, East Sussex County Council 1998, James, Pearce, et al. 2011). Unique fragile shallow reefs also occur in the site (R. Irving 1996).

[2] Overlaps with two Marine Sites of Nature Conservation Interest (mSNCI); these are non-statutory designated sites, designated on account of their special interest with regards to habitat, wildlife, geology or geomorphology by East and West Sussex County Council (R. Irving 1996).

Site is characterised by a highly biodiverse sandstone /chalk reef system (R. Irving 1996, Brodie, et al. 2007, East Sussex County Council 1998, James, Pearce, et al. 2011).

The Royal Sovereign Shoals area is one of the Key Inshore Biodiversity Forum (South East England Biodiversity Forum (SEEBF) 2010) and was also one of the recommendations put forward by the Marine Conservation Society as part of their 'Your sea your Voice' Campaign (Marine Conservation Society (MCS) 2011).

There is scientific value in this site because it is a well-studied site with good data, and there are a range of habitats that are not found anywhere else in the MCZ project area (Browning 2002).

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption		**rMCZ 13.1, Beachy Head East**
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Intertidal rock habitats are important sources of larval plankton upon which commercially important fish species feed, including mussels and larval fish of plaice and mackerel. Subtidal sand and subtidal mixed sediments are important for spawning and nursery grounds. These habitats can provide important nursery grounds for juvenile commercial species such as flatfishes and bass. Moderate energy and low energy infralittoral rock are important locations for commercial inshore fishing activity, particularly crab and lobster. Blue mussel beds provide habitat for shellfish and fish which are exploited by the fishing industry (Fletcher and others, 2011) The blue mussel beds in this rMCZ may be one of the best examples of this habitat in the region. Herring spawning grounds on hard boulder and gravel ground are known in the site, as well as nursery grounds for plaice and Dover sole on a reef just north of the Royal Sovereign Shoals; the Centre for Environment, Fisheries and Aquaculture Science (Cefas) considers this one of the most important places for nursery grounds within 0.25nm (nautical miles) of shore (Balanced Seas Final Recommendations, 2011). The site may thus help to support potential on-site and off-site fisheries. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The site contains important fishing grounds vessels (MCZ Fisheries	If the conservation objectives of the features are achieved, some of the features will recover to favourable condition. The rest will be maintained in favourable condition. New management of fishing activities is expected (above the baseline situation), the costs of which are set out in Table 2b, which may reduce the impacts on fish and shellfish habitats and harvesting of stocks. As most of the commercial species targeted by fishers in this area are mobile fish and crustaceans, it is unclear whether the scale of habitat recovered and the magnitude of reduced (on-site) harvesting will be enough to have any significant positive impact on commercial stocks. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 5a. Fish and shellfish for human consumption		rMCZ 13.1, Beachy Head East
Model) operating out of Hastings, Rye and Eastbourne, all under 15 metres in length. Static nets are the most common gear, targeting cod, plaice and Dover sole; potting is also important, targeting lobster and crab, closely followed by trawling, and cuttlefish (non-quota species) trapping; there is also some scallop dredging. Seasonal rod and line fishing for bass is a growing activity. A description of on-site fishing activity and the value derived from it is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits that derive from spawning and nursery areas.		

Table 5b. Recreation		rMCZ 13.1, Beachy Head East
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. Subtidal sand and mixed sediments are important for spawning and nursery grounds. These habitats can provide important nursery grounds for juvenile commercial species such as flatfishes and bass (Fletcher and others, 2011) which are also fished recreationally. Nursery grounds for plaice and Dover sole may occur on a reef just north of the Royal Sovereign Shoals. The Centre for Environment, Fisheries and Aquaculture Science (Cefas) has conducted a small fish survey which indicated that this is one of the most important places for nursery grounds within 0.25nm (nautical miles) of shore (Balanced Seas Final Recommendations, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The rMCZ is a popular area for shore angling, private boat angling and charter boat fishing. Angling is most concentrated around the various	If the conservation objectives of the features are achieved, some of the features, including the subtidal mixed sediments and subtidal sand, will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the subtidal mixed sediments and subtidal sand to favourable condition may improve its functioning as a nursery area, potentially benefiting angling activities within and outside the rMCZ (see Table 4a). As no additional management of angling is expected fishers will be able to benefit from any on-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers, both on and off-site Designation of this site may lead to an increase in angling visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in angling.	Anticipated direction of change: ⇧ Confidence: Low

reef complexes such as the nationally renowned Royal Sovereign Shoals (StakMap, 2010). Due to the complex habitats within the site and the generally high biodiversity, it is likely to help to support potential on-site and off-site fisheries. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the estuary spawning and nursery area.		
Diving: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation services. The rMCZ is a popular wreck and general diving spot (South Kent site meeting, 2011). The chalk reef systems of Royal Sovereign Shoals and the Horse of Willingdon reefs are both marine Sites of Nature Conservation Importance and as such are very popular with divers for their high biodiversity.	Designation of this site might lead to an increase in diving trips, as a result of publicity about the marine biodiversity and rare species found in the site. If populations of species such as seahorses and Ross coral increase, this could lead to an improved quality of experience for divers, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in diving trips at the national scale.	Anticipated direction of change: ⇧ Confidence: Low
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). Mussel beds are important habitat for foraging birds (Fletcher and others, 2011). Habitat complexity in the chalk reef systems and the subsequently high biodiversity of the site support foraging birds and marine mammals that may frequent the site. Birdwatching is possible throughout the site along the cliffs and the shore. Rocky ridges run approximately in line with the cliffs near Eastbourne, creating sheltered pools and lagoons at low tide that are full of seaweeds and other marine life (Balanced Seas Final Recommendations, 2011). The rMCZ is a popular wildlife watching destination both on land and via charter vessels conducting wildlife watching trips out of Eastbourne, Newhaven and Bexhill (StakMap, 2010). Beachy Head cliffs provide an	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the subtidal mixed sediments and subtidal sand and blue mussel beds to favourable condition may improve its functioning as a nursery area for a diverse array of species and increase the biodiversity of the site in general. Any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future	Anticipated direction of change: ⇧ Confidence: Low

Table 5b. Recreation		rMCZ 13.1, Beachy Head East
excellent vantage point for watching seabirds throughout the rMCZ (Sussex Wildlife Trust website). It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	degradation from pressures caused by human activities.	
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. Coastal walking in the accessible parts of the site and along the cliff tops alongside the site, which is adjacent to the South Downs National Park, is popular. Coastal swimming is also very popular within the rMCZ (Saturday Walkers' Club website). Other recreational pursuits are not known to occur specifically within the rMCZ; however, recreational traffic will pass through in transit to other destinations or on a scenic route past the iconic cliffs (StakMap, 2010). It has not been possible to estimate the value derived from tourism in the rMCZ.	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities. If the rMCZ is designated this will provide an additional positive aspect about the location that could be promoted by the tourism and leisure industry and that would be expected to increase visitation rates.	Anticipated direction of change: ⇧ Confidence: Low

Table 5c. Research and education		rMCZ 13.1, Beachy Head East
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. Sussex Wildlife Trust conducts sea-floor surveys through Seasearch and is collaborating with the Sussex Inshore Fisheries and Conservation Authority in research to help to improve the health of the marine environment (www.sussexwildlifetrust.org.uk/livingseas). The Beaches At Risk project (2003–8), an Anglo-French project which brought together coastal researchers from both sides of the Channel, also involved research in the rMCZ (www.sussex.ac.uk/geography/researchprojects/BAR). The South Downs Coastal Group carries out research between Selsey Bill and Beachy Head and thus within the rMCZ (Standing Conference on Problems Associated with the Coastline (SCOPAC) website). It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the pMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High

Table 5c. Research and education		rMCZ 13.1, Beachy Head East
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. Sussex Wildlife Trust undertakes educational activities at their centres or as outreach in schools that may involve the rMCZ (Sussex Wildlife Trust website). Seven Sisters Country Park provides educational resources in relation to the maritime cliffs between Brighton and Eastbourne and thus within the rMCZ (www.sevensisters.org.uk/page36). It has not been possible to estimate the value derived from education activities associated with the rMCZ.	MCZ designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ) education infrastructure (e.g. events, interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Moderate

Table 5d. Regulating services		rMCZ 13.1, Beachy Head East
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: the features of the site contribute to the bioremediation of waste (subtidal sediments), water filtration (Blue Mussel beds, Native oyster and *Sabellaria*) and sequestration of carbon (intertidal rock, Blue Mussel beds, Native oyster, *Sabellaria*, subtidal sediments) (Fletcher and others, 2011). ***Environmental resilience:*** the features of the site (intertidal rock, Blue Mussel beds and *Sabellaria*) contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** the features of the site, (infralttoral rock, Blue Mussel beds and *Sabellaria*) contribute to local flood and storm protection (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ.	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (subtidal sand, subtidal mixed sediments, *Sabellaria,* Native oyster and blue mussel beds) recovered to favourable condition. Recovery of the native oysters, Blue Mussel beds and *Sabellaria* Reefs and a potential reduction in the use of bottom towed fishing gear may increase the site's benthic biodiversity and biomass, improving the regulating capacity its habitats. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 5e. Non-use and option values	rMCZ 13.1, Beachy Head East
Baseline	**Beneficial impact under Policy Option 1**

Table 5e. Non-use and option values		rMCZ 13.1, Beachy Head East
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the pMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the rMCZ.	The pMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation. Examples of these values are shown in (Ranger, Lowe, Sanghera, & Solandt, 2012). Voters in the MCS's 'Your Seas Your Voice' campaign felt that features of the natural environment were strong motivators for reasons why people thought that some areas within the rMCZ should be protected, with people frequently attaching value to biodiversity and 'spectacular scenery.' Other themes that came up quite frequently were the sentiment that they felt "the whole place is amazing" and a feeling of emotional attachment to the site as well. Regarding non-extractive use value, ease of access and the provision of good facilities were considered important as reasons to protect this site. Furthermore, allowing species recovery, particularly fish and shellfish, was perceived as an important management reason to protect the site for both recreational and commercial users and local seafood consumers. In particular, MCS nominated Royal Sovereign Shoals which is within the rMCZ for its 'unique, fragile, shallow reefs' and its importance as a resource for the local community as it is 'vital to our economy, resources and local wildlife' and they want to see it 'protected for future generations'. Source: Ranger et al. (2011)	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head **Site area (km^2): 0.72**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts	rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head

1a. Ecological description

The recommended Marine Conservation Zone (rMCZ) Reference Area covers a small, primarily intertidal, area of the coastline falling within rMCZ 13.2 (Beachy Head West), and lies between Birling Gap and Beachy Head lighthouse. It contains exceptionally rich and diverse examples of littoral chalk communities.. The littoral chalk communities here are considered by the South East England Biodiversity Forum to be among the richest and most diverse in the Balanced Seas Project Area. The rMCZ Reference Area lies within the Seaford to Beachy Head Site of Special Scientific Interest and the Seven Sisters Voluntary Marine Conservation Area.Source: Balanced Seas Final Recommendations (2011).

N.B. Map showing boundary in Site Assessment Document in the Balanced Seas Final Recommendations Report (2011) is incorrect in showing the site as extending into the subtidal. As a result the site description lists a number of subtidal habitats for protection. As agreed at the August Regional Stakeholder Group meeting (Balanced Seas RSG Meeting Report 11, August 2011), this is an intertidal site and the seaward boundary should be Mean Low Water. This revision is reflected in the SNCB advice. The IA material below however is based on the information in the Final Recommendations Report.

1b. Baseline condition of MCZ features and impact of the MCZ

Feature	Area of feature (km2)	No. of occurrences	Baseline	Impact
Broad-scale habitats				
A1.2 Moderate energy intertidal rock	0.26	-	Unfavourable condition	Recover to favourable condition
A3.1 High energy infralittoral rock	-	-	Unfavourable condition	Recover to favourable condition
A3.2 Moderate energy infralittoral rock	-	-	Unfavourable condition	Recover to favourable condition
A4.2 Moderate energy circalittoral rock	-	-	Unfavourable condition	Recover to favourable condition
A5.2 Subtidal Sand*	-	-	Unfavourable condition	Recover to favourable condition
A5.4 Subtidal mixed sediments*	-	-	Unfavourable condition	Recover to favourable condition
Habitats of Conservation Importance				
Littoral chalk communities	0.47	-	Unfavourable condition	Recover to favourable condition
Subtidal chalk*	1,126 m^2	-	Unfavourable condition	Recover to favourable condition
Subtidal sands and gravels*	0.02	-	Unfavourable condition	Recover to favourable condition

- **<u>These features are incorrectly listed (see explanation above).</u>**

Site-specific costs arising from the effect of the rMCZ on human activities (over 2012 to 2031 inclusive)

Table 2a. Archaeological heritage	rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

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.

Table 2a. Archaeological heritage	rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
The site comprises cliff pits at Belle Tout, an unenclosed hut, a ritual shaft, an early bronze-age settlement, the wreck of a cargo vessel and Beachy Head Lighthouse, which is Grade II listed (English Heritage, 2012). English Heritage has indicated that this site is likely to be of interest for archaeological excavation in the future as it is relevant to its National Heritage Protection Plan (theme 3A1.2) (English Heritage, 2012). English Heritage has indicated that this site is likely to be of interest for archaeological excavation in the future as it is relevant to its National Heritage Protection Plan (theme 3A1.2).	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost in one licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). 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 Impact Assessment. 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.

Table 2b. Commercial fisheries	rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of entire site to all gear types.	
Summary of all fisheries: The rMCZ Reference Area is intertidal and therefore there is little if any overlap with commercial fishing interests. The site is included in rMCZ 13.2 Beachy Head West. Also, a Sussex Inland Fisheries and Conservation Authority (IFCA) byelaw prevents trawling within 0.25nm (nautical miles) of the coastline. More detail on the approach used for the fisheries method is provided in Annexes H7 and N4. It is unknown how many vessels use this rMCZ Reference Area. Estimated annual value of landings from the rMCZ Reference Area: £0.014m/yr (MCZ Fisheries Model). (Due to resolution issues of the MCZ Fisheries Model and the small size of many rMCZ Reference Area in the Balanced Seas region, some fisheries landings values may be inaccurate. They have been included as a precautionary measure and to avoid underestimating the economic value of a site.)	
Baseline description of UK commercial fisheries	**Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1**
Bottom trawls: It is very unlikely that bottom trawling occurs within this site because it is intertidal. Also, a Sussex Inland Fisheries and Conservation Authority (IFCA) byelaw prevents trawling within 0.25nm	Estimated annual value of UK vessel landings affected: *£m/yr* | Scenario 1

(nautical miles) of the coastline (Sussex IFCA, feedback response to first tranche of material, 10 January 2012.). The MCZ Fisheries Model indicates some use but this is likely to be the result of the level resolution of the model.

Value of landings affected	<0.001

This value is an overestimate as the site is intertidal and Sussex IFCA byelaw prohibits trawling within 0.25nm of the shore (for more detail see Annex E1)..

Pots and traps: It is unknown how many vessels use pots and traps in the rMCZ Reference Area but it has been indicated that use of this particular area is low (MCZ Fisheries Model).

Estimated annual value of UK vessel landings affected:

£m/yr	Scenario 1
Value of landings affected	<0.001

Nets: It is unknown how many vessels use nets in the rMCZ Reference Area but It has been indicated that use of this particular area is low (MCZ Fisheries Model). It is unlikely that netting occurs within this intertidal rMCZ Reference Area (Sussex IFCA, feedback response to first tranche of material, 10 January 201)

Estimated total value of landings from the rMCZ Reference Area: £0.001 m/yr (MCZ Fisheries Model).

Estimated annual value of UK vessel landings affected:

£m/yr	Scenario 1
Value of landings affected	0.001

Hooks and lines: It is unknown how many vessels use hooks and lines in the rMCZ Reference Area, but it has been indicated that use of this particular area is low (FisherMap Data 2010).

Estimated annual value of UK vessel landings affected:

£m/yr	Scenario 1
Value of landings affected	<0.001

Total direct impact on UK commercial fisheries under Policy Option

Estimated annual value of landings from the rMCZ Reference Area: £0.004m/yr (MCZ Fisheries Model).

Estimated annual value of UK vessel landings and GVA affected:

£m/yr	Scenario 2	Best estimate
Value of landings affected	0.001	<0.001
GVA affected	0.001	<0.001

The best estimate is based on an assumption that 75% of value is displaced to other areas. This is based upon an assumption of average displacement across

Table 2b. Commercial fisheries	rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head
	all rMCZs, and may be an under- or overestimate for this site.
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries**
	None.

Table 2c. Ports, harbours, shipping and disposal sites — **rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management scenario 1: Not applicable to this site.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for all port and harbour developments within 5 km of the rMCZ Reference Area. It is anticipated that additional mitigation of impacts on features protected by the rMCZ will be needed for port development and port-related activities relative to the mitigation provided in the baseline.

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
Port development: There is 1 port and harbour within 5km of the rMCZ Reference Area (Eastbourne – Ports & Harbours UK, 2012) which could potentially undergo development at some point in the future.	*£m/yr* | Scenario 1 | Scenario 2 Cost to the operator | N/A | 0.000 ***Scenario 1:*** Not applicable to this site. ***Scenario 2:*** Future licence applications for port or harbour development plans or proposal within 5km of this rMCZ Reference Area will be required to consider the potential effects of the activity on the features protected by the rMCZ Reference Area.

Table 2d. Recreational angling — **rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Closure of entire site to all recreational angling.

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
Seventeen StakMap interviews indicated that areas used for recreational	The local angling sector has agreed to cease angling in the site if it is

Table 2d. Recreational angling	rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head
angling (shore fishing and boat fishing) overlap with the rMCZ Reference Area. The interviewees represented three individual anglers and 14 clubs (representing a total of 1,598 users) based throughout the south-east region. The site is isolated and access is tricky, and equipment has to be carried to the site, which limits the numbers involved in shore angling. A small amount of recreational angling occurs from canoes but at an insignificant intensity (Natural England Stakeholder Interview for rMCZ Reference Area 9 Belle Tout to Beachy Head, November 2011).	designated (Sussex Local Group meeting, 2011). The limited numbers of anglers who currently fish in the site may respond to the closure by fishing at alternative locations in the area. Their travel costs may increase as a result. The costs are not expected to be significant.

Table 2e: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head
Oil and gas related activities (including carbon capture and storage) This rMCZ Reference Area overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, it is unlikely that any oil and gas (including carbon capture and storage) infrastructure will be proposed in future in this rMCZ Reference Area due to its location and size (DECC, pers. comm., 2012). Impacts of rMCZ Reference Areas on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N 10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head
Flood and coastal erosion risk management (coastal defence) Recreation (except for the activities listed above in table 2) Research and education Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath rMCZ 13.2 Beachy Head West This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions in Annex H.

Table 4a. Fish and shellfish for human consumption	**rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head**	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. Intertidal rock is an important source of larval plankton on which commercially important fish species feed, including mussels and the larval fish of plaice and mackerel (Fletcher and others, 2011). Infralittoral and circalittoral rock is an important location for commercial inshore fishing activity, particularly for crab and lobster (Fletcher and others, 2011). Subtidal sediments can provide important nursery grounds for juvenile commercial species such as flatfishes and bass (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMCZ 13.2 Table 1 for details). There is very little fishing in the rMCZ Reference Area due to its intertidal nature. A description of on-site fishing activity and the value derived from it is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits that derive from any potential spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. The costs of this are set out in Table 2b. Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption. Closure of the rMCZ Reference Area to fishing activity will reduce the on-site fishing mortality of species, but as the site is small it is unclear whether this would benefit stocks of mobile commercial finfish species. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation	**rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head**
Baseline	**Beneficial impact under Policy Option 1**

Table 4b. Recreation	rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Intertidal rock is an important source of larval plankton on which commercially important fish species feed, including mussels and the larval fish of plaice and mackerel (Fletcher and others, 2011), and this may also benefit recreational fisheries. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMCZ 13.2 Table 1 for details). There is a very small amount of angling mainly from canoes in this rMCZ Reference Area, as described in Table 2d. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the potential spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Anticipated direction of change: ⇧ Confidence: Low
Diving: The rMCZ Reference Area is mostly intertidal so there is little diving within it, but it may occasionally be used for shore diving.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The recovery of the features to reference condition may improve their functioning as support for fish and other marine wildlife (including increases in size and diversity of species), potentially benefiting diving within the rMCZ Reference Area. The designation may lead to an increase in diving visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK diving and/or a redistribution of location preferences.	Anticipated direction of change: ⇧ Confidence: Low
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. An improvement in the condition of site features and any	Anticipated direction of change:

Table 4b. Recreation	rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head	
Macroinvertebrates are an essential link between high trophic levels (e.g. fish and birds) and low trophic levels (e.g. algae) on intertidal rock habitat (Fletcher and others, 2011). Habitat complexity in the subtidal chalk and the consequently high biodiversity of the site support foraging birds and marine mammals that may frequent the site. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in some are in favourable condition and some are in unfavourable condition (see rMCZ 13.2 Table 1 for details). Beachy Head cliffs provide an excellent vantage point for watching sea birds throughout the rMCZ (Sussex Wildlife Trust website). The site lies within the Seven Sisters voluntary Marine Conservation Area and borders the South Downs National Park (Balanced Seas Final Recommendations, 2011), and is a popular wildlife watching destination both on land and via charter vessels conducting wildlife watching trips out of Eastbourne, Brighton and Newhaven (StakMap, 2010). It has not been possible to estimate the value derived from wildlife watching in the rMCZ Reference Area.	associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	⇧ Confidence: Low
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services. Coastal walking is popular along the cliff top bordering the rMCZ Reference Area (Saturday Walkers' Club website). It has not been possible to estimate the value derived from other recreation in the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The rMCZ Reference Area is fully contained within rMCZ 13.2 for which the benefits of other recreation have been assessed. It is not possible to identify whether the Reference Area will have additional benefits over and above this but this seems unlikely. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities (because, if necessary, mitigation would be introduced, with the associated costs and benefits).	Anticipated direction of change: ⇧ Confidence: Low

Table 4c. Research and education	rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head	
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. Sussex Wildlife Trust undertakes sea-floor surveys through Seasearch, and is collaborating with the Sussex Inshore Fisheries and Conservation Authority on research to improve the health of the marine environment (www.sussexwildlifetrust.org.uk/livingseas). These activities take place in the wider rMCZ in which this rMCZ Reference Area lies and may overlap. The National Trust undertakes research on the adjacent line, primarily on the eroding cliffs (Natural England Impact Assessment questionnaire, 2011). It has not been possible to estimate the value derived from research activities associated with the rMCZ Reference Area.	The rMCZ Reference Area will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. Sussex Wildlife Trust and Seven Sisters Country Park undertake educational activities in the broader rMCZ (www.sevensisters.org.uk/page36.html). These activities may overlap with the rMCZ Reference Area. It has not been possible to estimate the value derived from education activities associated with the rMCZ Reference Area.	MCZ Reference Area designation may provide an opportunity to expand the focus of marine education events, and particularly to promote the Seven Sisters voluntary Marine Conservation Area. Designation may aid the development of additional local (to the rMCZ Reference Area) education activities(e.g. events and interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ Reference Area contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Moderate

Table 4d. Regulating services	rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: Intertidal rock contributes to the sequestration of carbon (Fletcher and others, 2011). ***Environmental resilience:*** The features of the site, in particular intertidal rock, contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011).	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of broad-scale habitats and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats.	Anticipated direction of change: ⇧

Table 4d. Regulating services		rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head
Natural hazard protection: Intertidal rock provides a natural form of protection from erosion by reducing the wave energy that reaches the shore (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	Designating the recommended Marine Conservation Zone (rMCZ) Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Confidence: Low

Table 4e. Non-use and option values		rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head
Baseline	**Beneficial impact**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the Recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values the conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 14 Offshore Brighton

Site area (km^2): 861.97

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts — **rMCZ 14, Offshore Brighton**

1a. Ecological description

This recommended Marine Conservation Zone (rMCZ) would protect several sea bed habitats (high and moderate energy circalittoral rock and subtidal mixed sediments) in the deeper waters of the mid English Channel. Subtidal sands and gravels also occur, interspersed with Ross worm reef. The site overlaps an area of high benthic species richness and benthic biotope distinctness. It overlaps part of the Northern Paleovalley, a morphologically visible remnant of the ancient river system that underlies the English Channel, classified as an English Channel Outburst Flood feature, evidence of a megaflood which occurred some 200,000 years ago when a huge glacial lake in the North Sea burst through the Dover Straits Isthmus which contained it, thus separating England from mainland Europe. This site is not associated with any other existing designation.

Source: Balanced Seas Final Recommendations (2011).

1b. Baseline condition of MCZ features and impact of the MCZ

Feature	Area of feature (km2)	No. of occurrences	Baseline	Impact
Broad-scale habitats				
A4.1 High energy circalittoral rock	175.67	-	Unfavourable condition	Recover to favourable condition
A4.2 Moderate energy circalittoral rock	11.04		Unfavourable condition	Recover to favourable condition
A5.4 Subtidal mixed sediments	675.92	-	Unfavourable condition	Recover to favourable condition
Habitats of Conservation Importance				
Ross worm (*Sabellaria spinulosa*)	1,8779 m^2	-	To be assessed	To be assessed
Subtidal sands and gravels	458.19		Favourable condition	Maintain at favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone on human activities (over 2013 to 2032 inclusive)

Table 2a. Commercial fisheries — **rMCZ 14, Offshore Brighton**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of commercial fishing gears will be required for certain features protected by this rMCZ. Therefore, two scenarios have been employed in the Impact Assessment (IA) for these fisheries to reflect this uncertainty. Should the site be designated, the management that will be required will fall somewhere within this range.

Table 2a. Commercial fisheries **rMCZ 14, Offshore Brighton**

Management scenario 1: Closure of entire site to bottom trawls and dredges to protect areas of Ross worm reef *Sabellaria spinulosa* (SNCB informed scenario).

Management scenario 2: Closure of entire rMCZ to bottom trawls, dredges, lines, nets, pots and traps to protect areas of high and moderate energy circalittoral rock, sub-tidal mixed sediments and Ross worm reef *Sabellaria spinulosa* (SNCB informed scenario).

Summary of all fisheries: This site is wholly beyond 12 nautical miles (nm) and is fished by UK and non-UK vessels. The north-east part of the rMCZ is mainly fished by UK scallop dredgers. Both over 15 and under 15 metre UK vessels derive income from the rMCZ from potting, scallop dredging, rod and lining, bottom trawling and set netting; dredges and mid-water trawls are also used (information from Fishermap interviews). The Belgian, French and Dutch fleets are active in this area. More detail on the approach used for the fisheries method is provided at Annexes H7 and N4.

One fisher is concerned that the large UK potting vessels from the Channel Crabbers Association (based in the south-west of England) that fish in the adjacent Wight–Barfleur Special Area of Conservation (SAC) may be displaced to this rMCZ if additional restrictions on fisheries are introduced for the SAC. This could result in gear conflict with existing fisheries in the rMCZ (IA questionnaire response from Shoreham vessel owner, August 2011 clarified through discussion with ex-Balanced Seas fisheries liaison officer, April 2012). It has not been possible to obtain further views on this, and the likelihood of restrictions in the SAC is still unknown.

Estimated annual value of landings from the rMCZ: £1.436m/yr.

Baseline description of UK commercial fisheries	**Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1**
Bottom trawls: Number of vessels unknown Estimated total value of landings from the rMCZ: £0.833m/yr (MCZ Fisheries Model).	The estimated annual value of UK bottom trawl landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.833 | 0.833
Dredges: Number of vessels unknown. Estimated total value of landings from the rMCZ: £0.341m/yr (MCZ Fisheries Model).	The estimated annual value of UK dredge landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.341 | 0.341
Hooks and lines: Number of vessels unknown. Estimated total value of landings from the rMCZ: £0.006m/yr (MCZ	The estimated annual value of UK hook and line landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2

<table>
<tr><th colspan="2">Table 2a. Commercial fisheries</th><th>rMCZ 14, Offshore Brighton</th></tr>
<tr><td>Fisheries Model).</td><td><table><tr><td>Value of landings affected</td><td>0.000</td><td>0.006</td></tr></table>In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with hooks and lines at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Nets: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £0.004m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK net landings affected is expected to fall within the following range of scenarios:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.004</td></tr></table>In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with nets at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Pots and traps: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £0.043m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK pot and trap landings affected is expected to fall within the following range of scenarios:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.043</td></tr></table>In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with pots and traps at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Total direct impact on UK commercial fisheries under Policy Option 1</td><td></td></tr>
<tr><td></td><td>The estimated annual value of UK landings and gross value added (GVA) affected is expected to fall within the following range of scenarios:</td></tr>
</table>

£m/yr	Scenario 1	Scenario 2	Best estimate
Value of landings affected	0.294	1.228	0.297
GVA affected	0.128	0.537	0.129

The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas. This is based upon an assumption of average displacement across all rMCZs, and may be an under- or overestimate for this site.

The above figures do not reflect the impacts of possible displacement of large UK potting vessels from the Channel Crabbers Association (based in the south-west of England) that fish in the adjacent Wight–Barfleur, in response to management for the SAC (IA questionnaire response from Shoreham vessel owner, 24 August 2011 clarified through discussion with ex-Balanced Seas fisheries liaison officer, April 2012). In the event that such displacement arose, it could potentially increase the potting landings affected by the rMCZ and reduce landings by mobile gear that are affected (due to gear conflict from increased potting).

Baseline description of non-UK fisheries

Vessels from France: At least 82 French fishing vessels use the rMCZ (some only seasonally) (Direction des Pêches Maritimes et de l'Aquaculture, 2011):

- Nord-Pas de Calais and Picardie fleet: vessels targeting red mullet and squid, which are high value, non-quota species; also 20–40 trawlers under 15 metres from Boulogne-sur-Mer.
- Haute Normandie fleet: 45 vessels (bottom trawlers, pelagic trawlers and scallopers) target scallop, cuttlefish, bass, pout (bib), ray, whiting, squid, mackerel.

Costs of impact of rMCZ on non-UK commercial fisheries under Policy Option 1

Scenario 1: Non-UK vessels using bottom trawls and dredges throughout the site (notably French and Belgian vessels) will be affected by the management scenarios for the rMCZ. The estimated value of French landings affected is £0.153m/yr (bottom trawls/dredges) (Direction des Pêches Maritimes et de l' Aquaculture, 2011). No information on the effect on other non-UK vessels is available. The Dutch representative considered that there would be less impact on the Dutch fleet if zoned management were to be implemented. No zoning scenario has yet been proposed although it might be possible given the large size of the site (Report of Balanced Seas Regional Stakeholder Group Meeting 11, August 2011).

Scenario 2: Non-UK vessels using static gear and bottom trawls/dredges will

Table 2a. Commercial fisheries	rMCZ 14, Offshore Brighton
• Basse Normandie fleet: large number of vessels targeting a wide range of species, including several dredgers, bottom and pelagic trawlers (some under 15 metres). • Also 2 long liners under 15 metres that fish only in this site, all year. The southern part of the rMCZ is particularly heavily used for scalloping. Vessels from the Netherlands: historical rights for herring and to use beam trawling in a small part of the area; specific area for low impact Scottish seine/fly shoot fisheries (Balanced Seas Final Recommendations Report, 2011). Vessels from Belgium: the Belgian fleet fishes the area heavily with beam trawls (more in the east than the west because of the harder ground in the latter) (Balanced Seas Final Recommendations Report, 2011). Estimated value of landings from the rMCZ by French vessels: bottom trawls/dredges: £0.153m/yr; static gears: £0.001m/yr (Direction des Pêches Maritimes et de l' Aquaculture, 2011). Estimates are not available for other countries.	be affected by the rMCZ, particularly French (at least 82 vessels would be affected) and Belgian vessels. In the event of a full closure of the rMCZ the estimated value of French landings affected will be £0.153m/yr (bottom trawls/dredges) and £0.001m/yr (static gears) (Direction des Pêches Maritimes et de l' Aquaculture, 2011).

Table 2b. National defence	rMCZ 14, Offshore Brighton
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Mitigation of impacts of Ministry of Defence (MOD) activities on features protected by the suite of rMCZs will be provided by additional planning considerations during operations and training. It is not known whether mitigation will be required for features protected by this site. The MOD will also incur costs in revising environmental tools and charts to include MCZs.	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
The MOD is known to make use of the site. The entire rMCZ Reference Area is covered by national defence covering the air, water column and sea bed. The main impacts on the rMCZ Reference Area are listed as (a) air and water surface – noise, physical and visual disturbance, (b) water column noise and (c) sea bed – fixed equipment. Activities include: air general, acoustic trials, flares, firing range, smoke, surface target towing,	It is not known whether this rMCZ will impact on the MOD's use of the site. Impacts of rMCZs on national defence are assessed in Annex H10 and N9 (they are not assessed for this site alone).

towed array (surveillance system), aerial towed target and anti-aircraft.	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the rMCZ under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ No. 14 Offshore Brighton**
Cables (existing interconnectors and telecom cables) Commercial fisheries (mid-water trawls) Recreation Shipping	

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[8] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.								rMCZ 14 Offshore Brighton	
ENG Feature	**Represent-ativity**	**Replication**	**Adequacy**	**Viability**	**Gaps or shortfalls in relation to ENG minimum guidelines**	**Recommended conservation objective**	**Quantitative considerations at regional MCZ level**	**Ecological Importance at regional MCZ level**	**Ecological Importance at wider scale**
Ross worm *Sabellaria spinulosa* reefs * [1]	FOCI	✓	✓	✓	None	Recover			BAP and OSPAR habitat

[8] copied from the JNCC and Natural England's advice to Defra on rMCZs

Subtidal sands and gravels	FOCI	✓	✓	✓	None	*Maintain*			BAP habitat
A4.1 High energy circalittoral rock	BSH	✓	✓	✓	None	Recover			
A4.2 Moderate energy circalittoral rock	BSH	✓	✓	✓ * [2]	None	Recover		This feature is not currently protected within existing MPAs.	Only a small proportion of this BSH is currently protected in existing MPAs within the Eastern Channel Regional Sea
A5.4 Subtidal mixed sediments	BSH	✓	✓	✓	None	Recover			

Site considerations	
Connectivity	✓
Geological/Geomorphological features of interest	✓ * [3]
Appropriate boundary	✓
Areas of additional ecological importance	✓ * [4]
Overlaps with existing MPAs	None

An overview of features within the Dolphin Head recommended reference area and how these contribute to the ENG guidelines at the regional MCZ project area and at a wider scale copied from JNCC and Natural England's advice on rMCZs

✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Where an asterisk (*) has been given in the table, more detail is provided in the narrative.

ENG Feature	Representativity	Viability	Recommended conservation objective
Sabellaria spinulosa reef	FOCI	✓	Recover to reference condition
Subtidal sands and gravels	FOCI	✓	Recover to reference condition
A4.1 High energy circalittoral rock	BSH	✓	Recover to reference condition
A4.2 Moderate energy circalittoral rock	BSH	✓	Recover to reference condition
A5.4 Subtidal mixed sediments	BSH	✓	Recover to reference condition
Site considerations			
Appropriate boundary	✓		

Additional comments and site benefits:

- [1] There is uncertainty as to whether current data is for *Sabellaria spinulosa* reef or just an occurrence of *Sabellaria spinulosa* species. Further evidence will need to be gathered to confirm whether the reef feature is present (see Section 5.1 of JNCC and Natural England's Advice on rMCZs). Final advice is pending further discussion with Defra regarding the designation of Annex 1 features in MCZs.
- [2] There is only a small patch of the moderate energy circalittoral rock within this rMCZ.
- [3] The site also overlaps with Glacial Process features including the English Channel Outburst Flood Feature (listed as a feature of interest in the ENG) and rock outcrop features, although these have not been recommended as primary features for designation at this site. The English Channel Outburst Flood Feature is a very large scale Glacial Process (erosion) feature, formed by a catastrophic flood that occurred some 400, 000 years before present, when a land barrier at the Straits of Dover that had trapped meltwater in the North Sea became breached. The event left megaflood erosion features on the English Channel seabed including deeply-eroded channels.

- [4] Information on Areas of Additional Ecological Importance was used in decisions on the location and final boundary. This rMCZ and the recommended reference area overlap with an area of medium benthic species biodiversity and medium benthic biotope biodiversity (Langmead, et al. 2010).

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption		**rMCZ 14, Offshore Brighton**
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. High and moderate energy circalittoral rock is an important location for commercial inshore fishing activity, particularly crab and lobster. Subtidal mixed sediment habitats are an important nursery area for many species and thus often important for fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The rMCZ is important for scallop dredging in particular but also for trawling, potting, rod and lining, and set netting. There is currently a relatively high on-site value derived from fish and shellfish services, through these various fishing activities. A description of on-site fishing activity and the value derived from it is set out in Table 2a.	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some recovered to favourable condition. New management of fishing activities is expected (above the baseline situation), the costs of which are set out in Table 2a, which may reduce the impacts on fish and shellfish habitats and harvesting of stocks. As most of the commercial species targeted by fishers in this area are mobile fish and shellfish, it is unclear whether the scale of habitat recovered and the magnitude of reduced (on-site) harvesting will be enough to have any significant positive impact on commercial stocks. Potential benefits may arise on-site, for fishers permitted to fish within the rMCZ, and off-site from spill-over benefits.	Anticipated direction of change:  Confidence: Low

Table 5b. Recreation	**rMCZ 14, Offshore Brighton**

Table 5b. Recreation	rMCZ 14, Offshore Brighton	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. Circalittoral rock and subtidal mixed sediments support high biodiversity, and spawning and nursery grounds for many juvenile commercial fish species, all of which are therefore important habitats for angling (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The rMCZ is too far offshore for private angling boats, but may be used for fishing by charter vessels on their way over to fish French waters. The potential spawning ground for flatfishes and generally high biodiversity due to the complex habitats within the site are likely to help to support potential on-site and off-site fisheries. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the potential spawning and nursery area.	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the broad scale habitats to favourable condition may improve their functioning as a nursery area, potentially benefiting fisheries exploited within and outside the pMCZ (see Table 4a). As no additional management of angling is expected, fishers will be able to benefit from any on-site and off-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers. The designation may lead to an increase in angling visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in angling.	Anticipated direction of change: ⇧ Confidence: Low
Diving: Diving is not known to take place in the rMCZ.	N/A.	N/A
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). Due to its offshore location the rMCZ is not an important area for wildlife watching, but it lies within an area of the Channel used by	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the broad scale habitats to favourable condition may improve their functioning as support for fish, bird and marine mammal populations. Any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service.	Anticipated direction of change: ⇧ Confidence: Low

Table 5b. Recreation		rMCZ 14, Offshore Brighton
ferries, which may carry wildlife watchers, particularly those interested in marine mammals. It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	
Other recreation: Not known to take place in the rMCZ.	N/A	N/A

Table 5c. Research and education		rMCZ 14, Offshore Brighton
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. No known formal research activities are currently carried out in the rMCZ. However, ferries crossing the Channel may be used by marine mammal observers whose data contribute to national databases. It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. No known education activity occurs in the rMCZ.	As the rMCZ is approximately 36km offshore and therefore relatively inaccessible, no benefits are likely to arise from direct use of the site for education. Non-visitors may benefit if the rMCZ contributes to external education programmes (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Low

Table 5d. Regulating services	rMCZ 14, Offshore Brighton	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: the features of the site contribute to the bioremediation of waste (subtidal sediments), water filtration (*Sabellaria*) and sequestration of carbon (*Sabellaria* and subtidal sediments) (Fletcher and others, 2011). ***Environmental resilience:*** the features of the site (*Sabellaria*) contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** as the site is offshore, its features are not thought to contribute to the delivery of this service (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ.	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (circalittoral rock and subtidal mixed sediments) recovered to favourable condition. Recovery of the circalittoral rock and subtidal mixed sediments and a potential reduction in the use of bottom towed fishing gear may increase the site's benthic biodiversity and biomass, improving the regulating capacity its habitats. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 5e. Non-use and option values	rMCZ 14, Offshore Brighton	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the rMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the rMCZ.	The pMCZ will benefit the proportion of the UK population that values conservation of the pMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The pMCZ will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 14. Reference Area 10 Dolphin Head

Site area (km^2): 74.82

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts			**rMCZ 14, Reference Area 10 Dolphin Head**	
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) Reference Area lies within rMCZ 14 (Offshore Brighton) and was identified to protect an area of high and moderate energy circalittoral rock where there is higher confidence in its occurrence than elsewhere in the region. Offshore examples of two habitat Features of Conservation Importance would also be protected within the boundaries. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A4.1 High energy circalittoral rock	15.4	-	Unfavourable condition	Recover to favourable condition
A4.2 Moderate energy circalittoral rock	11.0	-	Unfavourable condition	Recover to favourable condition
A5.4 Subtidal mixed sediments	48.4	-	Unfavourable condition	Recover to favourable condition
Habitats of Conservation Importance				
Ross worm *Sabellaria spinulosa* reef	939.5 m^2	-	Unfavourable condition	Recover to favourable condition
Subtidal sands and gravels	7.37	-	Unfavourable condition	Recover to favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone on human activities (over 2013 to 2032 inclusive)

Table 2a. Commercial fisheries	**rMCZ 14, Reference Area 10 Dolphin Head**
Source of costs of the recommended Marine Conservation Zone (rMCZ) Reference Area under Policy Option 1 ***Management scenario 1:*** Entire rMCZ is closed to all fishing, except mid-water trawls (Statutory Nature Conservation Bodies (SNCB) informed scenario). ***Management scenario 2:*** Entire rMCZ is closed to all commercial fishing (SNCB informed scenario).	
Summary of all fisheries: The rMCZ Reference Area is beyond the 12 nautical mile (nm) limit and is included in rMCZ 14 Offshore Brighton. Eleven UK fishers who were interviewed for Fishermap indicated that their areas of operation overlapped with the rMCZ Reference Area but that this is a small proportion of the total area that they fish. UK vessels over 15 metres use scallop dredgers and trawlers. There are also large vessels from the Channel Crabbers Association that deploy pots, and vessels under 15 metres fish in the site using pots, scallop dredges, rod and line, bottom trawls and set nets (information from Fishermap interviews). The majority of fishing activity in the site may be by non-UK vessels and the Belgian, French and Dutch fleets are	

active in this area. More detail on the approach used for the fisheries method is provided at Annexes H7 and N4.

It is unknown how many vessels use this MCZ.

Estimated value of UK net landings from the rMCZ Reference Area: 0.101m/yr.

<table>
<tr><th>Baseline description of UK commercial fisheries</th><th>Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1</th></tr>
<tr><td>Bottom trawls: Number of vessels unknown but the areas of operation of vessels from the Newhaven Fish and Flake Ice Society Ltd overlap with the rMCZ Reference Area (information from FisherMap interviews, 2010).

Estimated total value of landings from the rMCZ Reference Area: £0.058m/yr.</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.058</td><td>0.058</td></tr></table></td></tr>
<tr><td>Dredges: Number of vessels unknown but the areas of operation of vessels from the Newhaven Fish and Flake Ice Society Ltd targeting scallops overlap with the rMCZ Reference Area (information from FisherMap interviews).

Estimated total value of landings from the rMCZ Reference Area: £0.039m/yr (MCZ Fisheries Model).</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.039</td><td>0.039</td></tr></table></td></tr>
<tr><td>Hooks and lines: It is unknown how many vessels use this site. The area of operation of at least 1 vessel from Hardway Fishermen’s Associationusing rod and line targeting bass and pollack overlaps with the rMCZ Reference Area (information from FisherMap interviews 2010).

Estimated total value of landings from the rMCZ Reference Area: 0.001m/yr (MCZ Fisheries Model).</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.001</td><td>0.001</td></tr></table></td></tr>
<tr><td>Pots and traps: Number of vessels unknown, but one stakeholder interview, targeting lobster and working as part of the Selsey Fishermen’s Association, indicated that the rMCZ Reference Area overlapped with his area of operation (information from FisherMap interviews 2010).

Estimated total value of landings from the rMCZ Reference Area: £0.004m/yr (MCZ Fisheries Model).</td><td>Estimated annual value of UK vessel landings affected:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.004</td><td>0.004</td></tr></table></td></tr>
</table>

Table 2a. Commercial fisheries — **rMCZ 14, Reference Area 10 Dolphin Head**

Mid-water trawling: It is unknown how many vessels use mid-water trawls in the rMCZ Reference Area.

Estimated annual value of UK vessel landings affected:

£m/yr	Scenario 1	Scenario 2
Value of landings affected	0.000	0.000

Under Scenario 1 there will be no impact on mid-water trawling landings from the rMCZ Reference Area (MCZ Fisheries Model). Under Scenario 2, there will be an impact but the value of landings affected is not known

Total direct impact on UK commercial fisheries under Policy Option 1

Estimated annual value of UK vessel landings and gross value added (GVA) affected:

£m/yr	Scenario 1	Scenario 2	Best estimate
Value of landings affected	0.025	0.101	0.025
GVA affected	0.011	0.045	0.011

The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas. This is based upon an assumption of average displacement across all rMCZs, and may be an under- or overestimate for this site.

Baseline description of non-UK fisheries

Belgian, French and Dutch vessels use this area but details of vessels, gear types and species targeted are not known specifically for the rMCZ Reference Area which lies within rMCZ 14. The use of this rMCZ Reference Area will be a proportion of the use described for rMCZ 14 (the rMCZ Reference Area comprises 9% of the area of rMCZ 14).

On this basis, the value of landings by French trawls and dredges from this site is estimated to be £0.14m/yr (which is 9% of the value of landings of these gear types for rMCZ 14). Estimates are not available for other countries.

Costs of impact of rMCZ on non-UK commercial fisheries

Non-UK vessels using all gear types will be affected by closure of this rMCZ Reference Area to fishing. French and Belgian vessels would be particularly affected. A rough estimate for the value of French landings affected is £0.14m/yr. Estimates are not available for other countries.

Table 2b. National defence — **rMCZ 14, Reference Area 10 Dolphin Head**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Mitigation of impacts of Ministry of Defence (MOD) activities on features protected by the suite of rMCZs will be provided by additional planning considerations during operations and training. It is not known whether mitigation will be required for features protected by this site. The MOD will also incur costs in revising environmental tools and charts to include MCZs.

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
The MOD is known to make use of the site. The entire rMCZ Reference Area is covered by national defence covering the air, water column and sea bed. The main impacts on the rMCZ Reference Area are listed as (a) air and water surface – noise, physical and visual disturbance, (b) water column noise and (c) sea bed – fixed equipment. Activities include: air general, acoustic trials, flares, firing range, smoke, surface target towing, towed array (surveillance system), aerial towed target and anti-aircraft.	It is not known whether this rMCZ Reference Area will impact on the MOD's use of the site. Impacts of rMCZs on national defence are assessed in Annex H10 and N9 (they are not assessed for this site alone).

Table 2c. Recreational angling **rMCZ 14, Reference Area 10 Dolphin Head**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Closure of the entire site to all recreational angling.

Description of activity and its impact on interest features	Costs of effect of rMCZ on the sector under Policy Option 1
About a third of the rMCZ Reference Area overlaps with the activities of 1 recreational sea angling club (undertaking both charter boat and wreck fishing and representing 24 people/year) (StakMap, 2010). Four charter boat vessels based in Langstone Harbour and Newhaven indicated that they use the site as part of a wider area for wreck fishing mainly during the summer months with 1 of the Newhaven vessels using the area all year round (representing 1,242 people/year). The Regional Stakeholder Group representatives thought that sea angling activity from charter boats in the area is minimal and is focused around the wrecks (Balanced Seas Offshore Task Group meeting report, March 2011). All StakMap interviewees (both charter boats and clubs) said that the area is of high importance to their activities and all said they visited it more than once a month.	Impacts of the rMCZ Reference Area are expected to be significant for a small number of operators, principally charter boats and some private boat anglers. It is anticipated that charter boat operators may respond by fishing at alternative sites in the vicinity. It has not been possible to estimate the number of anglers that will be affected and the impacts are not known.

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the MCZ under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ 14. Reference Area 10 Dolphin Head**
Recreation (except for the activities listed above in table 2) Shipping	

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath BS 14 Offshore Brighton rMCZ. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions in Annex H.

Table 4a. Fish and shellfish for human consumption	**rMCZ 14, Reference Area 10 Dolphin Head**	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. High and moderate energy circalittoral rock is an important location for commercial inshore fishing activity, particularly crab and lobster. Subtidal mixed sediment habitats are an important nursery area for many species and thus are often important for fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. The costs of this are set out in Table 2b. Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption.	Anticipated direction of change: ⇧ Confidence: Low

Table 4a. Fish and shellfish for human consumption	rMCZ 14, Reference Area 10 Dolphin Head	
condition (see rMCZ 14 Table 1 for details). This is a relatively important fishing area for both UK and non-UK vessels. A description of on-site fishing activity in the rMCZ Reference Area, which involves a number of gear types, and the value derived from it, is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits that derive from the spawning and nursery area.	Closure of the rMCZ Reference Area to fishing activity will reduce the on-site fishing mortality of species which could, given the relatively large size of this site, benefit stocks of mobile commercial finfish species. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	

Table 4b. Recreation	rMCZ 14, Reference Area 10 Dolphin Head	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Circalittoral rock and subtidal mixed sediments support high biodiversity and spawning and nursery grounds for many juvenile commercial fish species, all of which are therefore important habitats for angling (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMCZ 14 Table 1 for details). Charter boat angling is an important activity in this rMCZ Reference Area (see Table 2c). It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the potential spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Anticipated direction of change: ⇧ Confidence: Low
Diving: Diving is not known to take place in the site.	N/A	N/A

Table 4b. Recreation	rMCZ 14, Reference Area 10 Dolphin Head	
Wildlife watching: Wildlife watching is not known to take place in the site.	N/A	N/A
Other recreation: No other recreational activities are known to take place in the site.	N/A	N/A

Table 4c. Research and education	rMCZ 14, Reference Area 10 Dolphin Head	
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. No known research activity takes place in the site.	The rMCZ Reference Area will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. No known education activity takes place in the site.	As the rMCZ Reference Area is approximately 54km offshore and thus inaccessible, no benefits are likely to arise from direct use of the site for education. Non-visitors may benefit if the rMCZ Reference Area contributes to external education programmes (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Low

Table 4d. Regulating services	rMCZ 14, Reference Area 10 Dolphin Head	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: The features of the site contribute to the bioremediation of waste (subtidal sediments), water filtration (*Sabellaria*) and sequestration of carbon (*Sabellaria* and subtidal sediments) (Fletcher and others, 2011). ***Environmental resilience:*** A feature of the site (*Sabellaria*) contributes to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** As the site is offshore, its features do not contribute to the delivery of this service.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of the circalittoral rock and subtidal mixed sediments and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the recommended Marine Conservation Zone Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities (as, if necessary,	Anticipated direction of change: ⇧ Confidence: Low

Table 4d. Regulating services	rMCZ 14, Reference Area 10 Dolphin Head	
It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	mitigation would be introduced, with the associated costs and benefits).	

Table 4e. Non-use and option values	rMCZ 14, Reference Area 10 Dolphin Head	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 17, Offshore Overfalls

Site area (km^2): 592.97

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts	rMCZ 17, Offshore Overfalls
1a. Ecological description	
This recommended Marine Conservation Zone (rMCZ) would protect some sea bed habitats and most notably the Overfalls (the most inshore part of the site), an area consisting of mixed sediments, sands and gravels distinct from the surrounding sandstone and chalk rock habitats which is characterised by unusual morphological features such as sandwaves, 'mega-ripples' and large relic glacial deposits, forming a series of large bank features in an area of high tidal currents. These features have produced an ecologically important area for various fish species such as sand eel, but particularly elasmobranchs such as undulate ray, as well as sessile and encrusting species. The sea bed to the east of the Overfalls ridges is home to diverse wildlife and displays high biodiversity. In the centre of the site, the sea bed depth drops significantly where it overlaps the Northern Palaeovalley, geomorphological remains of the ancient river valley that once flowed through what is now the English Channel. There is evidence of the English Channel outburst flood feature, which runs along the Solent Palaeovalley and is itself evidence of a megaflood that occurred some 200,000 years ago when a huge glacial lake in the North Sea burst through	

Table 1. Conservation impacts				rMCZ 17, Offshore Overfalls
the Dover Straits Isthmus which contained it, thus separating England from mainland Europe. This site is not related to any existing designation. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A5.1 Subtidal coarse sediments	5.94	-	Unfavourable condition	Recover to favourable condition
A5.2 Subtidal sand	38.83	-	Unfavourable condition	Recover to favourable condition
A5.4 Subtidal mixed sediments	548.74	-	Unfavourable condition	Recover to favourable condition
Habitats of conservation importance				
Ross worm (*Sabellaria spinulosa*)	1,252.83m^2	-	Unfavourable condition	Recover to favourable condition
Subtidal sands & gravels	438.94	-	Favourable condition	Maintain at favourable condition
Species of conservation importance				
Undulate Ray (*Raja undulata)*	-	1 record	Favourable condition	Maintain at favourable condition
Geology				
English Channel outburst flood features			Favourable condition	Maintain at favourable condition

Site-specific costs arising from the effect of the rMCZ on human activities (over 2013 to 2032 inclusive)

Table 2a. Aggregate Extraction	rMCZ 17, Offshore Overfalls
Source of costs of the rMCZ under Policy Option 1 ***Scenario 1***: Increase in costs of assessing environmental impacts for future licence applications for existing production licences and current licence applications within 1km of an rMCZ. Also additional costs for provision of information that will be used for these assessments, which will be incurred for the entire suite of sites. This provides the best estimate of impact. ***Scenario 2***: Increase in costs of assessing environmental impacts for future licence applications, which is assessed for the entire suite of sites and is not attributed to specific sites.	
Baseline description of activity	**Costs of effect of MCZ on the sector under Policy Option 1**
There are 3 licensed aggregate extraction production areas within 1km of the rMCZ and an additional area for which a licence application has been submitted. It is anticipated that the Environmental Impact Assessment for	Average annual site-specific costs £m/yr / Scenario 1 / Scenario 2 Cost to the operator / 0.009 / Assessed for the

Table 2a. Aggregate Extraction	rMCZ 17, Offshore Overfalls
renewal of these licences will be conducted in the following years: • for aggregate extraction production licence nos. 122/1F and 122/1G: 2026 (based on information provided by The Crown Estate (pers. comm., 2011)) ; • for aggregate extraction production licence nos. 451/1 and 451/2: in 2017 and 2032 (based on information provided by The Crown Estate (pers. comm., 2011)) ; • for the application that is currently being considered for licence no. 451/3: in 2026 (assuming that the licence is awarded).	suite of sites ***Scenario 1:*** It is assumed that additional costs are incurred for future applications for renewal of existing production licences within 1km of this site. These costs arise from assessing the potential effects of aggregate extraction on the features protected by the rMCZ and are estimated to cost the operator an additional £27,000 per licence application (based on information provided by British Marine Aggregate Producers Association (BMAPA) (pers. comm.., 2011). An additional cost will also be incurred in provision of information by BMAPA for these assessments. This cost will be incurred as a result of the entire suite of MCZs and is not included here. Further details of the costs are provided in Annex N1. ***Scenario 2:*** An assessment of the additional costs of Scenario 2 is provided for the entire suite of sites, which is summarised in the Evidence Base. Details are provided in Annex H2 and N1.

Table 2b. Archaeological heritage	rMCZ 17, Offshore Overfalls
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Increase in costs of assessing environmental impacts for future licence applications (it is not anticipated that any additional mitigation of impacts on features protected by the Marine Conservation Zone (MCZ) 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. However, restrictions could also be placed upon anchoring in areas of vulnerable MCZ features in the site, including Ross worm *Sabellaria spinulosa* reef.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Vessel wrecks of British, Belgian and Norwegian origin have been recorded in this site (English Heritage, 2012).	An extra cost would be incurred in the assessment of environmental impact made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost of one licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). No

Table 2b. Archaeological heritage	rMCZ 17, Offshore Overfalls
	further impacts on activities related to archaeology are anticipated.

Table 2c. Commercial fisheries	rMCZ 17, Offshore Overfalls

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of commercial fishing gears will be required for certain features protected by this rMCZ. Therefore, two scenarios have been employed in the Impact Assessment (IA) for these fisheries to reflect this uncertainty. Should the site be designated, the management that will be required will fall somewhere within this range.

Management scenario 1: Zoned closure of the north-west corner of site to bottom trawls and dredges as proposed by the Overfalls Group (Balanced Seas informed scenario based on stakeholder recommendations).

Management scenario 2: Closure of entire rMCZ to bottom trawls and dredges to protect areas of Ross worm *Sabellaria spinulosa* reef (Statutory Nature Conservation Bodies (SNCB) informed scenario. Zoned closure is not possible without additional survey work to confirm distribution due to the uncertainty of the locality of ross worm *Sabellaria spinulosa* reef.

Management scenario 3: Closure of entire rMCZ to bottom trawls, dredges, lines, nets, pots and traps (SNCB informed scenario).

The original proposal for this site concerned a rectangle in the north-west corner and was put forward with an agreed set of management recommendations by the Overfalls Group, and is represented by Scenario 1. The rMCZ was subsequently increased in size to help to meet the MCZ Ecological Network Guidance criteria, but no management approaches were agreed by the Regional Stakeholder Group (RSG) for this larger offshore area because of the potential impact on the fisheries sector.

Summary of all fisheries: This site is partly beyond the 12 (nautical mile) nm limit, partly within the 6nm to 12nm limit and has a small area (the north-west corner) inside the 6nm limit. Both under and over 15 metre vessels operate in the site. Under 15 metre UK otter trawlers fish the south-east part of the site for high-value species such as bass, squid and red mullet. The northern part of the site is important for commercial rod and line fishing and potting. The main activities for UK vessels are potting, scallop dredging and bottom trawling.. A number of commercial fishing restrictions are already in existence (listed in Annex E1). French and Belgian vessels have historical fishing rights from 6nm to 12nm; French, Belgian and Dutch vessels fish beyond the 12nm limit. More detail on the approach used for the fisheries method is provided in Annexes H7 and N4.

Estimated annual value of landings from the rMCZ: £0.908m/yr.

Baseline description of UK commercial fisheries	Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1
Bottom trawls: Number of vessels not known. Estimated total value of landings from the rMCZ: £0.238m/yr (MCZ	The estimated annual value of UK bottom trawl landings affected is expected to fall within the following range of scenarios:

<table>
<tr><th colspan="2">Table 2c. Commercial fisheries</th><th>rMCZ 17, Offshore Overfalls</th></tr>
<tr><td>Fisheries Model).</td><td colspan="2"><table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td><td>Scenario 3</td></tr><tr><td>Value of landings affected</td><td>0.002</td><td>0.238</td><td>0.238</td></tr></table></td></tr>
<tr><td>Dredges: Number of vessels not known.

Estimated total value of landings from the rMCZ: £0.241m/yr (MCZ Fisheries Model)..</td><td colspan="2">The estimated annual value of UK dredge landings affected is expected to fall within the following range of scenarios:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td><td>Scenario 3</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.241</td><td>0.241</td></tr></table></td></tr>
<tr><td>Hooks and lines: Number of vessels not known..

Estimated total value of landings from the rMCZ: £0.014m/yr (MCZ Fisheries Model).</td><td colspan="2">The estimated annual value of UK hook and line landings affected is expected to fall within the following range of scenarios:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td><td>Scenario 3</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.000</td><td>0.014</td></tr></table>In establishing the draft conservation objectives, the site’s features may have been assessed as having low vulnerability to fishing with hooks and lines at current levels and, where this is the case, this activity was not the primary reason for assigning the ‘recover’ conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Nets: Number of vessels not known.

Estimated total value of landings from the rMCZ: £0.004m/yr (MCZ Fisheries Model).</td><td colspan="2">The estimated annual value of UK net landings affected is expected to fall within the following range of scenarios:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td><td>Scenario 3</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.000</td><td>0.004</td></tr></table>In establishing the draft conservation objectives, the site’s features may have been assessed as having low vulnerability to fishing with nets at current levels and, where this is the case, this activity was not the primary reason for assigning the ‘recover’ conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Pots and traps: Number of vessels not known.

Estimated total value of landings from the rMCZ: £0.023m/yr (MCZ</td><td colspan="2">The estimated annual value of UK pot and trap landings affected is expected to fall within the following range of scenarios:</td></tr>
</table>

Fisheries Model).

£m/yr	Scenario 1	Scenario 2	Scenario 3
Value of landings affected	0.000	0.000	0.023

In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with pots and traps at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.

Total direct impact on UK commercial fisheries under Policy Option 1

The estimated annual value of UK landings and gross value added (GVA) affected are expected to fall within the following range of scenarios:

£m/yr	Scenario 1	Scenario 2	Scenario 3	Best estimate
Value of landings affected	0.000	0.047	0.520	0.063
GVA affected	0.000	0.214	0.235	0.028

The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to to other areas. This is based upon an assumption of average displacement across all rMCZs, and may be an under- or overestimate for this site.

A stakeholder indicated that if UK otter trawlers are displaced from the site, pressure will increase in and around rMCZ 16 Kingmere (IA questionnaire response from Shoreham vessel owner, 24 August 2011).

Baseline description of non-UK fisheries

The eastern and southern parts of the rMCZ (beyond 12nm) are heavily used by Belgian, Dutch and French vessels employing trawls, pots and

Costs of impact of rMCZ on non-UK commercial fisheries under Policy Option 1

Scenario 1: No impacts are anticipated under Scenario 1, as this scenario concerns a small part of the north-west corner of the rMCZ and there is no

Table 2c. Commercial fisheries	rMCZ 17, Offshore Overfalls
nets; and the part between 6nm and 12nm is heavily used by French (and possibly Belgian) vessels. The west of the area is less fished by non-UK vessels. French vessels: the southern part of the rMCZ is fished by French demersal trawlers, scallop dredgers and pelagic pair trawlers targeting high-value species (cod, bass, sea bream, cuttlefish and squid). • Nord-Pas de Calais and Picardie fleet: about 25 trawlers from Boulogne-sur-Mer fish within the site, mainly during the winter. Vessels target red mullet and squid as they are high-value, non-quota species (Direction des Pêches Maritimes et de l' Aquaculture , 2011), Viera, A., IA questionnaire for International Stakeholders, 8 August 2011). • Haute-Normandie fleet: an average of 5 trawlers and scallopers target scallops, bass, tope and smoothhound quid (species with high value) in the site. • Basse-Normandie fleet: a larger number of bottom trawlers and 4 pelagic pair trawlers target a wide range of species in the area. Belgian and Dutch vessels: no information is available on numbers of vessels that fish in the site or the gear types that they deploy. Estimated value of landings from the rMCZ by French vessels: bottom trawls/dredges: £0.135m/yr; static gears: <£0.001m/yr (£60/yr) (Direction des Pêches Maritimes et de l' Aquaculture, 2011). Estimates are not available for other countries.	evidence that non-UK vessels use this area. ***Scenario 2:*** Non-UK vessels using bottom trawls and dredges anywhere in the site (notably French and Belgian vessels) will be affected by the rMCZ. The estimated value of French landings affected will be £0.135m/yr (bottom trawls/dredges) (Direction des Pêches Maritimes et de l' Aquaculture, 2011). No information on the effect on other non-UK vessels is available. ***Scenario 3:*** Non-UK vessels using any static gear and bottom trawls/dredges will be affected by the rMCZ. In the event of a full closure of the rMCZ, the estimated value of French landings affected will be £0.135m/yr (bottom trawls/dredges) and <£0.001m/yr (static gears) (Direction des Pêches Maritimes et de l' Aquaculture, 2011).

Table 2d. National defence	rMCZ 17, Offshore Overfalls
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Mitigation of impacts of Ministry of Defence (MOD) activities on features protected by the suite of rMCZs will be provided by additional planning considerations during operations and training. It is not known whether mitigation will be required for features protected by this site. MOD will also incur costs in revising environmental tools and charts to include MCZs.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**

MOD is known to make use of the site for mine laying, with and without explosives.	It is not known whether this rMCZ will impact on MOD's use of the site. Impacts of rMCZs on national defence are assessed in Annex H10 and N9(they are not assessed for this site alone).

Table 2e. Ports, harbours, shipping and disposal sites **rMCZ 17, Offshore Overfalls**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management scenario 1: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for disposal of dredged material that takes place within 1km of the rMCZ.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for disposal of dredged material that takes place within 5km of the rMCZ.

Baseline description of activity

Disposal sites: There is one site (Nab Tower) within 1km of the rMCZ which is licensed for disposal of channel dredge material. The average number of licence applications received for this disposal site is 16.7 per year (based on number of licence applications received between 2001 and 2010 (Cefas, pers. comm., 2011).

There is one site (Nab Tower) within 5km of the rMCZ which is licensed for disposal of channel dredge material. The average number of licence applications received for all of these disposal sites is 16.7 per year (based on number of licence applications received between 2001 and 2010 (Cefas, pers. comm., 2011).

Costs of impact of rMCZ on the sector under Policy Option 1

£m/yr	Scenario 1	Scenario 2
Cost to the operator	0.113	0.113

Scenario 1: Future licence applications for disposal of material within 1km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of costs by activity by site is provided in Annex N11).

Scenario 2: Future licence applications for disposal of material within 5km of this site will be required to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of costs by activity by site is provided in Annex N11).

Table 2f. Renewable energy – tidal energy **rMCZ 17, Offshore Overfalls**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management scenario 1: Increase in costs of assessing environmental impacts for licence applications (it is not anticipated that any additional mitigation of impacts on features protected by the MCZ will be needed relative to the mitigation provided in the baseline).

Management scenario 2: Increase in costs of assessing environmental impacts for licence applications and provision of additional mitigation of impacts of cabling (relative to the mitigation provided in the baseline).

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
There is potential for future developments that generate electricity using the	The estimated cost to tidal energy developers of the rMCZ is expected to fall

Table 2f. Renewable energy – tidal energy	rMCZ 17, Offshore Overfalls
tidal energy resource in this rMCZ.The rMCZ overlaps with the East of Isle of Wight Area of Potential, which has anticipated energy generation potential of 100MW (Department of Energy and Climate Change (DECC), pers. comm., 2011). It is assumed for the purpose of the IA that there would be one licence application within the timeframe of the IA. However, it is unlikely, though still possible, that deployment of tidal energy technology will take place in the rMCZ during the 20 year period covered by the IA.	within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Cost | 0.001 | 0.001 ***Scenario 1:*** one licence application for the tidal energy installations could be required to consider the potential effects of the construction and operational activities on the features protected by the rMCZ and the potential to achieve the rMCZ conservation objectives. This is expected to result in one-off costs of £0.012m in 2015 (based on, per broad-scale habitat assessed, 6 days of a consultant's time at £700/day + 1 day for legal review at £800/day) with a present value cost of £0.009m. ***Scenario 2:*** the costs would be the same as for Scenario 1 plus the additional costs of mitigating the impacts of cable protection. As the proposed cable routes are unknown, it is not known whether routes for any inter-array or export cables will be sought through the rMCZ and, if they are, what length of the cable route mitigation of impacts of cable protection may be required for. If mitigation involves re-routing of proposed cable routes to avoid sensitive features, it is assumed that this will cost £1.010m/km of cable (average of estimates provided by four developers). If frond mattressing is used to mitigate impacts, this is estimated to cost £1.000m/km more than the cable protection that would have been used in the absence of the MCZ (based on a frond mat of 3 metres x 3 metres; average cost provided by two developers).

Table 2g: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 17, Offshore Overfalls
Oil and gas related activities (including carbon capture and storage) This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ 17, Offshore Overfalls**
Commercial fisheries (mid-water trawls) Recreation Research and education Shipping	

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[9] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.								rMCZ 16, Kingmere	
ENG Feature	**Represent-ativity**	**Replication**	**Adequacy**	**Viability**	**Gaps or shortfalls in relation to ENG minimum guidelines**	**Recommended conservation objective**	**Quantitative considerations at regional MCZ level**	**Ecological Importance at regional MCZ level**	**Ecological Importance at wider scale**
Ross worm *Sabellaria spinulosa* reefs * [1]	FOCI	✓	✓	✓	None	Recover			BAP and OSPAR habitat
Subtidal sands and gravels	FOCI	✓	✓	✓	None	Maintain			BAP habitat
Undulate ray *Raja undulata*	FOCI	X * [2]	X * [3]	✓	Minimum replication target not met	Maintain	The replication target for this feature has not been achieved.	Only site proposed for this feature within the region. This feature is not	BAP species. This feature is not

[9] copied from the JNCC and Natural England's advice to Defra on rMCZs

								protected within existing MPAs.	protected in existing MPAs within the Eastern Channel Region.
A5.1Subtidal coarse sediment	BSH	✓	✓	✓ * [4]	None	Recover			
A5.2Subtidal sand	BSH	✓	✓	✓	None	Recover			
A5.4 Subtidal mixed sediments	BSH	✓	✓	✓	None	Recover	Out of all of the rMCZs this site contributes the second largest area of this feature towards meeting the ENG target for adequacy.	Only a small proportion of this habitat is protected within existing MPAS	Only a small proportion of this habitat is protected in existing MPAS within the Eastern Channel Region

Site considerations	
Connectivity	✓
Geological/Geomorphological features of interest	Glacial Process features - English Channel Outburst Flood Feature * [5]
Appropriate boundary	✓
Areas of additional ecological importance	✓ * [6]
Overlaps with existing MPAs	None

Additional comments and site benefits:

- [1] There is uncertainty as to whether current data are for *Sabellaria spinulosa* reef or just an occurrence of *Sabellaria spinulosa* species. Further evidence will need to be gathered to confirm whether the reef feature is present (see Section 5.1 of JNCC and Natural England's Advice on rMCZs). Final advice is pending further discussion with Defra regarding overlaps between Natura designation processes and MCZs.

- [2,3] Although there are other records for the highly mobile species *Raja undulata*, this is the only rMCZ where it is proposed as a feature for designation. For this reason the guideline for adequacy for this feature has also not been achieved.
- [4] The site is viable for the features that are proposed for designation, however the patch of subtidal coarse sediment habitat is very small.
- [5] The English Channel Outburst Flood Feature has been proposed as a feature for designation within this rMCZ. Although this feature covers a much wider area within the English Channel this is the only rMCZ proposed to protect it. It is a very large scale Glacial Process (erosion) feature, formed by a catastrophic flood that occurred some 400 000 years before present, when a land barrier at the Straits of Dover that had trapped meltwater in the North Sea became breached. The event left megaflood erosion features on the English Channel seabed including deeply-eroded channels. The selection assessment document for this site highlights interesting bathymetry in the form of sand and gravel bank features known as 'the Overfalls' (Balanced Seas 2011a) .This rMCZ hosts a wide range of broad-scale habitats from rocky habitats to soft sediment habitats.
- [6] The regional MCZ project recommendations state that this site was originally selected because of the existing Overfalls project but was progressively extended to incorporate an area of high biodiversity and broad-scale habitats (Balanced Seas 2011a). There are a number of ecological benefits which could be considered important and add value to this recommendation (see Annex 5 of JNCC and Natural England's advice on rMCZs for more detail on these). This site overlaps with areas of high and medium benthic species biodiversity and an area of medium benthic biotope biodiversity (Langmead, et al. 2010).

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the rMCZ contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption		**rMCZ 17, Offshore Overfalls**
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. High and moderate energy circalittoral rock is an important location for commercial inshore fishing activity, particularly crab and lobster. Subtidal coarse sediments, sand and mixed sediment habitats are important nursery areas for many species and thus often important for	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some recovered to favourable condition. New management of fishing activities is expected (above the baseline situation), the costs of which are set out in Table 2c, which may reduce the impacts on fish and shellfish habitats and harvesting of stocks.	Anticipated direction of change: ⇧

fisheries. In particular, such habitats can provide important nursery grounds for juvenile commercial species such as flatfishes and bass (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details).. Otter trawlers fish the south-east section of the site for bass, squid and red mullet. The northern part of the site is important for commercial rod and line fishing and potting. A description of on-site fishing activity and the value derived from it is set out in Table 2c.	As most of the commercial species targeted by fishers in this area are mobile fish and shellfish, it is unclear whether the scale of habitat recovered and the magnitude of reduced (on-site) harvesting will be enough to have any significant positive impact on commercial stocks. Potential benefits may arise on-site, for fishers permitted to fish within the rMCZ, and off-site from spill-over benefits.	Confidence: Low

Table 5b. Recreation	**rMCZ 17, Offshore Overfalls**	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. Subtidal mixed sediments, subtidal sand and subtidal coarse sediments support a high biodiversity within the site and provide spawning and nursery grounds for many juvenile commercial fish species, all of which are important locations for angling (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The rMCZ is used extensively by anglers, as a specific area in the north-west corner provides habitat for sand eel, blonde ray and bass, which are highly valued by private and charter boat anglers. Up to 17 vessels operate from Langstone, 10 from Portsmouth and up to 3 from the Isle of Wight and from Selsey; hundreds of anglers use the area annually either on charter or private boats, coming from some 50	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the broad scale habitats to favourable condition may improve their functioning as a nursery area, potentially benefiting fisheries exploited within and outside the rMCZ (see Table 4a). As no additional management of angling is expected, fishers will be able to benefit from any on-site and off-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers. The designation may lead to an increase in angling visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in angling trips at the national scale.	Anticipated direction of change:  Confidence: Low

Table 5b. Recreation		rMCZ 17, Offshore Overfalls
clubs, the majority of which are local, but including some non-local anglers. Total annual expenditure directly related to the Overfalls site by local and non-local sea anglers has been estimated at £100,000−£200,000 or more (Chapter 5, Overfalls Final Report, 2006). The potential spawning ground for flatfish and generally high biodiversity, due to the complex habitats within the site, are likely to help support potential on-site and off-site fisheries. It has not been possible to estimate the value derived from angling off-site which results from the potential spawning and nursery area.		
Diving: Diving occurs very occasionally, with the main interest being focused on the wrecks in the rMCZ.	Designation of this site might lead to an increase in diving trips, as a result of publicity about the marine biodiversity and rare species found in the site. The designation may lead to an increase in diving visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in diving trips at the national scale.	Anticipated direction of change:  Confidence: Low
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). Due to its offshore location, the rMCZ is not important for wildlife watching. However, the site has particularly high biodiversity and abundant fish populations, which support a number of foraging sea birds and potentially marine mammals. The site occurs within an area of the Channel used by ferries, which may carry wildlife watchers, particularly those interested in marine mammals.	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the broad scale habitats to favourable condition may improve their functioning as support for fish, bird and marine mammal populations, potentially benefitting wildlife watching within the rMCZ. In addition, an improvement in the condition of site features and any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife	Anticipated direction of change:  Confidence: Low

Table 5b. Recreation		rMCZ 17, Offshore Overfalls
It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	watching visits and/or a redistribution of location preferences. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	
Other recreation: Other forms of recreation are not known to take place in the rMCZ.	N/A	N/A

Table 5c. Research and education		rMCZ 17, Offshore Overfalls
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. A detailed study of the north-west corner of the site (the actual Overfalls) has been undertaken and the Overfalls Group supports research when it is undertaken in this area (Chapter 5, Overfalls Final Report, 2006). Ferries crossing the Channel may be used by marine mammal observers whose data contribute to national databases. It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. No known education activity occurs in this rMCZ.	As the rMCZ is approximately 15km offshore and therefore relatively inaccessible, no benefits are likely to arise from direct use of the site for education. Non-visitors may benefit if the rMCZ contributes to external education programmes (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Low

Table 5d. Regulating services		rMCZ 17, Offshore Overfalls
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: The features of the site contribute to the bioremediation of waste (subtidal sediments and subtidal sands and gravels), water purification (*Sabellaria*) and sequestration of carbon (*Sabellaria,* subtidal sands and gravels, and subtidal sediments) (Fletcher and others, 2011). ***Environmental resilience:*** The features of the site (*Sabellaria*) contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** As the site is offshore, its features are not thought to contribute to the delivery of this service (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ.	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (subtidal coarse sediments, subtidal sand, subtidal mixed sediments and *Sabellaria*) recovered to favourable condition. Recovery of the subtidal mixed sediments, subtotal coarse sediments, subtidal sand and *Sabellaria* and a potential reduction in the use of bottom towed fishing gear may increase the site's benthic biodiversity and biomass, improving the regulating capacity its habitats. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 5e. Non-use and option values		rMCZ 17, Offshore Overfalls
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the rMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the rMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 19 Norris to Ryde **Site area (km^2): 19.82**

- This site has been proposed for designation under Policy Option 1 only.
- Based on SNCB advice, the draft conservation objective for one feature in this site has been changed from that established by the Regional Projects. This impacts of this change on management and costs is not reflected in this Impact Assessment.

Table 1. Conservation impacts **rMCZ 19, Norris to Ryde**

1a. Ecological description

This recommended Marine Conservation Zone (rMCZ) would protect some of the region's best examples of subtidal mud, due to the sheltered nature of this stretch of coastline and one of the region's healthiest areas of seagrass. At the neck of Wootton Creek, the Old Mill Pond contains the highest density of tentacled lagoon worm in the region and is considered the best example of this species in the country. High densities of potentially breeding populations of mantis shrimp warrens occur within the site, which is one of the few recorded areas for this species in the region. Birds that specifically forage in this rMCZ include black-headed gull, common tern, great cormorant, Mediterranean gull and Sandwich tern. This site partially overlaps with: the Solent Maritime Special Area of Conservation; King's Quay Shore Site of Special Scientific Interest (SSSI); Medina Estuary SSSI; Ryde Sands and Wootton Creek SSSI; and Solent and Southampton Water Special Protection Area and Ramsar site.

Source: Balanced Seas Final Recommendations (2011).

1b. Baseline condition of MCZ features and impact of the MCZ

Feature	Area of feature (km2)	No. of occurrences	Baseline	Impact
Broad-scale habitats				
A5.3 Subtidal mud	11.37	-	Favourable condition	Maintain at favourable condition
SNCBs' advice recommends that the conservation objective for subtidal mud is changed from "Maintain" to "Recover to favourable condition".				
Habitats of conservation importance				
Seagrass beds	0.5	7917 records	Unfavourable condition	Recover to favourable condition
Species of conservation importance				
Tentacled Lagoon Worm (*Alkmaria romijni*)	-	14 records	Favourable condition	Maintain at favourable condition

Site-specific costs arising from the effect of the rMCZ on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage **rMCZ 19, Norris to Ryde**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Increase in costs of assessing environmental impacts for future licence applications (it is not anticipated that any additional mitigation of impacts on features

Table 2a. Archaeological heritage	rMCZ 19, Norris to Ryde
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. However, restrictions could be placed upon anchoring in areas of vulnerable MCZ features in the site, including sea grass.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Bronze Age and Neolithic artefacts have been found within the site and have been subject to archaeological investigation since the 1980s. Cup marks and earth work features have also been recorded. A 1944 section of the artificial Mulberry Harbour is recorded within the site, as well as vessel wrecks of British and French origin. German World War II aircraft are also recorded (English Heritage, 2012). English Heritage has indicated that this site is likely to be of interest for archaeological excavation in the future as it is relevant to its National Heritage Protection Plan (theme 3A1.2).	An extra cost would be incurred in the assessment of environmental impact made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost of one licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). No further impacts on activities related to archaeology are anticipated. If archaeologists respond to restrictions on anchoring over areas of seagrass by undertaking alternative archaeological excavations 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 Impact Assessment. If archaeological excavations do not take place as a result of this restriction, this will prevent interpretation of archaeological evidence from the site which will decrease acquisition of historical knowledge of past human communities from the site, resulting in a cost to society.

Table 2b. Commercial fisheries	rMCZ 19, Norris to Ryde
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of commercial fishing gears will be required for certain features protected by this rMCZ. Therefore, two scenarios have been employed in the Impact Assessment (IA) for these fisheries to reflect this uncertainty. Should the site be designated, the management that will be required will fall somewhere within this range.	
Management scenario 1: Zoned closure of the area from the shoreline out to the 2 metre depth contour of rMCZ to bottom trawls and dredges to protect sea grass beds (Statutory Nature Conservation Bodies (SNCB) informed scenario).	

Table 2b. Commercial fisheries **rMCZ 19, Norris to Ryde**

Management scenario 2: Closure of entire rMCZ to bottom trawls, dredges, nets, hooks and lines, pots and traps (SNCB informed scenario).

Summary of all fisheries: The rMCZ is wholly within the 6nm limit and is only fished by UK vessels. Vessels from Cowes and Portsmouth/Gosport fish the site. Oyster dredging is historically an important activity in the site, but in recent years cuttlefish trapping has been the most financially valuable activity. Oyster dredgers from various ports including Lymington, Hamble and Southampton fish the area if oyster beds develop. Recently, effort has been low due to a shortage of oysters. There is some potting, trawling and long lining activity but very little set netting (information from Fishermap questionnaires). The Southern Inshore Fisheries and Conservation Authority (IFCA) estimates that only 4 vessels operate at any one time in the site on a seasonal basis (Southern IFCA, feedback response to first tranche of IA material, 16 January 2012). A number of commercial fishing restrictions are already in existence (listed in Annex E1), including a byelaw prohibiting fishing by vessels over 12 metres within 6nm (Southern IFCA, feedback response to first tranche of IA material, 16 January 2012). The Southern IFCA is currently developing a Seagrass Management Strategy which will include a voluntary code of conduct that will close areas of sea grass to bottom trawls and dredges around the Isle of Wight (from mean high water out to a distance that is currently being determined) (Jury, J. from Southern IFCA email., 24 April 2012) . This will deliver part of the management that would be required under scenarios 1 and 2. More detail on the approach used for the fisheries method is provided in Annexes H7 and N4.

Estimated annual value of landings from the rMCZ: £0.153m/yr (this is likely to be an overestimate due to the future implementation of the Southern IFCA Seagrass Management Strategy to protect areas of seagrass (Jury, J. from Southern IFCA email., 24 April 2012)).

Baseline description of UK commercial fisheries	**Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1**
Bottom trawls: The Southern IFCA considers that a maximum of 4 vessels operate in this area and do so infrequently (Southern IFCA, pers. comm., 2012). Estimated total value of landings from the rMCZ: £0.011m/yr (MCZ Fisheries Model). This value islikely to be an overestimate as fewer vessels trawl in the site than is indicated by the MCZ Fisheries Model.	The estimated annual value of UK bottom trawl landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.004 | 0.011 The above values are likely to be overestimates as fewer vessels trawl in the site than is indicated by the MCZ Fisheries Model and the implementation of the Southern IFCA Seagrass Management Strategy to protect areas of sea grass through a voluntary code of conduct will significantly reduce the activity of bottom trawls in this rMCZ (Jury, J. from Southern IFCA email., 24 April 2012).
Dredges: Number of vessels is unknown. Estimated total value of landings from the rMCZ: £0.070m/yr (MCZ Fisheries Model). Dredging for oysters historically occurred here, but as oyster numbers have declined, fishing effort has also. At the start of the oyster season (November), there is a maximum of 15 vessels operating dredges in this	The estimated annual value of UK dredge landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.025 | 0.070 The above values are likely to be overestimates as the implementation of the Southern IFCA Seagrass Management Strategy to protect areas of sea grass

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 19, Norris to Ryde</th></tr>
<tr><td>area for 3 weeks (Southern IFCA, feedback response to first tranche of IA material, 16 January 2012).</td><td>through a voluntary code of conduct will significantly reduce the activity of dredges in this rMCZ (Jury, J. from Southern IFCA email, 24 April 2012).</td></tr>
<tr><td>Hooks and lines: It is unknown how many vessels use hooks and lines in the rMCZ (MCZ Fisheries Model).

Estimated total value of landings from the rMCZ: £0.002m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK hook and line landings affected is expected to fall within the following range of scenarios:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.002</td></tr></table>In establishing the draft conservation objectives, the site’s feature may have been assessed as having low vulnerability to fishing with hooks and lines at current levels and, where this is the case, this activity was not the primary reason for assigning the ‘recover’ conservation objective. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Nets: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £0.020m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK net landings affected is expected to fall within the following range of scenarios:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.020</td></tr></table>In establishing the draft conservation objectives, the site’s feature may have been assessed as having low vulnerability to fishing with nets at current levels and, where this is the case, this activity was not the primary reason for assigning the ‘recover’ conservation objective. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Pots and traps: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £0.050m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK pot and trap landings affected is expected to fall within the following range of scenarios:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.050</td></tr></table></td></tr>
<tr><td>Total direct impact on UK commercial fisheries</td><td></td></tr>
<tr><td></td><td>The estimated annual value of UK landings and gross value added (GVA) affected are expected to fall within the following range of scenarios:</td></tr>
</table>

Table 2b. Commercial fisheries	rMCZ 19, Norris to Ryde

£m/yr	Scenario 1	Scenario 2	Best estimate
Value of landings affected	0.007	0.153	0.021
GVA affected	0.003	0.072	0.010

These values are likely to be overestimates due to the future implementation of the Southern IFCA Seagrass Managment Strategy to protect areas of sea grass through a voluntary code of conduct which will close areas of sea grass to bottom trawls and dredges around the Isle of Wight (Jury, J. from Southern IFCA email., 24 April 2012)

The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas. This is based upon an assumption of average displacement across all rMCZs, and may be an under- or overestimate for this site.

A representative of the Isle of Wight fishing industrysuggested that small inshore potting vessels cannot respond to management for the site through displacement due to increasing fuel costs and tight profit margins. He also suggested that closure of the site to potting may result in heavy losses to the economy of the Isle of Wight (IA questionnaire response from Isle of Wight vessel owner, August 2011).

Baseline description of non-UK fisheries	Costs of impact of rMCZ on non-UK commercial fisheries
	None.

Table 2c. National defence	rMCZ 19, Norris to Ryde

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Mitigation of impacts of Ministry of Defence (MOD) activities on features protected by the suite of rMCZs will be provided by additional planning considerations during operations and training. It is not known whether mitigation will be required for features protected by this site. MOD will also incur costs in revising environmental tools and charts to include MCZs.

Baseline description of activity	Costs of impact of MCZ on the sector under Policy Option 1
The furthest offshore 100 metre strip of the rMCZ overlaps with National Defence activities covering the sea bed. The main impacts on the rMCZ are	Cost of impact to sector: It is not known whether this rMCZ will impact on MOD's use of the site. Impacts of rMCZs on national defence are assessed in

listed as physical disturbance to the sea bed through amphibious activities.	Annex H10 and N9 (they are not assessed for this site alone).

Table 2d. Ports, harbours, shipping and disposal sites **rMCZ 19, Norris to Ryde**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management scenario 1: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for disposal of dredged material and navigational dredging that take place within 1km of the rMCZ. The Balanced Seas regional MCZ project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the MCZ that will be needed relative to the mitigation provided in the baseline.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for disposal of dredged material, navigational dredging and all port and harbour developments within 5 km of the rMCZ. Also, additional costs to update the existing Southampton Water and Medina Maintenance Dredging Protocol (MDPs) and for including MCZ features in a potential new MDP for Ryde. The Balanced Seas regional MCZ project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the MCZ that will be needed relative to the mitigation provided in the baseline.

Baseline description of activity

Disposal sites: There is one site (WI071 Ryde Harbour) within 1km of the rMCZ, which is licensed for disposal of channel dredge material, which is likely to be used by the ports of Southampton, Portsmouth and Ryde. The average number of licence applications received for all of these disposal sites in total is 0.2 per year (based on number of licence applications received between 2001 and 2010 (Cefas, pers. comm., 2011).

There is one site (WI071 Ryde Harbour) within 5km of the rMCZ, which is licensed for disposal of channel dredge material, which is likely to be used by the ports of Southampton, Portsmouth and Ryde. The average number of licence applications received for all of these disposal sites in total is 0.2 per year (based on number of licence applications received between 2001 and 2010 (Cefas, pers. comm., 2011).

Navigational dredge areas: The main navigational channels for Ryde and Fishbourne lie within the rMCZ and are subject to maintenance dredging. It is assumed that each dredge area's marine licence is renewed once every 3 years and that an assessment of environmental impact on MCZ features is undertaken for each licence renewal.

As the main navigational channels for Ryde and Fishbourne lie within the rMCZ, they also lie within 5km and thus Scenario 2 applies. It is assumed that each dredge area's marine licence is renewed once every 3 years and that an assessment of environmental impact on MCZ features is

Costs of impact of rMCZ on the sector under Policy Option 1

£m/yr	Scenario 1	Scenario 2
Cost to the operator	0.004	0.004*

* This estimate for additional cost in future licence applications for port developments arising as a result of this rMCZ is not used to estimate the total costs for the IA. It is based on different assumptions to those used to estimate costs at a regional level and for the entire suite of sites. Also, this figure assumes that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal (every 3 years). It does not include the cost of incorporating MCZ features in an existing or new MDP. It is likely to over-estimate the cost of Scenario 2 for rMCZs with ports within 5km that have MDPs because of the savings in future costs provided by an MDP. See Annex H for further information.

Scenario 1**:** Future licence applications for disposal of dredged material and navigational dredging within 1km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11).

Scenario 2: Future licence applications for disposal of material, navigational dredging and port or harbour development plans and developments within 5km of this site will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 19, Norris to Ryde
undertaken for each licence renewal. As these navigational dredge areas are covered by existing MDPs and potentially a new additional MDP for Ryde, it is assumed that the assessment of environmental impact is not changed over the 20 year period of the IA. ***Port development:*** There are four ports and harbours within 5km of the rMCZ that may undergo development in the future: Cowes, Fishbourne, Newport and Ryde. Given the importance of Ryde and Fishbourne to the Isle of Wight economy as the main ferry terminals, these ports in particular expect growth (J. Burrows, Operations Director, Wightlink, letter, 11 February 2011). However, no port developments are known to be planned within the 20 year period of the Impact Assessment (IA).	breakdown of these by activity is provided in Annex N11). Additional costs will be incurred in the update of the existing Maintenance Dredging Protocol (MDPs) and for a potentially new MDP as this will need to consider the potential effects of activities on the features protected by the rMCZ. The anticipated additional cost in the MDPs is estimated to be a one-off cost of £8438.

Table 2e. Recreational anchoring	rMCZ 19, Norris to Ryde
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 ***Management scenario 1:*** Creation of no-anchoring zones for recreational vessels (except in emergency circumstances) over areas of sea grass beds ***Management scenario 2:*** Creation of no-anchoring zones and installation of permanent mooring structures (if the no-anchoring zone impacts on significant numbers of vessels and if the mooring structures provide the necessary mitigation while maintaining the condition of the feature).	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Some 36 yachting, sailing clubs and recreational organisations interviewed through StakMap use the rMCZ to anchor and ranked it as being of 'high importance'. Data collected for StakMap also indicate that the rMCZ is used by recreational sea anglers, by charter boat operators for angling and by yacht racing support vessels, and it is likely that these users also anchor in the rMCZ. Sea grass occurs in the rMCZ down to 2 metres below chart datum between Norris and Wootton Creek and in the vicinity of Ryde (Balanced Seas Final Recommendations Report, 2011), and StakMap data show an overlap between areas used for recreational anchoring and sea grass beds. Most anchoring takes place in the west of the rMCZ, and the level of activity is very high. Osborne Bay which, according to the Wildlife Trust, is one of the best existing sea grass beds around the island and a prime	***Scenario 1:*** Closure of the areas of sea grass in Osborne Bay to anchoring would affect up to 200 recreational vessels, as well as local clubs that use the bay as a safe haven for junior members and club racing events, and some users would be affected elsewhere in the rMCZ. Displacement of vessels from Osborne Bay will most likely not be possible as the area to the west is not sheltered and the areas to the east lack shelter, have limited tidal ranges, lack suitable substrate and are not as attractive (J. Pockett, RYA, email, 4th January, 2012). Displacement will occur to nearby anchoring areas such as Cowes but it is anticipated that it will not result in visitors choosing a location away from the island and thus the local economy will not be impacted (J. Pockett, RYA, pers. comm., April 2012). As anchoring is much less intense outside Osborne Bay, closure of other areas of sea grass in the rMCZ (outside Osborne Bay) would have little (possibly negligible) impact on many vessel users. However, it would impact on members of the one yacht club that lays temporary racing marks for racing events for junior

area for sea grass to flourish. It is a 'hotspot' for recreational anchoring due to its sheltered nature and picturesque setting, with up to 200 (50–150 on average) boats using it on weekends during the summer (May–September) (J. Pockett, Royal Yachting Association (RYA), email, 3rd November 2011). This is also an overspill area for vessels attending Cowes Week. In addition, local clubs lay temporary racing marks within the areas of sea grass once a week all year round and the area is used as a safe haven for novice and junior fleets in strong southerly winds.

Anchoring is at a much lower level in other areas of the rMCZ, and generally does not take place much in areas of sea grass in the rMCZ outside Osborne Bay (J. Pockett, RYA, email, November 2011). One club lays small racing marks once a week for 6 months over the sailing period between Woodside Bay and Ryde Pier overlapping with sea grass beds and one permanent mark in Woodside Bay itself (RYA BS IA 1st Tranche Feedback, January, 2012). Racing marks may also be lain in the rMCZ by other clubs.

StakMap data and information provided by the Local Group (Isle of Wight site meeting, 2011) suggest that recreational anglers tend not to anchor in the site. They only anchor if they are waiting for a tide change (the site is mostly used for drift fishing). Most vessels used for recreational angling in the area use the Natural England recommended rope risers that have less environmental impact than some alternative anchors (Tony Williams, BS IA 1st Tranche Feedback, January 2012).There are no moorings adjacent to Ryde Pier but boats sometimes anchor in the sea grass adjacent to Ryde Pier while waiting for the tide to enter Ryde Marina.

and disabled people once a week throughout the summer. This would reduce the quality of their activities and impact on their ability to run the club effectively.

The impact of the no-anchoring zone on recreational anglers is not expected to be significant because of the low intensity of anchoring by recreational anglers in the site.

The closure would have indirect impacts on local businesses as a result of fewer seafarers coming ashore to use cafés, shops and associated services.

Scenario 2: Because of the high number of recreational users who anchor in this rMCZ, it is likely that some eco-moorings will be needed. The 200 suggested in Scenario 2 are an upper estimate would be needed to accommodate the maximum level of anchoring in Osborne Bay. Suitable locations outside the sea grass would need to be found for their installation. The Local Group RYA representative asked those who anchor in this rMCZ (Balanced Seas Solent/IOW/Hants Sites Meeting Report, July, 2011) for their views on eco-moorings as a mitigation measure. Most respondents said this would be acceptable as long as they did not have to pay the installation costs. One club said they would be prepared to change the ground tackle for racing marks to satisfy the ecological needs of the site (RYA BS IA 1st Tranche Feedback, January, 2012).

Using the approach developed and costs calculated for eco-mooring installation in Studland Bay (Marina Projects, 2011), capital costs for the installation of 200 eco-moorings in Osborne Bay are estimated to total £0.800m, a one-off cost assumed to occur in the first year after designation (2013). This is likely to be an overestimate as it includes the cost of removal of existing moorings of which there are none in Osborne Bay. Operating costs, including maintenance of the eco-moorings and collection of mooring fees, are estimated to total £0.114m/yr (see Annex N12 for the assumptions used in the calculations).

It is assumed that a fee for use of the eco-mooring would be required to cover continued maintenance costs. For 200 eco-moorings, the total cost to visiting boats of such fees would be £0.180m/yr. Fees for both overnight and day only stays have been included in the costs. However, overnight stays may not be as frequent here as in Studland Bay due to the lack of onshore access and facilities

Table 2e. Recreational anchoring	rMCZ 19, Norris to Ryde
	(see Annex N12). The total cost of eco-moorings is taken to be the sum of the mooring fees and capital costs, plus any operating costs not covered by the mooring fees. The present value of the costs is £3.337m. The use of the Studland Bay study seems appropriate as this took into consideration the whole of the Solent area including the Isle of Wight, and vessel sizes and visitor activity are expected to be very similar in both locations. However, the RYA has expressed concerns over the suitability of using eco-moorings in this rMCZ because of stronger tides and possibly more difficult sea bed conditions in the Solent compared with Studland Bay. The RYA suggest that use of the more traditional and probably more costly EzyRider system might need to be considered if the helical mooring was not considered adequate. If this was required, the costs have been underestimated in the IA (RYA BS IA 3rd Tranche Feedback, February 2012).

Table 2f: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 19, Norris to Ryde
Oil and gas related activities (including carbon capture and storage)	
This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 19, Norris to Ryde
Commercial fisheries (mid-water trawls) Flood and coastal erosion risk management (coastal defence) Recreation (except for the activities listed above in table 2) Research and education	

Shipping Water abstraction, discharge and diffuse pollution*.

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[10] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.								rMCZ 19, Norris to Ryde	
ENG Feature	**Represent -ativity**	**Replication**	**Adequacy**	**Viability**	**Gaps or shortfalls in relation to ENG minimum guidelines**	**Recommended conservation objective**	**Quantitative considerations at regional MCZ level**	**Ecological Importance at regional MCZ level**	**Ecological Importance at wider scale**
A5.3 Subtidal mud	BSH	✓	✓	X	None	*Maintain*		Considered to be best example of feature in region	
Seagrass beds	FOCI Habitat	✓	✓	✓	None	Recover		Considered to be one of best examples of feature in Solent	BAP and OSPAR habitat
Tentacled lagoon worm *Alkmaria romijni*	FOCI Species	✓	✓	✓	None	Maintain		Highest density of feature in region	Listed on Schedule 5 of the Wildlife and Countryside

[10] copied from the JNCC and Natural England's advice to Defra on rMCZs

									Act
Site considerations									
Connectivity	✓								
Geological/Geomorphological features of interest	None								
Appropriate boundary	✓								
Areas of Additional Ecological Importance	✓								
Overlaps with existing MPAs	✓								

rRA 16 Wootton Old Mill Pond (Balanced Seas) (Natural England lead) within rMCZ 19. An overview of features proposed for designation within recommended reference area Wootton Old Mill Pond and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale

✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Where an asterisk (*) has been given in the table, more detail is provided in the narrative.

ENG Feature	Representativity	Viability	Recommended conservation objective
Tentacled lagoon worm *Alkmaria romijni*	FOCI Species	✓	Recover to reference condition
Site considerations			
Appropriate boundary	✓ Constrained by natural boundaries		

rRA 17 King's Quay (Balanced Seas) (Natural England lead) within rMCZ 19. An overview of features proposed for designation within recommended reference area King's Quay and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale

✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Where an asterisk (*) has been given in the table, more detail is provided in the narrative.

ENG Feature[7]	Representativity	Viability	Recommended conservation objective
Seagrass beds	FOCI Habitat	X	Recover to reference condition
A2.1 Intertidal coarse sediment	BSH	X	Recover to reference condition
A2.2 Intertidal sand and muddy sand	BSH	X	Recover to reference condition
A2.3 Intertidal mud	BSH	X	Recover to reference condition
A2.4 Intertidal mixed sediments	BSH	X	Recover to reference condition
A5.3 Subtidal mud	BSH	X	Recover to reference condition
Site considerations			
Appropriate boundary	X		

Additional comments and site benefits:

- rMCZ 19 Norris to Ryde/rRA 16 Wootton Old Mill Pond contains a high density of *Alkmaria romijni* in the region. (Hampshire Wildlife Trust 2006 onwards).
- This is a regionally important area for Mantis shrimp (believed to be a breeding population), it is a Key Inshore Biodiversity Area within the region, and it is an important foraging area for a number of nationally and internationally important bird species such as black-headed and Mediterranean gulls, common and Sandwich terns (South East England Biodiversity Forum (SEEBF) 2010, EMU Ltd 2010).
- There is scientific value in this site because it is well studied with good data (Hampshire Wildlife Trust 2006 onwards, EMU Ltd 2010).

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the rMCZ contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption		**rMCZ 19, Norris to Ryde**
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Seagrass beds, which occur within the rMCZ, generally provide important nursery areas for flatfish (Joint Nature Conservation Committee, 2011) and shellfish (Natural England website,) and so are likely to help support on-site and off-site fisheries. Subtidal mud, the other principal habitat in the rMCZ, provides a significant nursery area for many species and can provide important nursery grounds for juvenile commercial species such as flatfish and bass (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). Oyster dredging is, historically, an important activity in the site. Oyster dredgers still fish the area if oyster beds develop, but recent effort has been low due to a shortage of oysters; cuttlefish trapping has become increasingly important. There is also some potting, trawling and long lining activity. A description of on-site fishing activity and the value derived from it is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits which derives from the seagrass nursery area.	If the conservation objectives of the features are achieved, subtidal mud will be maintained in favourable condition and seagrass will be recovered to favourable condition. New management of fishing activities is expected (above the baseline situation), the costs of which are set out in Table 2b, which may reduce the impacts on fish and shellfish habitats and harvesting of stocks. As most of the commercial species targeted by fishers in this rMCZ are shellfish, it is unclear whether the scale of habitat recovered and the magnitude of reduced (on-site) harvesting will be enough to have any significant positive impact on commercial stocks. However, maintaining and monitoring the current level of potting practices and restricting other fishing practices over certain features will safeguard the healthy population of shellfish and by ensuring no increase in fishing activity occurs or alternative gears used, it is expected that the shellfish and other fish species population may increase over time. The recovery of the seagrass beds to favourable condition may improve their functioning as a nursery area, potentially benefiting fisheries exploited within and outside the rMCZ. Potential benefits may arise on-site, for fishers permitted to fish within the rMCZ, and off-site from spill-over benefits.	Anticipated direction of change: ⇧ Confidence: Low

Table 5b. Recreation		**rMCZ 19, Norris to Ryde**
Baseline	**Beneficial impact under Policy Option 1**	

Table 5b. Recreation		rMCZ 19, Norris to Ryde
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. The seagrass beds within this rMCZ provide important nursery areas for flatfish (Joint Nature Conservation Committee, 2011) and, as such, are likely to help support potential on-site and off-site angling activities (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The rMCZ is a very popular area for both shore and boat angling. An estimated 138 local angling boats use the rMCZ (Isle of Wight Angling Boat Survey, T Williams, 2011) excluding boats from the mainland. An estimated 2274 angling trips are made each year within this rMCZ (Shore Angling Intensity Report, T Williams, December 2010) with the most intense activity occurring during the summer months. To estimate the value of the site to the angling sector, Solent angling representatives suggested using national statistics for the average annual household expenditure of sea anglers (£295 per year) as detailed in the Drew Report (2004). Assuming that one prviate boat equals one household, private boat anglers spend £40,710 per year within this rMCZ. Using the national average number of trips made by shore anglers per year (13.62; Drew Ltd 2004), it can be estimated that 167 shore anglers use this rMCZ. Assuming that each shore angler equates to one household, shore anglers spend £49,253 per year within this rMCZ. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site which result from the seagrass nursery area.	If the conservation objectives of the features are achieved, some of the features, including the seagrass beds, will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the seagrass beds to favourable condition may improve their functioning as a nursery area, potentially benefiting angling activities within and outside the rMCZ (see Table 4a). As no additional management of angling is expected (other than some restrictions on anchoring locations), fishers will be able to benefit from any on-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers, both on and off-site Designation of this site may lead to an increase in angling visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in angling.	Anticipated direction of change: ⇧ Confidence: Low
Diving: Diving is not known to take place in the rMCZ, although it is	N/A	N/A

possible that some wrecks are visited.		
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The seagrass beds within this rMCZ provide a safe haven for juvenile fish and other species such as sea horse, sea anemone and sessile jellyfish (Natural England website,). These contribute to an area of high biodiversity which in turn may support foraging areas for sea birds. The rMCZ has not been identified as a particularly popular area for wildlife watching, but given the importance of the location for foraging sea birds (Balanced Seas Final Report Recommendations, 2011), bird watching may occur. It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	If the conservation objectives of the features are achieved, some of the features, including the seagrass beds, will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the seagrass beds (which occur over a large part of the chalk ledges) to favourable condition may improve their functioning as a safe haven for sessile and low mobility species, potentially benefitting wildlife watching within the rMCZ. In addition, an improvement in the condition of site features and any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The whole rMCZ is an extremely popular tourist destination, especially for recreational sailing and coastal walking with harbours, marinas, shopping facilities, camping sites and coastal paths nearby. Sailing clubs offer races and training for all age groups. Osborne Bay is the main area for recreational anchoring due to its sheltered nature and picturesque setting, with up to 200 (50−150 on average) boats using it on weekends during the summer (May–September) (John Pockett, pers. comm., November 2011). This is also an overspill area for vessels	If the conservation objectives of the features are achieved, some of the features, including the seagrass beds, will be recovered to favourable condition. Others will be maintained in favourable condition. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities. If the rMCZ is designated this will provide an additional positive aspect about the location that could be promoted by the tourism and leisure industry and that would be expected to increase	Anticipated direction of change: ⇧ Confidence: Low

Table 5b. Recreation		rMCZ 19, Norris to Ryde
attending Cowes Week. The coastal path between Ryde and Cowes runs inland at Wootton Creek and ends at Osborne House, the most popular tourist destination on the Island with views over Osborne Bay (Wight Walks Website). It has not been possible to estimate the value derived from these forms of recreation in the rMCZ.	visitation rates.	

Table 5c. Research and education		rMCZ 19, Norris to Ryde
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. Hampshire and Isle of Wight Wildlife Trust undertakes sea floor and sea shore surveys through Seasearch and Shoresearch (www.hwt.org.uk/events.php). Southampton and Portsmouth universities undertake research in the area and the Standing Conference on Problems Associated with the Coastline (SCOPAC) undertakes research relating to the shoreline in the Solent area (SCOPAC website). It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. Hampshire and Isle of Wight Wildlife Trust provides practical and theoretical learning opportunities as either taught lessons at its centres or as outreach in schools (Hampshire and Isle of Wight Wildlife Trust website). It has not been possible to estimate the value derived from education activities associated with the rMCZ.	MCZ designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ) education activities (e.g. events, interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Moderate

Table 5d. Regulating services	rMCZ 19, Norris to Ryde	
Baseline		**Beneficial impact**
Regulation of pollution: The features of the site contribute to the bioremediation of waste (subtidal sediments and seagrass beds) water purification (subtidal sediments and seagrass beds) and sequestration of carbon (subtidal sediments and seagrass beds) (Fletcher and others, 2011). ***Environmental resilience:*** The features (subtidal sediments) of the site contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** The features of the site, (subtidal sediments and seagrass beds) contribute to local flood and storm protection (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the pMCZ.	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (seagrass beds) recovered to favourable condition. Recovery of the seagrass beds and a potential reduction in the use of bottom towed fishing gear may increase the site's benthic biodiversity and biomass, improving the regulating capacity its habitats. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 5e. Non-use and option values	rMCZ 19, Norris to Ryde	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the pMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 19, Reference Area 16 Wootton Old Mill Pond **Site area (km^2): 0.16**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts			**rMCZ 19, Reference Area 16 Wootton Old Mill Pond**	
1a. Ecological description				
This site, lying within recommended Marine Conservation Zone 19 (Norris to Ryde), is a saline lagoon above mean high water and contains the best regional example of the tentacled lagoon-worm *Alkmaria romijni.* Historically, water levels in the lagoon have been controlled and they are currently managed through a series of structures at Wootton Bridge to prevent flooding. In the long term, Natural England, the Isle of Wight Council and the Environment Agency plan to return the mill pond to estuarine conditions with intertidal mud flats, through managed realignment. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Species of Conservation Importance				
Tentacled Lagoon Worm *Alkmaria romijni*	-	14 records	Unfavourable condition	Recover to favourable condition

Site-specific costs arising from the effect of the rMCZ on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	**rMCZ 19, Reference Area 16 Wootton Old Mill Pond**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Palaeo-environmental work has been undertaken within this site (English Heritage, 2012). In order to help reconstruct the environmental conditions and past landscapes from important archaeological remains of Wootton Beach and creek, a multidisciplinary analysis has been undertaken on a core extracted from the recommended rMCZ Reference Area. Further work will be needed on the substrata to confirm and refine the interpretation (English Heritage, 2012). English Heritage has indicated that this site is likely to be of interest for archaeological excavation in the future as it is relevant to its	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost of one licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). 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 Impact Assessment. The prohibition of excavation and therefore interpretation of archaeological evidence from the site will decrease

Table 2a. Archaeological heritage	rMCZ 19, Reference Area 16 Wootton Old Mill Pond
National Heritage Protection Plan (theme 3A1.2).	acquisition of historical knowledge of past human communities from the site, resulting in a cost to society.

Table 2b. Ports, harbours, shipping and disposal sites — **rMCZ 19, Reference Area 16 Wootton Old Mill Pond**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management scenario 1: Not applicable to this site.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for all port and harbour developments within 5 km of the rMCZ Reference Area. The Balanced Seas regional MCZ project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the MCZ that will be needed relative to the mitigation provided in the baseline.

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
Port development: There is one port within 5km of the rMCZ that may undergo development in the future: Fishbourne. Fishbourne is important for the Isle of Wight economy as the Wightlink ferry service from Portsmouth operates there (J. Burrows, Operations Director, Wightlink, letter, 2 February 2011). At present, there are no known proposals for development.	*£m/yr* — Scenario 1: N/A; Scenario 2: 0.000 Cost to the operator (port development) ***Scenario 1:*** Not applicable to this site. ***Scenario 2:*** Future licence applications for port or harbour development plans and proposals within 5km of this rMCZ Reference Area will need to consider the potential effects of the activity on the features protected by the rMCZ Reference Area. Additional costs will be incurred as a result as described in Annex N11.

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	MCZ 19, Reference Area 16. Wootton Old Mill Pond
Flood and coastal erosion risk management (coastal defence) Recreation Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath rMCZ 19 Norris to Ryde. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions in Annex H.

Table 4a. Fish and shellfish for human consumption	**rMCZ 19, Reference Area 16 Wootton Old Mill Pond**	
Baseline	**Beneficial impact under Policy Option 1**	
There are no features to be protected by the recommended Marine Conservation Zone Reference Area that contribute to the delivery of fish and shellfish for human consumption, and no fishing activities take place within the site.	N/A	N/A

Table 4b. Recreation	**rMCZ 19, Reference Area 16 Wootton Old Mill Pond**	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Angling does not take place in the site.	N/A	N/A
Diving: Diving is not known to take place in the site.	N/A	N/A
Wildlife watching: Wildlife watching is not known to take place in the site.	N/A	N/A
Other recreation: No other recreational activities are known to take place in the site.	N/A	N/A

Table 4c. Research and education	**rMCZ 19, Reference Area 16 Wootton Old Mill Pond**
Baseline	**Beneficial impact under Policy Option 1**

Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. Studies have been undertaken as part of plans to make this a managed realignment area under the Shoreline Management Plan. It has not been possible to estimate the value derived from research activities associated with the rMCZ Reference Area.	The rMCZ Reference Area will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: No known education activities take place in the site.	MCZ Reference Area designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of local (to the rMCZ Reference Area) education activities (e.g. events and interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ Reference Area contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Moderate

Table 4d. Regulating services	**rMCZ 19, Reference Area 16 Wootton Old Mill Pond**	
Baseline	**Beneficial impact**	
Regulation of pollution: N/A	N/A	N/A
Environmental resilience: N/A	N/A	N/A
Natural hazard protection: N/A	N/A	N/A

Table 4e. Non-use and option values	**rMCZ 19, Reference Area 16 Wootton Old Mill Pond**
Baseline	**Beneficial impact under Policy Option 1**

Table 4e. Non-use and option values	rMCZ 19, Reference Area 16 Wootton Old Mill Pond	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 19, Reference Area 17 King's Quay

Site area (km^2): 0.28

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts				**rMCZ 19, Reference Area 17 King's Quay**
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) Reference Area lies within rMCZ 19 (Norris to Ryde), on the north-east coast of the Isle of Wight, south of Osborne Bay. It is predominantly intertidal and contains some of the best seagrass beds, *Zostera marina* and *Z. noltii*, in the Balanced Seas Project Area, according to the Hampshire and Isle of Wight Wildlife Trust. There are also a number of broad-scale habitats which should be in relatively good condition, given that this section of the coastline is adjacent to private land. This site falls within the Solent Maritime Special Area of Conservation and King's Quay Shore Site of Special Scientific Interest. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A2.1 Intertidal coarse sediments	0.01	-	Unfavourable condition	Recover to favourable condition
A2.2 Intertidal sand & muddy sand	0.006	-	Unfavourable condition	Recover to favourable condition
A2.3 Intertidal mud	0.06	-	Unfavourable condition	Recover to favourable condition
A2.4 Intertidal mixed sediments	0.01		Unfavourable condition	Recover to favourable condition
A5.3 Subtidal mud	-		Unfavourable condition	Recover to favourable condition
Habitats of Conservation Importance				
Seagrass beds	0.13	-	Unfavourable condition	Recover to favourable condition

Site-specific costs arising from the effect of the rMCZ on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	**rMCZ 19, Reference Area 17 King's Quay**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Osborne House (property and grounds managed by English Heritage) borders this site; the available records indicate the presence of the wreck of the *New Moss Rose* (200 metres to the north) (English Heritage, 2012).	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost of one licence application could be in the region of

Table 2a. Archaeological heritage	rMCZ 19, Reference Area 17 King's Quay
	£500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). 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 Impact Assessment (IA). 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.

Table 2b. National defence — **rMCZ 19, Reference Area 17 King's Quay**

Source of costs of the recommended Marine Conservation Zone (MCZ) under Policy Option 1

Entire site closed to activities.

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
Amphibious national defence activities impacting the seabed through physical disturbance (Ministry of Defence (MOD), pers. comm., 2010).	It is not known whether this rMCZ will impact on MOD's use of the site. Impacts of rMCZs on national defence are assessed in AnnexH10 and N9 (they are not assessed for this site alone).

Table 2c. Ports, harbours, shipping and disposal sites — **rMCZ 19, Reference Area 17 King's Quay**

Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1**

Management scenario 1: Not applicable to this site.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for all port and harbour developments within 5 km of the rMCZ Reference Area.. The Balanced Seas regional MCZ project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the MCZ that will be needed relative to the mitigation provided in the baseline.

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
Port development: There are 2 ports and harbours within 5km of the rMCZ that may undergo development in the future: Fishbourne and Cowes. Fishbourne is particularly important for the Isle of Wight economy as the Wightlink ferry service operates to it from Portsmouth (J. Burrows,	*£m/yr* — Scenario 1: N/A; Scenario 2: 0.000 ***Scenario 1:*** Not applicable to this site. ***Sceanrio 2:*** Future licence applications for known port or harbour development plans and proposals within 5km of this rMCZ will need to consider the potential effects of

Table 2c. Ports, harbours, shipping and disposal sites	rMCZ 19, Reference Area 17 King's Quay
Operations Director, Wightlink, letter, 11 February 2011). At present, there are no known proposals for development at Cowes or Fishbourne.	the activity on the features protected by the rMCZ. Additional costs will be incurred as a result as described in Annex N11. .

Table 2d. Recreational angling	rMCZ 19, Reference Area 17 King's Quay
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of the entire site to all recreational angling.	
Description of activity and its impact on interest features	**Costs of effect of rMCZ on the sector under Policy Option 1**
It is thought that there is very little angling in this site as it is largely intertidal (Natural England Stakeholder Interview for rMCZ Reference Area 17 Kings Quay, March 2012)	The boundaries of the rMCZ Reference Area were developed in conjunction with Local Group sea angling representatives in order to minimise impact on this sector, and no significant impacts on anglers are anticipated.

Table 2e. Recreational bait collection	rMCZ 19, Reference Area 17 King's Quay
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of entire site to all bait collection.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Some people may gather crabs for bait in the site (Natural England Stakeholder Interview for rMCZ Reference Area 17Kings Quay, March 2012). Due to the isolated position of this site, the numbers of bait collectors are expected to be low.	It is anticipated that the rMCZ Reference Area will not have a significant impact on bait collection.

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 19, Reference Area 17 King's Quay
Flood and coastal erosion risk management (coastal defence) Recreation (except activities listed above in table 2) Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath rMCZ 19 Norris to Ryde. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions in Annex H.

Table 4a. Fish and shellfish for human consumption	**rMCZ 19, Reference Area 17 King's Quay**	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. Seagrass beds, which occur within the rMCZ Reference Area, generally provide important nursery areas for flatfish (Joint Nature Conservation Committee, 2011) and shellfish (http://www.naturalengland.org.uk/ourwork/marine/mpa/mcz/features/habitats/seagrassbeds.aspx) and so are likely to help support on-site and off-site fisheries. Intertidal mud provides habitat for fish of commercial importance (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in some are in favourable condition and some are in unfavourable condition (see rMCZ 19 Table 1 for details).	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. . Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption. If stocks did improve commercial fishers may benefit from spillover effects from the site.	Anticipated direction of change: ⇧ Confidence: Low

Table 4a. Fish and shellfish for human consumption	rMCZ 19, Reference Area 17 King's Quay	
There is no evidence of any commercial fishing taking place in this site (Stakmap 2010) and due to its intertidal nature, commercial fishing is unlikely to occur. It has not been possible to estimate the value of the off-site benefits that derive from the spawning and nursery area.		

Table 4b. Recreation	rMCZ 19, Reference Area 17 King's Quay	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. There is very little angling in this rMCZ Reference Area, as described in Table 2d. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that result from the potential spawning and nursery area. The seagrass beds within this rMCZ provide important nursery areas for flatfish (JNCC, 2011) and, as such, are likely to help support potential on-site and off-site angling activities (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMCZ 19 Table 1 for details).	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation		rMCZ 19, Reference Area 17 King's Quay
Diving: Diving is not known to take place in the site.	N/A	N/A
Wildlife watching: Wildlife watching is not known to take place in the site.	N/A	N/A
Other recreation: Small recreational vessels such as yachts, dinghies and personal watercraft pass through the rMCZ Reference Area; and very occasionally walkers pass along the edge of the site (Natural England Reference Area questionnaire, January 2012).	The rMCZ Reference Area is fully contained within rMCZ 19 for which the benefits of other recreation have been assessed. It is not possible to identify whether the Reference Area will have additional benefits over and above this but this seems unlikely.	N/A

Table 4c. Research and education		rMCZ 19, Reference Area 17 King's Quay
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. Hampshire and Isle of Wight Wildlife Trust undertakes sea-floor and sea-shore surveys through Seasearch and Shoresearch (http://www.hwt.org.uk/pages/hampshire-and-isle-of-wight-marine.html) in the wider rMCZ and this may include the rMCZ Reference Area. It has not been possible to estimate the value derived from research activities associated with the rMCZ Reference Area.	The rMCZ Reference Area will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. No known educational activities take place in the site**.**	MCZ Reference Area designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ Reference Area) education activities(e.g. events and interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ Reference Area contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Moderate

Table 4d. Regulating services	rMCZ 19, Reference Area 17 King's Quay	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: Seagrass beds contribute to the bioremediation of waste, water purification and sequestration of carbon (Fletcher and others, 2011). ***Environmental resilience:*** The features of the site contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** Seagrass beds contribute to local flood and storm protection (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of the seagrass beds and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities (as, if necessary, mitigation would be introduced, with the associated costs and benefits).	Anticipated direction of change: ⇧ Confidence: Low

Table 4e. Non-use and option values	rMCZ 19, Reference Area 17 King's Quay	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 20 The Needles

Site area (km^2): 11.01

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts	rMCZ 20, The Needles

1a. Ecological description
This recommended Marine Conservation Zone (rMCZ) would protect some good examples of seagrass beds and the only regional example of one of the rare stalked jellyfish species. The site includes The Needles, a row of three distinctive stacks of chalk off the western extremity of the Isle of Wight. Most of the rMCZ comprises low-energy infralittoral rock covered with a thin veneer of mixed sediments, with infralittoral mixed sediment dominating in the deeper areas. Seagrass beds, occurring in Alum, Colwell and Totland Bays, are important for breeding sea hares. Colwell Bay is home to the seaweed, peacock's tail, which in the Balanced Seas Project Area is found off the Isle of Wight alone. Alum Bay is home to sea squirt beds and sea anemones. Sea birds feed throughout the subtidal areas of the site and the area is a particularly important foraging ground for black-headed gull and great cormorant. Overall, the area is thought to be highly productive biologically and in addition to the species above, a range of fish species (e.g. smelt, bass, smooth hound and sole), crustaceans (e.g. lobster) and molluscs (e.g. whelk) are known to occur here. This site partially overlaps the South Wight Maritime Special Area of Conservation. Source: Balanced Seas Final Recommendations (2011).

1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A5.4 Subtidal mixed sediments	10.58	-	Favourable condition	Maintain at favourable condition
Habitats of conservation importance				
Seagrass beds		3004 records	Unfavourable condition	Recover to favourable condition
Species of conservation importance				
Stalked Jellyfish (*Lucernariopsis campanulata*)		1 record	Favourable condition	Maintain at favourable condition
Peacock's Tail (*Padina pavonica*)		12 records	Favourable condition	Maintain at favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone (rMCZ) on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	rMCZ 20, The Needles
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Increase in costs of assessing environmental impacts for future licence applications (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. However, restrictions could be placed on anchoring in areas of vulnerable MCZ features in the site, including sea grass.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Wrecks of vessels of British, Dutch, Greek, Prussian, Portuguese, Swedish, Italian and French origin are recorded within the site. The Needles' designated wreck site is thought to comprise two wrecks (HMS *Assurance* and HMS *Pomone*) and is protected by a 75	An extra cost would be incurred in the assessment of environmental impact made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost in one

Table 2a. Archaeological heritage	rMCZ 20, The Needles
metre exclusion zone. A German World War II aircraft is also recorded within the site (English Heritage, 2012).	licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). No further impacts on activities related to archaeology are anticipated. If archaeologists respond to restrictions on anchoring over areas of sea grass by undertaking alternative archaeological excavations 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 Impact Assessment. If archaeological excavations do not take place as a result of this restriction, this will prevent interpretation of archaeological evidence from the site which will decrease acquisition of historical knowledge of past human communities from the site, resulting in a cost to society.

Table 2b. Commercial fisheries	rMCZ 20, The Needles
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of commercial fishing gear will be required for certain features protected by this rMCZ. Therefore, two scenarios have been employed in the Impact Assessment for these fisheries to reflect this uncertainty. Should the site be designated, the management that will be required will fall somewhere within this range. ***Management scenario 1:*** Zoned closure of rMCZ to bottom trawls and dredges at a 2 metre depth contour along the shoreline to protect areas of sea grass bed (Statutory Nature Conservation Bodies (SNCB) informed scenario). ***Management scenario 2:*** Closure of rMCZ to bottom trawls, dredges, nets, lines, pots and traps to protect areas of sea grass bed (SNCB informed scenario).	
Summary of all fisheries: This site is wholly within the 6nm (nautical mile) limit and is fished only by UK vessels. The main fleets are based at Keyhaven, Lymington and Yarmouth and are indicated as being under 15 metres in length (MCZ Fisheries Model). The main fishing activities are cuttlefish trapping (effort in this fishery is increasing because cuttlefish is a non-quota species), potting for lobsters, crabs and whelks, gill netting for bass and mullet, long lining for bass and mullet, and tangle/trammel netting for sole and plaice. Trawling and oyster dredging effort is very limited. An Inshore Fisheries and Conservation Authority (IFCA) byelaw prohibits fishing by vessels over 12 metres in size within 6nm, which covers the entire site (Southern IFCA, feedback response to first tranche of IA material, 16 January 2012). A number of other commercial fishing restrictions are also in existence (listed in Annex E1). The Southern IFCA is currently developing a Seagrass Management Strategy which will include a voluntary code of conduct that closes areas of sea grass to bottom trawls and dredges around the Isle of Wight (from mean high water out to a distance that is currently being determined) (Jury, J. from Southern IFCA email., 24 April 2012; The SIFCA and the Seagrass Working Group (SWG). 2012.). This will deliver part of the management that would be required under scenarios 1 and 2. More detail on the approach used for the fisheries method is provided at Annexes H7 and N4.	

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 20, The Needles</th></tr>
<tr><td colspan="2">Estimated annual value of landings from the rMCZ: £0.032m/yr.</td></tr>
<tr><th>Baseline description of UK commercial fisheries</th><th>Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1</th></tr>
<tr><td>Bottom trawls: Numbers of vessels are unknown.

Estimated total value of landings from the rMCZ: £0.004m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK bottom trawl landings affected is expected to fall within the following range of scenarios:
<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.001</td><td>0.004</td></tr></table>In establishing the draft conservation objectives, the site’s feature may have been assessed as having low vulnerability to fishing with bottom trawls at current levels and, where this is the case, this activity was not the primary reason for assigning the ‘recover’ conservation objective. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.
The above values are likely to be over estimates because implementation of the Southern IFCA Seagrass Management Strategy to protect areas of sea grass through a voluntary code of conduct will significantly reduce the activity of bottom trawls in this rMCZ (Jury, J. from Southern IFCA email, 24 April 2012).</td></tr>
<tr><td>Dredges: Estimated total value of landings from the rMCZ: £0.002m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK dredge landings affected is expected to fall within the following range of scenarios:
<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td><0.001*</td><td>0.002</td></tr></table>* £450
In establishing the draft conservation objectives, the site’s feature may have been assessed as having low vulnerability to fishing with dredges at current levels and, where this is the case, this activity was not the primary reason for assigning the ‘recover’ conservation objective. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.

The above values are likely to be overestimates as the implementation of the Southern IFCA Seagrass Management Strategy to protect areas of sea grass through a voluntary code of conduct will significantly reduce the activity of dredges in this rMCZ (Jury, J., Southern IFCA email., 24 April 2012)</td></tr>
</table>

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 20, The Needles</th></tr>
<tr><td>Pots and traps: Estimated total value of landings from the rMCZ: £0.016m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK pot and trap landings affected is expected to fall within the following range of scenarios:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.016</td></tr></table>In establishing the draft conservation objectives, the site's feature may have been assessed as having low vulnerability to fishing with pots and traps at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objective. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Hooks and lines: Estimated total value of landings from the rMCZ: £0.001m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK hook and line landings affected is expected to fall within the following range of scenarios:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.001</td></tr></table>In establishing the draft conservation objectives, the site's feature may have been assessed as having low vulnerability to fishing with hooks and lines at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objective. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Nets: Estimated total value of landings from the rMCZ: £0.003m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK net landings affected is expected to fall within the following range of scenarios:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.003</td></tr></table></td></tr>
<tr><td>Total direct impact on UK commercial fisheries under Policy Option 1</td><td></td></tr>
<tr><td></td><td>The estimated annual value of UK landings and gross value added (GVA) affected is expected to fall within the following range of scenarios:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td><td>Best estimate</td></tr><tr><td>Value of landings affected</td><td>0.001</td><td>0.026</td><td>0.002</td></tr><tr><td>GVA affected</td><td>0.000</td><td>0.012</td><td>0.001</td></tr></table></td></tr>
</table>

Table 2b. Commercial fisheries	rMCZ 20, The Needles
	The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas. These values are likely to be overestimates due to the future implementation of the Southern IFCA Seagrass Managment Strategy to protect areas of sea grass through a voluntary code of conduct which will close areas of sea grass to bottom trawls and dredges around the Isle of Wight. (Southern IFCA, feedback response to first tranche of IA material, 16 January 2012).
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries**
	None.

Table 2c. National defence	rMCZ 20, The Needles
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Mitigation of impacts of Ministry of Defence (MOD) activities on features protected by the suite of rMCZs will be provided by additional planning considerations during operations and training. It is not known whether mitigation will be required for features protected by this site. MOD will also incur costs in revising environmental tools and charts to include MCZs.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
MOD is known to make use of the site through amphibious activities.	It is not known whether this rMCZ will impact on MOD's use of the site. Impacts of rMCZs on national defence are assessed in Annex H10 and N9 (they are not assessed for this site alone).

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 20, The Needles
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Management scenario 1: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for disposal of dredged material and navigational dredging that takes place within 1km of the rMCZ. The Balanced Seas regional MCZ project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the MCZ that will be needed relative to the mitigation provided in the baseline. ***Management scenario 2:*** Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for disposal of dredged material, navigational dredging and all port and harbour developments within 5 km of the rMCZ. Also, additional costs incurred to update the existing MDP for Yarmouth to assess impacts of activities on MCZ features. The Balanced Seas regional MCZ project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the MCZ that will be needed relative to the mitigation provided in the baseline.	

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 20, The Needles
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Disposal sites: There is one site (WI080 Hurst Fort) within 1km of the rMCZ which is licensed for disposal of channel dredge material. This is used by the ports of Yarmouth and Lymington (Lisher, 2011). The average number of licence applications received for this disposal site is 2.9 per year (based on number of licence applications received between 2001 and 2010 (Cefas, pers. comm., 2011). There are 2 sites (WI080 Hurst Fort and WI090 The Needles) within 5km of the rMCZ which are licensed for disposing of channel dredge material. The average number of licence applications received for both of these disposal sites is 12.8 per year (based on number of licence applications received between 2001 and 2010 (Cefas, pers. comm., 2011). ***Navigational dredge areas:*** Navigational dredging occurs within 1km. It is assumed that each dredge area's marine licence is renewed once every 3 years, and that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal. Navigational dredging occurs within 5km of the rMCZ. It is assumed that each dredge area's marine licence is renewed once every 3 years, and that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal. As this navigational dredge area is covered by an MDP, it is assumed that the assessment of environmental impact is not changed over the 20 year period of the IA. ***Port development:*** There is one port, Yarmouth, within 5km of the rMCZ which may undergo development in the future. The cross-Solent car ferry that operates between Lymington and Yarmouth (currently operated by Wightlink) is essential to the economy not only of Yarmouth and West Wight, but also the economy of the island as a whole. Some 25% of traffic to the island and over 1 million people per year pass through Yarmouth Harbour on their way to or from the island. The ferry service provides 40% of the Harbour's income (Lisher, C. email, feedback response to first tranche of IA material, 6 January 2012) However, no port developments are known to be planned within the 20	*£m/yr* — Scenario 1: Cost to the operator 0.022; Scenario 2: 0.091* * This estimate for additional cost in future licence applications for port developments arising as a result of this rMCZ is not used to estimate the total costs for the IA. It is based on different assumptions to those used to estimate costs at a regional level and for the entire suite of sites. Also, this figure assumes that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal (every 3 years). It does not include the cost of incorporating MCZ features in an existing or new MDP. It is likely to over-estimate the cost of Scenario 2 for rMCZs with ports within 5km that have MDPs because of the savings in future costs provided by an MDP. See Annex H for further information ***Scenario 1:*** Future licence applications for disposal of material and navigational dredging within 1km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11). ***Scenario 2:*** Future licence applications for disposal of material, navigational dredging and port or harbour development plans and proposals within 5km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11). An additional cost will arise to update the existing MDP to consider the potential effects of activities on the features protected by the rMCZ. The anticipated additional in the MDP is estimated to be a one-off cost of £8438.

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 20, The Needles
year period of the Impact Assessment (IA).	

Table 2e. Renewable energy – tidal energy	rMCZ 20, The Needles
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Management scenario 1: Increase in costs of assessing environmental impacts for licence applications (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).	
Management scenario 2: Increase in costs of assessing environmental impacts for licence applications and provision of additional mitigation of impacts of cabling (relative to the mitigation provided in the baseline).	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
The rMCZ is adjacent to the Solent Energy Nearshore deployment site which has a potential capacity of 1MW and is scheduled for development by 2015. It is part of the tidal energy project thatis being implemented by the Solent Ocean Energy Centre (SOEC), which plans to install capacity of a total of 21MW around the Isle of Wight (it has started initial trials) (Balanced Seas Final Reccomendations Report, 2011; SOEC, 2011; Merry, S. from Renewable Energy Association (REA) feedback response to 1st tranche of material., 13 January 2012). The Isle of Wight Council has indicated that this is one of the few areas in the UK where tidal energy technology could be implemented (Fawcett. J from Isle of Wight Council, email., 7 March 2012.., March 2012). It is assumed for the purpose of the Impact Assessment (IA) that there would be one licence application within the timeframe of the IA.	The estimated cost to tidal energy developers of the rMCZ is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Cost | 0.001 | 0.001 ***Scenario 1:*** one licence application for the tidal energy installations would be required to consider the potential effects of the construction and operational activities on the features protected by the rMCZ and the potential to achieve the MCZ conservation objectives. This is expected to result in one-off costs of £0.016m in 2015 (based on, per broad-scale habitat assessed, 6 days of a consultant's time at £700/day + 1 day for legal review at £800/day) with a present value cost of £0.015m. ***Scenario 2:*** the costs would be the same as for Scenario 1 plus the additional costs of the requirement to use removable frond matressing for cable protection. As the proposed cable routes are unknown, it is not known whether routes for any inter-array or export cables will pass through the rMCZ, and what length of cable protection may be required. If mitigation involves re-routing of proposed cable routes to avoid sensitive features, it is assumed that this will cost £1.01m/km of cable (average of estimates provided by 4 developers). If frond mattressing is used to mitigate impacts, this is estimated to cost £1m/km more than the cable protection that would have been used in the absence of the MCZ (based on a frond mat of 3

Table 2e. Renewable energy – tidal energy	rMCZ 20, The Needles
	metres x 3 metres; average cost provided by 2 developers). ***Additional concerns raised by stakeholders:*** SOEC considers that substantial costs for additional baseline, as well as on-going, monitoring will arise as a result of designation of this rMCZ (Merry, S., -feedback response to first tranche of IA material, 13 January 2012). It is estimated that the additional monitoring costs could be up to 20% of total project costs (which are £33.5m), or approximately £10.05m/yr. As the Centre is conceived as a test and demonstration facility for numerous tidal energy devices, it has been suggested that any additional costs may need to apply to each device that is deployed (Fawcett. J, tidal energy lead for the Isle of Wight Council, email, 7 March 2012.). The industry has not been able to provide further details of estimated costs of impact (which it anticipates may arise in avoiding impacts on sensitive features, for cable protection, repowering and recommissioning). Tidal energy is still a very new industry and there are many unknown contributing factors which accounts largely for the lack of information (Fawcett. J, tidal energy lead for the Isle of Wight Council, email, 7 March 2012.).

Table 2f: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 20, The Needles
Oil and gas related activities (including carbon capture and storage) This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 20 The Needles
Flood and coastal erosion risk management (coastal defence) Recreation Research and education Shipping	

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ 20 The Needles**
Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[11] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.	rMCZ 20, The Needles

ENG Feature	**Represent-ativity**	**Replicatio n**	**Adequac y**	**Viability**	**Gaps or shortfalls in relation to ENG minimum guidelines**	**Recommende d conservation objective**	**Quantitative considerations at regional MCZ level**	**Ecological Importance at regional MCZ level**	**Ecological Importance at wider scale**
A5.4 Subtidal mixed sediments	BSH	✓	✓	X	Not viable	Maintain			
Seagrass beds	FOCI Habitat	✓	✓	✓	None	Recover		Considered to be one of best examples of feature around IOW	BAP and OSPAR habitat

[11] copied from the JNCC and Natural England's advice to Defra on rMCZs

Stalked jellyfish *Lucernariopsis campanulata*	FOCI Species	✓ * [1]	✓	✓	Replication target not met	Maintain	Only record of feature within region.	This feature is not protected within existing MPAs	BAP species – marked decline in UK
Peacock's tail *Padina pavonica*	FOCI Species	X	X	✓	Replication target not met	Maintain	One of two sites proposed for this feature	This population represents the western extreme of the species' distribution within the region. This feature is not protected within existing MPAs	BAP species

Site considerations	
Connectivity	✓
Geological/Geomorphological features of interest	None
Appropriate boundary	✓
Areas of Additional Ecological Importance	✓
Overlaps with existing MPAs	✓

rRA 20 Alum Bay (Balanced Seas) (Natural England lead) within rMCZ 20. An overview of features proposed for designation within recommended reference area Alum Bay and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale

✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Where an asterisk (*) has been given in the table, more detail is provided in the narrative.

ENG Feature	**Representativity**	**Viability**	**Recommended conservation objective**
Stalked jellyfish *Lucernariopsis campanulata*	FOCI Species	✓ * [3]	Recover to reference condition
Site considerations			

Appropriate boundary	X *[3]

Additional comments and site benefits:

Variety of Southeast features occur within rMCZ (species and habitats), the site is an important foraging area for a number of nationally and internationally important bird species such as black-headed gulls and great cormorant, and it is a highly biodiverse and productive area (South East England Biodiversity Forum (SEEBF) 2010) (RSPB Pers. Comms Local Group (Feb. 2011))

Undulate Ray stated as breeding within rMCZ, but not proposed for designation, despite ENG guidelines for highly mobile species and only one pMCZ for this species in the region. Considered to be one of the top three examples of seagrass beds around the Isle of Wight (Dale, Chesworth and Leggett 2011).

Site has high biodiversity and productivity (Marine Conservation Society (MCS) 2011).

*[1]Replication target of 3 is not met, but this is the only record of species in region, within the rMCZ, so the target is considered met.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the rMCZ contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption		**rMCZ 20, The Needles**
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Seagrass beds, which occur within the rMCZ, generally provide important nursery areas for flatfish (Joint Nature Conservation Committee, 2011) and shellfish (Natural England website,) and so are likely to help support on-site and off-site fisheries. Subtidal mixed sediments, the other principal habitat in the rMCZ, provide an important nursery area for many species, including for juvenile commercial species such as flatfishes and bass. Infralittoral and circalittoral rock are important locations for commercial inshore fishing activity, particularly for crab and lobster (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The main fishing activities are cuttlefish trapping (effort in this area is increasing because cuttlefish is a non-quota species), potting for lobster, crab and whelk, gill netting for bass and mullet, long lining for bass and mullet, and tangle/trammel netting for sole and plaice. A description of on-site fishing activity and the value derived from it is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits which derives from the seagrass nursery area.	If the conservation objectives of the features are achieved, subtidal mixed sediments will be maintained in favourable condition and seagrass will be recovered to favourable condition. New management of fishing activities is expected (above the baseline situation), the costs of which are set out in Table 2b, which may reduce the impacts on fish and shellfish habitats and harvesting of stocks. As most of the commercial species targeted by fishers in this rMCZ are mobile fish and shellfish, it is unclear whether the scale of habitat recovered and the magnitude of reduced (on-site) harvesting will be enough to have any significant positive impact on commercial stocks. However, maintaining and monitoring the current level of potting practices and restricting other fishing practices over certain features will safeguard the healthy population of shellfish and by ensuring no increase in fishing activity occurs or alternative gears used, it is expected that the shellfish and other fish species population may increase over time. The recovery of the seagrass beds to favourable condition may improve their functioning as a nursery area, potentially benefiting fisheries exploited within and outside the rMCZ. Potential benefits may arise on-site, for fishers permitted to fish within the rMCZ, and off-site from spill-over benefits.	Anticipated direction of change: ⇧ Confidence: Low

Table 5b. Recreation		rMCZ 20, The Needles
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. The subtidal mixed sediments and seagrass beds within the rMCZ support high biodiversity and, as such, are likely to help support potential on-site and off-site angling activities (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The rMCZ is a popular area for both shore and boat angling. An estimated 132 local private angling boats use the rMCZ (Isle of Wight Angling Boat Survey, T Williams, 2011), excluding boats from the mainland. An estimated 1310 angling trips are made each year within this rMCZ (Shore Angling Intensity Report, T Williams, December 2010) with the most intense activity occurring during the summer months. Charter boats out of Yarmouth, Lymington and Southampton, and from west of the project area also bring anglers to the site. Due to the complex habitats in the rMCZ, it is likely to provide suitable habitat for many commercial fish species which are also important for recreational fishing and thus may help support potential on-site and off-site fisheries. Common smelt, bass, smooth hound, sole, pout and mullet, as well as crustaceans (e.g. lobster) and molluscs (e.g. whelk) occur within this site and are fished commercially and recreationally (Balanced Seas Isle of Wight Sites Meeting Report, February 2011). Solent angling representatives suggested using national statistics for the average annual household expenditure of sea anglers (£295 per year) from the Drew Report (2004) to estimate the value of the site to this sector. Assuming that one private boat equals one household, private boat anglers spend an estimated £38,940 per year within this rMCZ. Using the national average number of trips made by shore anglers per year (13.62; Drew Ltd 2004), it can be estimated that 96 shore anglers	If the conservation objectives of the features are achieved, some of the features, including the seagrass beds, will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the seagrass beds to favourable condition may improve their functioning as a nursery area, potentially benefiting angling activities within and outside the rMCZ (see Table 4a). As no additional management of angling is expected (other than some restrictions on anchoring locations), fishers will be able to benefit from any on-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers, both on and off-site Designation of this site may lead to an increase in angling visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in angling.	Anticipated direction of change: ⇧ Confidence: Low

Table 5b. Recreation		rMCZ 20, The Needles
use this rMCZ. Assuming that each shore angler equates to one household, shore anglers spends an estimated £28,320 per year within this rMCZ. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site which result from the estuary spawning and nursery area.		
Diving: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The rMCZ is used for diving and is popular both for wreck dives, such as the HMS *Pomone* found in The Needles Passage, and for its abundant marine life (www.isleofwighttouristguide.com). It has not been possible to estimate the value derived from diving in the rMCZ.	Designation of this site might lead to an increase in diving trips, as a result of publicity about the marine biodiversity and rare species found in the site. If populations of species such as seahorses and stalked jellyfish increase, this could lead to an improved quality of experience for divers. The designation may lead to an increase in diving visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in diving trips at the national scale.	Anticipated direction of change: ⇧ Confidence: Low
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The seagrass beds provide a safe haven for juvenile fish and other species such as sea horse, sea anemone and sessile jellyfish (Natural England website,). These are likely to contribute to an area of high biodiversity which in turn may support foraging areas for sea birds. The rMCZ is a popular area for wildlife watching, particularly bird watching and rockpooling. Alum Bay is a particularly popular spot for birdwatching (www.Fatbirder.com). The abundant fish populations support a number of foraging sea birds such as black-headed gull and great cormorant. It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	If the conservation objectives of the features are achieved, some of the features, including the seagrass beds, will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the seagrass beds (which occur over a large part of the chalk ledges) to favourable condition may improve their functioning as a safe haven for sessile and low mobility species. Any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 5b. Recreation		rMCZ 20, The Needles
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The whole rMCZ is an extremely popular tourist destination, especially for recreational sailing, kite surfing, boat trips (www.theneedles.co.uk) and coastal walking, with numerous harbours, marinas, shopping facilities, camping sites and coastal paths available (www.iowbreaks.com/activities/watersports.php). Alum Bay is a first stop shelter for recreational vessels crossing the Channel. The Needles Park, adjacent to the rMCZ, attracts nearly half a million visitors every year giving access to the Island's most famous landmarks, The Needles Rocks and Lighthouse, as well as Alum Bay (www.dayoutwiththekids.co.uk). It has not been possible to estimate the value derived from recreation and tourism services in the rMCZ.	If the conservation objectives of the features are achieved, some of the features, including the seagrass beds, will be recovered to favourable condition. Others will be maintained in favourable condition. If the rMCZ is designated this will provide an additional positive aspect about the location that could be promoted by the tourism and leisure industry and that would be expected to increase visitation rates. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 5c. Research and education		rMCZ 20, The Needles
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. Hampshire and Isle of Wight Wildlife Trust undertakes sea-floor and sea-shore surveys through Seasearch and Shoresearch (www.hwt.org.uk/events.php). The Standing Conference on Problems Associated with the Coastline (SCOPAC) also carries out research within this site, across the region between Lyme Regis and Shoreham (SCOPAC website). It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services.	MCZ designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the	Anticipated direction of change: ⇧

Hampshire and Isle of Wight Wildlife Trust provides practical and theoretical learning opportunities as either taught lessons at its centres or as outreach in schools (from pre-school to young adults) (Hampshire and Isle of Wight Wildlife Trust website). It has not been possible to estimate the value derived from education activities associated with the rMCZ.	rMCZ) education activities (e.g. events, interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Confidence: Moderate

Table 5d. Regulating services		**rMCZ 20, The Needles**
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: The features of the site contribute to the bioremediation of waste (subtidal sediments and seagrass beds) water purification (subtidal sediments and seagrass beds) and sequestration of carbon (subtidal sediments and seagrass beds) (Fletcher and others, 2011). ***Environmental resilience:*** The features (subtidal sediments) of the site contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** The features of the site, (subtidal sediments and seagrass beds) contribute to local flood and storm protection (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the pMCZ.	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (seagrass beds) recovered to favourable condition. Recovery of the seagrass beds and a potential reduction in the use of bottom towed fishing gear may increase the site's benthic biodiversity and biomass, improving the regulating capacity its habitats. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Moderate

Table 5e. Non-use and option values		**rMCZ 20, The Needles**
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the rMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the pMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

	Examples of these values are shown in (Ranger, Lowe, Sanghera, & Solandt, 2012). Voters in the MCS's 'Your Seas Your Voice' campaign felt that features of the natural environment were strong motivators for reasons why people thought that certain locations within the rMCZ should be protected, with people frequently attaching value to biodiversity and 'outstanding underwater features.' Furthermore, allowing species recovery was perceived as an important management reason to protect the site for the benefit of the environment but also both recreational and commercial users. In particular, MCS nominated The Needles itself, where strong personal attachment was expressed and importance to the wider community with the perception that this is 'an unspoiled oasis in our cluttered south east'. Its importance to national heritage as an 'area is spectacularly beautiful and not only has important habitats, there are also important palaeo-archaeological and palaeo-environmental deposits in the area' was highlighted by many. Source: Ranger and others (2011)	

rMCZ 20 Reference Area 20 Stalked Jellyfish (within Alum Bay) **Site area (km^2): 0**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts			**rMCZ 20, Reference Area 20 Stalked Jellyfish (within Alum Bay)**	
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) Reference Area lies within rMCZ 20 (The Needles), but its boundaries have not been determined. The site contains the only record of the stalked jellyfish *Lucernariopsis campanulata* in the Balanced Seas Project Area, which lies to the north of the Needles, and for this reason the Balanced Seas Regional Stakeholder Group has recommended that an rMCZ Reference Area be considered for this locality. However, since there is some uncertainty about the validity of the record, the RSG considered that further survey work is needed before appropriate site boundaries can be developed. This species is known to attach to algae and seagrass on the lower shore and sublittoral rocky zones but there are no more recent data than this record of 1999. This site falls within the South Wight Maritime Special Area of Conservation. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Species of Conservation Importance				
Stalked Jellyfish *Lucernariopsis campanulata*		1 record	Unfavourable condition	Recover to favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone (rMCZ) on human activities (over 2013 to 2032 inclusive)

No site boundary has yet been defined for this rMCZ Reference Area due to the uncertainty of the location of the stalked jellyfish *Lucernariopsis campanulata* and the high quantity of commercial potting and recreational activities that occur within the area. . Activities that take place in the site and that would be impacted by an rMCZ Reference Area include commercial potting, costs for future licence applications for oil and gas exploration and production, recreational anchoring, recreational sea angling and use of charter boats for angling. A further review of this site will be required when a boundary has been agreed upon.

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath rMCZ 20 The Needles. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

These will be assessed for this recommended Marine Conservation Zone (rMCZ) Reference Area once the boundaries have been determined.

rMCZ 21 Wight-Barfleur Extension **Site area (km^2): 94.04**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts	**rMCZ 21, Wight-Barfleur Extension**
1a. Ecological description	
This recommended Marine Conservation Zone (rMCZ) would protect some sea bed habitats, including subtidal mixed and coarse sediments that lie to the south-east of the high-energy circalittoral rock reef which is proposed for protection under the Wight-Barfleur candidate Special Area of Conservation (cSAC). The site is thought to encompass nursery and spawning grounds for mackerel and sole. Overall, the site has high benthic biotope distinctness and benthic species richness, which supports foraging grounds for various bird species and is particularly important for great cormorant and Sandwich tern. The site overlaps with part of the English Channel outburst flood feature which runs along the Solent Palaeovalley. This geomorphological feature is evidence of a megaflood which occurred some 200,000 years ago when a huge glacial lake in the North Sea burst through the Dover Straits Isthmus which contained it, thus separating England from mainland Europe. Sonar evidence of the sea bed reveals deeply gouged channels where the floodwaters broke through. This site shares a boundary with the Wight-Barfleur cSAC. Source: Balanced Seas Final Recommendations (2011).	

1b. Baseline condition of MCZ features and impact of the MCZ

Feature	Area of feature (km2)	No. of occurrences	Baseline	Impact
Broad-scale habitats				
A5.4 Subtidal mixed sediments	70.13	-	Favourable condition	Maintain at favourable condition
A5.1 Subtidal coarse sediments	22.24		Favourable condition	Maintain at favourable condition
Habitats of conservation importance				
Subtidal sands and gravels	91.76		Favourable condition	Maintain at favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone on human activities (over 2013 to 2032 inclusive)

Table 2a. National defence	**rMCZ 21, Wight-Barfleur Extension**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Mitigation of impacts of Ministry of Defence (MOD) activities on features protected by the suite of rMCZs will be provided by additional planning considerations during operations and training. It is not known whether mitigation will be required for features protected by this site. MOD will also incur costs in revising environmental tools and charts to include MCZs.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
MOD is known to make use of the site. Activities include: anti-aircraft firing, machine gun firing, surface target towing, surface-to-surface firing, aerial towed target, acoustic trials, flares and smoke.	It is not known whether this rMCZ will impact on MOD's use of the site. Impacts of rMCZs on national defence are assessed in Annex H10 and N9 (they are not assessed for this site alone).

Human activities in the site that are not negatively affected

by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone under Policy Option 1 (rMCZ) (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ 21 Wight-Barfleur Extension**
Commercial fisheries (bottom trawls, dredges, hooks and lines, mid-water trawls, nets, pots and traps) Recreation Shipping	

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[12] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.	rMCZ 21, Wight-Barfleur Extension

ENG Feature	**Represent-ativity**	**Replicatio n**	**Adequacy**	**Viability**	**Gaps or shortfalls in relation to ENG minimum guidelines**	**Recommended conservation objective**	**Quantitative considerations at regional MCZ level**	**Ecological Importance at regional MCZ level**	**Ecological Importance at wider scale**
Subtidal sands and gravels	FOCI	✓	✓	✓	None	Maintain			**BAP habitat**
A5.1 Subtidal coarse sediment	BSH	✓	✓	✓	None	Maintain			
A5.4 Subtidal mixed sediments	BSH	✓	✓	✓	None	Maintain			
Site considerations									

[12] copied from the JNCC and Natural England's advice to Defra on rMCZs

Connectivity	✓
Geological/Geomorphological features of interest	✓ * [1]
Appropriate boundary	✓
Areas of Additional Ecological Importance	✓ * [2]
Overlaps with existing MPAs	The rMCZ is adjacent to the Wight-Barfleur Reef pSAC and the Wight-Barfleur recommended reference area overlaps with the Wight-Barfleur Reef pSAC.

An overview of features within the Wight-Barfleur recommended reference area and how these contribute to the ENG guidelines at the regional MCZ project area and at a wider scale copied from JNCC and Natural England's advice on rMCZs

✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Where an asterisk (*) has been given in the table, more detail is provided in the narrative.

ENG Feature	**Representativity**	**Viability**	**Recommended conservation objective**
Subtidal sands and gravels	FOCI	✓	Recover to reference condition
A5.1 Subtidal coarse sediment	BSH	✓	Recover to reference condition
A4.1 High energy circalittoral rock	BSH	✓	Recover to reference condition
Site considerations			
Appropriate boundary	✓ *		

Additional comments and site benefits:

- [1] The site also includes with Glacial Process features including the English Channel Outburst Flood Feature and rock outcrop features, listed as a feature of interest in the ENG, although this has not been recommended as a primary feature for designation at this site. This is a very large scale Glacial Process (erosion) feature, formed by a catastrophic flood that occurred some 400 000 years before the present, when a land barrier at the Straits of Dover that had trapped meltwater in the North Sea became breached. The event left megaflood erosion features on the English Channel seabed including deeply-eroded channels.
- [2] This rMCZ and the recommended reference area overlap with an area of medium benthic species biodiversity and medium benthic biotope biodiversity (Langmead, et al. 2010).

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the rMCZ contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption		**rMCZ 21, Wight-Barfleur Extension**
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Subtidal coarse and mixed sediments, subtidal sands and gravels are important nursery areas for many species and are potentially important spawning and nursery grounds for juvenile commercial species such as flatfishes and bass (Fletcher and others, 2011). The area of circalittoral rock is an important location for commercial inshore fishing activity, particularly for crab and lobster (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see Table 1 for details). UK vessels use pots and lines in the rMCZ but trawling intensity is low (MCZ Fisheries Model). However, the site is important for French, Belgian and Dutch fishing vessels which target scallop, cuttlefish, bass, pout (bib), ray, whiting, squid and mackerel. The total value of landings derived from commercial fisheries within this site is £0.046m/yr (MCZ Fisheries Model).	If the conservation objectives of the features are achieved, the features will be maintained in favourable condition. No additional management (above that in the baseline situation) of fishing activities is expected. However, maintaining and monitoring the current fishing practices will safeguard the population of commercial fish and ensure no increase in fishing activity occurs or alternative gears are used. No change in feature condition or harvesting of fish and shellfish is anticipated and therefore no impact on on-site or off-site benefits is expected. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities .	Anticipated direction of change: ⟺ Confidence: Moderate

Table 5b. Recreation		**rMCZ 21, Wight-Barfleur Extension**
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. Subtidal mixed sediment and subtidal coarse sediments support	If the conservation objectives of the features are achieved, the features will be maintained in favourable condition. No change in on-site feature condition or fishing mortality is anticipated and therefore no impact on on-site benefits is expected (see Table 4a).	Anticipated direction of change: ⟺ Confidence:

high biodiversity within the site and provide spawning and nursery grounds for many juvenile commercial fish species, and are therefore important habitats for fish and shellfish fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see Table 1 for details). The rMCZ is too far offshore for private angling boats, but is used for fishing by charter vessels from Yarmouth, Keyhaven and Lymington on their way over to fish in French waters and French charter vessels fishing in UK waters. The potential spawning ground for flatfishes and generally high biodiversity, due to the complex habitats within the site, are likely to help support potential on-site and off-site fisheries. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site which result from the potential spawning and nursery area.	As no additional management of angling is expected, fishers will be able to benefit from any on-site and off-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers. The designation may lead to an increase in angling visits to the site, which may benefit the local economy. This increase is likely to arise from a change in anglers' preferred angling locations rather than an increase in days spent angling or the number of anglers at a national scale. The adjacent popular angling spot, the Varne Bank may benefit from possible spill-over effects.	Moderate
Diving: Diving is not known to take place in the rMCZ.	N/A	N/A
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. Subtidal mixed and coarse sediment habitats (the two dominant habitats in the rMCZ) support internationally important fish and shellfish fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see Table 1 for details). Due to its offshore location, the rMCZ has not been identified as a popular area for wildlife watching. However, the site has particularly high biodiversity and abundant fish populations, which support a number of foraging sea birds and potentially marine mammals. The	If the conservation objectives of the features are achieved, the features will be maintained in favourable condition. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇔ Confidence: Moderate

site occurs within an area of the English Channel used by ferries, which often carry wildlife watchers, particularly those interested in marine mammals. Visitors in transit across the Channel may benefit from any increased biodiversity through more regular sightings of birds and marine mammals. It has not been possible to estimate the value derived from wildlife watching in the rMCZ.		
Other recreation: Other forms of recreation are not known to take place in the rMCZ.	N/A	N/A

Table 5c. Research and education	**rMCZ 21, Wight-Barfleur Extension**	
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. No known formal research activities are currently carried out in the rMCZ. However, ferries crossing the English Channel are often utilised by marine mammal observers whose data contribute to national databases. It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. No known education activity occurs in the rMCZ.	As the rMCZ is approximately 44km offshore and therefore relatively inaccessible, no benefits are likely to arise from direct use of the site for education. Non-visitors may benefit if the rMCZ contributes to external education programmes (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Low

Table 5d. Regulating services	**rMCZ 21, Wight-Barfleur Extension**	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: The features of the site contribute to the bioremediation of waste (subtidal sediments) water purification (subtidal sediments) and sequestration of carbon (subtidal sediments) (Fletcher	If the conservation objectives of the features are achieved, the features will be maintained in favourable condition.	Anticipated direction of change:

and others, 2011). ***Environmental resilience:*** The features (subtidal sediments) of the site contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** As the site is offshore, its features are not thought to contribute to the delivery of this service (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the pMCZ.	No change in feature condition and management of human activities is expected and therefore no benefit to the regulation of pollution is expected. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	⟺ Confidence: Moderate

Table 5e. Non-use and option values	**rMCZ 21, Wight-Barfleur Extension**	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the rMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the pMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 21 Reference Area 14 Wight-Barfleur **Site area (km^2): 24.58**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts			**rMCZ 21, Reference Area 14 Wight-Barfleur**	
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) Reference Area has been identified primarily for one broad-scale habitat (subtidal coarse sediment) and lies across the southern boundary of the Wight-Barfleur proposed Special Area of Conservation (pSAC) and the northern boundary of rMCZ 21 (Wight-Barfleur Extension). The rMCZ Reference Area includes the edge of the Wight-Barfleur reef, which has been surveyed recently in the preparation of the pSAC proposal. The wider rMCZ is thought to encompass nursery and spawning grounds for mackerel and sole and has a high benthic biotope distinctness and benthic species richness supporting foraging grounds for various bird species. It is particularly important for great cormorants and Sandwich terns, to which the rMCZ Reference Area may contribute. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A4.1 High energy circalittoral rock	-	-	Unfavourable condition	Recover to favourable condition
A5.1 Subtidal coarse sediment	16.6	-	Unfavourable condition	Recover to favourable condition
A5.4 Subtidal mixed sediments	-	-	Unfavourable condition	Recover to favourable condition
Habitats of Conservation Importance				
Subtidal sands and gravels	24.58	-	Unfavourable condition	Recover to favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone on human activities (over 2013 to 2032 inclusive)

Table 2a. Commercial fisheries	**rMCZ 21, Reference Area 14 Wight-Barfleur**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Closure of entire site to all gear types.	
Summary of all fisheries The rMCZ Reference Area is beyond the 12nm (nautical mile) limit and lies across the southern boundary of the Wight Barfleur pSAC and the northern boundary of rMCZ 21 Wight-Barfleur Extension. UK vessels deploy pots and undertake a small amount of trawling in the rMCZ Reference Area (MCZ Fisheries Model). The site is important for French, Belgian and Dutch fishing vessels. More detail on the approach used for the fisheries method is provided in Annexes H7 and N4. It is unknown how many UK vessels use this rMCZ. Estimated value of UK pot and trap landings from the rMCZ Reference Area: £0.007m/yr.	
Baseline description of UK commercial fisheries	**Costs of impact of rMCZ on UK commercial fisheries under Policy Option**

Table 2a. Commercial fisheries — **rMCZ 21, Reference Area 14 Wight-Barfleur**

	1
Pots and traps: One stakeholder (who works as part of the Selsey Fishermen's Association and targets lobster) indicated that the rMCZ Reference Area overlaps with their area of operation (FisherMap Data 2010). Estimated total value of landings from the rMCZ Reference Area: £0.007m/yr (MCZ Fisheries Model).	Estimated annual value of UK vessel landings affected: *£m/yr* — Scenario 2 Value of landings affected — 0.007
Total direct impact on UK commercial fisheries under Policy Option 1	
	The estimated annual value of UK landings and gross value added (GVA) affected: *£m/yr* — Scenario 1 / Best Estimate — Scenario 21 Value of landings affected — 0.002 — 0.007 GVA affected — 0.001 — 0.003
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries**
The French, Belgian and Dutch fleets are active in the site. Some French vessels use this rMCZ Reference Area intensively (Balanced Seas Final Recommendations Report, 2011; Viera, A. from CRPMEM., feedback response to 1st tranche of material, 13 January 2012): • Haute Normandie fleet: 13 trawlers, scallopers and pelagic trawlers target scallop, cuttlefish, bass, pout (bib), ray, whiting, squid and mackerel in the site. • Basse Normandie fleet: a large number of trawlers take a range of species from the site. More detailed estimates are not available for this site. This rMCZ Reference Area overlaps with rMCZ 21 Wight-Barfleur and is about 20% of the size. Estimated total value of landings from by French vessels) from the rMCZ Reference Area 14 is £0.21m/yr based on 20% of the values for rMCZ 21.	French, Belgian and Dutch vessels that fish in the site using all gear types would be affected by closure of this rMCZ Reference Area. A rough estimate of the value of French landings affected is £0.21m/yr. Estimates are not available for other countries.

Table 2b. National defence — **rMCZ 21, Reference Area 14 Wight-Barfleur**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Mitigation of impacts of Ministry of Defence (MOD) activities on features protected by the suite of rMCZs will be provided by additional planning considerations during operations and training. It is not known whether mitigation will be required for features protected by this site. MOD will also incur costs in revising environmental tools and charts to include MCZs.

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
MOD is known to make use of the site. The entire rMCZ Reference Area is covered by national defence – the air, water column and sea bed. The main impacts on the rMCZ Reference Area are listed as: air and water surface – noise and physical and visual disturbance; water column noise; and sea bed – fixed equipment.	It is not known whether this rMCZ Reference Area will impact on MOD's use of the site. Impacts of rMCZs on national defence are assessed in Annex H10 and N9 (they are not assessed for this site alone).

Table 2c. Recreational anchoring	**rMCZ 21, Reference Area 14 Wight-Barfleur**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of entire site to all recreational anchoring (except in emergency circumstances).	
Baseline description of activity	**Costs of impact of rMCZ on sector under Policy Option 1**
Twenty-five StakMap stakeholder interviews indicated that yachting interests overlap with the rMCZ Reference Area. However, in all cases the rMCZ Reference Area represents a small proportion of the overall area used for yachting and no interviewees indicated that they anchor there. Anchoring of diving and recreational sea angling vessels and charter boats within this rMCZ Reference Area was also not reported during any relevant Local Group discussions throughout the site recommendation process. However, a stakeholder indicated that charter boat operators from Langstone Harbour and Lymington say that they and French charter boats anchor when the tide and weather allow when they are fishing in this area (S. Wall-Palmer, Langstone Harbour charter boat operator, pers. comms., February, 2011).	The management for the rMCZ Reference Area is unlikely to impact on the recreational sailing sector but will impact on the recreational angling and charter boats that currently anchor in the site. The costs of the impact of the site on recreational sea angling and charter vessels are assessed in Table 2d below.

Table 2d. Recreation – recreational angling	**rMCZ, 21 Reference Area 14 Wight-Barfleur**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of the entire site to all recreational angling.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Most charter angling boats do not operate out this far offshore but a small number of Solent-based boats use the site. Six StakMap interviewees (one representative of a club that uses charter boats and five charter boat operators) indicated that there is a small overlap between the rMCZ Reference Area and their areas of operation. The site is used by at least two vessels from Langstone Harbour and some French charter vessels, which may anchor to fish in the site when tide and weather allow (S. Wall-Palmer, Langstone Harbour charter boat operator, pers. comms., December 2011). The area overlaps with some of the most popular wreck	Closure of the site to angling is expected to result in significant costs for a small number of Solent-based charter vessels. The vessels are unable to fish alternative grounds in the area because of the nature of the fishing marks and the depth of the water around the site (which is too shallow on one side and too deep on the other) (S. Wall-Palmer, Langstone Harbour charter boat operator, pers. comms., December 2011). It is anticipated that the charter boats based at Lymington and Keyhaven that occasionally use the site would not be likely to affected by its closure (A. Savage, Solent/IOW/Hants Lcoal Group charter boat representative, pers. comms., January 2012).

fishing sites in the locality, and accounts for 80% of wreck angling by Solent-based vessels (S. Wall-Palmer, Langstone Harbour charter boat operator, ,pers. comms., December 2011) . Vessels often stop in the site on the way to French waters on two-day trips, targeting conger eel and black bream (in February/March) with drift fishing (S. Wall- Palmer, Langstone Harbour charter boat operator, pers. comms., December 2011). Vessels based at Lymington and Keyhaven occasionally use this site (A. Savage, Solent/IOW/Hants Lcoal Group charter boat representative, pers. comms., January 2012). Two charter boat operators estimate that they make on average of 40 two-day trips per year to this site each, with revenue of £1,000 per trip (S. Wall-Palmer, Langstone Harbour charter boat operator ,pers. comms.,December 2011).	The costs are estimated in terms of loss of revenue for two charter boat businesses (only two operators provided data for the Impact Assessment). It is assumed that the operators lose all of their revenue from the trips that they make to the site and that they cannot respond to the closure by fishing at alternative sites (for the reasons given above). The total loss of revenue for the two operators is £0.080m/yr (based on an average of 40 two-day trips per year to the site each, with revenue of £1,000 per trip). This may represent 40% of the total annual turnover of these businesses (S. Wall-Palmer, Langstone Harbour charter boat operator, pers. comms., December 2011). Potential lost revenue for other UK-based vessels and for French charter vessels is not known. The values provided below are therefore likely to be under-estimates.

£m/yr	Scenario 1
Estimated value of charter boat revenue affected	0.080
GVA affected	0.038

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ 21, Reference Area Wight-Barfleur**
Recreation (except for the activities listed above in table 2)	
Shipping	

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath BS 21 Wight-Barfleur Extension rMCZ. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions in Annex H.

Table 4a. Fish and shellfish for human consumption	rMCZ 21, Reference Area 14 Wight-Barfleur	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. Subtidal coarse sediments are important nursery areas for many species and are potentially important spawning and nursery grounds for juvenile commercial species such as flatfish and bass (Fletcher and others, 2011). Circalittoral rock is an important location for commercial inshore fishing activity, particularly crab and lobster (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see rMCZ 21 Table 1 for details). This is an important fishing area for both UK and non-UK vessels. A description of on-site fishing activity in the rMCZ Reference Area, which involves a number of gear types, and the value derived from it, is set out in Table 2a. It has not been possible to estimate the value of the off-site benefits that derive from the spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. The costs of this are set out in Table 2a. Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption. Closure of the rMCZ Reference Area to fishing activity will reduce the on-site fishing mortality of species which could, given the relatively large size of this site, benefit stocks of mobile commercial finfish species. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation	rMCZ 21, Reference Area 14 Wight-Barfleur	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Subtidal coarse sediments support high biodiversity within the site and provide spawning and nursery grounds for many fish species, and are thus important habitats for recreational fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see rMCZ 21 Table 1	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation		rMCZ 21, Reference Area 14 Wight-Barfleur
for details). Charter boat angling is an important activity in this rMCZ Reference Area and a description of this activity is set out in Table 2d. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that result from the potential spawning and nursery area.	outside the rMCZ Reference Area. Such benefits may be insignificant.	
Diving: Diving is not known to take place in the site	N/A	N/A
Wildlife watching: Wildlife watching is not known to take place in the site.	N/A	N/A
Other recreation: No other recreational activities are known to take place in this site.	N/A	N/A

Table 4c. Research and education		rMCZ 21, Reference Area 14 Wight-Barfleur
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. No known research activity takes place in the site.	The rMCZ Reference Area will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. No known education activity takes place in the site.	As the rMCZ Reference Area is approximately 44km offshore and thus inaccessible, no benefits are likely to arise from direct use of the site for education. Non-visitors may benefit if the rMCZ Reference Area contributes to external education programmes (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Low

Table 4d. Regulating services	rMCZ 21, Reference Area 14 Wight-Barfleur
Baseline	**Beneficial impact under Policy Option 1**

Table 4d. Regulating services		rMCZ 21, Reference Area 14 Wight-Barfleur
Regulation of pollution: Subtidal sediments contribute to the bioremediation of waste, water purification and sequestration of carbon (Fletcher and others, 2011). ***Environmental resilience:*** Subtidal sediments contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** As the site is offshore, its features do not contribute to the delivery of this service. It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of subtidal sediments and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the recommended Marine Conservation Zone (rMCZ) Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities (as, if necessary, mitigation would be introduced, with the associated costs and benefits).	Anticipated direction of change:  Confidence: Low

Table 4e. Non-use and option values		rMCZ 21, Reference Area 14 Wight-Barfleur
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change:  Confidence: Moderate

rMCZ 22 Bembridge **Site area (km^2): 94.04**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts **rMCZ 22, Bembridge**

1a. Ecological description

The site lies adjacent to the east coast of the Isle of Wight and would protect a diverse range of species and habitats with several species reaching the eastern limit of their distribution within the English Channel, such as the peacock's tail, found on the ledges to the south of Bembridge Harbour; these populations are considered to seed other populations around the Isle of Wight. The lagoon sand shrimp and starlet sea anemone occur in Bembridge Harbour and adjacent areas above the mean high water mark. Two species of seahorse occur in the recommended Marine Conservation Zone (rMCZ) which provides suitable breeding habitat for both species. The only location of maerl beds in the Balanced Seas Project Area lies off Culver Spit. One of only two occurrences of the kaleidoscope jellyfish in the Project Area is in this site, as well as two regionally extremely scarce habitat features of conservation interest – mud habitats in deep water, and sea-pens and burrowing megafauna – which occur at the same spot in the north of the rMCZ. The northern part of the site has particularly high biodiversity in the form of benthic biotope richness and benthic species taxonomic distinctness. Extensive areas of limestone and chalk bedrock provide a complex system of crevices, tunnels and pools supporting a very diverse algae and invertebrate fauna. Most notably the site contains littoral chalk, exposed at low tide, and subtidal chalk in the north of the site along the area known as Tyne and Bembridge Ledges, which has the only record in the Balanced Seas Project Area of the rare sea snail *Paludinella littorina*.

A diverse array of demersal and pelagic fish and shellfish are supported by the high biodiversity (e.g. black sea bream, plaice, lobster and squid). Migratory fish use the area (e.g. Atlantic salmon, European eel and the rare twaite shad). In addition the area is important for a number of foraging birds and offshore waterfowl such as great crested grebe. The area is the best foraging area for Sandwich tern in the Balanced Seas project area. This site partially overlaps the South Wight Maritime Special Area of Conservation (SAC), Whitecliff Bay and Bembridge Ledges Site of Special Scientific Interest (SSSI), Brading Marshes to St Helen's Ledges SSSI and Solent and Isle of Wight Lagoons SAC.

Source: Balanced Seas Final Recommendations (2011).

1b. Baseline condition of MCZ features and impact of the MCZ

Feature	Area of feature (km2)	No. of occurrences	Baseline	Impact of the MCZ
REC Broad-scale Habitats				
A5.2 subtidal sand	12.35		Favourable condition	Maintain at favourable condition
A5.3 subtidal mud	1.36		Unfavourable condition	Recover to favourable condition
A5.4 subtidal mixed sediments	61.31		Favourable condition	Maintain at favourable condition
Habitats of Conservation Importance				
Common maerl		1 record	Unfavourable condition	Recover to favourable condition
Mud habitats in deep water		1 record	Unfavourable condition	Recover to favourable condition
Native oyster beds	-	-	Unfavourable condition	Recover to favourable condition (as
Rossworm (*Sabellaria spinulosa)* reef	625.33 m^2		Unfavourable condition	Recover to favourable condition
Seagrass beds	0.24		Unfavourable condition	Recover to favourable condition

Table 1. Conservation impacts				rMCZ 22, Bembridge
Seapens and burrowing megafauna		1 record	Unfavourable condition	Recover to favourable condition
Species of conservation importance				
Tentacled Lagoon Worm (*Alkmaria romijni*)		4 records	Favourable condition	Maintain at favourable condition
Lagoon Sand Shrimp (*Gammarus insensibilis*)†	-	-	Favourable condition	Maintain at favourable condition
Kaleidoscope Stalked Jellyfish (*Haliclystus auricula*)		1 record	Favourable condition	Maintain at favourable condition
Long-snouted seahorse (*Hippocampus guttulatus*)		1 record	Favourable condition	Maintain at favourable condition
Short-snouted seahorse (*Hippocampus hippocampus*)		4 records	Favourable condition	Maintain at favourable condition
Starlet Sea Anemone (*Nematostella vectensis*)	-	-	Favourable condition	Maintain at favourable condition
Native Oyster (*Ostrea edulis*)		11 records	Unfavourable condition	Recover to favourable condition
Peacock's Tail (*Padina pavonica*)		78 records	Favourable condition	Maintain at favourable condition
Sea Snail (*Paludinella littorina*)	-	-	Favourable condition	Maintain at favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone (rMCZ) on human activities (over 2013 to 2032 inclusive)

Table 2a. Aggregate Extraction **rMCZ 22, Bembridge**

Source of costs of the rMCZ under Policy Option 1

***Management Scenario 1*:** Increase in costs of assessing environmental impacts for future licence applications for existing production licences and current licence applications within 1km of an rMCZ. Also additional costs for provision of information that will be used for these assessments, which will be incurred for the entire suite of sites. This provides the best estimate of impact.

Management Scenario 2: Increase in costs of assessing environmental impacts for future licence applications, which is assessed for the entire suite of sites and is not attributed to specific sites.

Baseline description of activity	Costs of effect of MCZ on the sector under Policy Option 1
There is 1 licensed aggregate extraction production area (No. 122/3) within 1km of the rMCZ. It is anticipated that the Environmental Impact Assessment for renewal of this licence will be conducted in 2026 (based on information provided by The Crown Estate (pers. comm., 2012).	<table><tr><td>Average annual site-specific costs £m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Cost to the operator</td><td>0.001</td><td>Assessed for the suite of sites</td></tr></table> **Scenario 1 :** It is assumed that additional costs are incurred for future applications for renewal of existing production licences within 1km of this site. These costs arise from

	assessing the potential effects of aggregate extraction on the features protected by the rMCZ and are estimated to cost the operator an additional £27,000 per licence application (based on information provided by the British Marine Aggregate Producers Association (BMAPA) (pers. comm.., 2011). An additional cost will also be incurred in provision of information by BMAPA for these assessments. This cost will be incurred as a result of the entire suite of MCZs and is not included here. Further details of the costs are provided in Annex N1. **Scenario 2:** An assessment of the additional costs of Scenario 2 is provided for the entire suite of sites, which is summarised in the Evidence Base. Details are provided in Annex H2 and N1.

Table 2b. Archaeological heritage	**rMCZ 22, Bembridge**
***Source of costs of the recommended Marine Conservation Zone (rMCZ)* under Policy Option 1** Increase in the costs of assessing environmental impacts for future licence applications (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. However, restrictions could also be placed on anchoring in areas of vulnerable rMCZ features in the site, including seagrass and Ross worm *Sabellaria spinulosa* reef.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Several World War II defence aids/structures are recorded in the site, including pillboxes and anti-aircraft emplacements. Vessel wrecks of British, French, Swedish, Dutch, American, Irish and German origin are recorded within the site, as well as a World War II German Messerschmitt aircraft wreck. Several other unidentified obstructions have been reported by fishers. Artefacts of Palaeolithic, Romano-Celtic and Neolithic age have been found within the site. Crop marks and cup and ring marks are also recorded. There is one designated monument within the site, that of St Helens Fort (English Heritage,2012). English Heritage has indicated that this site is likely to be of interest for archaeological excavation in the future as it is relevant to its National Heritage Protection Plan (theme 3A1.2).	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known, so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost for one licence application could be in the region of £500–£10,000, depending on the size of the rMCZ (English Heritage, pers. comm., 2012). No further impacts on activities related to archaeology are anticipated. If archaeologists respond to restrictions on anchoring over areas of seagrass or Ross worm *Sabellaria spinulosa* reef by undertaking alternative archaeological excavations 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 Impact Assessment. If archaeological excavations do not take place as a result of these restrictions, this will prevent interpretation of archaeological evidence from the site, thereby decreasing the acquisition of historical knowledge of past human communities from the site, resulting in a cost to society.

Table 2c. Commercial fisheries	**rMCZ 22, Bembridge**

Table 2c. Commercial fisheries	rMCZ 22, Bembridge

Source of costs of the Recommended Marine Conservation Zone (rMCZ) **under Policy Option 1**

The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of commercial fishing gears will be required for certain features protected by this rMCZ. Therefore, two management scenarios have been employed in the Impact Assessment (IA) for these fisheries to reflect this uncertainty. Should the site be designated, the management that will be required will fall somewhere within this range.

Management scenario 1: Closure of the entire rMCZ to bottom trawls and dredges to protect areas of Ross worm *Sabellaria spinulosa* reef and seagrass beds (Statutory Nature Conservation Bodies (SNCB) informed scenario).

Management scenario 2: Closure of the entire rMCZ to bottom trawls, dredges, lines, nets, pots and traps to protect all features of concern (SNCB informed scenario).

Summary of all fisheries: This site is wholly within the 6 nautical mile (nm) limit and is fished only by UK vessels. Vessels that fish in the site are based in Bembridge, Ventnor , Portsmouth, Lymington and Selsey, and several beach-based static gear boats are based at Steephill Cove and Bonchurch (IA questionnaire response from Isle of Wight vessel owners, August 2011). The most important fishery is potting, with crab/lobster and prawn fisheries both important to the local economy. Some of the shellfish is used nationally and some is exported to France and Spain. Other fisheries that take place in the rMCZ include set nets, longlines, traps, trawls and towed dredges. Much of the ground is unsuitable for towed gears. The Southern Inshore Fisheries and Conservation Authority (IFCA) estimates that a maximum of 4 under 15 metre vessels operate in the site at any one time (Southern IFCA, feedback response to first tranche of IA material, 16 January 2012). Certain commercial fishing restrictions are already in existence (listed in Annex E1). An IFCA byelaw prohibits fishing by vessels over 12 metres within 6nm over an area that covers the site (Southern IFCA, feedback response to first tranche of IA material, 16 January 2012). The Southern IFCA is currently developing a Seagrass Management Strategy which will include a voluntary code of conduct that closes areas of sea grass to bottom trawls and dredges around the Isle of Wight (from mean high water out to a distance that is currently being determined) (Jury, J., Southern IFCA email, 24 April 2012; The SIFCA and the Seagrass Working Group (SWG). 2012). This will deliver part of the management that would be required under Scenarios 1 and 2. More detail on the approach used for the fisheries method is provided in Annexes H7 and N4.

Estimated annual value of landings from the rMCZ: £0.264 million per year (m/yr) (this is likely to be an overestimate due to the future implementation of the Southern IFCA Seagrass Management Strategy to protect areas of seagrass through a voluntary code of conduct (Jury, J., Southern IFCA email, 24 April 2012)).

Baseline description of UK commercial fisheries	Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1
Bottom trawls: Southern IFCA estimates that a maximum of 4 under 15 metre vessels operate in this area and that these do so infrequently (Southern IFCA, pers. comm., 2012). Estimated total value of landings from the rMCZ: £0.017m/yr (MCZ Fisheries Model). This is likely to be an overestimate due to the resolution of the MCZ Fisheries Model.	The estimated annual value of UK bottom-trawl landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.017 | 0.017 The above values are likely to be overestimates due to the resolution of the MCZ Fisheries Model and the implementation of the Southern IFCA Seagrass Management Strategy to protect areas of seagrass through a voluntary code of conduct, which will significantly reduce the activity of bottom trawls in this rMCZ (Jury, J., Southern IFCA email, 24 April 2012).
Dredges: Southern IFCA estimates that 4 under 15 metre vessels operate at any one time, for a few weeks at the start of the oyster season	The estimated annual value of UK dredge landings affected is expected to fall within the following range of scenarios:

<table>
<tr><th colspan="2">Table 2c. Commercial fisheries</th><th>rMCZ 22, Bembridge</th></tr>
<tr><td colspan="2">(November), due to the decline in oysters ((Jury, J., Southern IFCA email, 24 April 2012)).

Estimated total value of landings from the rMCZ: £0.021m/yr (MCZ Fisheries Model).

This is likely to be an overestimate due to the resolution of the MCZ Fisheries Model..</td><td><table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.021</td><td>0.021</td></tr></table>The above values are likely to be overestimates as the implementation of the Southern IFCA Seagrass Management Strategy to protect areas of seagrass through a voluntary code of conduct will significantly reduce the activity of dredges in this rMCZ (Jury, J., Southern IFCA emai., 24 April 2012).</td></tr>
<tr><td colspan="2">Pots and traps: Estimated total value of landings from the rMCZ: £0.159m/yr (MCZ Fisheries Model).

Stakeholders indicated that Sandown Bay is a vital potting area for 6 Ventnor-based vessels. Several more beach-based vessels (based at Steephill Cove and Bonchurch) deploy pots in the site during the winter and during south-westerly gales (IA questionnaire response froman Isle of Wight vessel owner, August 2011)).</td><td>The estimated annual value of UK pot and trap landings affected is expected to fall within the following range of scenarios:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.159</td></tr></table></td></tr>
<tr><td colspan="2">Hooks and lines: Number of vessels is unknown.Estimated total value of landings from the rMCZ: £0.006m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK hook and line landings affected is expected to fall within the following range of scenarios:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.006</td></tr></table>In establishing the draft conservation objectives, the site’s features may have been assessed as having low vulnerability to fishing with nets at current levels and, where this is the case, this activity was not the primary reason for assigning the ‘recover’ conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td colspan="2">Nets: Number of vessels is unknown.
Estimated total value of landings from the rMCZ: £0.058m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK net landings affected is expected to fall within the following range of scenarios:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.058</td></tr></table></td></tr>
<tr><td colspan="3">Total direct impact under Policy Option 1</td></tr>
<tr><td colspan="2"></td><td>The estimated annual value of UK landings and gross value added (GVA) affected is expected to fall within the following range of scenarios:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td><td>Best estimate</td></tr><tr><td>Value of landings affected</td><td>0.009</td><td>0.261</td><td>0.037</td></tr></table></td></tr>
</table>

Table 2c. Commercial fisheries	rMCZ 22, Bembridge
	GVA affected 0.004 0.123 0.017 The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas. These values are likely to be overestimates due to the future implementation of the Southern IFCA Seagrass Managment Strategy to protect areas of sea grass through a voluntary code of conduct which will close areas of sea grass to bottom trawls and dredges around the Isle of Wight. (Jury, J., Southern IFCA email, 24 April 2012). The four fisheries representatives from the Isle of Wight who were interviewed for the IA indicated that closure of the rMCZ to potting would significantly affect vessels based in Ventnor, Bembridge, Steephill Cove and Bonchurch for which the site is an important ground. In Bembridge, at least 6 full-time and 6 part-time fishers would be affected by Scenario 2, and of these at least 5 full-time potters/netters would lose their entire income. The four Isle of Wight vessel owners who were interviewed considered that it would not be feasible for any of the affected fishers to respond by fishing alternative grounds because: (i) all other fishing grounds have existing users and any increased effort within them could lead to conflict; and (ii) all available species are already fished using appropriate gears (see Annex J3afor more detail). They suggested that affected vessels would experience a significant loss of revenue which could force them to leave the fleet. This could impact on employment of the crews of 10 boats, 12 staff at Ventnor Haven Fishery and 7 wholesalers, and have an important social impact on local fishing communities through loss of revenue from national sales and exports to France and Spain. The closure would also impact indirectly on local fish markets, restaurants, fish retailers and activities linked to the fishing sector such as repairs, fuel services and gear suppliers (IA questionnaire response from Blake, G., Kennet, J. and Wareham, M., Isle of Wight vessel owners, 26 & 27 August 2011).
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries**
	None.

Table 2c. National defence	rMCZ 22, Bembridge
Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1** Mitigation of impacts of Ministry of Defence (MOD) activities on features protected by the suite of rMCZs will be provided by additional planning considerations during operations and training. It is not known whether mitigation will be required for features protected by this site. MOD will also incur costs in revising environmental tools and charts to include rMCZs.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
MOD is known to make use of the site for non-explosives mine-	It is not known whether this rMCZ will impact on MOD's use of the site. Impacts of rMCZs on

countermeasures training.	national defence are assessed in Annex H10 and N9 (they are not assessed for this site alone).

Table 2d. Ports, harbours, shipping and disposal sites **rMCZ 22, Bembridge**

Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1**

Management scenario 1: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for navigational dredging that takes place within 1km of the rMCZ. It is anticipated that additional mitigation of impacts on features protected by the rMCZ will be needed for commercial anchoring relative to the mitigation provided in the baseline.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for navigational dredging and all port and harbour developments within 5 km of the rMCZ. Also, additional costs to update the existing Maintenance Dredging Protocol (MDP) for Southampton Water and for including MCZ features in a potential new MDP for Bembridge. It is anticipated that additional mitigation of impacts on features protected by the rMCZ will be needed for commercial anchoring.

Baseline description of activity

Navigational dredge areas: There is licensed navigational dredging of the main shipping channel within 1km of this rMCZ. There is also dredging on a smaller scale associated with the port of Bembridge. It is assumed that each dredge area's marine licence is renewed once every 3 years, and that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal. As these navigational dredge areas are covered by an existing and a potential new MDP, it is assumed that the assessment of environmental impact is not changed over the 20 year period of the IA.

There is licensed navigational dredging of the main shipping channel within 5km of this rMCZ. There is also dredging on a smaller scale associated with the port of Bembridge. It is assumed that each dredge area's marine licence is renewed once every 3 years, and that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal.

Port development: There are two ports within 5km of the rMCZ that may undergo development in the future: Bembridge and Ventnor (Ports & Harbours UK, 2012). This may not represent a full list of all ports and harbours impacted by the site. No port developments are known to be

Costs of impact of rMCZ on the sector under Policy Option 1

£m/yr	Scenario 1	Scenario 2
Total	0.002	0.003*

* This estimate for additional cost in future licence applications for port developments arising as a result of this rMCZ is not used to estimate the total costs for the IA. It is based on different assumptions to those used to estimate costs at a regional level and for the entire suite of sites. Also, this figure assumes that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal (every 3 years). It does not include the cost of incorporating MCZ features in an existing or new MDP. It is likely to over-estimate the cost of Scenario 2 for rMCZs with ports within 5km that have MDPs because of the savings in future costs provided by an MDP. See Annex H for further information.

Scenario 1: Future licence applications for navigational dredging within 1km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11).

Scenario 2: Future licence applications for navigational dredging port or harbour development plans or proposals and commercial shipping anchoring within 5km of this rMCZ will need to

planned within the 20 year period of the Impact Assessment (IA).

Commercial shipping anchorage: The St Helen's Roads anchorage covers a large part of the northern section of the rMCZ. The western part of the anchorage fully overlaps the area of sub-tidal mud. The north-west part of the anchorage lies immediately adjacent to the data points for seapens and burrowing megafauna and for mud habitats in deep water.

The anchorage has been in use for over 50 years and has developed because its sheltered location ensures the relative safety of commercial vessels bound for Southampton and Portsmouth. It is heavily used on a daily basis and is particularly used as a safe anchorage during heavy south-westerly winds by vessels entering/exiting Portsmouth and Southampton and vessels in transit from/to other UK ports or simply passing through (Hare, N. letter., 28 February 2012; Portsmouth Queen's Harbour Master (QHM), pers. Comm., November 2011).

Vessels up to 7 metres in draught and 149.99 metres in length may anchor at St Helen's Roads anchorage (larger vessels must anchor at the Nab anchorage to the south-east). Up to 11 vessels anchor each day, with an average of 4 vessels. Vessels usually anchor for several days, but some anchor for only 1–2 hours and others for up to 10 days. On average there are 3.5 days a year when no ships are at anchor in the anchorage. Vessels using the area include barges, liquefied petroleum gas vessels, tankers, chemical tankers, general cargo vessels, roll-on roll-off vessels, dredgers and small container feeder carriers (Hare, N. letter, 28 February 2012; Portsmouth Queen's Harbour Master (QHM), pers. Comm., November 2011).

consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11).

Additional costs will be incurred to the existing Maintenance Dredging Protocol (MDP) for Southampton Water and to include MCZ features in a new potential MDP for Bembridge to consider the potential effects of activities on the features protected by the rMCZ. The anticipated additional cost in the MDPs is estimated to be a one-off cost of £8438.

Mitigation of impacts for commercial shipping anchoring for Scenarios 1 and 2: Portsmouth QHM considers that there is no alternative anchorage within or near the Solent that could cater for the current operational requirements (Portsmouth QHM, email, November 2011) and so relocation of the anchorage is not considered feasible. Reasons include the large area covered by the anchorage, its intensity of use, commercial and safety considerations and its use by international as well as UK vessels. Portsmouth QHM and Associated British Ports (ABP) have indicated that the anchorage could not be partially or completely closed for commercial and safety reasons.

For the reasons given above the IA assumes that use of the anchorage would continue and the impacts on the MCZ features would not be mitigated. The cost is assessed in the impact assessment (IA) in terms of the hypothetical cost to operators providing environmental benefit that is equivalent to the impact that anchoring in the site would have on the MCZ's features. In the event that an activity impacts on achieving the conservation objectives of an MCZ's features, this would be required under Section 126(7) of the Marine and Coastal Access Act 2009. The cost is hypothetical because it would be infeasible for the the large number of operators that use the anchorage to undertake to provide equivalent environmental benefit.

Alternative m management options suggested by the Regional Stakeholder Group (RSG) (RSG 11 meeting) and Natural England (R. Waldock, pers. comm., December 2011) are presented below. Impacts of these are not assessed in the IA because both the QHM and ABP consider that no feasible mitigation can be provided:

- limiting the number of vessels using the anchorage at any one time (this would require improved berth availability to limit the need for lay-up awaiting berthing space);
- limiting the size of vessels using the anchorage;
- provision of a permanent anchorage system within the site (this would be dependent on vessel size).

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 22, Bembridge
	ABP, in their IA feedback form (Jan 2012) however noted that they could "agree to some level of management in conjunction with the Queen's Harbour Master should the restricted anchorage area be much reduced (i.e. to just the specific points of the most sensitive features). Such management could include remote monitoring via radar and charting the restricted points,"

Table 2e. Recreational anchoring	rMCZ 22, Bembridge
Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1** Creation of no-anchoring zones for recreational vessels (except in emergency circumstances) over areas of maerl bed, Ross worm *Sabellaria spinulosa* reef. Creation of no-anchoring zones over areas of seagrass bed and installation of permanent eco-moorings In appropriate locations (assuming that the mooring structures provide the necessary mitigation of impacts on the feature).	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Overview: The greatest concentration of boating activity, and thus anchoring of recreational vessels, in the rMCZ is around Bembridge and Seaview. Six sailing clubs lay a range of fixed marks, seasonally, and inflatable laid marks within the rMCZ. The marks are used frequently, especially during regattas and training events. In addition, an estimated 198 private sea-angling boats operate from Bembridge Harbour through to Ventnor and these may anchor anywhere while fishing in the site (or while waiting for tidal change in order to enter Bembridge Harbour). The baseline and impacts are presented below for each feature as the features cover geographically separate areas in the rMCZ.	
Maerl bed: The maerl bed occurs on Culver Spit, south-east of Culver. StakMap results indicate a very low level of anchoring here, with only 1 sailing club stating that it uses this location. Three sea-angling clubs and 7 charter boats use this site as part of a wider area for angling, and so anchoring of vessels may occur but is not likely to be at a high intensity.	***Maerl bed:*** impacts of anchoring on the maerl bed off Culver Spit would be mitigated through creation of a no-anchoring zone (except in emergency circumstances). Use of the area for anchoring is limited and the no-anchoring zone is not expected to significantly impact on recreational vessel users. It is anticipated that vessel users will respond by anchoring in alternative suitable areas in the vicinity.
Ross worm **Sabellaria spinulosa** ***reef:*** The known areas of *Sabellaria spinulosa* reef, which are small, occur east of Culver Spit and within the offshore area of Sandown Bay. StakMap results indicate that very little anchoring by recreational water-sports vessels overlaps this feature. Only 1 club stated that its members use the areas for anchoring as part of a wider area. The intensity of anchoring by vessels used for recreational sea angling is expected to be higher. Between 5 and 8 clubs and approximately 15 charter boats fish in the general area regularly and also anchor there (StakMap). Most vessels that fish in the area use the Natural England recommended rope risers that have less environmental impact than some	***Ross worm (*****Sabellaria spinulosa*****) reef:*** Since the known areas of *Sabellaria spinulosa* reef appear to be small, the creation of no-anchoring zones over these is not expected to significantly impact on vessels that anchor in the area, despite the high intensity of angling activity described in the baseline. Local recreation representatives have requested that the full extent of *Sabellaria spinulosa* reef is determined through a survey (Balanced Seas Solent/IOW/Hants Sites Meeting Report, July 2011). Costs of the surveys are included as part of the costs for surveying the features in the site.

Table 2e. Recreational anchoring	rMCZ 22, Bembridge
anchors (Tony Williams, BS IA 1st Tranche Feedback, January 2012).	If the feature is found to be more widespread than currently indicated, creation of no-anchoring zones over the areas of reef could potentially impact on the recreational sea-angling sector considerably through loss of fishing grounds and possibly decrease revenues for local businesses on the Isle of Wight and in Hampshire. Mitigation of anchoring by sea-angling boats is more difficult than that by recreational sailing boats, as they do not anchor in concentrated numbers and the areas where they anchor are dependent on fishing marks.
Seagrass beds: StakMap results indicate that some anchoring by non-motorised vessels occurs over the seagrass beds, with approximately 8 clubs stating that they use the area north of Bembridge Harbour; only 1 club says it uses the area south of the harbour. Racing marks are laid out seasonally in the vicinity of seagrass beds but not overlapping them. Recreational angling from private boats and some charter boat activity takes place in the area south of the harbour along Bembridge Ledges. Twelve charter boats and clubs indicated that they regularly use this part of the site (which overlaps the seagrass beds) for fishing and therefore anchor there (StakMap). The following areas within the rMCZ are important for permanent moorings and anchoring. All of them overlap areas of seagrass beds according to project data (Samuelson, M. Boating Leisure Activities in BAI 22 v2.pdf, February, 2011): • Seaview: **this is an** extensive area of over 150 recreational boat moorings off Seaview Yacht Club and southwards into Seagrove Bay between Nettlestone Point and Horestone Point, as well as about15 moorings used by sea-angling boats. • Priory Bay: extensive anchoring within and up to 1,500 metres seaward of Priory Bay during the summer (peaks July to September). In 2011, a total of 567 vessels anchored in the 'southern anchorage' of the bay, which overlaps the area of seagrass bed, with a maximum of 10 vessels (both non-motorised and motorised) anchoring at any one time during the peak summer months (Mike Samuelson, RYA, email, 13th November 2011). The numbers of vessels that anchor here are much higher than for other areas of Priory Bay where there is no seagrass. • St Helen's Tide Gauge and outer entrance to Bembridge Harbour: this is heavily used for anchoring during the summer while vessels wait for	***Seagrass beds:*** It is anticipated that creation of no-anchoring zones would need to be accompanied by replacement of existing moorings with eco-moorings and installation of further permanent eco-moorings mooring structures (if this provided the necessary mitigation of impacts on the feature), given the large number of vessels that anchor over seagrass in this area of the rMCZ.. Although displacement of anchoring into the northern half of Priory Bay, where there is no seagrass, is possible at all times of the year, on weekends of peak use this could lead to overcrowding which could possibly make the area unsafe (M. Samuelson, email, 13th January 2012). Using the approach developed and costs calculated for the installation of eco-mooring in Studland Bay (Marina Projects, 2011), costs have been calculated for the replacement of all the moorings listed in the baseline and for providing additional moorings to accommodate the extra anchoring described. It is estimated that installation of 300 eco-moorings would be sufficient. Capital costs for 300 eco-moorings is estimated to total £1.134m (see Annex N12 for the assumptions used in the calculations), a one-off cost assumed to occur in the first year after designation (2013). This may overestimate the costs because it allows for the removal of existing moorings and there are none in Priory Bay. Operating costs, including maintenance of the eco-moorings and collection of mooring fees, are estimated to total £0.141m/yr (see Annex N12 for the assumptions used in the calculations). It is assumed that a fee for using the eco-mooring would be required to cover continued maintenance costs. For 10 eco-moorings, the total cost to visiting boats of such fees would be £0.271m/yr. The total cost of eco-moorings is taken to be the sum of the mooring fees and capital costs, plus any operating costs not covered by the mooring fees. The present value of the costs is £4.947m.

Table 2e. Recreational anchoring	rMCZ 22, Bembridge
the tide to be right for entry to Bembridge. • Silver Beach (beach to the south side of the entrance to Bembridge Harbour): a small number of moorings have been laid off Silver Beach/Ducie by owners of the beachfront properties. • Bembridge (Under Tyne): there are over 50 moorings in use throughout the sailing season; ground chains and risers remain throughout the year. There is regular anchoring by visiting craft seaward of the moorings during the sailing season. Speed-limit buoys are laid 1,000 metres out during the summer season. Some 60 sea-angling boats are also moored in Bembridge Harbour, when the boats are not being used for fishing. • Bembridge Lifeboat Station: the Royal National Lifeboat Institution moorings and breasting buoys are just north of the offshore lifeboat station. Six sea-angling boats are moored here as well, when not in use for fishing. Most vessels used for recreational angling in this area use the Natural England recommended rope risers, which have less environmental impact than alternative anchors (Tony Williams, BS IA 1st Tranche Feedback, January 2012).	The use of the Studland Bay study seems appropriate as this took into consideration the whole of the Solent area, including the Isle of Wight, and and vessel sizes and visitor activity are expected to be very similar in both locations. However, RYA has expressed concerns over the suitability of eco-moorings due to stronger tides and possibly more difficult seabed conditions in the Solent compared with those found in Studland Bay. RYA suggests that use of the more traditional and probably more costly EzyRider system might need to be considered if helical moorings are not considered adequate. If this system is required, the costs have been underestimated in the IA (RYA BS IA 3rd Tranche Feedback, March, 2012). Creation of no-anchoring zones would impact on recreational sea-anglers who anchor in the mud by fishing marks and do not use fixed moorings whilst fishing. Information on the likely impacts on anglers was not available.

Table 2f. Renewable energy – tidal energy	rMCZ 22, Bembridge
Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1** ***Management scenario 1:*** Increase in the costs of assessing environmental impacts for licence applications (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). ***Management scenario 2:*** Increase in the costs of assessing environmental impacts for licence applications and provision of additional mitigation of the impacts of cable protection (relative to the mitigation provided in the baseline).	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
There is potential for future developments that generate electricity using the tidal energy resource in this rMCZ. The rMCZ overlaps the East of Isle of Wight Area of Potential, which has anticipated energy generation potential of 100 megawatts (Department of Energy and Climate Change, pers. comm., 2011). It is assumed for the purpose of the Impact Assessment (IA) that there would be one licence	The estimated cost to tidal energy developers of the rMCZ is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Cost | 0.001 | 0.001 For Scenario 1, one licence application for tidal energy installations could be required to consider the potential effects of construction and operational activities on the features protected by the rMCZ and the potential to achieve the rMCZ conservation objectives. This is

Table 2f. Renewable energy – tidal energy	rMCZ 22, Bembridge
application within the timeframe of the IA. However, it is unlikely, though still possible, that deployment of tidal energy technology will take place in the rMCZ during the 20 year period covered by the IA.	expected to result in one-off costs of £0.012m in 2015 (based on, per broad-scale habitat assessed, 6 days of a consultant's time at £700 per day plus 1 day for legal review at £800 per day) with a present value cost of £0.009m. For Scenario 2, the costs would be the same as for Scenario 1 plus the additional costs of mitigating impacts of cable protection. As the proposed cable routes are unknown, it is unclear whether routes for any inter-array or export cables will be sought that pass through the rMCZ and, if they are, what length of cable may be required. If alternative cable protection is required to mitigate impacts, this is estimated to cost £1.000m/km more than the cable protection that would have been used in the absence of the MCZ. However, both Natural and JNCC have said that this additional requirement is unlikely to be needed and so this additional cost is anticipated to be unlikely (Natural England and JNCC, pers. comm., 2012).

Table 2g: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 22 Bembridge
Oil and gas related activities (including carbon capture and storage) This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the Recommended Marine Conservation Zone (rMCZ) (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the Recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 22 Bembridge
Cables (interconnectors and telecom) Commercial fisheries (collection by hand and mid-water trawls) Flood and coastal erosion risk management (coastal defence) Recreation (except for the activities listed above in table 2) Research and education Shipping (except anchoring at St Helen's Road Anchorage) Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[13] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.								rMCZ 22, Bembridge	
ENG Feature	**Represen t-ativity**	**Replicati on**	**Adequac y**	**Viability**	**Gaps or shortfalls in relation to ENG minimum guidelines**	**Recommended conservation objective**	**Quantitative considerations at regional MCZ level**	**Ecological Importance at regional MCZ level**	**Ecological Importance at wider scale**
A5.2 Subtidal sand	BSH	✓	✓	✓	None	Maintain			
A5.3 Subtidal mud	BSH	✓	✓	✓	None	Recover			
A5.4 Subtidal mixed sediments	BSH	✓	✓	✓	None	Maintain			
Maerl beds	FOCI Habitat	✓ * [1]	✓	✓	None	Recover	This is the only example of this feature in the region	This feature is not protected within existing MPAs	BAP habitat
Mud habitats in deep water	FOCI Habitat	X	X	✓	Replication target not met	Recover	One of two sites proposed for this feature	This feature is not protected within existing MPAs	BAP habitat

[13] copied from the JNCC and Natural England's advice to Defra on rMCZs

Native oyster *Ostrea edulis* beds	FOCI Habitat	✓	✓	✓	None	Recover		This feature is not protected within existing MPAs	OSPAR habitat
Ross worm *Sabellaria spinulosa* reef	FOCI Habitat	✓	✓	✓	None	Recover			BAP and OSPAR habitat
Seagrass beds	FOCI Habitat	✓	✓	✓	None	Recover			BAP and OSPAR habitat
Sea-pens and burrowing megafauna	FOCI Habitat	✓	✓	✓	None	Recover	This FOCI is currently only reaching the minimum replication target (one existing MPA).		OSPAR habitat
Tentacled lagoon worm *Alkmaria romijni*	FOCI Species	✓	✓	✓	None	Maintain			Listed on Schedule 5 of the Wildlife and Countryside Act
Lagoon sand shrimp *Gammarus insensibilis*	FOCI Species	✓	✓	✓	None	Maintain			BAP species and listed on Schedule 5 of the Wildlife and Countryside Act
Stalked jellyfish *Haliclystus auricula*	FOCI Species	✓ * [3]	✓	✓	None	Maintain	One of two sites proposed for this feature	This feature is not protected within existing MPAs	BAP species – marked decline in the UK
Long-snouted seahorse *Hippocampus guttulatus*	FOCI Species	X * [4]	X	✓	Replication target not met	Maintain	One of two sites proposed for this feature	This feature is not protected within existing MPAs	OSPAR species, BAP species (internationally threatened) and listed on Schedule 5 of the Wildlife and

									Countryside Act.
Short-snouted seahorse *Hippocampus hippocampus*	FOCI Species	✓	✓	✓	None	Maintain		This feature is not protected within existing MPAs	OSPAR species, BAP species (internationally threatened) and listed on Schedule 5 of the Wildlife and Countryside Act.
Starlet sea anemone *Nematostella vectensis*	FOCI Species	✓	✓	✓	None	Maintain			BAP species and listed on Schedule 5 of the Wildlife and Countryside Act
Native oyster *Ostrea edulis*	FOCI Species	✓	✓	✓	None	Recover		This feature is not protected within existing MPAs	BAP and OSPAR species
Peacock's tail *Padina pavonica*	FOCI Species	X	X	✓	Replication target has not been met.	Maintain	One of three populations proposed for designation in region One of two sites proposed for this feature	Most important and extensive population in region; thought to seed other populations around the Isle of Wight. This feature is not protected within existing MPAs	BAP species
Sea snail *Paludinella littorina*	FOCI Species	✓ * [1]	✓	✓	None	Maintain	This is the only example of this feature in the region	This feature is not protected within existing MPAs	Listed on Schedule 5 of the Wildlife and Countryside Act
Site considerations									
Connectivity				✓					

Geological/Geomorphological features of interest	None
Appropriate boundary	✓
Areas of Additional Ecological Importance	✓
Overlaps with existing MPAs	✓

rRA 15 Tyne Ledges (Balanced Seas) (Natural England lead) within rMCZ 22. An overview of features proposed for designation within recommended reference area Tyne Ledges and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale
✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Where an asterisk (*) has been given in the table, more detail is provided in the narrative.

ENG Feature	Representativity	Viability	Recommended conservation objective
Seagrass beds	FOCI Habitat	✓	Recover to reference condition
Peacock's tail *Padina pavonica*	FOCI Species	✓	Recover to reference condition
A5.2 Subtidal sand	BSH	X	Recover to reference condition
Native oyster *Ostrea edulis*	FOCI Species	X	Recover to reference condition
Site considerations			
Appropriate boundary	✓		

rRA 21 Culver Spit (Balanced Seas) (Natural England lead) within rMCZ 22. An overview of features proposed for designation within recommended reference area Culver Spit and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale
✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Where an asterisk (*) has been given in the table, more detail is provided in the narrative.

ENG Feature	Representativity	Viability	Recommended conservation objective
Maerl beds	FOCI Habitat	✓	Recover to reference condition
A5.4 Subtidal mixed sediments	BSH	X	Recover to reference condition
Short-snouted seahorse *Hippocampus hippocampus*	FOCI Habitat	X	Recover to reference condition
Site considerations			
Appropriate boundary	✓		

Additional comments and site benefits:

- Highly biodiverse area for benthic, demersal and pelagic invertebrate and vertebrate species, and includes a black bream nesting area, and migratory fish species such as Atlantic salmon, European eel and Twaite Shad. It is an important breeding and foraging area for a number of nationally and internationally important bird species such as Black-headed gulls and Sandwich terns (Jackson, Langmead, et al. 2009, Balanced Seas 2011a).

- There is scientific value in this site because it is well studied with good data (Collins, Herbert and Mallinson 1990, Defra n.d., Hampshire and Isle of Wight Wildlife Trust 2011, Natural England 2011b).
- [1]These features (maerl beds and *Paludinella littorina* (Sea snail)) are below the replication target of three, however these are the only example of the features in the region, so the replication target is considered met.
- [2]The FOCI species *Haliclystus auricula* (Stalked jellyfish) is below the replication target; however the maximum achievable number of replicateshas been proposed for designation as it has a limited distribution in the region, so this is considered to meet the replication criteria.
- [3] The feature (Long-snouted seahorse *Hippocampus guttulatus)* is below the replication target, however the regional project decided to propose sites where records exist, only where there is suitable habitat within the site (this has led to 7 other records of this species not being proposed within the region as they are low confidence records). Natural England advises that seahorses, which are notoriously difficult to spot, can be found in a variety of unpredictable habitats, and where a sighting is confirmed within a site, inclusion could be considered

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and on definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption		**rMCZ 22, Bembridge**
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Seagrass beds, which occur within the rMCZ, generally provide important nursery areas for flatfishes (JNCC, 2011) and shellfish (Natural England website, seagrass beds article) and so are likely to help to support on-site and off-site fisheries (Fletcher and others, 2011). The rMCZ is also possibly a spawning area for commercial fish stocks, including Dover sole and mackerel. It is abundant in other fish species such as cod, herring and bass, and shellfish, including lobster, crab and prawns (Environmental Resources Management Ltd, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (including seagrass) recovered to favourable condition. New management of fishing activities is expected (above the baseline situation), the costs of which are set out in Table 2c, which may reduce the impacts on fish and shellfish habitats and harvesting of stocks. As most of the commercial species targeted by fishers in this rMCZ are shellfish, it is unclear whether the scale of habitat recovered and the magnitude of reduced (on-site) harvesting will be enough to have any significant positive impact on commercial stocks. However, maintaining and monitoring the current level of potting practices and restricting other fishing practices over certain features will safeguard the healthy population of shellfish	Anticipated direction of change: ⇧ Confidence: Low

unfavourable condition (see Table 1 for details). There is currently a relatively high on-site value derived from fish and shellfish services, principally through potting activity and to a lesser extent trawling, scalloping and netting. Commercial potters from Bembridge and Ventnor on the Isle of Wight and some from the mainland use the rMCZ. A description of on-site fishing activity and the value derived from it is set out in Table 2c. It has not been possible to estimate the value of the off-site benefits that derive from the seagrass nursery area.	and by ensuring no increase in fishing activity occurs or alternative gears used, it is expected that the shellfish and other fish species population may increase over time. The recovery of the seagrass beds to favourable condition may improve their functioning as a nursery area, potentially benefiting fisheries exploited within and outside the rMCZ. Potential benefits may arise on-site, for fishers permitted to fish within the rMCZ, and off-site from spill-over benefits.	

Table 5b. Recreation		**rMCZ 22, Bembridge**
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. The seagrass beds provide important nursery areas for flatfishes (JNCC, 2011) and as such are likely to help to support potential on-site and off-site angling activities (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The rMCZ is a popular area for both shore and boat angling. An estimated 212 local private angling boats use the rMCZ (Isle of Wight Angling Boat Survey, T Williams, 2011), excluding boats from the mainland. An estimated 5010 angling trips (including competitions) are made each year within this rMCZ (Shore Angling Intensity Report, T Williams, December 2010) with the most intense activity occurring during the summer months. Charter boats out of Bembridge, Langstone Harbour, Portsmouth, Southampton and Chichester bring anglers to the site as well (with up to 10 anglers on board at a time). As a spawning ground for Dover sole and mackerel and generally abundant in fish species due to the complex habitats within the site, it is likely to help to	If the conservation objectives of the features are achieved, some of the features, including the seagrass beds, will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the seagrass beds to favourable condition may improve their functioning as a nursery area, potentially benefiting angling activities within and outside the rMCZ (see Table 4a). As no additional management of angling is expected (other than some restrictions on anchoring locations), fishers will be able to benefit from any on-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers, both on and off-site Designation of this site may lead to an increase in angling visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in angling.	Anticipated direction of change: ⇧ Confidence: Low

support potential on-site and off-site fisheries. Black sea bream, plaice, squid and smooth hound, as well as crustaceans (e.g. lobster) occur within this site and are fished commercially and recreationally (Balanced Seas Isle of Wight Sites Meeting Report, February 2011). To estimate the value of this rMCZ to anglers, Solent angling representatives suggested using national statistics for the average annual household expenditure of sea anglers (£295 per year) as detailed in the Drew Report (2004). Assuming that one prviate boat equals one household, private boat anglers spend £62,540 per year within this rMCZ. Using the national average number of trips made by shore anglers per year (13.62; Drew Ltd 2004), it can be estimated that 368 shore anglers use this rMCZ. Assuming that each shore angler equates to one household, shore anglers spend £108,560 per year within this rMCZ. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that result from the diversity of the rMCZ.		
Diving: The rMCZ is used for shore diving, particularly around Bembridge Ledge which is considered a good beginner's site and is also popular because of the interesting rock features and abundant marine life (www.isleofwighttouristguide.com/articles/scuba-diving-on-the-isle-of-wight/69/).	Designation of this site might lead to an increase in diving trips, as a result of publicity about the marine biodiversity and rare species found in the site. If populations of species such as seahorses and stalked jellyfish increase, this could lead to an improved quality of experience for divers. The designation may lead to an increase in diving visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in diving trips at the national scale.	Anticipated direction of change: ⇧ Confidence: Low
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details).	If the conservation objectives of the features are achieved, some of the features, including the seagrass beds, will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the seagrass beds (which occur over a large part of the chalk ledges) to favourable condition may improve their functioning as a safe haven for sessile and low mobility species. Any associated increase in abundance and diversity of	Anticipated direction of change: ⇧ Confidence: Low

Table 5b. Recreation		rMCZ 22, Bembridge
The seagrass beds provide a safe haven for juvenile fish and other species such as sea horses, sea anemones and sessile jellyfish (Natural England website, seagrass beds article) and in this site they cover the chalk ledges which harbour and support diverse algae and invertebrate populations. These contribute to an area of high biodiversity in the north of the site which in turn supports the foraging birds and marine mammals that frequent it. The rMCZ is a popular area for wildlife watching, particularly birdwatching and rock-pooling. The northern part of the site has particularly high biodiversity, and extensive areas of limestone and chalk bedrock provide a complex system of crevices (Tyne and Bembridge Ledges), tunnels and pools supporting a very diverse algae and invertebrate fauna. This in addition to the abundant fish populations supports a number of foraging birds and offshore waterfowl such as great crested grebe. The area is the best foraging area for Sandwich tern in Balanced Seas project area. It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The whole rMCZ is an extremely popular tourist destination especially for recreational sailing and coastal walking with numerous harbours, marinas, shopping facilities, camping sites and coastal paths available for visitors and residents. Sailing clubs offer races and training for all ages with the largest and most popular clubs and marinas situated in Seaview, Bembridge, Sandown Bay and Shanklin. It has not been possible to estimate the value derived from tourism in the rMCZ.	If the conservation objectives of the features are achieved, some of the features, including the seagrass beds, will be recovered to favourable condition. Others will be maintained in favourable condition. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities. If the rMCZ is designated this will provide an additional positive aspect about the location that could be promoted by the tourism and leisure industry and that would be expected to increase visitation rates.	Anticipated direction of change: ⇧ Confidence: Low

Table 5c. Research and education	rMCZ 22, Bembridge
Baseline	**Beneficial impact under Policy Option 1**

Table 5c. Research and education		rMCZ 22, Bembridge
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. Hampshire and Isle of Wight Wildlife Trust conducts research in the rMCZ including the Shoresearch and Seasearch programmes (surveys of the shore and sea bed). Southampton University may undertake academic research in the rMCZ. There is also archaeological interest within the foreshore and potentially in the subtidal areas with ongoing research being conducted by the Isle of Wight County Archaeology and Historic Environment Service. The Standing Conference on Problems Associated with the Coastline (SCOPAC) has also carried out research within this site (SCOPAC website). It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. Hampshire and Isle of Wight Wildlife Trust may undertake education activities within the rMCZ. It has not been possible to estimate the value derived from education activities associated with the rMCZ.	MCZ designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid additional local (to the rMCZ) provision of education (e.g. events, interpretation boards), from which visitors would derive benefit. Non-visitors may benefit if the rMCZ contributes to wider provision of education (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Moderate

Table 5d. Regulating services		rMCZ 22, Bembridge
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: the features of the site contribute to the bioremediation of waste (Native oysters, *Sabellaria*, seagrass beds and subtidal sediments), water filtration (Native oyster, *Sabellaria* and seagrass beds) and sequestration of carbon (Native oysters, *Sabellaria,* seagrass beds and subtidal sediments) (Fletcher and others, 2011). ***Environmental resilience:*** the features of the site (Native oyster and *Sabellaria)* contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011).	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (infralittoral rock, intertidal underboudler communities, peat and clay exposures, *Sabellaria* reefs and seagrass beds) recovered to favourable condition. Recovery of the seagrass beds may improve the regulating capacity of the habitat.	Anticipated direction of change: ⇔ Confidence: Low

Table 5d. Regulating services		rMCZ 22, Bembridge
Natural hazard protection: the features of the site, (Native oyster, *Sabellaria* and seagrass beds) in particularly the coastal saltmarshes, contribute to local flood and storm protection (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the pMCZ.	Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	

Table 5e. Non-use and option values		rMCZ 22, Bembridge
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the rMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the pMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect both the features and the option to benefit from the services in the future from the risk of future degradation. Examples of these values are shown in (Ranger, Lowe, Sanghera, & Solandt, 2012). Voters in the MCS's 'Your Seas Your Voice' campaign expressed the following: Features of the natural environment were strong motivators for reasons why people thought that certain areas within the rMCZ should be protected, with people frequently attaching value to biodiversity and 'spectacular scenery.' Other themes that came up quite frequently were the sentiment that they felt "the whole place is amazing" and a feeling of emotional attachment to the site as well. Regarding non-extractive use value, ease of access and the provision of good facilities were considered important as reasons to protect this site. Furthermore, allowing species recovery, particularly fish and shellfish, was perceived as an important management reason to protect the site. Source: Ranger et al. (2011)	Anticipated direction of change: Confidence: Moderate

rMCZ 22 Reference Area 15 Tyne Ledges **Site area (km^2): 0.05**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts			**rMCZ 22, Reference Area 15 Tyne Ledges**	
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) Reference Area lies within rMCZ 22 (Bembridge), to the south of Bembridge Harbour. It is primarily intertidal, extending out to the mean low water springs mark, and covers the Tyne Ledges which is the northern part of the well-known 'ledges' that extend along this stretch of coast. The wave-cut platforms contain large and slowly draining pools between the gently shelving ledges that provide habitat for the most important and extensive population of the alga Peacock's Tail *Padina pavonica* in the Balanced Seas Project Area, which is thought to seed the other populations around the Isle of Wight. Within the Balanced Seas Project Area, this species is found only on the Isle of Wight which is thought to be the eastern limit of the species distribution in the UK. The wider rMCZ in which this site lies has high biodiversity, including a diverse array of shellfish and demersal and pelagic fish (e.g. black sea bream, plaice, lobster and squid), migratory fish (e.g. Atlantic salmon, European eel and the rare twaite shad), foraging birds and offshore waterfowl (such as the great crested grebe), to which this site may contribute. The rMCZ Reference Area falls within the South Wight Maritime Special Area of Conservation and the Whitecliff Bay and Bembridge Ledges Site of Special Scientific Interest. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A5.2 Subtidal sand	-	-	Unfavourable condition	Recover to favourable condition
Habitats of Conservation Importance				
Seagrass beds	0.02	-	Unfavourable condition	Recover to favourable condition
Species of Conservation Importance				
Native Oyster *Ostrea edulis*[1]	-	-	-	-
Peacock's Tail (*Padina pavonica*)	-	14 records	Unfavourable condition	Recover to favourable condition

[1] Although listed in the Site Assessment Document (SAD) in the final report, this species is not found within the rMCZ Reference Area (See Final Recommendations Final Amendments Report for explanation).

Site-specific costs arising from the effect of the recommended Marine Conservation Zone (rMCZ) on human activities (over 2012 to 2031 inclusive)

Table 2a. Archaeological heritage	**rMCZ 22, Reference Area 15 Tyne Ledges**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Increase in the 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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**

Table 2a. Archaeological heritage	rMCZ 22, Reference Area 15 Tyne Ledges
A British World War II landing craft is recorded within this site and a World War II pillbox is also recorded on the foreshore (English Heritage, 2012).	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known, so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost for one licence application could be in the region of £500–£10,000, depending on the size of the rMCZ (English Heritage, pers. comm., 2012). If archaeologists respond to the prohibition of excavation by undertaking alternative archaeological excavations 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 Impact Assessment. The prohibition of excavation will prevent interpretation of archaeological evidence from the site, thereby decreasing the acquisition of historical knowledge of past human communities from the site, resulting in a cost to society.

Table 2b. Ports, harbours, shipping and disposal sites — **rMCZ 22, Reference Area 15 Tyne Ledges**

Source of costs of the Recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management scenario 1: Not applicable to this site.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for all port and harbour developments within 5 km of the rMCZ. The Balanced Seas regional MCZ project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the MCZ that will be needed relative to the mitigation provided in the baseline.

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
Port development: Bembridge is within 5km of the rMCZ Reference Area and may undergo development in the future (Ports & Harbours UK, 2012). This may not represent a full list of all ports and harbours impacted by the site. No port developments are known to be planned within the 20 year period of the Impact Assessment (IA).	*£m/yr* | Scenario 1 | Scenario 2 Cost to the operator (port development) | N/A | 0.000 ***Scenario 1:*** Not applicable to this site ***Scenario 2:*** Future licence applications for port developments within 5km of this rMCZ Reference Area will need to consider the potential effects of the activity on the features protected by the rMCZ Reference Area. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11).

Table 2c. Recreational angling — **rMCZ 22, Reference Area 15 Tyne Ledges**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Table 2c. Recreational angling	rMCZ 22, Reference Area 15 Tyne Ledges
Closure of the entire site to all recreational angling.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
The site is intertidal and covers an area where there is comparatively little angling (Balanced Seas Solent/IOW/Hants Sites Meeting Report, July 2011).	The boundaries of this rMCZ Reference Area were developed with the Local Group sea angling representatives to minimise the impact of the closure on recreational anglers (Balanced Seas Final Recommendations Amendments report, 2012). Due to the low level of activity within the rMCZ Reference Area, it is anticipated that the closure would not have a significant impact on anglers. Affected anglers would respond by fishing in alternative sites nearby.

Table 2a. Recreation – Walking (including dog walking)	rMCZ 22, Reference area 15 Tyne Ledges
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Management scenario 1 (uniform management): People walking through the rMCZ will be encouraged to use marked routes; dog walkers will be required to dispose of dog faeces in provided facilities.	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
The ledges are a very popular tourist destination for walkers and dog walkers (no numbers have been identified). The top of the beach is used by up to 20 dog walkers a day, and up to 50 in school holidays;. There is no Dog Control Order in place, and an estimated half dog walkers do not pick up the faeces (Natural England Stakeholder Interview for rMCZ Reference Area 15 Tyne Ledges, January 2012)	Given that walking would still be allowed in the site, impacts are likely to be negligible. Visitors would be encouraged to keep to the coastal footpath to avoid adverse effects. Impacts would include the cost of notifying visitors of the need to stay to designated paths (which is included in costs of managing the site). A Dog Control Order would need to be put in place that covered the rMCZ Reference Area. Dog walkers would be required to remove and dispose of dog faeces in provided facilities. Impacts would include the cost of putting the Dog Control order in place and notifying visitors of the need to remove dog faeces and of the location of the nearest disposal facility (which is included in costs of managing the site).

Table 2d: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 22 Reference Area 15 Tyne Ledges
Oil and gas related activities (including carbon capture and storage)	
This rMCZ Reference Area overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 27th Seaward Licensing Rounds). However, it is unlikely that any oil and gas (including carbon capture and storage) infrastructure will be proposed in future in this rMCZ Reference Area due to its location and size (DECC, pers. comm., 2012). Impacts of rMCZ Reference Areas on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N 10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the Recommended Marine Conservation Zone (rMCZ) (over 2012 to 2031 inclusive)

Table 3. Human activities in the site that are not negatively affected by the Recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ 22 Reference Area 15 Tyne Ledges**
Flood and coastal erosion risk management (coastal defence) Recreation (except for the activities listed above in table 2) Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath rMCZ 22 Bembridge. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions in Annex H.

Table 4a. Fish and shellfish for human consumption	**rMCZ 22, Reference Area 15 Tyne Ledges**	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. Seagrass beds, which occur within the rMCZ Reference Area, generally provide important nursery areas for flatfish (JNCC, 2011) and shellfish (Natural England website, seagrass beds article) and so are likely to help to support on-site and off-site fisheries (Fletcher and others, 2011).	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and	Anticipated direction of change: ⇧ Confidence: Low

Table 4a. Fish and shellfish for human consumption	rMCZ 22, Reference Area 15 Tyne Ledges	
The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition. There is minimal fishing in the rMCZ Reference Area due to its intertidal nature. It has not been possible to estimate the value of the off-site benefits that derive from the spawning and nursery area.	shellfish for human consumption. Closure of the rMCZ Reference Area to fishing activity will reduce the on-site fishing mortality of species, but as the site is small it is unclear whether this would benefit stocks of mobile commercial finfish species. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	

Table 4b. Recreation	rMCZ 22, Reference Area 15 Tyne Ledges	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Seagrass beds provide important nursery areas for flatfish (JNCC, 2011) and, as such, are likely to help to support potential on-site and off-site angling activities (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMC 22 Table 1 for details). There is very little angling in this rMCZ Reference Area, as described in Table 2c. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the potential spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area. As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Anticipated direction of change: ⇧ Confidence: Low
Diving: Diving is not known to take place in the site.	N/A	N/A
Wildlife watching: Wildlife watching is not known to take place in the site.	N/A	N/A
Other recreation: The coastal footpath runs along the top of the beach and is regularly used by walkers (up to 50 a day in winter; up to 100 a day in summer); horse riders also use the upper part of the beach. (Natural	N/A Although other recreation activities take place in this site, largely above MHW, the small area of the site means that no benefits to these activities are anticipated if the site is	Anticipated direction of change:

Table 4b. Recreation	rMCZ 22, Reference Area 15 Tyne Ledges	
England Stakeholder Interview for rMCZ Reference Area 15 Tyne Ledges, November 2011).	designated. In addition, the rMCZ Reference Area is fully contained within rMCZ 22 for which the benefits of other recreation have been assessed. It is not possible to identify whether the Reference Area will have additional benefits over and above this but this seems unlikely.	⇧ Confidence: Low

Table 4c. Research and education	rMCZ 22, Reference Area 15 Tyne Ledges	
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. Hampshire and Isle of Wight Wildlife Trust conducts research in the wider rMCZ including the Shoresearch and Seasearch programmes (surveys of the shore and sea bed) which may overlap with the rMCZ Reference Area. It has not been possible to estimate the value derived from research activities associated with the rMCZ Reference Area.	The rMCZ Reference Area will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. Hampshire and Isle of Wight Wildlife Trust may undertake education activities within the rMCZ Reference Area. It has not been possible to estimate the value derived from Reference Area education activities associated with the rMCZ Reference Area. .	MCZ Reference Area designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ Reference Area) education activities(e.g. events and interpretation boards), from which visitors to the site would derive benefit. The Peacock's Tail is a species of considerable interest and could become a focus for educational work. Non-visitors may benefit if the rMCZ Reference Area contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Moderate

Table 4d. Regulating services	rMCZ 22, Reference Area 15 Tyne Ledges
Baseline	**Beneficial impact under Policy Option 1**

Table 4d. Regulating services		rMCZ 22, Reference Area 15 Tyne Ledges
Regulation of pollution: Seagrass beds contribute to the bioremediation of waste, water purification and sequestration of carbon (Fletcher and others, 2011). ***Environmental resilience:*** The features of the site contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** Seagrass beds contribute to local flood and storm protection (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of seagrass beds and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the recommended Marine Conservation Zone Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities (as, if necessary, mitigation would be introduced, with the associated costs and benefits).	Anticipated direction of change: ⇧ Confidence: Low

Table 4e. Non-use and option values		rMCZ 22, Reference Area 15 Tyne Ledges
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 22 Reference Area 21 Culver Spit **Site area (km^2): 0.25**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts				**rMCZ 22, Reference Area 21 Culver Spit**
1a. Ecological description				
This subtidal recommended Marine Conservation Zone (rMCZ) Reference Area lies south-east of Culver Down in rMCZ 22 (Bembridge) and contains the only record of living maerl beds *Phymatolithon calcareum* in the Balanced Seas Project Area. The rMCZ Reference Area is also considered to be suitable habitat for the short-snouted seahorse *Hippocampus hippocampus*; there are records showing it close to the site although not within the boundaries. The wider rMCZ in which this site lies supports high biodiversity, including a diverse array of demersal and pelagic fish and shellfish (e.g. black sea bream, plaice, lobster and squid), migratory fish (e.g. Atlantic salmon, European eel and the rare twaite shad), as well as foraging birds and offshore waterfowl (such as the great crested grebe), to which the rMCZ Reference Area may contribute. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A5.4 Subtidal mixed sediments	-	-	Unfavourable condition	Recover to favourable condition
Habitats of Conservation Importance				
Maerl beds	-	1 record	Unfavourable condition	Recover to favourable condition
Species of Conservation Importance				
Short snouted seahorse *Hippocampus hippocampus*	-	-	No records	No records

Site-specific costs arising from the effect of the recommended Marine Conservation Zone (rMCZ) on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	**rMCZ 22, Reference Area 21 Culver Spit**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Increase in the 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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
The patrol boat HMS P12 (lost in 1918) is recorded within this site (English Heritage, 2012).	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known, so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost for one licence application could be in the region of £500–£10,000 depending on the size of the rMCZ (English Heritage, pers.

Table 2a. Archaeological heritage	rMCZ 22, Reference Area 21 Culver Spit
	comm., 2012). If archaeologists respond to the prohibition of excavation by undertaking alternative archaeological excavations 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 Impact Assessment. The prohibition of excavation will prevent interpretation of archaeological evidence from the site, thereby decreasing the acquisition of historical knowledge of past human communities from the site, resulting in a cost to society.

Table 2b. Commercial fisheries — **rMCZ 22, Reference Area 21 Culver Spit**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Closure of the entire site to all gear types.

Summary of all fisheries: The rMCZ Reference Area is non-coastal, within the 6 nautical mile (nm) limit and lies in rMCZ 22 Bembridge. The main commercial fishing fleets using the general area and thus possibly fishing in the rMCZ Reference Area are based in Bembridge, Portsmouth and Selsey. Trawling, static netting, potting and lining operations by under 15 metre vessels is indicated to overlap with the site (information from interviews carried out for Fishermap). A Southern Inshore Fisheries and Conservation Authority (IFCA) byelaw prohibits the use of vessels over 12 metres in size within 6nm over an area that includes the site. The Southern IFCA has indicated that a maximum of 4 vessels operate at any one time within this rMCZ Reference Area (Southern IFCA email, feedback response to first tranche of IA material, 16 January 2012). More detail on the approach used for the fisheries method is provided in Annexes H7 and N4.

Estimated value of UK net landings from the rMCZ Reference Area: £0.001 million per year (m/yr).

(Due to resolution issues of the MCZ Fisheries Model and the small size of many rMCZ Reference Areas in the Balanced Seas region, some fisheries landings values may be inaccurate. They have been included as a precautionary measure and to avoid underestimating the economic impact of a site.)

Baseline description of UK commercial fisheries	Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1
Bottom trawls: At least two vessel owners indicated that their area of operation overlapped the rMCZ Reference Area (FisherMap Data 2010). The vessels target dover sole using trawls and beam trawls.	The estimated annual value of UK bottom-trawl landings affected: *£m/yr* — Scenario 1 Value of landings affected — <0.001
Hooks and lines:Two vessel owners who were interviewed indicated that their areas of operation overlap the rMCZ Reference Area (FisherMap Data 2010). The vessels use static lines to target bass.	The estimated annual value of UK hook and line landings affected: *£m/yr* — Scenario 1 Value of landings affected — <0.001
Nets: Interviews with vessel owners indicated that the areas of	The estimated annual value of UK net landings affected:

Table 2b. Commercial fisheries	rMCZ 22, Reference Area 21 Culver Spit
operation of at least 7 vessels overlap the rMCZ Reference Area targetingbass, dover sole, plaice, European eel, skates and rays, using drift, fixed and gill nets (FisherMap Data 2010). Local Group discussions also indicated that the area is heavily fished using nets.	<table><tr><td>*£m/yr*</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table>
Pots and traps: Seven vessel owners who were interviewed for Fishermap have areas of operation that overlap the rMCZ Reference Area where they target whelks and common lobster (FisherMap Data 2010). Estimated value of UK net landings from the rMCZ Reference Area: £0.001m/yr (MCZ Fisheries Model).	The estimated annual value of UK pots and traps landings affected: <table><tr><td>*£m/yr*</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td>0.001</td></tr></table>
Total direct impact on UK commercial fisheries under Policy Option 1	
	The estimated annual value of UK landings and gross value added (GVA) affected: <table><tr><td>*£m/yr*</td><td>Scenario 1</td></tr><tr><td>Value of landings affected</td><td>0.001</td></tr><tr><td>GVA affected</td><td>0.000</td></tr></table>
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries**
	None.

Table 2c. National defence	rMCZ 22, Reference Area 21 Culver Spit
Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1** Mitigation of impacts of Ministry of Defence (MOD) activities on features protected by the suite of rMCZs will be provided by additional planning considerations during operations and training. It is not known whether mitigation will be required for features protected by this site. MOD will also incur costs in revising environmental tools and charts to include rMCZs.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
MOD is known to make use of the site. The entire rMCZ Reference Area is covered by national defence covering the air, water column and sea bed. The main impacts on the rMCZ Reference Area are listed as: (i) air and water surface – noise, physical and visual disturbance; (ii) water column noise; and (iii) sea bed – fixed equipment. Activities include: acoustic trials, flares, mine	It is not known whether this rMCZ Reference Area will impact on MOD's use of the site. Impacts of rMCZs on national defence are assessed in Annex H10 and N9 (they are not assessed for this site alone).

countermeasures, smoke, seabed sampling and towed array (surveillance system).	

Table 2d. Ports, harbours, shipping and disposal sites **rMCZ 22, Reference Area 21 Culver Spit**

Source of costs of the Recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management scenario 1: Not applicable to this site.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for all port and harbour developments within 5 km of the rMCZ Reference Area. The Balanced Seas regional MCZ project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the MCZ that will be needed relative to the mitigation provided in the baseline.

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
Port development: There is 1 port (Bembridge) within 5km of the rMCZ Reference Area that may undergo development in the future (Ports & Harbours UK, 2012). This may not represent a full list of all ports and harbours impacted by the site. No port developments are known to be planned within the 20 year period of the Impact Assessment (IA).	*£m/yr* / Scenario 1 / Scenario 2 Cost to the operator (port development) / N/A / 0.000 ***Scenario 1:*** Not applicable to this site. ***Scenario 2:*** Future licence applications for port developments within 5km of this rMCZ Reference Area will need to consider the potential effects of the activity on the features protected by the rMCZ Reference Area. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11). .

Table 2e. Recreational anchoring **rMCZ 22, Reference Area 21 Culver Spit**

Source of costs of the Recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Closure of the entire site to all recreational anchoring (except in emergency circumstances).

Baseline description of activity	Costs of impacts of MCZ on the sector under Policy Option 1
Local Group members indicated that anchoring of recreational vessels does not take place at a significant level in the rMCZ Reference Area (Balanced Seas Solent/IOW/Hants Sites Meeting Report, July 2011). One StakMap interviewee (representing 240 people per year) indicated that, although areas used for anchoring recreational vessels overlapped the rMCZ, the level of use is likely to be very low.	Given the low level of anchoring taking place in the rMCZ Reference Area, closure to anchoring is not expected to impact significantly on recreational vessel users. Local Group representatives of recreational sea anglers and charter boat operators indicated that they would accept a closure to anchoring if the rMCZ Reference Area is as small as possible (Balanced Seas Solent/IOW/Hants Sites Meeting Report, July 2011).

Table 2f. Recreational sea angling **rMCZ 22, Reference Area 21 Culver Spit**

Source of costs of the Recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of the entire site to all recreational angling.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Twenty stakeholder interviewees, representing clubs and charter boat owners across the south coast (18 representing charter boat fishing; 2 representing private boat angling (representing 196 anglers)), indicated that their areas of activity overlap the rMCZ Reference Area (StakMap, 2010). Boat anglers (from the Solent and further afield) target smoothhounds, black bream and cod. Charter boats that use the site are based mainly in Langstone Harbour and represent 3,534 anglers per year. Only a small extent of the area that they fish overlaps the rMCZ Reference Area (StakMap, 2010).	Although the rMCZ Reference Area is used by recreational anglers, representatives of recreational anglers said that this rMCZ Reference Area would have little impact on anglers (Balanced Seas Solent/IOW/Hants Sites Meeting Report, July 2011). The representative of Bembridge Angling Club indicated that the rMCZ Reference Area would have little impact on club members as long as the area of the site is as small as possible (Balanced Seas Solent/IOW/Hants Sites Meeting Report, July 2011). No significant costs are expected.

Table 2g: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	**rMCZ 22 Reference Area 21 Culver Spit**
Oil and gas related activities (including carbon capture and storage)	
This rMCZ Reference Area overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 27th Seaward Licensing Rounds). However, it is unlikely that any oil and gas (including carbon capture and storage) infrastructure will be proposed in future in this rMCZ Reference Area due to its location and size (DECC, pers. comm., 2012). Impacts of rMCZ Reference Areas on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the Recommended Marine Conservation Zone (rMCZ) (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the Recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ 22, Reference Area 21 Culver Spit**
Recreation (except for the activities listed above in table 2) Shipping Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath rMCZ 22 Bembridge. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone rMCZ Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 4a. Fish and shellfish for human consumption		**rMCZ 22, Reference Area 21 Culver Spit**
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. Subtidal coarse sediments are important nursery areas for many species and are potentially important spawning and nursery grounds for juvenile commercial species such as flatfish and bass (Fletcher and others, 2011). Maerl beds are also of benefit to fisheries, although it is not known how extensive the bed is in this site. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMC 22 Table 1 for details). There is a small amount of on-site fishing activity in the rMCZ Reference Area, and the value derived from it is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits that derive from any potential spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. The costs of this are set out in Table 2b. Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption. Closure of the rMCZ Reference Area to fishing activity will reduce the on-site fishing mortality of species, but as the site is small it is unclear whether this would benefit stocks of mobile commercial finfish species. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation	**rMCZ 22, Reference Area 21 Culver Spit**

Table 4b. Recreation	rMCZ 22, Reference Area 21 Culver Spit	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Subtidal coarse sediments are important nursery areas for many fish species (Fletcher and others, 2011) and so may benefit recreational fisheries; maerl beds are also of benefit to fisheries, although it is not known how extensive the bed is in this site. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMC 22 Table 1 for details). Angling is carried out by some local clubs and boats in this rMCZ Reference Area and a description of this activity is set out in Table 2f. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the potential spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Anticipated direction of change: ⇧ Confidence: Low
Diving: Diving may occur in the site but this has not been confirmed.	N/A	N/A
Wildlife watching: Wildlife watching is not known to take place in the site.	N/A	N/A
Other recreation: No other recreational activities are known to take place in the site.	N/A	N/A

Table 4c. Research and education	rMCZ 22, Reference Area 21 Culver Spit	
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. No known research activities take place in the site.	The rMCZ Reference Area will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High

Table 4c. Research and education		rMCZ 22, Reference Area 21 Culver Spit
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. No known educational activities take place in the site.	As the rMCZ Reference Area lies offshore and thus is relatively inaccessible, no benefits are likely to arise from direct use of the site for education.	

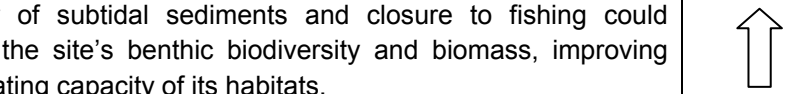
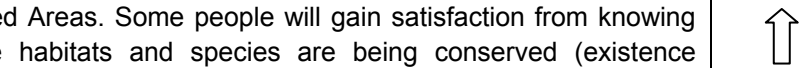
Table 4d. Regulating services		rMCZ 22, Reference Area 21 Culver Spit
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: Subtidal sediments contribute to the bioremediation of waste and sequestration of carbon (Fletcher and others, 2011). ***Environmental resilience:*** N/A ***Natural hazard protection:*** As the site is offshore, its features do not contribute to the delivery of this service. It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of subtidal sediments and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the recommended Marine Conservation Zone Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities (as, if necessary, mitigation would be introduced, with the associated costs and benefits).	Anticipated direction of change:  Confidence: Low

Table 4e. Non-use and option values		rMCZ 22, Reference Area 21 Culver Spit
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change:  Confidence: Moderate

rMCZ 23 Yarmouth to Cowes **Site area (km^2): 16.75**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts			**rMCZ 23, Yarmouth to Cowes**	
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) would protect some of the most highly species-rich examples of Ross worm reef, several restricted habitats (e.g. peat and clay exposures and the best regional example of estuarine rocky habitats) and good examples of seagrass beds. Newtown Harbour, within the site, is home to wild populations of native oyster and a population of lagoon sand shrimp occurs in the salt pans. To the west of the Newtown Harbour entrance is Bouldnor Cliff, a 4 metre high underwater cliff containing peat layers and a submerged forest of tree boles and root systems, which is considered to be the only known submerged prehistoric primary site in British waters. Other notable features include hard-rock reefs and peacock worm, and intertidal underboulder communities with numerous boulders hosting a variety of sponges, seasquirts and crustaceans. The majority of the sea bed within the site is shown to be subtidal coarse sediment, which is part of a larger stretch of mixed subtidal gravel and sand habitat. Furthermore, the site is an important foraging area for common tern, great cormorant, little tern, Mediterranean gull and Sandwich tern. This site overlaps with the Solent Maritime Special Area of Conservation, Newtown Harbour Site of Special Scientific Interest (SSSI) and Thorness Bay SSSI, and is adjacent to the Yar Estuary SSSI. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A1.3 Low energy intertidal rock	0.01	-	Favourable condition	Maintain at favourable condition
A2.1 Intertidal coarse sediment	0.03	-	Favourable condition	Maintain at favourable condition
A3.2 Moderate energy infralittoral rock	0.21	-	Unfavourable condition	Recover to favourable condition
A5.1 Subtidal coarse sediment	11.99	-	Favourable condition	Maintain at favourable condition
Habitats of conservation importance				
Estuarine rocky habitats	81 m^2	-	Favourable condition	Maintain at favourable condition
Intertidal underboulder communities	-	2 records	Unfavourable condition	Recover to favourable condition
Native oyster beds	-	21 records	Favourable condition	Maintain at favourable condition
Peat and clay exposures	-	8 records	Unfavourable condition	Recover to favourable condition
Rossworm (*Sabellaria spinulosa*)	313.38 m^2	-	Unfavourable condition	Recover to favourable condition
Seagrass beds	-	1 record	Unfavourable condition	Recover to favourable condition
Species of conservation importance				
Lagoon Sand Shrimp (*Gammarus insensibilis*)	-	2 records	Favourable condition	Maintain at favourable condition
Native Oyster (*Ostrea edulis*)	-	25 records	Favourable condition	Maintain at favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone (rMCZ) on human activities (*over 2013 to* 2032 inclusive)

Table 2a. Archaeological heritage	**rMCZ 23, Yarmouth to Cowes**
Source of costs of the Recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Increase in the costs of assessing environmental impacts for future licence applications (it is not anticipated that any additional mitigation of impacts on features protected by the MCZ 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. However, restrictions could be placed on: • anchoring in areas of vulnerable rMCZ features in the site, including seagrass and Ross worm *Sabellaria spinulosa* reef; • archaeological excavation in areas of peat and clay exposures in the site.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
A World War II bombing decoy area is in the site. Roman and Neolithic artefacts have been found within the site. Wrecked vessels of British, Spanish, German, French and Dutch origin have been recorded within the site; of these vessels, 1 is protected by the Protection of Wrecks Act 1973 (the *Yarmouth Roads*) with a 50-metre exclusion zone. Yarmouth Pier is also a designated monument. A bronze-age burial site, a late iron-age cremation cemetery and several cup marks have been recorded within the site. Bouldnor cliff underwater Mesolithic site has been subject to archaeological investigation since the late 1990s (English Heritage, 2012). Since 2003, 1 survey licence has been granted each year for the *Yarmouth Roads* wreck. English Heritage has indicated that this site is likely to be of interest for archaeological excavation in the future as it is relevant to its National Heritage Protection Plan (theme 3A1.2)	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known, so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost for one licence application could be in the region of £500–£10,000, depending on the size of the rMCZ (English Heritage, pers. comm., 2012). No further impacts on activities related to archaeology are anticipated. If archaeologists respond to restrictions on excavation in areas of peat and clay exposures and restrictions on anchoring over areas of seagrass or ross worm (*Sabellaria spinulosa*) reef by undertaking alternative archaeological excavations 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 Impact Assessment. If archaeological excavations do not take place as a result of these restrictions, this will prevent interpretation of archaeological evidence from the site, thereby decreasing the acquisition of historical knowledge of past human communities from the site, resulting in a cost to society.

Table 2b. Commercial fisheries	**rMCZ 23, Yarmouth to Cowes**
Source of costs of the Recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of commercial fishing gear will be required for certain features protected by this rMCZ. Therefore, two management scenarios have been employed in the Impact Assessment for these fisheries to reflect this uncertainty. Should the site be designated, the management that will be required will fall somewhere within this range. ***Management scenario 1:*** Closure of the entire rMCZ to bottom trawls and dredges to protect areas of seagrass beds and ross worm (*Sabellaria spinulosa*) reef (SNCBinformed scenario).	

Table 2b. Commercial fisheries **rMCZ 23, Yarmouth to Cowes**

Management scenario 2: Closure of the entire rMCZ to bottom trawls, dredges, lines, nets, pots and traps to protect areas of seagrass beds, infralittoral rock, peat and clay exposures, and Ross worm *Sabellaria spinulosa* reef (SNCB informed scenario).

Summary of all fisheries: The rMCZ is wholly within the 6 nautical mile (nm) limit and is fished only by UK vessels. Vessels from Cowes, Lymington, Keyhaven and Portsmouth/Gosport fish this rMCZ and potting is the most important fishing activity. In recent years cuttlefish trapping has also been a financially valuable activity. Oyster dredging has historically been an important activity, and oyster dredgers from various other ports, including Hamble and Southampton, fish the area if oyster beds develop. Recently, effort has been low due to a shortage of oysters. There is also longlining but very little set netting. There are no vessels over 12 metres fishing this area as an Inshore Fisheries and Conservation Authority (IFCA) byelaw states that all vessels must be under 12 metres in size within 6nm (Southern IFCA, pers. comm., 2012). Southern IFCA considers that a maximum of 4 vessels operate at any one time in this rMCZ (Southern IFCA, pers. comm., 2012) . More detail on the approach used for the fisheries method is provided in Annexes H7 and N4.

Certain commercial fishing restrictions are already in existence (listed in Annex E1). The Southern IFCA is currently developing a Seagrass Management Strategy which through a voluntary code of conduct will close of areas of sea grass to bottom trawls and dredges around the Isle of Wight (from mean high water out to a distance that is currently being determined) (Jury, J. from Southern IFCA email., 24 April 2012; The SIFCA and the Seagrass Working Group (SWG). 2012). This will partially deliver the management that is required for Scenarios 1 and 2.

Estimated annual value of landings from the rMCZ: £0.091 million per year (m/yr) (this is likely to be an overestimate due to the future implementation of the Southern IFCA byelaw to protect areas of seagrass).

Costs of impact of rMCZ on UK commercial fisheries	**Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1**
Bottom trawls: The Southern IFCA has indicated that a maximum of 4 under 15 metre vessels operate in this area at any one time (Southern IFCA, pers. comm., 2012). Estimated total value of landings from the rMCZ: £0.009m/yr (MCZ Fisheries Model). The above figures are likely to be overestimates as the Fisheries Model overestimates the number of vessels trawling in the site.	The estimated annual value of UK bottom-trawl landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.009 | 0.009 The above values are likely to be overestimates as the Fisheries Model overestimates the number of vessels trawling in the site, and the implementation of the Southern IFCA Seagrass Management Strategy to protect areas of sea grass through a voluntary code of conduct will significantly reduce the activity of bottom trawls in this rMCZ (Jury, J., Southern IFCA email., 24 April 2012).
Dredges: The Southern IFCA has indicated that a maximum of 4 under 15 metre vessels operate in this area at any one time (Southern IFCA email, feedback response to first tranche of IA material, 16 January 2012). Estimated total value of landings from the rMCZ: £0.031m/yr (MCZ Fisheries Model). The above figures are likely to be overestimates as the Fisheries Model overestimates the number of vessels dredging in the site.	The estimated annual value of UK dredge landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.031 | 0.031 The above values are likely to be overestimates as the Fisheries Model overestimates the number of vessels dredging in the site, and the implementation of the Southern IFCA

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 23, Yarmouth to Cowes</th></tr>
<tr><td></td><td>Seagrass Management Strategy to protect areas of sea grass through a voluntary code of conduct will significantly reduce the activity of dredges in this rMCZ (Jury, J., Southern IFCA email., 24 April 2012).</td></tr>
<tr><td>Hooks and lines: The Southern IFCA has indicated that a maximum of 4 under 15 metre vessels operate in this area at any one time (Southern IFCA email, feedback response to first tranche of IA material, 16 January 2012).

Estimated total value of landings from the rMCZ: £0.002m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK hook and line landings affected is expected to fall within the following range of scenarios:
<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.002</td></tr></table>
In establishing the draft conservation objectives, the site’s features may have been assessed as having low vulnerability to fishing with nets at current levels and, where this is the case, this activity was not the primary reason for assigning the ‘recover’ conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears..</td></tr>
<tr><td>Nets: The Southern IFCA has indicated that a maximum of 4 under 15 metre vessels operate in this area at any one time (Southern IFCA email, feedback response to first tranche of IA material, 16 January 2012).

Estimated total value of landings from the rMCZ: £0.012m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK net landings affected is expected to fall within the following range of scenarios:
<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.012</td></tr></table>
In establishing the draft conservation objectives, the site’s features may have been assessed as having low vulnerability to fishing with nets at current levels and, where this is the case, this activity was not the primary reason for assigning the ‘recover’ conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Pots and traps: The Southern IFCA has indicated that a maximum of 4 under 15 metre vessels operate in this area at any one time (Southern IFCA email, feedback response to first tranche of IA material, 16 January 2012).
Estimated total value of landings from the rMCZ: £0.037m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK pot and trap landings affected is expected to fall within the following range of scenarios:
<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.037</td></tr></table></td></tr>
<tr><td>Total direct impact on UK commercial fisheries under Policy Option 1</td><td></td></tr>
<tr><td></td><td>The estimated annual value of UK landings and gross value added (GVA) affected is expected to fall within the following range of scenarios:
<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td><td>Best estimate</td></tr><tr><td>Value of landings affected</td><td>0.010</td><td>0.091</td><td>0.016</td></tr></table></td></tr>
</table>

Table 2b. Commercial fisheries	rMCZ 23, Yarmouth to Cowes

GVA affected	0.005	0.043	0.007

The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas.
The above values are likely to be overestimates as the Fisheries Model overestimates the number of vessels fishing in the site, and the implementation of the Southern IFCA Seagrass Managment Strategy to protect areas of sea grass through a voluntary code of conduct will close areas of sea grass to bottom trawls and dredges around the Isle of Wight. (Jury, J., Southern IFCA email, 24 April 2012).

Baseline description of non-UK fisheries	Costs of impact of rMCZ on non-UK commercial fisheries
	None.

Table 2c. Ports, harbours, shipping and disposal sites	rMCZ 23, Yarmouth to Cowes

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management scenario 1: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for navigational dredging that takes place within 1km of the rMCZ. The Balanced Seas regional MCZ project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the MCZ that will be needed relative to the mitigation provided in the baseline.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for disposal of dredged material, navigational dredging and all port and harbour developments within 5 km of the rMCZ. Also, additional costs to update the existing Maintenance Dredging Protocol (MDPs) for Southampton Water , Yarmouth and Lymington. The Balanced Seas regional MCZ project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the MCZ that will be needed relative to the mitigation provided in the baseline.

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
Disposal sites:. There is 1 site (WI080 Hurst Fort) within 5km of the rMCZ which is licensed for disposal of channel dredge material. The average number of licence applications received for this disposal site is 2.9 per year (based on number of licence applications received between 2001 and 2010 (Cefas, pers. comm., 2011). Hurst Fort dumping ground is used every winter by Lymington Harbour Commissioners, Berthon Marina (Lymington), Yacht Haven Marina (Lymington) and Yarmouth Harbour Commissioners (Lisher, C. email, feedback response to first tranche of IA material, 6 January 2012).	<table><tr><td>*£m/yr*</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Total</td><td>0.002</td><td>0.007*</td></tr></table> * This estimate for additional cost in future licence applications for port developments arising as a result of this rMCZ is not used to estimate the total costs for the IA. It is based on different assumptions to those used to estimate costs at a regional level and for the entire suite of sites. Also, this figure assumes that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal (every 3 years). It does not include the cost of incorporating MCZ features in an existing or new MDP. It is likely to over-estimate the cost of Scenario 2 for rMCZs with ports within 5km that have MDPs because of the savings in

Table 2c. Ports, harbours, shipping and disposal sites	rMCZ 23, Yarmouth to Cowes
Navigational dredge areas: There is licensed maintenance and navigational dredging within 1km of this rMCZ associated with the Yarmouth Harbour Commission and with the main shipping channel associated with Southampton Port. It is assumed that each dredge area's marine licence is renewed once every 3 years, and that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal. Within 5km of this rMCZ, maintenance and navigational dredging is carried out by the Yarmouth Harbour Commission, Southampton Port and the Port of Lymington. It is assumed that each dredge area's marine licence is renewed once every 3 years, and that an assessment of environmental impact upon rMCZ features is undertaken for each licence renewal. As these navigational dredge areas are covered by existing MDPs, it is assumed that the assessment of environmental impact is not changed over the 20 year period of the IA. ***Port development:*** There are three ports within 5km of the rMCZ that may undergo development in the future: Yarmouth, Lymington and Keyhaven (Ports & Harbours UK, 2012). This may not represent a full list of all ports and harbours impacted by the site. No port developments are known to be planned within the 20 year period of the Impact Assessment (IA).	future costs provided by an MDP. See Annex H for further information. ***Scenario 1:*** Future licence applications for navigational dredging within 1km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11). ***Scenario 2:*** Future licence applications for disposal of material, navigational dredging and port or harbour development plans and proposals within 5km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11). Additional costs will be incurred in the update of the existing Maintenance Dredging Protocols (MDPs) to consider the potential effects of activities on the features protected by the rMCZ.. The anticipated additional cost in the MDPs is estimated to be a one-off cost of £8438. ***Additional concerns raised by a stakeholder:*** If use of the Hurst Fort disposal site were restricted in any way, the costs of dredging for all facilities in the Lymington and Yarmouth area would escalate as the other disposal sites (Needles and Nab) are further away and require larger vessels (Lisher, C. email, feedback response to first tranche of IA material, 6 January 2012).

Table 2d. Recreational Anchoring	rMCZ 23, Yarmouth to Cowes
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Creation of no-anchoring zones for recreational vessels (except in emergency circumstances) over areas of moderate-energy infralittoral rock, intertidal underboulder communities, and Ross worm *Sabellaria spinulosa* reef. Creation of no-anchoring zones over areas of seagrass bed and installation of permanent eco-moorings In appropriate locations (assuming that the mooring structures provide the necessary mitigation of impacts on the feature). Also mitigation of impacts of anchoring racing marks in areas of seagrass beds.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Overview: The stretch of coastline from Yarmouth to Cowes is a popular area for recreational boating. It is located within the western Solent, a globally renowned sailing destination and home to Cowes Week, the largest sailing regatta of its kind in the world. Yarmouth, situated at the western end of the rMCZ, is possibly the busiest single tourist and recreational vessel destination in the Solent, if not on the south coast. It is a stopping-off point for vessels to and from the Channel Islands and northern France and for those heading further west along the south coast.	

Table 2d. Recreational Anchoring	rMCZ 23, Yarmouth to Cowes
Two sailing clubs adjacent to the harbour with almost 2,000 members, and 7 clubs in and around the Cowes area with 2,500 members, use this rMCZ and potentially anchor in it. The yachting activity brings direct employment to local people and business as well as attracting visitors to the area, which further contributes to the economy (RYA BS IA 1st Tranche Feedback, January, 2012). In terms of charter boats, 3 angling charters from Yarmouth Harbour, 6 from Keyhaven Harbour, 9 from Lymington Harbour on the mainland and 2 diving charters from Yarmouth Harbour potentially anchor in the rMCZ (StakMap). The Solent Local Group angling representatives have said that 112 private sea-angling boats are launched from Yarmouth and over 290 boats could potentially use and anchor in the rMCZ. The inshore area of the rMCZ, which coincides with all features recommended for protection, has a medium intensity of sea angling with 13 to 24 private boats operating at any given time depending on the season (Williams, T, Isle of Wight Angling Intensity Report, 2010). It can be assumed that these private boats will anchor on the features. (Information is provided below for the baseline and impacts for each feature as the features cover different areas.	
Moderate-energy infralittoral rock: This feature occurs just west of Thorness Bay along the Salt Mead Ledges within the rMCZ. StakMap data show that 1 sailing club uses this area for anchoring as part of a wider area. Five sea-angling clubs and 7 charter boats that use the area for fishing anchor anywhere depending on weather and tides (StakMap data). Solent Local Group sea-angling representatives said that small dinghies anchor here with light anchors (Balanced Seas Isle of Wight site meeting report, February, 2011).	***Moderate-energy infralittoral rock:*** Since the feature is intertidal, the intensity of anchoring is expected to be low. Creation of no anchoring zones over the feature is not expected to result in significant impacts or costs. It is anticipated that vessels that anchor over the feature will respond by anchoring in suitable alternative areas in the vicinity.
Intertidal underboulder communities: This feature occurs within the rMCZ between Egypt Point and Gurnard Head, just to the east of Gurnard Ledges. StakMap data show that 33 sailing clubs use this general area for anchoring. Stakeholders report that racing buoys with light anchors are laid seasonally in the general area of the rMCZ, but they are usually not laid this far inshore (Balanced Seas Isle of Wight site meeting report, February, 2011). Five sea-angling clubs and 7 charter boats fish in this part of the rMCZ and may anchor there depending on weather and tides (Stakmap, 2010).	***Intertidal underboulder communities:*** Participants at the Solent Local Group meeting in July 2011 said that, since this is an intertidal habitat, anchoring only occurs when the tide is in, and so overall anchoring activity is expected to be very low. Therefore, impacts on recreational anchoring of creation of no anchoring zones over areas of the feature are expected to be minimal, with no significant costs expected.
Ross worm* Sabellaria spinulosa *reef: This occurs just outside the mouth of Newtown Harbour, on the east site of the approach channel, within the rMCZ. StakMap data show intense use of the general area where Rossworm reef occurs. Between 25 and 33 sailing clubs using the area around the Rossworm reef for anchoring (Stakmap, 2010) and this has been confirmed by other stakeholders. Anchoring is mainly undertaken on the west side of the approach channel into Newtown Harbour (Balanced Seas Solent/IOW/Hants Sites Meeting Report, July 2011). Five sea-angling clubs and 7 charter boats highlighted the area as important for fishing, and	***Ross worm Sabellaria spinulosa reef:*** The distribution of this feature needs to be verified, but if the record held by the project is correct and it occurs only on the east side of the approach channel into Newtown Harbour, a no-anchoring zone would not impact on the recreational sector (Local Group meeting, 2011). The anchoring described in the baseline relates to the general area and is not specific to the small location where the feature occurs. Survey costs have been included in monitoring costs in Annex N12.

anglers may anchor there depending on weather and tides. There is thus little specific evidence for actual overlap of anchoring and Rossworm reef.	
Seagrass beds: This feature occurs in the rMCZ from the western boundary, across the mouth of the River Yar up to Yarmouth, with a small patch by Bouldnor. StakMap data show that 8 sailing clubs use the area as a potential anchoring spot. Royal Solent Yacht Club, adjacent to Yarmouth Harbour, lays racing marks in 6 areas that overlap the seagrass beds. The rMCZ covers 2 areas of the Club's moorings that are licensed by the Crown Estate and which the Club has requested are excluded from the rMCZ. Even if the Club had space to store them, it is not practical to lift the main types of boat that race at the Club out of the water between races, as they are traditional, heavy, often wooden keelboats. Also, there is not enough space in the harbour to keep afloat those boats that race twice a week throughout the season (RYA BS IA 2nd Tranche Feedback, February, 2012). Solent recreation representatives said that existing moorings would need to be maintained (Balanced Seas Solent/IOW/Hants Sites Meeting Report, July 2011). This could impact on the seagrass beds Five sea-angling clubs and 7 charter boats interviewed highlighted the area as important for fishing. They may anchor in the areas of seagrass depending on the weather and tides (StakMap, 2010). Yarmouth has 250 resident berths and 250 visitor berths; this includes 38 visitor moorings north of the breakwater outside the harbour at Yarmouth Roads for overspill which are laid and made available from April to September. Closer inshore, there is a permanent small-craft anchorage near the breakwater, and small-craft moorings east of Yarmouth Pier; these all overlap the seagrass beds (RYA BS IA 2nd Tranche Feedback, February, 2012).	***Seagrass beds:*** To mitigate impacts on the sea grass the management scenario that is used for the IA entails creation of no-anchoring zone over the seagrass beds, replacement of existing moorings in the areas of seagrass beds with eco-moorings and installation of further eco-moorings to mitigate impacts on the seagrass. This is suggested because of the potential impacts of existing moorings and the high level of anchoring and mooring over the seagrass, particularly in the summer. If additional moorings were not provided it is anticipated that this would result in significant displacement of anchoring into surrounding areas. Vessels would anchor in alternative areas to the west, in Alum Bay and Totland Bay (which occurs in rMCZ 20); to the east, in Newtown Harbour (parts of which are within an rMCZ Reference Area); or north on the other side of the Solent. This could increase travel costs for vessel users and greenhouse gas emissions. It would also result in loss of business for facilities in Yarmouth that provide services to vessel users. Costs have been estimated using the approach used for eco-mooring installation in Studland Bay (Marina Projects, 2011). Capital costs for the installation of 100 eco-moorings, which would accommodate the maximum level of anchoring in the rMCZ, are estimated to total £0.433m (see Annex H12 for the assumptions used in the calculations). This is a one-off cost assumed to occur in the first year after designation (2013) and includes the cost of removing and replacing the existing moorings at Yarmouth Harbour and Royal Solent Yachting Club. Operating costs, including maintenance of the eco-moorings and collection of mooring fees, are estimated to total £0.087 million per year (m/yr) (see Annex N12 for the assumptions used in the calculations). It is assumed that a fee for using the eco-mooring would be required to cover continued maintenance costs. For 100 eco-moorings, the total cost to visiting boats of such fees would be £0.090m/yr. (See Annex N12 for a full breakdown of costs and assumptions.) Yarmouth Harbour has indicated that an increase in mooring costs will put off visitors, especially those from abroad, and will cause a loss of income for the harbour and local businesses (C. Lisher, BS IA response, 2012). The total cost of eco-moorings is taken to be the sum of the mooring fees and capital costs, plus any operating costs not covered by the mooring fees. The

Table 2d. Recreational Anchoring	rMCZ 23, Yarmouth to Cowes
	present value of the costs is £1.700m. The use of the Studland Bay study seems appropriate as this took into consideration the whole of the Solent area, including the Isle of Wight, and vessel sizes and visitor activity are expected to be very similar in both locations. However, RYA has expressed concerns over the suitability of the eco-moorings due to stronger tides, which would put much more load onto the moorings than would normally be expected (off Yarmouth on the ebb, a spring tide can run at 4 knots) (Yarmouth Harbour Master, IA response, 2012) and possibly more difficult seabed conditions in the Solent compared with those found in Studland Bay. RYA suggests that use of the more traditional and probably more costly EzyRider system might need to be considered, if the helical moorings are not considered adequate. This would result in costs that are greater than those estimated in the IA (RYA BS IA 3rd Tranche Feedback, March, 2012). The impacts of racing marks laid out seasonally by the Royal Solent Yacht Club may be mitigated through using more environmentally friendly ground tackle, if this provides sufficient mitigation. Costs for suitable tackle were not available to inform this IA. If such mitigation is not sufficient, closure of the area to anchoring of racing marks would impact significantly on the club's activities and could make the club financially unviable since its primary function is the organisation of races and regattas (RYA BS IA 2nd Tranche Feedback, February, 2012). This would impact on its members and local businesses that provide services to them.

Table 2e. Renewable energy – tidal energy	rMCZ 23, Yarmouth to Cowes
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Management scenario 1: Increase in the costs of assessing environmental impacts for licence applications (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).	
Management scenario 2: Increase in the costs of assessing environmental impacts for licence applications and provision of additional mitigation of the impacts of cable protection (relative to the mitigation provided in the baseline).	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
	The estimated cost to tidal energy developers of the rMCZ is expected to fall within the

The rMCZ is adjacent to the Solent Energy nearshore deployment site, which has a potential capacity of 1 megawatt (MW) and is scheduled for development by 2015. It is part of the tidal energy project that is being implemented by the Solent Ocean Energy Centre (SOEC), which plans to install capacity totalling 21MW around the Isle of Wight (it has started initial trials) (SOEC, 2011). The Isle of Wight Council has indicated that this is one of the few areas in the UK where this technology could be implemented (Isle of Wight Council, pers. comm., March 2012). It is assumed for the purpose of the Impact Assessment (IA) that there would be one licence application within the time frame of the IA.

following range of scenarios:

£m/yr	Scenario 1	Scenario 2
Cost	0.001	0.001

For Scenario 1, If the rMCZ were designated, one licence application for the tidal energy installation will be required to consider the potential effects of construction and operational activities on the features protected by the rMCZ and the potential to achieve the rMCZ conservation objectives. This is expected to result in additional one-off costs of £0.013m in 2015 (based on, per broad-scale habitat assessed, 6 days of a consultant's time at £700 per day plus 1 day for legal review at £800 per day) with a present value cost of £0.012m.

For Scenario 2, the costs would be the same as for Scenario 1 plus additional costs of mitigating the impacts of cable protection. As the proposed cable routes are unknown, it is unclear whether routes for any inter-array or export cables will be sought that pass through the rMCZ, and if they are what length of cable protection may be required. If alternative cable protection is required to mitigate impacts, this is estimated to cost £1.000m/km more than the cable protection that would have been used in the absence of the MCZ. However, both Natural England and JNCC have said that this additional requirement is unlikely to be needed and so this additional cost is anticipated to be unlikely (Natural England and JNCC, pers. comm., 2012).

Additional concerns raised by stakeholders:

Both the industry and the Isle of Wight Council consider that additional baseline monitoring and ongoing monitoring will be required as a result of rMCZ designation and that the costs of this will be substantial, particularly for ongoing monitoring. It has estimated these will cost up to 20% of total project costs (which is £33.500m in total), or approximately £10.050m per year. As SOEC is conceived as a test and demonstration facility for numerous tidal energy devices, it has been suggested that any additional costs may need to apply to each device that is deployed (Fawcett. J tidal energy lead for the Isle of Wight Council., email, 7 March 2012.).

The industry has not been able to provide further details of estimated costs of impact (which it anticipates may arise in avoiding impacts on sensitive features, for cable protection, repowering and recommissioning). This is because tidal energy is still a very new industry and there are many unknown contributory factors (Fawcett. J, tidal energy lead for the Isle of Wight Council, email., 7 March 2012.).

Table 2f: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 23, Yarmouth to Cowes
Oil and gas related activities (including carbon capture and storage)	
This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the Recommended Marine Conservation Zone (rMCZ) (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the Recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 23, Yarmouth to Cowes
Commercial fisheries (collection by hand, mid-water trawls) Recreation (except for the activities listed above in table 2) Research and education Shipping Water abstraction, discharge and diffuse pollution*.*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[14] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.								rMCZ 21, Yarmouth to Cowes	
ENG Feature	**Represent-ativity**	**Replication**	**Adequacy**	**Viability**	**Gaps or shortfalls in relation to ENG minimum**	**Recommended conservation objective**	**Quantitative considerations at regional MCZ level**	**Ecological Importance at regional MCZ level**	**Ecological Importance at wider scale**

[14] copied from the JNCC and Natural England's advice to Defra on rMCZs

					guidelines				
A2.1 Intertidal coarse sediment	BSH	✓	✓	✓	None	Maintain			
A1.3 Low energy intertidal rock	BSH	✓	✓	✓	None	Maintain			
A3.2 Moderate energy infralittoral rock	BSH	✓	✓	✓	None	Recover			
A5.1 Subtidal coarse sediment	BSH	✓	✓	X	Viability not met	Maintain	This site has a significant contribution to the adequacy target in inshore sites.		
Estuarine rocky habitats	FOCI Habitat	✓	✓	✓	None	Maintain	This site is one of four rMCZs for this feature (min. target is 3)	Site includes some of the best examples of this feature in the region	BAP habitat – UK obligation, decline, key species

Intertidal underboulder communities	FOCI Habitat	✓	✓	✓	None	Recover	This site is one of four rMCZs for this feature (min. target is three)		BAP habitat – UK obligation, decline, functional habitat
Native oyster *Ostrea edulis* beds	FOCI Habitat	✓	X	X	Viability not met (though could be)*[3]	Maintain		This feature is not protected within existing MPAs.	OSPAR habitat
Peat and clay exposures	FOCI Habitat	✓	✓	✓	None	Recover			BAP habitat – Key species, functional habitat
Ross worm *Sabellaria spinulosa* reef	FOCI Habitat	✓	✓	✓	None	Recover			BAP and OSPAR habitat
Seagrass beds	FOCI Habitat	✓	✓	✓	None	Recover			BAP and OSPAR habitat
Lagoon sand shrimp *Gammarus insensibilis*	FOCI Species	✓	✓	✓	None	Maintain	This site is one of four rMCZs for this feature (min. target is three)		BAP species and listed on Schedule 5 of the Wildlife and Countryside Act.
Native oyster *Ostrea edulis*	FOCI Species	✓	X	X	Viability not met (though could be)*[3]	Maintain		This feature is not protected within existing MPAs.	BAP and OSPAR species

Site considerations	
Connectivity	✓
Geological/Geomorphological features of interest	Bouldnor Cliff
Appropriate boundary	✓
Areas of Additional Ecological Importance	✓
Overlaps with existing MPAs	✓

rRA 19 Newtown Harbour (Balanced Seas) (Natural England lead) within rMCZ 23. An overview of features proposed for designation within rRA Newtown Harbour recommended reference area and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale
✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Where an asterisk (*) has been given in the table, more detail is provided in the narrative.

ENG Feature	Representativity	Viability	Recommended conservation objective
Estuarine rocky habitats	FOCI Habitat	X	Recover to reference condition
Lagoon sand shrimp *Gammarus insensibilis*	FOCI Species	X	Recover to reference condition
A2.3 Intertidal mud	BSH	X	Recover to reference condition
A5.4 Subtidal mixed sediments	BSH	X	Recover to reference condition
Site considerations			
Appropriate boundary	X		

Additional comments and site benefits:

- Site contains features such as hard rock reefs and Peacock worm (*Sabella pavonina*), includes two of the Key Inshore Biodiversity Areas in the region, and is an important foraging area for a number of nationally and internationally important bird species such as common, little and Sandwich terns (South East England Biodiversity Forum (SEEBF) 2010). In addition, European eel, smelt and undulate ray are present throughout the site, although not listed as features for protection.
- The *Sabellaria* reefs enclosed within the rMCZ supports high species diversity (Balanced Seas 2011a).

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the rMCZ contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption	**rMCZ 23, Yarmouth to Cowes**	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Intertidal rock habitats are important sources of larval plankton, upon	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (including seagrass) recovered to favourable condition. New management of fishing activities is expected (above the	Anticipated direction of change: ⇧

Table 5a. Fish and shellfish for human consumption		rMCZ 23, Yarmouth to Cowes
which commercially important fish species feed, including mussel beds and larval fish of plaice and mackerel. Intertidal coarse sediment provides a scavenging area for fish, which supports commercial fisheries. Infralittoral rock is an important location for commercial inshore fishing activity, particularly for crab and lobster. Subtidal coarse sediment is an important nursery area for many species and provides potentially important spawning and nursery grounds for juvenile commercial species such as flatfishes and bass. Seagrass beds, which occur within the rMCZ, generally provide important nursery areas for flatfishes (Joint Nature Conservation Committee, 2011) and shellfish (Natural England website, seagrass beds article) and so are likely to help support on-site and off-site fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). Potting is the most important fishing activity. Oyster dredging is historically an important activity and, in recent years, cuttlefish trapping has also been a financially valuable activity. Oyster dredgers from various other ports, including Hamble and Southampton, fish the area if oyster beds develop. Recently effort has been low due to a shortage of oysters. There is also long lining activity. A description of on-site fishing activity and the value derived from it is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits which derives from the seagrass nursery area.	baseline situation), the costs of which are set out in Table 2b, which may reduce the impacts on fish and shellfish habitats and harvesting of stocks. As most of the commercial species targeted by fishers in this rMCZ are shellfish, it is unclear whether the scale of habitat recovered and the magnitude of reduced (on-site) harvesting will be enough to have any significant positive impact on commercial stocks. However, maintaining and monitoring the current level of potting practices and restricting other fishing practices over certain features will safeguard the healthy population of shellfish and by ensuring no increase in fishing activity occurs or alternative gears used, it is expected that the shellfish and other fish species population may increase over time. The recovery of the seagrass beds to favourable condition may improve their functioning as a nursery area, potentially benefiting fisheries exploited within and outside the rMCZ. Potential benefits may arise on-site, for fishers permitted to fish within the rMCZ, and off-site from spill-over benefits.	Confidence: Low

Table 5b. Recreation		rMCZ 23, Yarmouth to Cowes
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services.	If the conservation objectives of the features are achieved, some of the features, including the seagrass beds, will be recovered to favourable condition. Others will be maintained in favourable condition.	Anticipated direction of change: ⇧

Table 5b. Recreation		rMCZ 23, Yarmouth to Cowes
The subtidal coarse sediments and infralittoral rock within this rMCZ support high biodiversity and, as such, are likely to help support potential on-site and off-site angling activities (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The rMCZ is a popular area for both shore and boat angling. Due to the complex habitats within the site, it provides suitable habitat for many commercial fish species important for recreational angling, which is likely to help support potential on-site and off-site fisheries. An estimated 262 local private angling boats use this rMCZ (Isle of Wight Angling Boat Survey, T Williams, 2011), excluding boats the mainland. An estimated 2170 angling trips are made each year within this rMCZ including competitions (Shore Angling Intensity Report, T Williams, December 2010) with the most intense activity occurring during the summer months. Charter boats out of Yarmouth, Lymington and Southampton bring anglers to the site and charter boats from west of the project area use the site as well. To estimate the value of the site to anglers, Solent angling representatives have suggested using national statistics for the average annual household expenditure of sea anglers (£295 per year) as detailed in the Drew Report (2004). Assuming that one prviate boat equals one household, private boat anglers spend £77,290 per year within this rMCZ. Using the national average number of trips made by shore anglers per year (13.62; Drew Ltd 2004), it can be estimated that 159 shore anglers use this rMCZ. Assuming that each shore angler equates to one household, shore anglers spend £47,001 per year within this rMCZ. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site which result from the estuary spawning and nursery area.	The recovery of the seagrass beds and infralittoral rock to favourable condition may improve their functioning as a nursery area, potentially benefiting angling activities within and outside the rMCZ (see Table 4a). As no additional management of angling is expected (other than some restrictions on anchoring locations), fishers will be able to benefit from any on-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers, both on and off-site Designation of this site may lead to an increase in angling visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in angling.	Confidence: Low
Diving: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and	Designation of this site might lead to an increase in diving trips, as a result of publicity about the marine biodiversity and rare	Anticipated direction of

tourism services The rMCZ is used for diving and is popular both for wreck dives and for its abundant marine life (www.isleofwighttouristguide.com). It has not been possible to estimate the value derived from diving in the rMCZ.	species found in the site. If populations of species such as seahorses and stalked jellyfish increase, this could lead to an improved quality of experience for divers. The designation may lead to an increase in diving visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in diving trips at the national scale.	change: ⇧ Confidence: Low
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see Table 1 for details). The seagrass beds provide a safe haven for juvenile fish and other species such as sea horses, sea anemones and sessile jellyfish (Natural England website, seagrass beds article). These may contribute to an area of high biodiversity, which in turn supports foraging areas for sea birds. The rMCZ is a popular area for wildlife watching, particularly bird watching in Newtown Harbour where there are many waders and wildfowl in winter; breeding terns and gulls in summer and little egrets and grey herons all year round (Fat Birder Website). Grey seals and bottlenose dolphins are seen regularly in the Western Solent where the marine traffic is less intense (Isle of Wight County press Online and Cowes Online) and mammal-watching may therefore be undertaken from this rMCZ. It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	If the conservation objectives of the features are achieved, some of the features, including the seagrass beds, will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the seagrass beds and infralittoral rock to favourable condition may improve their functioning as a safe haven for sessile and low mobility species. Any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The whole rMCZ is an extremely popular tourist destination, especially	If the conservation objectives of the features are achieved, some of the features, including the seagrass beds, will be recovered to favourable condition. Others will be maintained in favourable condition.	Anticipated direction of change: ⇧

Table 5b. Recreation		rMCZ 23, Yarmouth to Cowes
for recreational sailing (www.redfunnel.co.uk/island-guide/things-to-do/sailing), charter boats and coastal walking (www.wight-cam.co.uk/WightCAM/HTML/CoastalPath&InlandTrails/BW-Stage4.htm) with numerous harbours, marinas, shopping facilities, camping sites and coastal paths available. It has not been possible to estimate the value derived from recreation and tourism services in the rMCZ.	Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities. If the rMCZ is designated this will provide an additional positive aspect about the location that could be promoted by the tourism and leisure industry and that would be expected to increase visitation rates.	Confidence: Low

Table 5c. Research and education		rMCZ 23, Yarmouth to Cowes
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. Hampshire and Isle of Wight Wildlife Trust is very active in the area, regularly conducting sea floor and sea shore surveys through Seasearch and Shoresearch (www.hwt.org.uk/events.php) and collating public sightings of marine mammals which are submitted to the Dorset Marine Mammal Research Programme and the South Coast Seal Project (Hampshire and IOW Wildlife Trust Website). The Standing Conference on Problems Associated with the Coastline (SCOPAC) also carries out research within this site, across the region between Lyme Regis and Shoreham (SCOPAC website). It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. Hampshire and Isle of Wight Wildlife Trust provides practical and theoretical learning opportunities as either taught lessons at its centres or as outreach in schools (Hampshire and Isle of Wight Wildlife Trust website). It has not been possible to estimate the value derived from education activities associated with the rMCZ.	MCZ designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ) education activities (e.g. events, interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Moderate

Table 5d. Regulating services	rMCZ 23, Yarmouth to Cowes	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: The features of the site contribute to the bioremediation of waste (subtidal sediments, native oyster, *Sabellaria* and seagrass beds), water filtration (native oyster, *Sabellaria* and seagrass beds) and sequestration of carbon (subtidal sediments, intertidal rock, native oyster, *Sabellaria* and seagrass beds) (Fletcher and others, 2011). ***Environmental resilience:*** The features of the site (native oyster, *Sabellaria* and intertidal rock) contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** The features of the site, (infralittoral rock, native oyster, *Sabellaria* and seagrass beds) contribute to local flood and storm protection (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the pMCZ.	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (subtidal mud, *Sabellaria* reefs, seagrass beds,seapens and burrowing megafauna and Native oysters) recovered to favourable condition. Recovery of the subtidal mud, *Sabellaria,* seagrass beds, seapendss and burrowing megafauna and Native oysters and a potential reduction in the use of bottom towed fishing gear may increase the site's benthic biodiversity and biomass, improving the regulating capacity its habitats. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 5e. Non-use and option values	rMCZ 23, Yarmouth to Cowes	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the rMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the pMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 23 Reference Area 19 Newtown Harbour **Site area (km^2): 1.19**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts			**rMCZ 23, Reference Area 19 Newtown Harbour**	
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) Reference Area lies within rMCZ 23 (Yarmouth to Cowes), on the north-western coast of the Isle of Wight. While this site may not contain the very best examples of features proposed for protection, it is none the less important because it contains a variety of different habitats, species and intertidal broad-scale habitats and is considered to be in very good ecological condition. Old salt workings at Newtown Quay form an important saline lagoon. The rare lagoon sand shrimp *Gammarus insensibilis* has been recorded here in the salt pans. Other features (native oysters, peat and clay exposures, and subtidal chalk) occur just outside the boundaries of the rMCZ Reference Area but within Newtown Harbour and may subsequently be found to occur within the site. Newtown Harbour is considered to be the best example of an undisturbed natural harbour on the south coast. The harbour is also a major wintering ground for wildfowl and waders, with important numbers of Brent geese, the black-tailed godwit, wigeon and teal. The wider rMCZ is an important foraging area for common terns, great cormorants, little terns, Mediterranean gulls and Sandwich terns, to which the rMCZ Reference Area may contribute. This site falls within the Solent Maritime Special Area of Conservation and Newtown Harbour Site of Special Scientific Interest, and is a National Nature Reserve managed by the National Trust. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A2.3 Intertidal mud	0.82	-	Unfavourable condition	Recover to favourable condition
A5.4 Subtidal mixed sediments	-	-	Unfavourable condition	Recover to favourable condition
Habitats of Conservation Importance				
Estuarine rocky habitats	34.78 m^2	-	Unfavourable condition	Recover to favourable condition
Species of Conservation Importance				
Lagoon sand shrimp *Gammarus insensibilis*	No data	-	Unfavourable condition	Recover to favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone (rMCZ) on human activities (over 2012 to 2031 inclusive)

Table 2a. Archaeological heritage	**rMCZ 23, Reference Area 19 Newtown Harbour**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Increase in the 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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**

Table 2a. Archaeological heritage	rMCZ 23, Reference Area 19 Newtown Harbour
A World War II bombing decoy site is recorded within the site. There is evidence of 17th- to 19th-century salt workings (Salterns). Several unidentified obstructions have been reported by fishers in the site (English Heritage, 2012).	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known, so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost for one licence application could be in the region of £500–£10,000, depending on the size of the rMCZ (English Heritage, pers. comm., 2012). If archaeologists respond to the prohibition of excavation by undertaking alternative archaeological excavations 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 Impact Assessment. The prohibition of excavation will prevent interpretation of archaeological evidence from the site, thereby decreasing the acquisition of historical knowledge of past human communities from the site, resulting in a cost to society.

Table 2b. Commercial fisheries	rMCZ 23, Reference Area 19 Newtown Harbour
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Closure of the entire site to all gear types.	
Summary of all fisheries: The rMCZ Reference Area lies within an estuary in rMCZ 23 Yarmouth to Cowes and is primarily intertidal, so there is little overlap with commercial fishing interests. It is unknown how many vessels use this rMCZ Reference Area, although it is indicated that some deploy bottom trawls, dredges, pots and traps, nets, hooks and lines fish at low levels (MCZ Fisheries Model, 2011). More detail on the approach used for the fisheries method is provided in Annexes H7 and N9. Estimated annual value of landings from the rMCZ Reference Area: £0.001 million per year (m/yr) (MCZ Fisheries Model). (Due to resolution issues of the MCZ Fisheries Model and the small size of many rMCZ Reference Areas in the Balanced Seas region, the values of some fisheries' landings may be inaccurate. They have been included as a precautionary measure and to avoid underestimating the economic value of a site.)	
Baseline description of UK commercial fisheries	**Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1**
Bottom trawls: It is unknown how many vessels use bottom trawls in the rMCZ Reference Area, but the MCZ Fisheries Model indicates that numbers are very low.	Estimated annual value of UK vessel landings affected: *£m/yr* | Scenario 2 Value of landings affected | <0.001
Dredges: It is unknown how many vessels use dredges in the rMCZ Reference Area, but the MCZ Fisheries Model indicates that numbers are very low.	Estimated annual value of UK vessel landings affected: *£m/yr* | Scenario 2 Value of landings affected | <0.001
Pots and traps: It is unknown how many vessels use pots and traps in the rMCZ Reference Area, but the MCZ Fisheries Model indicates that	Estimated annual value of UK vessel landings affected:

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries</th><th>rMCZ 23, Reference Area 19 Newtown Harbour</th></tr>
<tr><td colspan="2">numbers are very low.</td><td><table><tr><td>£m/yr</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><td colspan="2">Nets: It is unknown how many vessels use nets in the rMCZ Reference Area, but the MCZ Fisheries Model indicates that numbers are very low.</td><td>Estimated annual value of UK vessel landings affected:<table><tr><td>£m/yr</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><td colspan="2">Hooks and lines: It is unknown how many vessels use hooks and lines in the rMCZ Reference Area, but the MCZ Fisheries Model indicates that numbers are very low.</td><td>Estimated annual value of UK vessel landings affected:<table><tr><td>£m/yr</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><td colspan="2">Total direct impact on UK commercial fisheries under Policy Option 1</td><td></td></tr>
<tr><td colspan="2">Estimated annual value of landings from the rMCZ Reference Area: £0.001m/yr (MCZ Fisheries Model).</td><td>Estimated annual value of UK vessel landings and gross value added (GVA) affected:<table><tr><td>£m/yr</td><td>Scenario 1 and Best Estimate</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.001</td></tr><tr><td>GVA affected</td><td>0.000</td><td>0.001</td></tr></table></td></tr>
<tr><td colspan="2">Baseline description of non-UK fisheries</td><td>Costs of impact of rMCZ on non-UK commercial fisheries</td></tr>
<tr><td colspan="2"></td><td>None.</td></tr>
</table>

<table>
<tr><th colspan="2">Table 2c. Recreational Anchoring</th><th>rMCZ 23, Reference Area 19 Newtown Harbour</th></tr>
<tr><td colspan="3">Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1
Closure of the entire site (which comprises four separate segments within the harbour) to all recreational anchoring (except in emergency circumstances).</td></tr>
<tr><td colspan="2">Baseline description of activity</td><td>Costs of impact of rMCZ on the sector under Policy Option 1</td></tr>
<tr><td colspan="2">The main anchoring areas in Newtown Harbour have been excluded from the rMCZ Reference Area. Although stakeholder interviews indicated that there is a high intensity of anchoring in Newtown Harbour as a whole, this is in areas outside the four components of the rMCZ Reference Area. A total of 23 interviewees (representing 4,290 club members per year, or 21,804 individuals in total (including additional family members)) indicated that they anchor in the harbour more frequently than monthly (Stakmap, 2010). Permanent moorings have been installed in some areas but</td><td>The boundaries of this site (which is a ‘cluster’ of four separate areas) were developed with the National Trust, which manages the area, the Newtown Harbour Master and representatives of the angling and water-sports sectors, to ensure minimum impact on users and local businesses. The main anchoring areas in Newtown Harbour have been excluded from the rMCZ Reference Area and no significant impacts on the anchoring of recreational vessels are expected.</td></tr>
</table>

Table 2c. Recreational Anchoring	rMCZ 23, Reference Area 19 Newtown Harbour
anchoring in the seabed is popular, especially within Clamerkin Lake, which lies partially within the north-east segment of the site.	

Table 2d. Recreational sea angling	rMCZ 23, Reference Area 19 Newtown Harbour
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1	
Closure of the entire site to all recreational angling.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
The main angling areas in the harbour have been excluded from the rMCZ Reference Area. Sea angling is popular in the harbour, with shore angling taking place along the old sea walls and private boat angling within the bay (Balanced Seas Solent/IOW/Hants Sites Meeting Report, July 2011), but this is mainly in areas outside the four components of the rMCZ Reference Area.	The boundaries for the rMCZ Reference Area were developed with the National Trust, which manages the area, the Newtown Harbour Master and representatives of the angling and water-sports sectors, to ensure minimum impact on users and local businesses. The main angling areas in Newtown Harbour have been excluded from the rMCZ Reference Area and no significant impacts on recreational anglers are expected.

Table 2e: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 23 Reference Area 19 Newtown Harbour
Oil and gas related activities (including carbon capture and storage)	
This rMCZ Reference Area overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 27th Seaward Licensing Rounds). However, it is unlikely that any oil and gas (including carbon capture and storage) infrastructure will be proposed in future in this rMCZ Reference Area due to its location and size (DECC, pers. comm., 2012). Impacts of rMCZ Reference Areas on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the Recommended Marine Conservation Zone (rMCZ) (over 2012 to 2031 inclusive)

Table 3. Human activities in the site that are not negatively affected by the MCZ under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 23 Reference Area 19 Newtown Harbour
Flood and coastal erosion risk management (coastal defence) Recreation (except for the activities listed above in table 2) Research and education Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath rMCZ 23 Yarmouth to Cowes. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions in Annex H.

Table 4a. Fish and shellfish for human consumption	**rMCZ 23, Reference Area 19 Newtown Harbour**	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. Intertidal mud provides habitat for fish of commercial importance (Fletcher and others, 2011), and the harbour may provide a spawning and nursery area. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMCZ 23 Table 1 for details). There is very little fishing in the rMCZ Reference Area due to its intertidal nature. A description of on-site fishing activity and the value derived from it is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits that derive from any spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. The costs of this are set out in Table 2b. Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption. Closure of the rMCZ Reference Area to fishing activity will reduce the on-site fishing mortality of species, but as the site is small it is unclear whether this would benefit stocks of mobile commercial finfish species. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation	**rMCZ 23, Reference Area 19 Newtown Harbour**

Table 4b. Recreation	rMCZ 23, Reference Area 19 Newtown Harbour	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Intertidal mud provides habitat for fish of commercial importance (Fletcher and others, 2011) which are also of interest to anglers. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMCZ 23 Table 1 for details). Although Newtown Harbour is an important location for angling, the main angling areas were excluded from the rMCZ Reference Area itself, as described in Table 2c. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the potential spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Anticipated direction of change: ⇧ Confidence: Low
Diving: Diving is not known to take place in the site.	N/A	N/A
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services. This highly productive ecosystem is a very important feeding ground for wading birds that prey on macroinvertebrates as it is a primary feeding ground that is available all year round (Bale and others 2007 in Fletcher and others, 2011). The most important predators on intertidal mudflats are sole (*Solea solea)*, dab (*Limanda limanda*), flounder (*Platichthys flesus)* and plaice (*Pleuronectes platessa)* which feed on polychaetes, young bivalves and siphons. This habitat is used by migrating birds for feeding, in particular brent geese, shelduck, pintail, oystercatcher, ringed plover, grey plover, bar-tailed and black-tailed godwits, curlew, redshank, knot, dunlin and sanderling (Jones, Hiscock and Connor 2000in Fletcher and others, 2011).	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The recovery of the features to reference condition may improve their functioning as support for fish and bird populations, potentially benefiting wildlife watching within the rMCZ Reference Area. In addition, an improvement in the condition of site features and any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation	rMCZ 23, Reference Area 19 Newtown Harbour	
The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when some are in favourable condition and some are in unfavourable condition (see rMCZ 23 Table 1 for details). Given the good bird life in the harbour, bird watching is a popular activity and there are hides and nature trails (Natural England Newtown National Nature Reserve website). It has not been possible to estimate the value derived from wildlife watching in the site.	watching visits and/or a redistribution of location preferences. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services. Newtown Harbour is a very popular location for a range of recreational activities associated with the National Nature Reserve, including boating, swimming and walking (Natural England Newtown National Nature Reserve website). Between 10 and 20 people walk their dogs along the edge of the rMCZ Reference Area every day (Natural England Reference Area questionnaire with National Trust, December 2011). It has not been possible to estimate the value derived from other recreation in the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The rMCZ Reference Area is fully contained within rMCZ 2 for which the benefits of other recreation have been assessed. It is not possible to identify whether the Reference Area will have additional benefits over and above this but this seems unlikely. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4c. Research and education	rMCZ 23, Reference Area 19 Newtown Harbour	
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. A variety of research activities and monitoring are undertaken as part of management of the National Nature Reserve. It has not been possible to estimate the value derived from research activities associated with the rMCZ Reference Area.	The rMCZ Reference Area will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be	MCZ Reference Area designation may provide an opportunity to	Anticipated

Table 4c. Research and education	rMCZ 23, Reference Area 19 Newtown Harbour	
protected by the rMCZ Reference Area can contribute to the delivery of education services. The Medina Valley Centre carries out field studies in the rMCZ Reference Area about twice a year in collaboration with the National Trust (Natural England Reference Area questionnaire with National Trust, December 2011). There is a visitor centre with educational materials (Natural England Newtown National Nature Reserve website). It has not been possible to estimate the value derived from education activities associated with the rMCZ Reference Area.	expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ Reference Area) education activities (e.g. events and interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ Reference Area contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	direction of change: ⇧ Confidence: Moderate

Table 4d. Regulating services	rMCZ 23, Reference Area 19 Newtown Harbour	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: Intertidal mud contributes to the bioremediation of waste (Fletcher and others, 2011). ***Environmental resilience:*** N/A ***Natural hazard protection:*** Intertidal mud contributes to local flood and storm protection (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of intertidal mud and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the recommended Marine Conservation Zone Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities (as, if necessary, mitigation would be introduced, with the associated costs and benefits).	Anticipated direction of change: ⇧ Confidence: Low

Table 4e. Non-use and option values	rMCZ 23, Reference Area 19 Newtown Harbour	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence	Anticipated direction of change: ⇧

Table 4e. Non-use and option values	rMCZ 23, Reference Area 19 Newtown Harbour	
It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Confidence: Moderate

rMCZ 24.2 Fareham Creek **Site area (km^2): 3.58**

- This site has been proposed for designation under Policy Option 1.

Table 1. Conservation impacts				**rMCZ 24.2, Fareham Creek**
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) would protect an area rich in native oysters and sheltered muddy gravels. The site covers Fareham Creek, the north-westernmost tributary into Portsmouth Harbour. The banks of the estuary at Fareham are the only parts of Portsmouth Harbour that are undeveloped and thus retain their natural setting of wooded banks and grassland. Tagged grey seals frequent Portsmouth Harbour on a regular basis and so may occur here. This site is completely contained within the Portsmouth Harbour Site of Special Scientific Interest, Special Protection Area and Ramsar site. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Habitats of conservation importance				
Native Oyster beds	-	N/A	Favourable condition	Maintain at favourable condition
Sheltered muddy gravels	-	1 record	Favourable condition	Maintain at favourable condition
Species of conservation importance				
Native oyster (*Ostrea edulis*)	-	5 records	Favourable condition	Maintain at favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	**rMCZ 24.2, Fareham Creek**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Increase in costs of assessing environmental impacts for future licence applications (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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Mesolithic, palaeolithic and bronze-age artefacts have been recorded within the site (English Heritage, 2012).	An extra cost would be incurred in the assessment of environmental impact made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost of one licence application could be in the region of £500 to £10,000 depending

Table 2a. Archaeological heritage	rMCZ 24.2, Fareham Creek
	on the size of the MCZ (English Heritage, pers. comm., 2012). No further impacts on activities related to archaeology are anticipated.

Table 2b. National defence	rMCZ 24.2, Fareham Creek
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Mitigation of impacts of Ministry of Defence (MOD) activities on features protected by the suite of rMCZs will be provided by additional planning considerations during operations and training. It is not known whether mitigation will be required for features protected by this site. MOD will also incur costs in revising environmental tools and charts to include MCZs.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
MOD is known to make use of the site. Activities include sea bed sampling and machine gun firing.	It is not known whether this rMCZ will impact on MOD's use of the site. Impacts of rMCZs on national defence are assessed in Annex H10 and N9 (they are not assessed for this site alone).

Table 2c. Ports, harbours, shipping and disposal sites — **rMCZ 24.2, Fareham Creek**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management scenario 1: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for navigational dredging that takes place within 1km of the rMCZ. The Balanced Seas regional MCZ project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the MCZ that will be needed relative to the mitigation provided in the baseline.

Management scenario 2: Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for disposal of dredged material, navigational dredging and all port and harbour developments within 5 km of the rMCZ. Also, additional costs to update the Maintenance Dredging Protocol (MDP) being prepared by Portsmouth Port in order to assess impacts of activities on MCZ features. The Balanced Seas regional MCZ project is not aware of activities related to ports, harbours and shipping for which additional mitigation of impacts on features protected by the MCZ that will be needed relative to the mitigation provided in the baseline.

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
Disposal sites: There are two sites (WI065 Basin 1 Naval Base Portsmouth and WI064 Portsmouth Ballast) within 5km of the rMCZ which are licensed for disposal of channel dredge material. The average number of licence applications received for all of these disposal sites in total is 0.3 per year (based on number of licence applications received between 2001 and 2010 (Cefas, pers. comm., 2011). ***Navigational dredge areas:*** Maintenance dredging is licensed within 1km of the rMCZ. The main channel leading up to Bedenham Pier is used by ammunition barges for MOD, and has a maintained depth of 5 metres. The	*£m/yr* — Scenario 1: Cost to the operator 0.002; Scenario 2: 0.005* * This estimate for additional cost in future licence applications for port developments arising as a result of this rMCZ is not used to estimate the total costs for the IA. It is based on different assumptions to those used to estimate costs at a regional level and for the entire suite of sites. Also, this figure assumes that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal (every 3 years). It does not include the cost of incorporating MCZ features in an existing or new MDP. It is likely to over-estimate the cost of Scenario 2 for rMCZs with ports within 5km that have

Table 2c. Ports, harbours, shipping and disposal sites	rMCZ 24.2, Fareham Creek
channel is surveyed annually and dredged if necessary every 2 or 3 years by the Queen's Harbour Master Portsmouth. It is assumed that each dredge area's marine licence is renewed once every 3 years, and that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal. Maintenance dredging is licensed within 5km of the rMCZ. The main channel leading up to Bedenham Pier is used by ammunition barges for MOD, and has a maintained depth of 5 metres. The channel is surveyed annually and dredged if necessary every 2 or 3 years by the Queen's Harbour Master Portsmouth. It is assumed that each dredge area's marine licence is renewed once every 3 years, and that an assessment of environmental impact upon MCZ features is undertaken for each licence renewal. As this navigational dredge area is covered by an MDP, it is assumed that the assessment of environmental impact is not changed over the 20 year period of the IA. ***Port development:*** There is one port within 5km of the rMCZ which may undergo development in the future: Portsmouth. No port developments are known to be planned within the 20 year period of the Impact Assessment (IA).	MDPs because of the savings in future costs provided by an MDP. See Annex H for further information. ***Scenario 1:*** Future licence applications for navigational dredging within 1km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of costs by activity by site is provided in Annex N11). ***Scenario 2:*** Future licence applications for disposal of material, navigational dredging and port or harbour development plans and proposals within 5km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of costs by activity by site is provided in Annex N11). Also, additional costs will be incurred in updating the Maintenance Dredging Protocol (MDP) being prepared for Portsmouth Port as this will need to consider the potential effects of activities on the features protected by the rMCZ. The anticipated additional cost for MDPs is estimated to be a one-off cost of £8438..

Table 2d: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 24.2, Fareham Creek
Oil and gas related activities (including carbon capture and storage) This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 24.2 Fareham Creek

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 24.2 Fareham Creek
Cables (existing interconnectors and telecom cables) Commercial fisheries (mid-water trawls) Recreation Research and education Shipping Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[15] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.								rMCZ 24.2 Fareham Creek	
ENG Feature	**Represent-ativity**	**Replication**	**Adequacy**	**Viability**	**Gaps or shortfalls in relation to ENG minimum guidelines**	**Recommended conservation objective**	**Quantitative considerations at regional MCZ level**	**Ecological Importance at regional MCZ level**	**Ecological Importance at wider scale**
Native oyster *Ostrea edulis* beds	FOCI Habitat	✓	✓	✓	None	Maintain		Example of rMCZ for native oysters that are not commercially harvested. This feature	OSPAR habitat

[15] copied from the JNCC and Natural England's advice to Defra on rMCZs

								is not protected within existing MPAs	
Native oyster *Ostrea edulis*	FOCI Species	✓	✓	✓	None	Maintain		Example of rMCZ for native oysters that are not commercially harvested. This feature is not protected within existing MPAs	BAP and OSPAR species
Sheltered muddy gravels	FOCI Habitat	✓	✓	✓	None	Maintain			BAP habitat

Site considerations	
Connectivity	✓
Geological/Geomorphological features of interest	None
Appropriate boundary	✓
Areas of Additional Ecological Importance	X
Overlaps with existing MPAs	✓

Additional comments and site benefits:

- Considered to be a good site for protection of a natural, and unharvested, population of native oysters *Ostrea edulis* which are of national and international importance through their inclusion on BAP and OSPAR lists (BRIG 2007).
- The area is part of one of the Key Inshore Biodiversity Areas in the region (South East England Biodiversity Forum (SEEBF) 2010).

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the rMCZ contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption	**rMCZ 24.2, Fareham Creek**	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Sheltered muddy gravels support commercially targeted fish and shellfish. Native oyster reef supports the production of commercial fish and large mobile crustaceans for the functional lifetime of the reef (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see Table 1 for details). Although previously fished for native oysters, there is a byelaw	If the conservation objectives of the features are achieved, the features will be maintained in favourable condition. No additional management (above that in the baseline situation) of fishing activities is expected. However, maintaining and monitoring the current fishing practices will safeguard the population of commercial fish and ensure no increase in fishing activity occurs or alternative gears are used. No change in feature condition or harvesting of fish and shellfish is anticipated and therefore no impact on on-site or off-site benefits is expected. Designating the rMCZ will protect its features and the ecosystem	Anticipated direction of change: ⇔ Confidence: Moderate

prohibiting dredging in order to protect the seagrass beds and so there is currently no oyster fishing.	services that they provide against the risk of future degradation from pressures caused by human activities.	

Table 5b. Recreation	**rMCZ 24.2, Fareham Creek**	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. The sheltered muddy gravels found within this rMCZ support high biodiversity and, as such, are likely to help support potential on-site and off-site angling activities (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see Table 1 for details). The rMCZ is a popular area for local shore anglers particularly at low tide (World Fishing Forum). Due to the complex habitats within the site, it provides suitable habitat for many commercial fish species, which are fished recreationally and is likely to help support potential on-site and off-site angling. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site which result from rMCZ.	If the conservation objectives of the features are achieved, all features will be maintained in favourable condition As no additional management of angling is expected (other than some restrictions on anchoring locations), fishers will be able to benefit from any on-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers, both on and off-site. Designation of this site may lead to an increase in angling visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in angling.	Anticipated direction of change: ⟺ Confidence: Moderate
Diving: Diving is not known to take place in the rMCZ.	N/A	N/A
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see Table 1 for details). The sheltered muddy gravels within the rMCZ contribute to an area of	If the conservation objectives of the features are achieved, all features will be maintained in favourable condition. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities. If the rMCZ is designated this will provide an additional positive	Anticipated direction of change: ⟺ Confidence: Moderate

Table 5b. Recreation		rMCZ 24.2, Fareham Creek
high biodiversity which in turn may support foraging areas for sea birds, particularly waders such as oyster catcher and redshank. The rMCZ is a popular area for bird watching (www.hants.gov.uk/rh/walking/feat.pdf). It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	aspect about the location that could be promoted by the tourism and leisure industry and that would be expected to increase visitation rates, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in wildlife watching trips at the national scale.	
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The rMCZ is used for sailing (www.sailingnetworks.com/organisation/view/286) and coastal walking (www.hants.gov.uk/rh/walking/feat.pdf). It has not been possible to estimate the value derived from tourism in the rMCZ.	If the conservation objectives of the features are achieved, all features will be maintained in favourable condition. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities. If the rMCZ is designated this will provide an additional positive aspect about the location that could be promoted by the tourism and leisure industry and that would be expected to increase visitation rates.	Anticipated direction of change: ⟺ Confidence: Moderate

Table 5c. Research and education		rMCZ 24.2, Fareham Creek
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. Hampshire and Isle of Wight Wildlife Trust may undertake research in this rMCZ, as may local universities and other institutions. It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. Hampshire and Isle of Wight Wildlife Trust may provide educational activities in this rMCZ (Hampshire and Isle of Wight Wildlife Trust website). It has not been possible to estimate the value derived from education activities associated with the rMCZ.	MCZ designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ) education activities (e.g. events, interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational	Anticipated direction of change: ⇧ Confidence: Moderate

	resources developed for use in schools).	

Table 5d. Regulating services		rMCZ 24.2, Fareham Creek
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: The features of the site (native oysters and sheltered muddy gravels) contribute to the sequestration of carbon. (Fletcher and others, 2011) ***Environmental resilience:*** The features of the site (native oysters and sheltered muddy gravels) contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** The features of the site (native oysters) contribute to local flood and storm protection (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the pMCZ.	If the conservation objectives of the features are achieved, the features will be maintained in favourable condition. No change in feature condition and management of human activities is expected and therefore no benefit to the regulation of pollution is expected. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⟺ Confidence: Moderate

Table 5e. Non-use and option values		rMCZ 24.2, Fareham Creek
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the rMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the pMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation. Examples of these values are shown in (Ranger, Lowe, Sanghera, & Solandt, 2012). Voters in the MCS's 'Your Seas Your Voice' campaign felt that features of the natural environment were strong motivators for reasons why people thought that areas within the rMCZ should be protected, with people frequently attaching value to biodiversity and 'outstanding scenery.' A feeling	Anticipated direction of change: ⇧ Confidence: Moderate

	of emotional attachment to the site was highlighted as important as well. Regarding non-extractive use value, ease of access and close proximity for recreational users were considered important as reasons to protect this site. Source: Ranger and others. (2011)	

rMCZ 25.1 Reference Area 11 Church Norton Spit — Site area (km^2): 0.03

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts			**rMCZ 25.1, Reference Area 11 Church Norton Spit**	
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) Reference Area lies within rMCZ 25.1 (Pagham Harbour) and is of very high importance for the rare Defolin's lagoon snail *Caecum armoricum* as it is one of only two locations where this species has been recorded within the Balanced Seas Project Area. Previously known in the UK only from a single record on the Fleet in Dorset, this species was found in 2007 in the upper shore shingle on Church Norton Spit, above mean high water. The rMCZ Reference Area covers part of the shingle spit only, from mean high water on the harbour side to mean high water on the seaward side (no subtidal water is included). The wider rMCZ supports ideal conditions for breeding common and little terns and other shore birds, and has roosting sites for waders on the shingle coastline, to which this site may contribute. The rMCZ Reference Area lies within Pagham Harbour Local Nature Reserve which and is also a Site of Special Scientific Interest, a site protected under the Ramsar Convention and a Special Protection Area. The entire spit is fenced off from April to July (or August depending on the status of the ground-nesting birds) and the rMCZ Reference Area lies entirely within this existing seasonal closed area. Source: Balanced Seas Final Recommendations (2011) and Balanced Seas Final Final Recommendations Amendments Report (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**impact**
Species of Conservation Importance				
Defolin's Lagoon Snail *Caecum armoricum*	-	1 record	Unfavourable condition	Recover to favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone (rMCZ) on human activities (over 2013 to 2032 inclusive)

Table 2a. Recreational angling	**rMCZ 25.1, Reference Area 11 Church Norton Spit**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Closure of entire site to all recreational angling.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
It is understood that anglers cast their lines only below mean high	It is not anticipated that the Reference Area will impact on where anglers cast their

Table 2a. Recreational angling	rMCZ 25.1, Reference Area 11 Church Norton Spit
water and so will not be fishing in the rMCZ Reference Area, which covers only intertidal areas. Shore angling takes place on the harbour side of the rMCZ Reference Area through a permit scheme (25 permits are issued by the local nature reserve). Generally only one shore angler fishes from the shore at a time, for approximately an hour a day from September to March during mid-tide when water is entering the harbour (T. Osborne, email, 12th July 2011). There is no access to Church Norton Spit within the rMCZ Reference Area from 1 April to 31 July as it is part of the area closed seasonally to protect breeding terns and other birds. On the seaward side, larger numbers of shore anglers use the area, particularly in September and October, and slightly longer if the early autumn is warm and fish (bass and mullet) linger in the harbour. Rod holders or shelters are pushed down into the shingle for stability (T. Osborne, email, 12th July 2011; Natural England Stakeholder Interview for rMCZ Reference Area 11Church Norton Spit, November 2011).	lines. If it transpires that the activities of anglers on the shore, such as pushing rod holders into the surface of the shingle spit and erecting shelters are impacting on the site's features, mitigation may be required. Given the low level of use of the shore by anglers, it is not anticipated that this would have a significant impact.

Table 2b. Recreation – Walking (including dog walking)	rMCZ 25.1, Reference area 11 Church Norton Spit
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 ***Management scenario 1 (uniform management):*** People walking through the rMCZ will be encouraged to use marked routes; dog walkers will be required to dispose of dog faeces in provided facilities.	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
Significant numbers of people enjoy walking along the spit throughout the year but they tend to follow the tracks as softer single areas (where Defolins Lagoon Snail occurs) are hard to walk in. It is therefore anticipated that walkers will have a neglible impact on the site's features. Dog walking takes place along the spit at a very low level on a small strip of the Reference Area on the landward side (Natural England Stakeholder Interview for rMCZ Reference Area 11Church Norton Spit, November 2011). There is no Dog Control Order in place but there is a Dog on Lead byelaw	Given that walking would still be allowed in the site, that some regulations are already in place and that walkers prefer not to walk on shingle which is where Defolins Lagoon Snail occurs, impacts are likely to be negligible. If the rMCZ Reference Area is designated, visitors would be encouraged to use existing marked routes to avoid adverse effects, and dog walkers would be required to remove and dispose of dog faeces in provided facilities. Costs of the site would include the cost of notifying visitors of the need to stay on to designated paths if walkers were found to impact on the site's features and such notification is not in place already. Also costs of notifying people of the need to remove dog faeces and the location of the nearest disposal facility

Table 2b. Recreation – Walking (including dog walking)	rMCZ 25.1, Reference area 11 Church Norton Spit
which only allows dogs off leads between mean low water and mean high water. If dog fouling occurs this can be prosecuted through the District Council through a fixed penalty. The top of the spit ridge within the rMCZ Reference Area is closed to the public during the summer months to protect the breeding colony of terns as per SPA regulations (Natural England Stakeholder Interview for rMCZ Reference Area 11Church Norton Spit, November 2011).	if this is found to impact on the site's features, though adequate control should be provided if the existing management of dog fouling is effective. These costs are included in the costs of managing the site.

Table 2c: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 25.1 Reference Area 11 Church Norton Spit
Oil and gas related activities (including carbon capture and storage)	
This rMCZ Reference Area overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 27th Seaward Licensing Rounds). However, it is unlikely that any oil and gas (including carbon capture and storage) infrastructure will be proposed in future in this rMCZ Reference Area due to its location and size (DECC, pers. comm., 2012). Impacts of rMCZ Reference Areas on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 25.1 Reference Area 11 Church Norton Spit
Recreation (except for the activities listed above in table 2) Research and education Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath : rMCZ BS 25.1 Pagham Harbour This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions in Annex H.

Table 4a. Fish and shellfish for human consumption	**rMCZ 25.1, Reference Area 11 Church Norton Spit**	
Baseline	**Beneficial impact under Policy Option 1**	
There are no features to be protected by the recommended Marine Conservation Zone that contribute to the delivery of fish and shellfish for human consumption, and no fishing activities take place within the site.	N/A	N/A

Table 4b. Recreation	**rMCZ 25.1, Reference Area 11 Church Norton Spit**	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: There is a small amount of shore angling adjacent to this recommended Marine Conservation Zone (rMCZ) Reference Area as described in Table 2a. The anglers stand within the rMCZ Reference Area but the majority of lines are cast outside the site.	N/A	N/A
Diving: Diving is not known to take place in the site.	N/A	N/A
Wildlife watching: As part of an existing nature reserve, this rMCZ Reference Area is a very important site for wildlife watching with regular visitors who come particularly for bird watching (Natural England Reference Area questionnaire, November 2011). It has not been possible to estimate the value derived from wildlife watching in the rMCZ Reference Area.	If the conservation objectives of the feature are achieved, the feature will be recovered to reference condition. However, the Defolin's lagoon snail, given its microscopic size, will not itself contribute to benefits from wildlife watching.	N/A

Table 4b. Recreation	rMCZ 25.1, Reference Area 11 Church Norton Spit	
Other recreation: The rMCZ Reference Area is popular for a range of recreational activities associated with the existing nature reserve, particularly walking (a byelaw requires dogs to be kept on leads) (Natural England Reference Area questionnaire, November 2011). It has not been possible to estimate the value derived from other recreation in the rMCZ Reference Area.	If the conservation objectives of the feature are achieved, the feature will be recovered to reference condition. The rMCZ Reference Area is fully contained within rMCZ 2 for which the benefits of other recreation have been assessed. It is not possible to identify whether the Reference Area will have additional benefits over and above this but this seems unlikely. Designating the rMCZ Reference Area will protect its feature and the ecosystem services that it provides against the risk of future degradation from pressures caused by human activities (because, if necessary, mitigation would be introduced, with the associated costs and benefits).	Anticipated direction of change: ⇧ Confidence: Low

Table 4c. Research and education	rMCZ 25.1, Reference Area 11 Church Norton Spit	
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the feature to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. A range of monitoring and research activities are undertaken as part of the management of the nature reserve (Natural England Reference Area questionnaire, November 2011). It has not been possible to estimate the value derived from research activities associated with the rMCZ Reference Area.	The rMCZ Reference Area will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the feature to be protected by the rMCZ Reference Area can contribute to the delivery of education services. A number of educational activities are carried out by the nature reserve management, involving both adults and children (Natural England Reference Area questionnaire, November 2011). It has not been possible to estimate the value derived from education activities associated with the rMCZ Reference Area.	MCZ Reference Area designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ Reference Area) education activities (e.g. events and interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ Reference Area	Anticipated direction of change: ⇧ Confidence: Moderate

Table 4c. Research and education	rMCZ 25.1, Reference Area 11 Church Norton Spit	
	contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	

Table 4d. Regulating services	rMCZ 25.1, Reference Area 11 Church Norton Spit	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: N/A	N/A	N/A
Environmental resilience: N/A	N/A	N/A
Natural hazard protection: N/A	N/A	N/A

Table 4e. Non-use and option values	rMCZ 25.1, Reference Area 11 Church Norton Spit	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its feature and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the feature and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 25.2 Selsey Bill and the Hounds

Site area (km^2): 12.90

- This site is proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts	rMCZ 25.2, Selsey Bills and the Hounds
1a. Ecological description	
This recommended Marine Conservation Zone (rMCZ) would protect the unusual outcrops of limestone and clay exposures (the Hounds, the Malt Owers, the Streets, the Grounds and the Mixon) and a section of the geological feature, Bracklesham Bay. This site is well known for its high biodiversity, created by the unusual sea bed topography and indicated by the benthic biotope richness data. In the south-east of the site is the Mixon Hole, a dramatic 20 metre drop in the sea floor exposing clay cliffs capped with limestone which support a rich diversity of habitats and species. The Hounds, lying to the west of	

Selsey Bill, is a reef formed of limestone cap-rock, with an underlying softer clay layer eroded in places to form holes and caves. The bedrock outcrops are sparsely colonised by an assortment of algal species, such as kelp and red foliose algae, and sessile species, such as anemones and sponges. The reef is considered important, as sublittoral rocky reefs account for less than 3% of the total Sussex sea bed (within 12nm) and exposed limestone strata are also rare. The Mixon Hole contains the most important examples of peat and clay exposures in the region. Selsey Bill and the Hounds is a crucial foraging area for common tern, little tern and Sandwich tern in the spring, and for nearby breeding birds in the summer. The Hounds and the Streets are important haul-out sites for seals. In addition, the important south-east features of hard rock reefs and Ross coral *Pentapora foliacea* also occur here. The site overlaps with Bracklesham Bay Site of Special Scientific Interest, designated for its geological interest. The Hounds and Mixon Hole were identified as marine Sites of Nature Conservation Importance (mSNCIs)[16] in 2001 by West and East Sussex County Councils.
Source: Balanced Seas Final Recommendations (2011)

1b. Baseline condition of MCZ features and impact of the MCZ

Feature	Area of feature (km2)	No. of occurrences	Baseline	Impact
Broad-scale habitats				
A3.1 High energy infralittoral rock	2.33	-	Favourable condition	Maintain at favourable condition
A5.2 Subtidal sand	4.98	-	Favourable condition	Maintain at favourable condition
A5.4 Subtidal mixed sediments	4.79		Favourable condition	Maintain at favourable condition
Habitats of conservation importance				
Peat and clay exposures	7,394 m^2	-	Favourable condition	Maintain at favourable condition
Species of conservation importance				
Short-snouted seahorse (*Hippocampus hippocampus*)	-	No records	Favourable condition	Maintain at favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage — **rMCZ 25.2, Selsey Bill and the Hounds**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Increase in costs of assessing environmental impacts for future licence applications (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. However, restrictions could be placed on archaeological excavation in areas of peat and clay exposures in the site.

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
Objects of all periods from the Palaeolithic to the Roman period have been recovered from the foreshore along the eroding coastline and objects and sites have been spotted further out away from the coast (English Heritage, 2012).	An extra cost would be incurred in the assessment of environmental impact made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence

[16] Marine SNCIs are non-statutory sites identified on account of their special interest with regard to habitat, wildlife, geology or geomorphology by East and West Sussex County Councils.

Table 2a. Archaeological heritage	rMCZ 25.2, Selsey Bill and the Hounds
	application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost in one licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). No further impacts on activities related to archaeology are anticipated. If archaeologists respond to restrictions on excavation in areas of peat and clay exposures by undertaking alternative archaeological excavations 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 Impact Assessment. If archaeological excavations do not take place as a result of this restriction, this will prevent interpretation of archaeological evidence from the site which will decrease acquisition of historical knowledge of past human communities from the site, resulting in a cost to society.

Table 2b. Renewable energy – tidal energy — **rMCZ 25.2, Selsey Bill and the Hounds**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Management scenario 1: Increase in costs of assessing environmental impacts for licence applications (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).

Management scenario 2: Increase in costs of assessing environmental impacts for licence applications and provision of additional mitigation of impacts of cable protection (relative to the mitigation provided in the baseline).

Baseline description of activity

There is potential for future developments that generate electricity using the tidal energy resource in this rMCZ.

The rMCZ overlaps with the East of Isle of Wight Area of Potential, for which there is anticipated energy generation potential of 100MW (Department of Energy and Climate Change, pers. comm., 2011). It is assumed for the purpose of the Impact Assessment (IA) that there would be one licence application within the timeframe of the IA. However, it is unlikely, though still possible, that deployment of tidal energy technology will take place in the rMCZ during the 20 year period covered by the IA.

Costs of impact of rMCZ on the sector under Policy Option 1

The estimated cost to tidal energy developers of the rMCZ is expected to fall within the following range of scenarios:

£m	Scenario 1	Scenario 2
Cost	0.001	0.001

For Scenario 1, If the rMCZ is designated, one licence application for the tidal energy installations could be required to consider the potential effects of the construction and operational activities on the features protected by the rMCZ and the potential to achieve the MCZ conservation objectives. This is expected to result in one-off costs of £0.011m in 2015 (based on, per broad-scale habitat assessed, 6 days of a consultant's time at £700/day + 1 day for

Table 2b. Renewable energy – tidal energy	rMCZ 25.2, Selsey Bill and the Hounds
	legal review at £800/day) with a present value cost of £0.009m. For Scenario 2, the costs would be the same as for Scenario 1 plus the additional costs of mitigating the impacts of cable protection. As the proposed cable routes are unknown, it is unclear whether routes for any inter-array or export cables will be sought that pass through the rMCZ, and if they are what length of cable protection may be required. If alternative cable protection is required to mitigate impacts, this is estimated to cost £1m/km. However, both Natural and JNCC have said that this additional requirement is unlikely to be needed and so this additional cost is anticipated to be unlikely (Natural England and JNCC, pers. comm., 2012).

Table 2c: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 25.2, Selsey Bill and the Hounds
Oil and gas related activities (including carbon capture and storage) This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (MCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 25.2, Selsey Bill and the Hounds
Commercial fisheries (bottom trawls, collection by hand, dredges, hooks and lines, mid-water trawls, nets, pots and traps) Flood and coastal erosion risk management activities - current plans (based on advice provided by Natural England (pers. comm., 26.6.12) that mitigation is not needed for impacts that arise as a result of natural processes associated with managed realignment), Recreation Research and education Shipping Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[17] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.								rMCZ 25.2, Selsey Bill and the Hounds	
ENG Feature	**Represent-ativity**	**Replication**	**Adequacy**	**Viability**	**Gaps or shortfalls in relation to ENG minimum guidelines**	**Recommended conservation objective**	**Quantitative considerations at regional MCZ level**	**Ecological Importance at regional MCZ level**	**Ecological Importance at wider scale**
A3.1 High Energy infralittoral rock	BSH	✓	✓	X	Not viable	Maintain	This site makes the second greatest contribution towards the adequacy target in the region for this feature		
A5.2 Subtidal sand	BSH	✓	✓	X	Not viable	Maintain			
A5.4 Subtidal mixed sediments	BSH	✓	✓	X	Not viable	Maintain			
Peat and clay exposures	FOCI Habitat	✓	✓	✓	None	Maintain		One of the most important examples of this feature within the region	BAP habitat – key species, functional habitat

[17] copied from the JNCC and Natural England's advice to Defra on rMCZs

Short-snouted seahorse *Hippocampus hippocampus*	FOCI Species	✓	✓	✓	This feature is not found in or near the rMCZ	Maintain	We have low confidence that this feature occurs in this site; this feature is redundant	This feature is not protected within existing MPAs.	OSPAR species and BAP species – International threat. Listed on Schedule 5 of Wildlife and Countryside Act

Site considerations	
Connectivity	✓
Geological/Geomorphological features of interest	Bracklesham Bay GCR * [1]
Appropriate boundary	X
Areas of Additional Ecological Importance	✓ * [2]
Overlaps with existing MPAs	✓ * [3]

rRA 12 Mixon Hole (Northern Slope) (Balanced Seas) (Natural England lead) within rMCZ 25.2. An overview of features proposed for designation within Mixon Hole (Northern Slope) and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale
✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Where an asterisk (*) has been given in the table, more detail is provided in the narrative.

ENG Feature	**Representativity**	**Viability**	**Recommended conservation objective**
Peat and clay exposures	FOCI Habitat	X	Recover to reference condition
A5.4 Subtidal mixed sediment	BSH	X	Recover to reference condition
Site considerations			
Appropriate boundary	X		

Additional comments and site benefits:

- [1] Geological features of interest protected under SSSI; unprotected subtidal extension of feature is proposed for designation. The geological feature, Bracklesham Bay is incorporated into the site boundaries where the Earnley Clay Formation exposes Eocene fossils along the beach. 'Gallo-Belgique' archaeology is present in this area (Brooks, et al. 2009).
- [2] Crucial foraging area for common tern, Sandwich tern and little tern, and breeding birds in the area. Two of the SNCIs are important haul-out sites for seals. Important south-east features such as rock reefs and Ross coral occur within the rMCZ
- [3] This MCZ overlaps with 5 marine Sites of Nature Conservation Interest (SNCI: non statutory designations, uniquely allocated to marine features by West and East County Councils)
- One of the most important examples of peat and clay exposures within the Balanced Seas region (Balanced Seas 2011a). This feature is found on the clay cliff face which extends 30m down and supports an array of flora and fauna. Due to the location of this peat and clay feature there are very few activities which overlap with it and therefore the feature is in one of the best natural states in the region (Balanced Seas 2011c).

- The key features of this site are the unusual outcrops of limestone and clay exposures. The reef is considered important as sublittoral rocky reefs account for less than 3% of the total Sussex sea beds (within 12nm) and exposed limestone strata are also rare, being mostly sandstone or chalk (R. Irving 1996).
- Mixon hole is recognised as an Important Plant Area for its unusual algal communities (Brodie, et al. 2007).
- Mixon hole site was one of the recommendations put forward by the Marine Conservation Society as part of their 'Your Seas Your Voice' Campaign (Marine Conservation Society (MCS) 2011).
- Mixon hole is thought to be a segment of an ancient river gorge swept clear by tidal current; the Hole contains Roman remains of worked stone in the form of large cuboidal blocks and spherical catapult balls (R. Irving 1996).
- Ledges, crevices and fissures of clay in the Mixon hole are covered by foliose red algae, bored by piddocks *Pholas dactylus* and inhabited by crustaceans such as squat lobsters, edible crab, etc and fish species such as Tompot Blennies and leopard-spotted gobies. This site is well known for its high biodiversity created by the unusual seabed topography and indicated by the benthic biotope richness data (Jackson, Langmead, et al. 2009, Defra n.d., R. Irving 1996).
- One of the Key Inshore Biodiversity Areas in the Balanced Seas Region (South East England Biodiversity Forum (SEEBF) 2010).
- There is scientific value in this site because it is well studied with good data (Jackson, Langmead, et al. 2009, Seeley, Higgs, et al. 2010b, Seeley, Lear, et al. 2010a, R. Irving 1996).

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the rMCZ contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption	**rMCZ 25.2, Selsey Bill and the Hounds**	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Subtidal sand and subtidal mixed sediments are important spawning and nursery grounds for juvenile commercial species such as flatfishes and bass. Infralittoral rock is suitable habitat for inshore commercial fisheries species, particularly lobster and crab (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the	If the conservation objectives of the features are achieved, the features will be maintained in favourable condition. No additional management (above that in the baseline situation) of fishing activities is expected. However, maintaining and monitoring the current fishing practices will safeguard the population of commercial fish and ensure no increase in fishing activity occurs or alternative gears are used. No change in feature condition or harvesting of fish and shellfish is anticipated and therefore no impact on on-site or off-site benefits is expected.	Anticipated direction of change: ⇔ Confidence: Moderate

site when in favourable condition (see Table 1 for details). The rMCZ is one of the most important potting grounds on the south coast and also has a high level of netting.. The total value of landings derived from commercial fisheries within this site is £0.059m/yr (MCZ Fisheries Model). It has not been possible to estimate the value of the off-site benefits which derives from the spawning and nursery area.	Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	

Table 5b. Recreation	**rMCZ 25.2, Selsey Bill and the Hounds**	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. The infralittoral rock and subtidal sand found within this rMCZ support high biodiversity and are important spawning and nursery grounds for commercially important fish species and, as such, are likely to help support potential on-site and off-site angling activities (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see Table 1 for details). The rMCZ is a popular area for both shore and boat angling including charter vessels. The reef features such as The Hounds, The Streets and Mixon Hole are particularly popular boat fishing spots as well as Selsey Bill itself. Shore anglers will frequent anywhere with good access and hotspots include both the west and east beach either side of Selsey Bill (Total fishing website). Due to the complex habitats within the site, it provides suitable habitat for many commercial fish species, which is likely to help support potential on-site and off-site fisheries. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site which result from the estuary spawning and nursery area.	If the conservation objectives of the features are achieved, all features will be maintained in favourable condition. As no additional management of angling is expected (other than some restrictions on anchoring locations), fishers will be able to benefit from any on-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers, both on and off-site Designation of this site may lead to an increase in angling visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in angling.	Anticipated direction of change: ⟺ Confidence: Moderate

Table 5b. Recreation		rMCZ 25.2, Selsey Bill and the Hounds
Diving: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The rMCZ is used for diving and the Mixon Hole is a particularly popular dive site (Mulberry Divers website). It has not been possible to estimate the value derived from diving in the rMCZ.	If the conservation objectives of the features are achieved, all features will be maintained in favourable condition. Designation of this site might lead to an increase in diving trips, as a result of publicity about the marine biodiversity and rare species found in the site. If populations of species such as seahorses and stalked jellyfish increase, this could lead to an improved quality of experience for divers. The designation may lead to an increase in diving visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in diving trips at the national scale.	Anticipated direction of change: ⟺ Confidence: Moderate
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The infralittoral rock and subtidal sands found within this rMCZ contribute to an area of high biodiversity, which in turn may support foraging areas for sea birds, particularly common tern, little tern and Sandwich tern. The high biodiversity of the site also supports important haul-out sites for seals (Balanced Seas Final Report Recommendations, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see Table 1 for details). The rMCZ is a popular area for wildlife watching, particularly bird watching in Bracklesham Bay (RSPB Website). It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	If the conservation objectives of the features are achieved, all features will be maintained in favourable condition. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities. If the rMCZ is designated this will provide an additional positive aspect about the location that could be promoted by the tourism and leisure industry and that would be expected to increase visitation rates.	Anticipated direction of change: ⟺ Confidence: Moderate
Other recreation: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. The rMCZ is a popular recreational seaside destination, with a variety of facilities, camping sites and coastal paths available for visitors (West	If the conservation objectives of the features are achieved, all features will be maintained in favourable condition. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities. If the rMCZ is	Anticipated direction of change: ⟺ Confidence:

Table 5b. Recreation		rMCZ 25.2, Selsey Bill and the Hounds
Sussex Info Website). It has not been possible to estimate the value derived from recreation and tourism services in the rMCZ.	designated this will provide an additional positive aspect about the location that could be promoted by the tourism and leisure industry and that would be expected to increase visitation rates.	Moderate

Table 5c. Research and education		rMCZ 25.2, Selsey Bills and the Hounds
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. Considerable research has been done on the geology of the seabed within this rMCZ and the movement of sediment due to coastal erosion (Southern Coastal Group Website). Sussex Wildlife Trust collect information through their Seasearch and Shoresearch initiatives and work in close partnership with Sussex Inshore Fisheries and Conservation Authority on various projects including a habitat mapping project in coastal waters (Sussex Wildlife Trust Website). It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. Sussex Wildlife Trust provide outreach into schools relating to the marine environment as well as adult learning courses out in the field (Sussex Wildife Trust Website), but it is not known whether any of these activities relate to the rMCZ. It has not been possible to estimate the value derived from education activities associated with the rMCZ.	MCZ designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ) education activities (e.g. events, interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Moderate

Table 5d. Regulating services	rMCZ 25.2, Selsey Bill and The Hounds
Baseline	**Beneficial impact under Policy Option 1**

Table 5d. Regulating services		rMCZ 25.2, Selsey Bill and The Hounds
Regulation of pollution: The features of the site contribute to bioremediation of waste (subtidal sediments) and the sequestration of carbon (subtidal sediments) (Fletcher and others, 2011). ***Environmental resilience:*** The features of the site are not known to contribute to resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** The features of the site, (infralittoral rock) contribute to local flood and storm protection (Fletcher and others, 2011). It has not been possible to estimate the value derived from regulating services associated with the rMCZ.	If the conservation objectives of the features are achieved, the features will be maintained in favourable condition. No change in feature condition and management of human activities is expected and therefore no benefit to the regulation of pollution is expected. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇔ Confidence: Moderate

Table 5e. Non-use and option values		rMCZ 25.2, Selsey Bills and the Hounds
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the rMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the rMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation. Examples of these values are shown in (Ranger, Lowe, Sanghera, & Solandt, 2012). Voters in the MCS's 'Your Seas Your Voice' campaign felt that features of the natural environment were strong motivators for reasons why people thought that areas within the rMCZ should be protected, with people frequently attaching value to biodiversity and that the 'site has been identified as an important site many years ago under the mSNCI scheme which was pioneered in Sussex.' Regarding non-extractive use value, recreational users particularly divers felt that	Anticipated direction of change: ⇧ Confidence: Moderate

	‘there’s nowhere else like it’ and considered the importance to recreational use as an important reason to protect this site. Furthermore, allowing species recovery, particularly fish and shellfish, was perceived as an important management reason to protect the site and the area is considered an important nursery area for ‘lots of important fisheries species, like lobster, edible crab and young cuttlefish, as well as supporting a healthy population of UK shark species’. Source: Ranger and others. (2011)	

rMCZ 25.2 Reference Area 12 Mixon Hole **Site area (km^2): 0.23**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts			**rMCZ 25.2, Reference Area 12 Mixon Hole**	
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) Reference Area lies within rMCZ 25.2 (Selsey Bill and the Hounds) and comprises the clay cliff forming the north face of the Mixon Hole. This is a very unusual feature and is one of the best examples of the peat and clay exposures habitat Feature of Conservation Importance in the Balanced Seas Project Area. The clay cliff extends 30 metres down and supports an array of flora and fauna including burrowing piddocks, the evidence for which can be seen in the numerous holes. This feature is unique within both the Balanced Seas Project Area and the UK. The area has been noted by Plantlife and Natural History Museum surveys as containing unusual plant assemblages and a rare combination of species found only on top of the Mixon Hole. The Mixon Hole is a Marine Site of Nature Conservation Importance. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A5.4 Subtidal mixed sediments	-	-	Unfavourable condition	Recover to favourable condition
Habitats of Conservation Importance				
Peat and clay exposures	0.23	-	Unfavourable condition	Recover to favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone (rMCZ) on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	**rMCZ 25.2, Reference Area 12 Mixon Hole**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
An unidentified sea bed feature is recorded. A feature identified as a 'marine quarry' is located 200 metres north of this site and a wreck identified as the *Prosperous* (grounded on Mixon Rocks, 1833) (English Heritage, 2012).	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost in one licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). If archaeologists respond to the prohibition of excavation by undertaking

Table 2a. Archaeological heritage	rMCZ 25.2, Reference Area 12 Mixon Hole
	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 Impact Assessment. 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.

Table 2b. Recreational angling	rMCZ 25.2, Reference Area 12 Mixon Hole
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 Closure of the entire site to all recreational angling.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Ten Stakmap interviews (7 charter boat fishing, 3 boat angling) indicated that their areas of activity overlap with the rMCZ Reference Area. For the boat anglers (representing 3 local clubs and 69 people/yr), the extent of the overlap of the rMCZ Reference Area with the areas where they fish may be substantial. The charter boat operators who were interviewed represent 3,950 anglers/yr. According to local sea anglers, from May to September on most weekends (Friday, Saturday and Sunday) an average of 6 to 8 boats, and sometimes as many as 12, fish Mixon Hole throughout the day. Each boat carries 1–3 anglers on average, although larger boats carry 6–10 anglers (Selsey Boat Angling Club via Manhood Peninsula Steering Group, email, 28th December 2011).	It is anticipated that some anglers would respond to the closure by fishing in alternative areas adjacent to the site. However, because of the high level of use of the site by recreational anglers, a large number of anglers and charter boat operators are likely to be affected. If anglers respond to the closure by fishing in alternative areas that are more distant this could impact on local businesses that provide services to anglers.

Table 2c. Recreational diving	rMCZ 25.1, Reference area 12 Mixon Hole
Source of costs of the MCZ under Policy Option 1 ***Management scenario 1:*** Installation of a permanent fixing for a shot line to reduce damage from the activities of recreational divers.	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
Numerous divers and dive clubs use the Mixon Hole, though estimated numbers are not available (Natural England Stakeholder Interview for rMCZ Reference Area 12 Mixon Hole, November 2011; Stakmap, 2010). Diving in the site is highly dependent on the weather and time of slack tide	A screw anchor with a buoyed riser has been suggested to mitigate the impacts of shot lines used by divers, which would minimise the impacts of the management requirements for the rMCZ Reference Area on recreational divers using the site (Natural England Reference Area mitigation spreadsheet,

Table 2c. Recreational diving	rMCZ 25.1, Reference area 12 Mixon Hole
(which is the only time that divers can visit this location because of the strong currents). In general, only responsible divers dive the Mixon Hole. Mulberry Divers, the main operator that uses the site, tries to operate the Professional Association of Diving Instructors (PADI) Aware scheme, which includes providing divers who using their facilities with a clear brief on not touching wildlife and reinforcing the need for good buoyancy control. If they see people being irresponsible, they will ask them to stop (Natural England Stakeholder Interview for rMCZ Reference Area 12 Mixon Hole, November 2011). Shot lines are used to provide an aid to the depth of the Mixon Hole and to act as a visual cue. Shot lines can drag across the cliff face and sea bed but if their use were to be prohibited, this could result in significantly more damage, as divers would be less able to steady themselves and would be likely to hold on to the cliff and ledges (Natural England Stakeholder Interview for rMCZ Reference Area 12 Mixon Hole, November 2011).	January 2012). The costs of this have not been estimated. Because the IA assumes that recreational users of MCZs can be expected to adopt best practice in the absence of MCZs, the costs of developing a specific code of conduct, which may be needed to encourage this, are not assessed.

Table 2d. Recreation – spear fishing	rMCZ 25.1, Reference area 12 Mixon Hole
Source of costs of the MCZ under Policy Option 1 ***Management scenario 1:*** Closure of the rMCZ Reference Area to spear fishing	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
Spear fishermen are known to use the Mixon Hole but it has not been possible to obtain information on numbers or any further details (Natural England Stakeholder Interview for rMCZ Reference Area 12 Mixon Hole, November 2011).	Closure of the rMCZ Reference Area to spear fishering will impact on those individuals that undertake this activity if there are not other locations where they can carry it out in the area.

Table 2e: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 25.2 Reference Area 12 Mixon Hole
Oil and gas related activities (including carbon capture and storage) This rMCZ Reference Area overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 27th	

Table 2e: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 25.2 Reference Area 12 Mixon Hole
Seaward Licensing Rounds). However, it is unlikely that any oil and gas (including carbon capture and storage) infrastructure will be proposed in future in this rMCZ Reference Area due to its location and size (DECC, pers. comm., 2012). Impacts of rMCZ Reference Areas on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 25.2 Reference Area 12 Mixon Hole
Recreation (except for the activities listed above in table 2) Research and education Shipping Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath : rMCZ 25.2 Selsey Bill and the Hounds This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions in Annex H.

Table 4a. Fish and shellfish for human consumption	rMCZ 25.2, Reference Area 12 Mixon Hole	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human	If the conservation objectives of the features are achieved, the features will be recovered to reference condition.	Anticipated direction of change:

Table 4a. Fish and shellfish for human consumption	rMCZ 25.2, Reference Area 12 Mixon Hole	
consumption. Subtidal mixed sediments are important spawning and nursery grounds for juvenile commercial species such as flatfish and bass, and peat and clay exposures may provide fisheries habitat (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see rMCZ 25.2 Table 1 for details). There is no on-site fishing activity in the rMCZ Reference Area. It has not been possible to estimate the value of the off-site benefits that derive from the potential spawning and nursery area.	Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	⇧ Confidence: Low

Table 4b. Recreation	rMCZ 25.2, Reference Area 12 Mixon Hole	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Subtidal mixed sediments are important spawning and nursery grounds for certain fish species such as flatfish and bass, and peat and clay exposures may provide fisheries habitat (Fletcher and others, 2011). These habitats will therefore benefit recreational fisheries. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in favourable condition (see rMCZ 25.2 Table 1 for details). Angling is carried out in this rMCZ Reference Area as described in Table 2b. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the potential spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation	rMCZ 25.2, Reference Area 12 Mixon Hole	
Diving: Diving is a very important activity in the rMCZ Reference Area as this is one of the most popular dive sites in the Balanced Seas Project Area, and among the top dive sites in England on account of its great depth close to shore (Irving, 1996; Marine Site of Nature Conservation Importance report). It has not been possible to obtain information on the frequency of dive visits.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The recovery of the features to reference condition may improve their functioning as support for fish and other marine wildlife (including increases in size and diversity of species) potentially benefiting diving within the rMCZ Reference Area. The designation may lead to an increase in diving visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK diving and/or a redistribution of location preferences.	
Wildlife watching: Wildlife watching is not known to take place in the site.	N/A	N/A
Other recreation: No other recreational activities are known to take place in the site.	N/A	N/A

Table 4c. Research and education	rMCZ 25.2, Reference Area 12 Mixon Hole	
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. There are no known research activities under way, although the site was surveyed in the 1990s as part of the survey of Marine Sites of Nature Conservation Importance.	The rMCZ Reference Area will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. No known education activities are associated with the site.	MCZ Reference Area designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ Reference Area) education activities (e.g. events and interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ Reference Area	Anticipated direction of change: ⇧ Confidence: Low

Table 4c. Research and education	rMCZ 25.2, Reference Area 12 Mixon Hole	
	contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	

Table 4d. Regulating services	rMCZ 25.2, Reference Area 12 Mixon Hole	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: N/A	N/A	N/A
Environmental resilience: N/A	N/A	N/A
Natural hazard protection: N/A	N/A	N/A

Table 4e. Non-use and option values	rMCZ 25.2, Reference Area 12 Mixon Hole	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of the rMCZ Reference Area features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 26. Reference Area 8 Hythe Flats

Site area (km^2): 0.56

- This site has been proposed for designation under Policy Option 2 only.

Table 1. Conservation impacts	rMCZ 26, Reference Area 8 Hythe Flats
1a. Ecological description	
This recommended Marine Conservation Zone (rMCZ) Reference Area encompasses a small subtidal area near the seaward boundary of rMCZ 26 (Hythe Bay) which would protect an area of sea-pens and burrowing megafauna, mud habitats in deep water and subtidal mud, all three of which are supported by	

biotope data collated by the Environment Agency. This is one of only two locations in the Balanced Seas Project Area where sea-pens and burrowing megafauna habitat occurs. The wider rMCZ is extremely species-rich and is considered to be a biodiversity hotspot containing many species rare in south-east England (e.g. Spoonworm and a burrowing anemone), to which this site will contribute.
Source: Balanced Seas Final Recommendations (2011).

1b. Baseline condition of MCZ features and impact of the MCZ

Feature	Area of feature (km2)	No. of occurrences	Baseline	Impact
Broad-scale habitats				
A5.3 Subtidal mud	37.02	-	Unfavourable condition	Recover to favourable condition
Habitats of Conservation Importance				
Mud habitats in deep water	-	79 records	Unfavourable condition	Recover to favourable condition
Seapens & burrowing megafauna	-	28 records	Unfavourable condition	Recover to favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone Reference Area on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage — **rMCZ 26, Reference Area 8 Hythe Flats**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

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.

Baseline description of activity	Costs of impact of rMCZ on the sector under Policy Option 1
There is no evidence to indicate the presence of archaeological features within this site (English Heritage, 2012). Balanced Seas understood from fishers that there is a wreck in this site (Balanced Seas Final Recommendations Report., 2011).	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost of one licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). 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. 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.

Table 2b. Commercial fisheries **rMCZ 26, Reference Area 8 Hythe Flats**

Source of costs of the recommended Marine Conservation Zone (rMCZ) Reference Area under Policy Option 1

Closure of entire site to all gear types.*
*This site was agreed to as a Reference Area by the Balanced Seas regional stakeholder group when developing the management scenario for rMCZ 26 (see Scenario 2, Table 2b in tables for rMCZ 26).

Summary of all fisheries: The rMCZ Reference Area is non-coastal and within the 6nm limit. The site is included in rMCZ 26 Hythe Bay. There is little trawling, netting and potting taking place in the rMCZ Reference Area. More detail on the approach used for the fisheries method is provided in Annexes H7 and N4.

It is unknown how many vessels use this rMCZ Reference Area.

Estimated annual value of landings from the rMCZ Reference Area: £0.001m/yr.
(Due to resolution issues of the MCZ Fisheries Model and the small size of many rMCZ Reference Areas in the Balanced Seas region, some fisheries landings values may be inaccurate. They have been included as a precautionary measure and to avoid underestimating the economic impact of a site.)

Baseline description of UK commercial fisheries	Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1
Bottom trawls:. Vessel numbers unknown Estimated total value of landings from the rMCZ Reference Area: £360/yr	Estimated annual value of UK vessel landings affected: *£m/yr* | Scenario 1 Value of landings affected | <0.001
Dredges: Vessel numbers unknown, Estimated total value of landings from the rMCZ Reference Area: £70/yr.	Estimated annual value of UK vessel landings affected: *£m/yr* | Scenario 1 Value of landings affected | <0.001
Mid-water trawls: Vessel numbers unknown. Estimated total value of landings from the rMCZ Reference Area: £180/yr.	Estimated annual value of UK vessel landings affected: *£m/yr* | Scenario 1 Value of landings affected | <0.001
Nets: Vessel numbers unknown. Estimated total value of landings from the rMCZ Reference Area: £570/yr	Estimated annual value of UK vessel landings affected: *£m/yr* | Scenario 1 Value of landings affected | 0.001
Pots and traps: Vessel numbers unknown. Estimated total value of landings from the rMCZ Reference Area: £120/yr (MCZ Fisheries Model).	Estimated annual value of UK vessel landings affected: *£m/yr* | Scenario 1 Value of landings affected | <0.001

Table 2b. Commercial fisheries	rMCZ 26, Reference Area 8 Hythe Flats
Total direct impact on UK commercial fisheries under Policy Option 1	
	Estimated annual value of UK vessel landings and gross value added (GVA) affected: *£m/yr* — Scenario 1 and Best Estimate Value of landings affected: 0.000 GVA affected: 0.000 The local fishing fleet agreed to halt trawling in this rMCZ Reference Area, which is one of several small 'management areas' within rMCZ 26, due to the low level of fishing activity here (South Kent Local Group meeting, July 2011). The site is not expected to impact the fishing industry.
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries**
	None.

Table 2c. Recreational angling	rMCZ 26, Reference Area 8 Hythe Flats
Source of costs of the recommended Marine Conservation Zone (rMCZ) Reference Area under Policy Option 1	
Closure of the entire site to all recreational angling.	
Baseline description of activity	**Costs of impact of MCZ on the sector**
Angling is an important activity in the rMCZ Reference Area and in the wider area, covered by Hythe rMCZ 26. Four Stakmap interviews indicated that areas used for recreational angling (charter boats and boat fishing) overlapped with the rMCZ Reference Area. The interviewees represented 4 local clubs (176 people/year) and charter boat operators representing 1,000 anglers/year. According to a local charter boat operator, a total of 26 vessels (3 based at Dungeness, 7 at Dover, 2 at Folkestone, 8 at Ramsgate, 3 at Rye and 3 beach-launched vessels at Deal) probably fish within the site due to its proximity to their launch port (D. Hancock, RSG charter boat operator, pers. comms., January, 2012). In particular, the site is used by 14 vessels based at Rye, Folkestone, Dungeness, Deal and Dover because of its proximity. They can take up to 8 anglers per trip. The same operator estimated that these vessels could fish in this inshore site for up to 150 days a year. The Balanced Seas project team consider this to be an over estimate as charter boats typically work in total 200 days a year (as indicated by StakMap interviews, 2010) and visit a number of sites.	Anglers and charter boat operators may respond to the closure to angling by fishing in other areas nearby if the weather or fish movements allow. However, there may be times when the rMCZ Reference Area is the only suitable site for angling in the area (D. Hancock, Regional Stakeholder Group (RSG) charter boat representative pers. comm., January 2012). Some anglers who fish from private boats have indicated that they would agree to cease fishing in this small area (RSG August 2011). To avoid underestimation of costs, the IA assumes that charter boat operators will lose all revenue from angling trips. Since the estimate of 150 days use of the site (D. Hancock, RSG charter boat representative) is considered — Scenario 1

Table 2c. Recreational angling			rMCZ 26, Reference Area 8 Hythe Flats
The estimated average revenue per charter vessel is £300/day (D. Hancock, Regional Stakeholder Group (RSG) charter boat representative, email, 5th December, 2011). .	an over-estimate, the IA is assuming that just one a third (50 days) of this number is more realistic, given the charter boats' use of a number of sites, and allowing for displacement of some of their activity to alternative locations. Consequently, Balanced Seas estimates that on average each of the 14 vessels loses revenue of £300/day for 50 days a year. Since the charter vessels using this site may be capable of fishing elsewhere nearby,depending on the weather and fish movements, the value of actual revenue lost may nevertheless be lower than the estimate that is provided here.*£m/yr*		
	Estimated value of charter boat revenue affected	0.210	
	GVA affected	0.099	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the rMCZ under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 26 Reference Area 8 Hythe Flats
Recreation (except for the activities listed above in table 2)	
Shipping	
Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath BS 26 Hythe Bay. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions in Annex H.

Table 4a. Fish and shellfish for human consumption	**rMCZ 26, Reference Area 8 Hythe Flats**	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. Subtidal mud is an important nursery area for many species, including for juvenile commercial species such as flatfish and bass (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see rMCZ 26 Table 1 for details). A description of on-site fishing activity in the rMCZ Reference Area, which involves a number of gear types, and the value derived from it is set out in Table 2b. It has not been possible to estimate the value of the off-site benefits that derive from the spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. The costs of this are set out in Table 2b. Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption. Closure of the rMCZ Reference Area to fishing activity will reduce the on-site fishing mortality of species, but as the site is small it is unclear whether this would benefit stocks of mobile commercial finfish species. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation	**rMCZ 26, Reference Area 8 Hythe Flats**	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ)	If the conservation objectives of the features are achieved, the features will be recovered to reference condition.	Anticipated direction of

Table 4b. Recreation		rMCZ 26, Reference Area 8 Hythe Flats
Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Subtidal mud habitats support nursery grounds for certain fish species (Fletcher and others, 2011) and are therefore beneficial to recreational fisheries. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see rMCZ 26 Table 1 for details). Angling is an important activity in this rMCZ Reference Area and a description of this activity is set out in Table 2c. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the potential spawning and nursery area.	Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	change: ⇧ Confidence: Low
Diving: Diving and snorkelling may take place on the wrecks in the site.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The recovery of the features to reference condition may improve their functioning as support for fish and other marine wildlife (including increases in size and diversity of species) potentially benefiting diving within the rMCZ Reference Area. Any increase may represent a redistribution of dive location preferences rather than an overall increase in diving.	Anticipated direction of change: ⇧ Confidence: Low
Wildlife watching: Wildlife watching is not known to take place in the site.	N/A	N/A
Other recreation: No other recreational activities are known to take place in the site.	N/A	N/A

Table 4c. Research and education	rMCZ 26, Reference Area 8 Hythe Flats
Baseline	**Beneficial impact under Policy Option 1**

Table 4c. Research and education		rMCZ 26, Reference Area 8 Hythe Flats
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. No known research activities take place in the site.	The rMCZ Reference Area will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. No known education activities take place in the site.	MCZ Reference Area designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid the development of additional local (to the rMCZ Reference Area) education activities(e.g. events and interpretation boards), from which visitors to the site would derive benefit. Non-visitors may benefit if the rMCZ Reference Area contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Moderate

Table 4d. Regulating services		rMCZ 26, Reference Area 8 Hythe Flats
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: Subtidal mud contributes to the bioremediation of waste and sequestration of carbon (subtidal sediments) (Fletcher and others, 2011). ***Environmental resilience:*** N/A ***Natural hazard protection*****:** As the site is offshore, its features do not contribute to the delivery of this service. It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of subtidal mud and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the recommended Marine Conservation Zone Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities (as, if necessary, mitigation would be introduced, with the associated costs and benefits).	Anticipated direction of change: ⇧ Confidence: Low

Table 4e. Non-use and option values	rMCZ 26, Reference Area 8 Hythe Flats	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of the rMCZ Reference Area features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change:  Confidence: Moderate

rMCZ 28 Utopia **Site area (km^2): 2.71**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts				**rMCZ 28, Utopia**
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) would protect one of only two examples of fragile sponge and anthozoan communities documented in the Balanced Seas Project Area. The boundaries incorporate an area of bedrock and large boulders hosting rich communities of sponges, anthozoans, hydroids and bryozoans. This bedrock feature is thought to be locally unique, being an isolated area of rock surrounded by extensive sediment. The key feature of this site is the discrete group of rock outcrops and boulders that support a rich biological community, standing proud on an otherwise uninterrupted sediment-covered sea bed. This site is not associated with any existing designation. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Habitats of conservation importance				
Fragile sponge & anthozoan communities	-	1 record	Unfavourable condition	Recover to favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone (rMCZ) on human activities (over 2013 to 2032 inclusive)

Table 2a. Aggregate Extraction **rMCZ 28, Utopia**

Source of costs of the rMCZ under Policy Option 1

Scenario 1: Increase in costs of assessing environmental impacts for future licence applications for existing production licences and current licence applications within 1km of an rMCZ. Also additional costs for provision of information that will be used for these assessments, which will be incurred for the entire suite of sites. This provides the best estimate of impact.

Scenario 2: Increase in costs of assessing environmental impacts for future licence applications, which is assessed for the entire suite of sites and is not attributed to specific sites.

Baseline description of activity	**Costs of effect of MCZ on the sector under Policy Option 1**
There are 3 licensed aggregate extraction production areas within 1km of the rMCZ and an additional area for which a licence application has been submitted. It is anticipated that the Environmental Impact Assessment for renewal of these licences will be conducted in the following years: • for aggregate extraction production licence no. 351, for which an application is currently being considered: in 2026 (based on	Average annual site-specific costs £m/yr: Scenario 1 — Scenario 2 Cost to the operator: 0.007 — Assessed for the suite of sites

information provided by The Crown Estate (pers. comm., 2011), assuming that the licence is awarded in 2012) ; • for aggregate extraction production licence nos. 395/1 and 395/2: in 2013 and 2028 (based on information provided by The Crown Estate (pers. comm., 2011)) ;	***Scenario 1 :*** It is assumed that additional costs are incurred for future applications for renewal of existing production licences within 1km of this site. These costs arise from assessing the potential effects of aggregate extraction on the features protected by the rMCZ and are estimated to cost the operator an additional £27,000 per licence application (based on information provided by BMAPA (pers. comm.., 2011). An additional cost will also be incurred in provision of information by the British Marine Aggregate Producers Association for these assessments. This cost will be incurred as a result of the entire suite of MCZs and is not included here. Further details of the costs are provided in Annex N1. ***Scenario 2:*** An assessment of the additional costs of Scenario 2 is provided for the entire suite of sites, which is summarised in the Evidence Base. Details are provided in Annex H2 and N1.

Table 2a. Archaeological heritage	**rMCZ 28, Utopia**
Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1** Increase in costs of assessing environmental impacts for future licence applications (it is not anticipated that any additional mitigation of impacts on features protected by the MCZ 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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
An archaeological feature has been recorded within the rMCZ Reference Area (see tables below) found within this rMCZ (English Heritage, 2012).	An extra cost would be incurred in the assessment of environmental impact made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost for one licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). No further impacts on activities related to archaeology are anticipated.

Table 2b. Commercial fisheries	**rMCZ 28, Utopia**
Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1**	

Table 2b. Commercial fisheries **rMCZ 28, Utopia**

The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of commercial fishing gears will be required for certain features protected by this rMCZ. Therefore, two scenarios have been employed in the Impact Assessment (IA) for these fisheries to reflect this uncertainty. Should the site be designated, the management that will be required will fall somewhere within this range.

Management scenario 1: Closure of entire rMCZ to bottom trawls and dredges to protect areas of fragile sponge and anthozoan communities (Balanced Seas informed scenario).

Management scenario 2: Closure of entire rMCZ to bottom trawls, dredges, lines, nets, pots and traps (Statutory Nature Conservation Bodies informed scenario).

Summary of all fisheries This site is wholly within the 6 nautical mile (nm) limit and is fished only by UK vessels. The majority of vessels fishing the rMCZ are based in Portsmouth/Gosport, Selsey and Bembridge and are under 15 metres in length. The main fishing method used is potting. There is low set netting and bottom trawling effort in the site (MCZ Fisheries Model). Bottom trawling activity does not overlap the main rock features. Certain commercial fishing restrictions are already in existence (listed in Annex E1). Sussex Inshore Fisheries and Conservation Authority (IFCA) byelaws prohibit the use of scallop dredges within 3 nm of the coast, and oyster dredges throughout the Sussex IFCA District. More detail on the approach used for the fisheries method is provided in Annexes H7 and N4.

Estimated annual value of landings from the rMCZ: £0.009m/yr.

Baseline description of UK commercial fisheries	**Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1**
Bottom trawls: Vessel numbers unknown.Estimated total value of landings from the rMCZ: £0.001m/yr (MCZ Fisheries Model).	The estimated annual value of UK bottom trawl landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.001 | 0.001
Dredges: Vessel numbers unknown.Estimated total value of landings from the rMCZ: £220/yr (MCZ Fisheries Model).	The estimated annual value of UK dredge landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | <0.001* | <0.001* * £220/yr This value is likely to be an overestimate as Sussex IFCA byelaws prohibit the use of scallop dredges within 3 nm of the coast, and oyster dredges throughout the Sussex IFCA District(for more details see Annex E1).
Hooks and lines Vessel numbers unknown.Estimated total value of landings from the rMCZ: £320/yr (MCZ Fisheries Model).	The estimated annual value of UK hook and line landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries</th><th>rMCZ 28, Utopia</th></tr>
<tr><td></td><td colspan="2"><table><tr><td>Value of landings affected</td><td>0.000</td><td><0.001*</td></tr></table>* £320/yr
In establishing the draft conservation objectives, the site's feature may have been assessed as having low vulnerability to fishing with hooks and lines at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objective. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Nets: Vessel numbers unknown.Estimated total value of landings from the rMCZ: £0.002m/yr (MCZ Fisheries Model).</td><td colspan="2">The estimated annual value of UK net landings affected is expected to fall within the following range of scenarios:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.002</td></tr></table>In establishing the draft conservation objectives, the site's feature may have been assessed as having low vulnerability to fishing with nets at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objective. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Pots and traps: Vessel numbers unknown.Estimated total value of landings from the rMCZ: £0.004m/yr (MCZ Fisheries Model).</td><td colspan="2">The estimated annual value of UK pot and trap landings affected is expected to fall within the following range of scenarios:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.004</td></tr></table>In establishing the draft conservation objectives, the site's feature may have been assessed as having low vulnerability to fishing with pots and traps at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objective. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Total direct impact on UK commercial fisheries</td><td colspan="2">Total direct impact on UK commercial fisheries under Policy Option 1</td></tr>
</table>

Table 2b. Commercial fisheries — **rMCZ 28, Utopia**

The estimated annual value of UK landings and gross value added (GVA) affected is expected to fall within the following range of scenarios:

£m/yr	Scenario 1	Scenario 2	Best estimate
Value of landings affected	0.000	0.007	0.001
GVA affected	0.000	0.003	<0.001

The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas.
This value is likely to be an overestimate as Sussex IFCA byelaws prohibit the use of scallop dredges within 3 nm of the coast, and oyster dredges throughout the Sussex IFCA District (for more details see Annex E1).

Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries**
	None.

2c. National defence — **rMCZ 28, Utopia**

Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1**

Mitigation of impacts of Ministry of Defence (MOD) activities on features protected by the suite of rMCZs will be provided by additional planning considerations during operations and training. It is not known whether mitigation will be required for features protected by this site. The MOD will also incur costs in revising environmental tools and charts to include MCZs.

Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
The MOD is known to make use of the site. Activities include: air general, acoustic trials, flares, mine counter measures, smoke, sea bed sampling, towed array (surveillance systems) and amphibious.	It is not known whether this rMCZ will impact on the MOD's use of the site. Impacts of rMCZs on national defence are assessed in Annex H10 and N9 (they are not assessed for this site alone).

Table 2d. Renewable energy – tidal energy — **rMCZ 28, Utopia**

Source of costs of the recommended Marine Conservation Zone (rMCZ)

Management scenario 1: Increase in costs of assessing environmental impacts for licence applications (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).

Management scenario 2: Increase in costs of assessing environmental impacts for licence applications and provision of additional mitigation of impacts of

Table 2d. Renewable energy – tidal energy	rMCZ 28, Utopia
cable protection (relative to the mitigation provided in the baseline).	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
There is potential for future developments that generate electricity using the tidal energy resource in this rMCZ as it overlaps with the East of Isle of Wight Area of Potential, which has anticipated energy generation potential of 100MW (DECC, pers. comm., 2011). It is assumed for the purpose of the IA that there would be 1 licence application within the time frame of the IA. However, it is unlikely, though still possible, that deployment of tidal energy technology will take place in the rMCZ during the 20 year period covered by the IA.	The estimated cost to tidal energy developers of the rMCZ is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Cost | 0.001 | 0.001 ***Scenario1:*** One licence application for the tidal energy installations could be required to consider the potential effects of the construction and operational activities on the features protected by the rMCZ and the potential to achieve the rMCZ conservation objectives. This is expected to result in one-off costs of £0.011m in 2015 (based on, per broad-scale habitat assessed, 6 days of a consultant's time at £700/day + 1 day for legal review at £800/day) with a present value cost of £0.009m. ***Scenario 2:*** The costs would be the same as for Scenario 1 plus the additional costs of mitigating impacts of cable protection. As the proposed cable routes are unknown, it is unclear whether routes for any inter-array or export cables will be sought that pass through the rMCZ, and if they are what length of cable protection may be required. If alternative cable protection is required to mitigate impacts, this is estimated to cost £1m/km. However, both Natural England and JNCC have said that this additional requirement is unlikely to be needed and so this additional cost is anticipated to be unlikely (Natural England and JNCC, pers. comm., 2012).

Table 2e: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 28, Utopia
Oil and gas related activities (including carbon capture and storage)	
This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the rMCZ under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ 28, Utopia**
Commercial fisheries (mid-water trawls) Recreation Research and education Shipping	

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[18] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.								rMCZ 28, Utopia	
ENG Feature	**Repres ent-ativity**	**Replica tion**	**Adequacy**	**Viability**	**Gaps or shortfalls in relation to ENG minimum guidelines**	**Recommended conservation objective**	**Quantitative considerations at regional MCZ level**	**Ecological Importance at regional MCZ level**	**Ecological Importance at wider scale**
Fragile sponge and anthozoan communities (on subtidal rocky habitat)	FOCI Habitat	✓	✓	✓ * [1]	N/A	*Recover*	Replication is at its minimum.	This is one of two regional occurrences of this feature. This feature is not protected within existing MPAs.	BAP habitat - UK obligation, decline, key species, functional habitat

[18] copied from the JNCC and Natural England's advice to Defra on rMCZs

Site considerations	
Connectivity	✓
Geological/Geomorphological features of interest	None
Appropriate boundary	✓
Areas of Additional Ecological Importance	X
Overlaps with existing MPAs	X

rRA BS 13 North Utopia. An overview of features proposed for designation within North Utopia recommended reference area (rRA 13) and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale

✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Where an asterisk (*) has been given in the table, more detail is provided in the narrative.

ENG Feature	Representativity	Viability	Recommended conservation objective
Fragile sponge and anthozoan communities	FOCI Habitat	✓	Recover to reference condition
Subtidal sands and gravels	FOCI Habitat	X	Recover to reference condition
A5.4 Subtidal mixed sediments	BSH	X	Recover to reference condition
Site considerations			
Appropriate boundary	✓		

Additional comments and site benefits:

- The bedrock feature, supporting a highly diverse and abundant community of sponges, anthozoans, hydroids and bryozoans, is thought to be a locally unique habitat.
- *[1] The minimum patch diameter of 1 km for this feature is met for the rMCZ. The full extent of the subtidal rocky reef feature which supports the fragile sponge and anthozoan communities has been proposed for protection, so there is significant conservation value.
- There is scientific value in this site because it is well studied with good data (EMU Ltd 2010, SeaSearch 2005).

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the rMCZ contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption		**rMCZ 28, Utopia**
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. High and moderate energy circalittoral rock is an important location for commercial inshore fishing activity, particularly for crab and lobster (Fletcher and others, 2011).	If the conservation objective of the feature is achieved, the feature will be recovered to favourable condition. New management of fishing activities is expected (above the baseline situation), the costs of which are set out in Table 2b, which may reduce the impacts on fish and shellfish habitats and harvesting of stocks.	Anticipated direction of change: ⇧ Confidence: Low

Table 5a. Fish and shellfish for human consumption		rMCZ 28, Utopia
The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see Table 1 for details). The main fishing method used is potting. There is low set netting and bottom trawling effort in the site. A description of on-site fishing activity and the value derived from it is set out in Table 2b.	As most of the commercial species targeted by fishers in this area are mobile fish and shellfish, it is unclear whether the scale of habitat recovered and the magnitude of reduced (on-site) harvesting will be enough to have any significant positive impact on commercial stocks. Potential benefits may arise on-site, for fishers permitted to fish within the rMCZ, and off-site from spill-over benefits.	

Table 5b. Recreation		rMCZ 28, Utopia
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. Infralittoral rock supports rich biodiversity within the site and provides important habitats for fish and shellfish fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see Table 1 for details). The rMCZ is an important site for both private boat anglers and charter boats from the Isle of Wight and Hampshire particularly Langstone Harbour (Stakmap 2010). The generally high biodiversity due to the complex habitats within the site is likely to help support potential on-site and off-site fisheries. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site which result from the potential spawning and nursery area.	If the conservation objective of the feature is achieved, the feature will be recovered to favourable condition. As no additional management of angling is expected, fishers will be able to benefit from any on-site and off-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers. The designation may lead to an increase in angling visits to the site, which may benefit the local economy. This increase is likely to arise from a change in anglers' preferred angling locations rather than an increase in days spent angling or the number of anglers at a national scale.	Anticipated direction of change: ⇧ Confidence: Low
Diving: Diving is not known to take place in the rMCZ.	N/A	N/A
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services.	If the conservation objective of the feature is achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition.	Anticipated direction ⇧

Infralittoral rock habitat supports internationally important fish and shellfish fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see Table 1 for details). Due to its offshore location, the rMCZ is not important for wildlife watching. However, the site has particularly high biodiversity and abundant fish populations, which potentially support foraging sea birds and marine mammals. The site occurs within an area of the English Channel used by ferries, which may carry wildlife watchers, particularly those interested in marine mammals. It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	of change: Confidence: Low
Other recreation: Other recreational activities are not known to take place in the rMCZ.	N/A	N/A

Table 5c. Research and education		**rMCZ 28, Utopia**
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. No known formal research activities are currently carried out in the rMCZ. However, ferries crossing the English Channel may be used by marine mammal observers, whose data contribute to national databases. It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. No known education activity occurs in the rMCZ.	As the rMCZ is approximately 9km offshore and therefore relatively inaccessible, no benefits are likely to arise from direct use of the site for education. Non-visitors may benefit if the rMCZ contributes to external	Anticipated direction of change: ⇧

	education programmes (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Confidence: Low

Table 5d. Regulating services		**rMCZ 28, Utopia**
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: The features of the site are not known to contribute to contribute to the regulation of pollution. ***Environmental resilience:*** The features of the site are not known to contribute to contribute to the resilience and continued regeneration of marine ecosystems. ***Natural hazard protection:*** As the site is offshore, its features are not thought to contribute to the delivery of this service.	If the conservation objective of the feature is achieved, fragile sponge & anthrozoan communities recovered to favourable condition. Fragile sponge & anthrozoan communities are not known to contribute to regulating services. However, a potential reduction in the use of bottom towed fishing gear may increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 5e. Non-use and option values		**rMCZ 28, Utopia**
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the rMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the rMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence : Moderate

rMCZ 28. Reference Area 13 North Utopia **Site area (km^2): 0.28**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts				**rMCZ 28, Reference Area 13 North Utopia**
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) Reference Area lies within rMCZ 28 (Utopia) and is the location for one of the only two examples of fragile sponge and anthozoan communities in the Balanced Seas Project Area. It is found on a prominent area of bedrock reef and large boulders that stand out from the otherwise sediment-dominated sea bed. A single point record denotes the fragile sponge and anthozoan feature, but additional video footage and still images have been collected to demonstrate the extent of the habitat. The wider rMCZ supports a rich biological community based on a discrete group of rock outcrops and boulder, to which the rMCZ Reference Area may contribute. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A5.4 Subtidal mixed sediments	-	-	Unfavourable condition	Recover to favourable condition
Habitats of Conservation Importance				
Subtidal sands & gravels	0.08	-	Unfavourable condition	Recover to favourable condition
Fragile sponge & anthozoan communities	-	1 record	Unfavourable condition	Recover to favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone (rMCZ) Reference Area on human activities (over 2013 to 2032 inclusive)

Table 2a. Aggregate extraction	**rMCZ 28, Reference Area 13 North Utopia**
Source of costs of the recommended Marine Consevation Zone (rMCZ) Reference Area under Policy Option 1: ***Management scenario 1***: Increase in costs of assessing environmental impacts for future licence applications for existing production licences and current licence applications within 1km of an rMCZ. Additional costs for provision of information that will be used for these assessments will be incurred for the entire suite of sites. Aggregate extraction continues outside the rMCZ Reference Area and the operator incurs additional monitoring costs to assess the impact of this activity on the MCZ features. The Balanced Seas Regional Stakeholder Group (RSG) specified that the rMCZ Reference Area should only be taken forward if the existing licensed activities taking place adjacent to it are allowed to continue. This provides the best estimate of impact. ***Management scenario 2:*** Increase in costs of assessing environmental impacts for future licence applications, which is assessed for the entire suite of sites and is not attributed to specific sites. Closure of the aggregate extraction licence area to mitigate impacts on features in the rMCZ Reference Area.	
Baseline description of activity	**Costs of impact of rMCZ under Policy Option 1**
Future licence applications:	The Balanced Seas Regional Stakeholder Group (RSG) specified that the rMCZ

There are 3 licensed aggregate extraction production areas within 1km of the rMCZ and an additional area for which a licence application has been submitted. It is anticipated that the Environmental Impact Assessment for renewal of these licences will be conducted in the following years:

- for aggregate extraction production licence no. 351, for which an application is currently being considered: in 2026 (based on information provided by The Crown Estate (pers. comm., 2011), assuming that the licence is awarded in 2012) ;
- for aggregate extraction production licence nos. 395/1 and 395/2: in 2013 and 2028 (based on information provided by The Crown Estate (pers. comm., 2011)) .

Operations:

Licence application area 395 lies immediately adjacent to this site. Two companies Kendall Brothers (Portsmouth) Limited and Tarmac Marine Dredging Limited operate this licence. It represents a significant portion of their business. It is the only aggregate licence operated by Kendall Brothers Limited.

Although the licence has been worked for 13 years, considerable resources remain and the current licence operators are currently seeking a replacement licence to allow dredging to continue for a further 15 years beyond the end of March 2013 to extract a maximum total of 18.75 million tonnes (which has a potential asset value over the licence period 2013 to 2028 of £187.5m). In support of this application, various environmental studies have been undertaken at both a site-specific scale and as part of a wider industry regional environmental assessment (British Marine Aggregate Producers Association, pers. comm., 2012).

Reference Area should only be taken forward if the existing licensed activities taking place adjacent to it are allowed to continue.

Average annual site-specific costs £m/yr	Scenario 1	Scenario 2
Additional costs to the operator for future licence applications	0.007	Assessed for the suite of sites
Costs to operator of mitigation	0.010	1.662 plus unknown costs
Total	0.017	1.662 plus unknown costs

Scenario 1: It is assumed that additional costs are incurred for future applications for renewal of existing production licences within 1km of this site. These costs arise from assessing the potential effects of aggregate extraction on the features protected by the rMCZ and are estimated to cost the operator an additional £27,000 per licence application (based on information provided by BMAPA (pers. comm., 2011). An additional cost will also be incurred in provision of information by the British Marine Aggregate Producers Association for these assessments. This cost will be incurred as a result of the entire suite of MCZs and is not included here. Further details of the costs are provided in Annex N1.

BMAPA has estimated that ongoing monitoring of the site to assess the impacts will cost £0.010/yr over the lifetime of the licence term (from 2013 to 2028 – see table of costs above) to cover the additional survey effort, analysis and reporting needed (BMAPA, pers. comm., 2012).

Scenario 2: An assessment of the additional costs for future licence applications under Scenario 2 is provided for the entire suite of sites, which is summarised in the Evidence Base. Details are provided in Annex H2 and N1.

BMAPA (pers. comm., 2011) estimates that closure of the aggregate extraction area would cost the operators £1.661m/yr (this is the highest estimate of cost provided by BMAPA, to avoid underestimation - see table of costs above). This estimate is based on the assumption that the tonnage lost from the closure of the area is replaced with production from a licensed area 40km away, which would result in additional costs because a vessel would need to change from a 12 hour cycle time to a 24 hour cycle time. This estimated cost does not

Table 2a. Aggregate extraction	rMCZ 28, Reference Area 13 North Utopia
	consider the additional costs per cargo arising from increased wear and tear on vessels from additional distance travelled or the increased routine maintenance costs per cargo arising from a less efficient operating cycle. This scenario would increase greenhouse gas emissions because aggregate supplies would be transported over longer distances. Costs to the operators would include loss of the sunk investment in the site, the loss of asset value arising from the resources in a licence area being constrained, and costs incurred as a result of the time it would take to successfully secure a new licence, which could take up to 3 years (this cost would be particularly significant if the operator does not have an alternative source of supply to use) (BMAPA, pers. comm., 2012). BMAPA has indicated that because licence area 395 is a significant part of the business for both its operators, the consequences for the operators of impacts that arise from the licence being constrained or even lost would be significant (pers. comm., 2011). 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).

Table 2b. Archaeological heritage	rMCZ 28, Reference Area 13 North Utopia
Source of costs of the recommended Marine Conservation Zone (rMCZ) Reference Area under Policy Option 1	
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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
One unidentified sea bed feature is recorded within this site (English Heritage, 2012).	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known so no overall cost to the sector of this rMCZ Reference Area has been estimated. However, the additional cost of one licence application could be in the region of £500 to £10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). 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. The prohibition of excavation and

Table 2b. Archaeological heritage	rMCZ 28, Reference Area 13 North Utopia
	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.

Table 2c. Commercial fisheries	rMCZ 28, Reference Area 13 North Utopia
Source of costs of the recommended Marine Conservation Zone (rMCZ) Reference Area under Policy Option 1	
Closure of entire site to all gear types.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
Summary of all fisheries: The rMCZ Reference Area is non-coastal and within the 6nm limit. It is located within rMCZ 28 Utopia. The majority of vessels fishing the rMCZ are based in Portsmouth/Gosport, Selsey and Bembridge and are under 15 metres in length. The main fishing method used is potting. There is a low level of set netting and bottom trawling effort in the site (FisherMap Data 2010).. Bottom trawling activity does not overlap the main rock features and it is unlikely that either bottom trawling or dredging actually occur within the site. More detail on the approach used for the fisheries method is provided in Annexes H7 and N4. Estimated total value of landings from the rMCZ Reference Area: £0.001m/yr. (Due to resolution issues of the MCZ Fisheries Model and the small size of many rMCZ Reference Areas in the Balanced Seas region, some fisheries landings values may be inaccurate. They have been included as a precautionary measure and to avoid underestimating the economic impact of a site.)	
Baseline description of UK commercial fisheries	**Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1**
Bottom trawls: Nine stakeholder interviewees (from Hardway Fishermen's Association) indicated that their area of operation overlapped with the rMCZ Reference Area (FisherMap Data 2010). The vessels target Dover sole using trawls and beam trawls.	The estimated annual value of UK bottom trawl landings affected: *£m/yr* | Scenario 2 Value of landings affected | <0.001
Dredges: One stakeholder interviewee (from Hardway Fishermen's Association) indicated that their area of operation overlapped with the rMCZ Reference Area. The vessels use towed dredges and target oysters (FisherMap Data 2010).	The estimated annual value of UK dredge landings affected: *£m/yr* | Scenario 2 Value of landings affected | <0.001
Mid-water trawls: One stakeholder interviewee indicated that their area of operation overlaps with the rMCZ Reference Area. The vessel targets sprats and the area of overlap is small (FisherMap Data 2010).	The estimated annual value of UK mid-water trawl landings affected: *£m/yr* | Scenario 2

Table 2c. Commercial fisheries	rMCZ 28, Reference Area 13 North Utopia
	Value of landings affected: <0.001
Hooks and lines: Five stakeholder interviewees (Hardway Fishermen's Association and unspecified affiliations) indicated that their areas of operation overlap with the rMCZ Reference Area The vessels use rod and line and static lines to target bass. The area of overlap with the rMCZ Reference Area is small in all cases (FisherMap Data 2010).	The estimated annual value of UK hook and line landings affected: *£m/yr* — Scenario 2 Value of landings affected: <0.001
Nets: The area of operation of at least 8 vessels (Isle of Wight Fishermen's Association and unspecified affiliations) were indicated to overlap with the rMCZ Reference Area. Species targeted include bass, Dover sole, skates and rays using drift, fixed and gill nets (FisherMap Data 2010).	The estimated annual value of UK net landings affected: *£m/yr* — Scenario 2 Value of landings affected: <0.001
Pots and traps: 9 vessels (Selsey Fishermen's Association, Southern Commercial Fishermen and unspecified affiliations), targeting whelks and common lobster, indicated that the rMCZ Reference Area overlapped with their area of operation (FisherMap Data 2010).	The estimated annual value of UK pot and trap landings affected: *£m/yr* — Scenario 2 Value of landings affected: <0.001
Total direct impact on UK commercial fisheries under Policy Option 1	
	The estimated annual value of UK landings and gross value added (GVA) affected is expected to fall within the following range of scenarios: *£mi/yr* — Scenario 1 and Best Estimate — Scenario 2 Value of landings affected: 0.000 — 0.001 GVA affected: 0.000 — 0.000
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries**
	None.

Table 2d. Recreational anchoring	rMCZ 28, Reference Area 13 North Utopia

***Source of costs of the recommended Marine Conservation Zone (rMCZ) Reference Area* under Policy Option 1** Closure of entire site to all recreational anchoring (except in emergency circumstances).	
Baseline description of activity	**Costs of impact of rMCZ Reference Area on the sector under Policy Option 1**
A total of 44 stakeholder interviews indicated that yachting interests overlap with the rMCZ Reference Area from clubs from south-east England that represent 40,614 individuals (11,251 people/yr). However, in all cases, the rMCZ Reference Area represents a small proportion of the overall area used even for clubs that are based locally, and there is no indication that yachting vessels anchor there. This is a popular spot for angling and angling vessels do anchor in the rMCZ Reference Area (Balanced Seas Solent/IOW/Hants Sites Meeting Report, July 2011).	The closure to anchoring is unlikely to affect the recreational sailing sector as anchoring by sailing vessels has not been identified as occurring in the site. Impacts on angling are assessed in Table 2d. Recreational anglingand charter boatsector representatives have agreed to cease activity in the site and no costs are expected.

Table 2d. Recreational angling	**rMCZ 28, Reference Area 13 North Utopia**
Source of costs of the recommended Marine Conservation Zone (rMCZ) Reference Area under Policy Option 1 Closure of the entire site to all recreational angling.	
Description of activity and its impact on interest features	**Costs of effect of rMCZ on the sector under Policy Option 1**
A total of 17 StakMap interviewees (9 charter boat fishing, 4 boat angling) indicated that their areas of activity overlap with the rMCZ Reference Area. Three charter boat operators indicated that they have areas of operation that substantially overlap with the rMCZ Reference Area. A local angling club said that the rMCZ Reference Area is little used by anglers from the Isle of Wight, although mainland anglers may use it (Balanced Seas Solent/IOW/Hants Sites Meeting Report, July 2011).	Representatives of recreational sea anglers said the impact of closure of this small area would be minimal for users from the Isle of Wight and probably also for charter boats from the mainland (Balanced Seas Solent/IOW/Hants Sites Meeting Report, July 2011). In addition, a local charter boat operator said that the site would not have a significant impact on his revenue as he and others could continue to operate in the surrounding area (S. Wall-Palmer, Langstone Harbour charter boat operator, pers. comms., December 2011). The representatives have agreed to cease angling in the rMCZ Reference Area, and no costs are expected.

Table 2e. Renewable energy – tidal energy	**rMCZ 28, Reference Area 13 North Utopia**
Source of costs of the recommended Marine Conservation Zone (rMCZ) Reference Area under Policy Option 1 Installation of devices and cables not permitted within the rMCZ. Increase in costs of assessing environmental impacts for licence applications with 1km of the 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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
There is potential for future developments that generate electricity using the	The rMCZ Reference Area would be closed to tidal energy development

Table 2e. Renewable energy – tidal energy	rMCZ 28, Reference Area 13 North Utopia
tidal energy resource in this rMCZ Reference Area as it overlaps with the East of Isle of Wight Area of Potential, which has anticipated energy generation potential of 100MW (Department of Energy and Climate Change, pers. comm., 2011), but the area of overlap is not known. It is assumed for the purpose of the Impact Assessment (IA) that there would be 1 licence application within the time frame of the IA. However, it is unlikely, though still possible, that deployment of tidal energy technology will take place in the rMCZ during the 20 year period covered by the IA.	because it involves deposition of cables and devices. It is not known whether either of these would be proposed in the site in the absence of the MCZ and what if any mitigation of impacts on MCZ features would be required. The impacts have not been estimated but could be potentially significant. Costs of mitigation could arise from siting devices and cables to avoid the rMCZ Reference Area, from mitigation of impacts of cable protection and, if necessary, from a reduction in the number of devices installed as a result of the rMCZ Reference Area. It is estimated that cables cost £1.010m/km/cable (average of estimates provided by four developers) and that use of frond mattressing to mitigate impacts of cable protection costs £1.000m/km more than the cable protection that would be used in the absence of the rMCZ. It may be that areas that would have been developed in the absence of the rMCZ will not be developed because of the site, which could impact on costs for the developer. One licence application for the tidal energy installations could be required to consider the potential effects of the construction and operational activities on the features protected by the rMCZ Reference Area and the potential to achieve the rMCZ conservation objectives. This is expected to result in one-off costs of £0.011m in 2015 (based on, per broad-scale habitat assessed, 6 days of a consultant's time at £700/day + 1 day for legal review at £800/day) with a present value cost of £0.009m.

Table 2f: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 28, Reference Area 13 North Utopia
Oil and gas related activities (including carbon capture and storage) This rMCZ Reference Area overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 27th Seaward Licensing Rounds). However, it is unlikely that any oil and gas (including carbon capture and storage) infrastructure will be proposed in future in this rMCZ Reference Area due to its location and size (DECC, pers. comm., 2012). Impacts of rMCZ Reference Areas on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the rMCZ under Policy Option 1 (existing	rMCZ 28, Reference Area 13

activities at their current levels and future proposals known to the regional MCZ projects)rMCZ 28. Reference Area 13 North Utopia	North Utopia
Recreation (except for the activities listed above in table 2) Research and education Shipping	

Contribution to Ecological Network Guidance

This rRA sits within an rMCZ. For information on how this reference area contributes towards the guidelines in the Ecological Network Guidance please see the information provided underneath rMCZ 28 Utopia. This is also taken from Annex 5 in JNCC and Natural England's Advice on rMCZs.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions in Annex H.

Table 4a. Fish and shellfish for human consumption	rMCZ 28, Reference Area 13 North Utopia	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. Subtidal coarse sediments and sand are important spawning and nursery grounds for juvenile commercial species such as flatfish and bass (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see rMCZ 28 Table 1 for details). A description of on-site fishing activity in the rMCZ Reference Area, which involves a number of gear types, and the value derived from it is set out in Table 2c.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. The costs of this are set out in Table 2c. Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption. Closure of the rMCZ Reference Area to fishing activity will reduce the on-site fishing mortality of species, but as the site is small it is unclear whether this would benefit stocks of mobile commercial finfish species.	Anticipated direction of change: ⇧ Confidence: Low

Table 4a. Fish and shellfish for human consumption		rMCZ 28, Reference Area 13 North Utopia
It has not been possible to estimate the value of the off-site benefits that derive from the spawning and nursery area.	As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised.	

Table 4b. Recreation	rMCZ 28, Reference Area 13 North Utopia	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. Subtidal coarse sediments and sand are important spawning and nursery grounds for certain fish species such as flatfish and bass. (Fletcher and others, 2011) and thus can support recreational fisheries. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see rMCZ 28 Table 1 for details). Angling is an important activity in this rMCZ Reference Area and a description of this activity is set out in Table 2e. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site that results from the potential spawning and nursery area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to closure of the rMCZ Reference Area (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Anticipated direction of change: ⇧ Confidence: Low
Diving: Diving is not known to take place in the site.	N/A	N/A
Wildlife watching: Wildlife watching is not known to take place in the site.	N/A	N/A
Other recreation: No other recreational activities are known to take place in the site.	N/A	N/A

Table 4c. Research and education	rMCZ 28, Reference Area 13 North Utopia
Baseline	**Beneficial impact under Policy Option 1**

Table 4c. Research and education		rMCZ 28, Reference Area 13 North Utopia
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. No known research activities take place in the site.	The rMCZ Reference Area will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. No known education activities take place in the site.	As the rMCZ Reference Area is about 10km offshore and therefore relatively inaccessible, no benefits are likely to arise from direct use of the site for education. Non-visitors may benefit if the rMCZ Reference Area contributes to external education programmes (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Low

Table 4d. Regulating services		rMCZ 28, Reference Area 13 North Utopia
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: Subtidal sediments contribute to the bioremediation of waste and sequestration of carbon (Fletcher and others, 2011). ***Environmental resilience:*** Subtidal sediments contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** As the site is offshore, its features do not contribute to the delivery of this service. It has not been possible to estimate the value derived from regulating services associated with the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of the subtidal sediments and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the recommended Marine Conservation Zone Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities (as, if necessary, mitigation would be introduced, with the associated costs and benefits).	Anticipated direction of change: ⇧ Confidence: Low

Table 4e. Non-use and option values	rMCZ 28, Reference Area 13 North Utopia
Baseline	**Beneficial impact under Policy Option 1**

Table 4e. Non-use and option values		rMCZ 28, Reference Area 13 North Utopia
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 29 East Meridian **Site area (km^2): 407.67**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts				**rMCZ 29, East Meridian**
1a. Ecological description				
Lying over the Northern Palaeovalley and Palaeovalley Banks, which are geological remnants of the deeper ancient river system, the sea bed within the site consists of deep circalittoral rock overlain with a thin veneer of sediments. The south-eastern quarter of the site overlaps an area supporting the region's top 10% of species richness and, while the southern half of the site contains the top 25% of benthic species richness, pelagic data show that the north of the site is higher in biodiversity. Ross worm reef and subtidal sands and gravels are also found in the site. The site's sea bed shows geomorphological evidence of the eastern English Channel outburst flood, which occurred some 200,000 years ago when a huge glacial lake in the North Sea burst through the Dover Straits Isthmus which contained it, thus separating England from mainland Europe. Sonar evidence of the sea bed reveals deeply gouged channels where the floodwaters broke through. This site is not associated with any existing designation. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A5.2 Subtidal sand	128.37	-	Unfavourable condition	Recover to favourable condition
A5.4 Subtidal mixed sediments	279.36	-	Unfavourable condition	Recover to favourable condition
Habitats of conservation importance				
Ross worm (*Sabellaria spinulosa*) reef	313.04 m^2	-	Unfavourable condition	Recover to favourable condition
Subtidal sands and gravels	253.64 m^2	-	Unfavourable condition	Recover to favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone on human activities (over 2013 to 2032 inclusive)

Table 2a. Aggregate Extraction	**rMCZ 29, East Meridian**
Source of costs of the rMCZ under Policy Option 1	
Management Scenario 1: Increase in costs of assessing environmental impacts for future licence applications for existing production licences and current licence applications within 1km of an rMCZ. Also additional costs for provision of information that will be used for these assessments, which will be incurred for the entire suite of sites. This provides the best estimate of impact.	
Management Scenario 2: Increase in costs of assessing environmental impacts for future licence applications, which is assessed for the entire suite of sites and is not attributed to specific sites.	
Baseline description of activity	**Costs of effect of MCZ on the sector under Policy Option 1**

There are 2 licensed aggregate extraction production areas (Nos. 464/1 and 464/2) within 1km of the rMCZ. It is anticipated that the Environmental Impact Assessment for renewal of this licence will be conducted in 2021(based on information provided by The Crown Estate (pers. comm., 2012).

Average annual site-specific costs £m/yr	Scenario 1	Scenario 2
Cost to the operator	0.003	Assessed for the suite of sites

Scenario 1 : It is assumed that additional costs are incurred for future applications for renewal of existing production licences within 1km of this site. These costs arise from assessing the potential effects of aggregate extraction on the features protected by the pMCZ and are estimated to cost the operator an additional £27,000 per licence application (based on information provided by BMAPA (pers. comm.., 2011). An additional cost will also be incurred in provision of information by the British Marine Aggregate Producers Association for these assessments. This cost will be incurred as a result of the entire suite of MCZs and is not included here. Further details of the costs are provided in Annex N1.

Scenario 2: An assessment of the additional costs of Scenario 2 is provided for the entire suite of sites, which is summarised in the Evidence Base. Details are provided in Annex H2 and N1.

Table 2b. Commercial fisheries **rMCZ 29, East Meridian**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of commercial fishing gears will be required for certain features protected by this rMCZ. Therefore, two scenarios have been employed in the Impact Assessment (IA) for these fisheries to reflect this uncertainty. Should the site be designated, the management that will be required will fall somewhere within this range.

Management scenario 1: Closure of entire rMCZ to bottom trawls and dredges to protect areas of Ross worm reef *Sabellaria spinulosa* (Statutory Nature Conservation Bodies (SNCB) informed scenario). It is not possible to provide a zoned closure scenario due to uncertainty of the locality of the Ross worm reef.

Management scenario 2: Closure of entire rMCZ to bottom trawls, dredges, lines, nets, pots and traps (SNCB informed scenario).

Table 2b. Commercial fisheries **rMCZ 29, East Meridian**

Summary of all fisheries: The rMCZ is situated in the westbound Channel shipping lane. Approximately half of the rMCZ is between the 6nm and 12nm limits and half beyond the 12nm limit. Recommended MCZ 29.2 is an alternative option, which comprises the eastern half of rMCZ 29. Most UK vessels fishing the site are based in Shoreham and Newhaven and are both under 15 metres and over 15 metres in length. For those vessels that carry out scallop dredging and beam trawling, these activities have a high revenue with about 40% of ttheir income coming from scallop dredging (Regional Stakeholder Group (RSG) meeting, July 2011). Nomadic vessels travel from Newlyn, Plymouth and Brixham to use the rMCZ. The site is heavily fished by large UK scallop dredgers and beam trawlers, and by several vessels under 10 metres. The smaller vessels derive income mainly from scallop dredging followed by set netting and bottom trawling (MCZ Fisheries Model). Many Scottish scallopers land into Shoreham (these vessels fish the site because they have been displaced from their northern grounds). More detail on the approach used for the fisheries method is provided in Annexes H7 and N4.

The site is heavily fished by large Dutch, Belgian and French scallop dredgers and beam trawlers. Belgian and French vessels have historical rights to fish between 6nm and 12nm. Dutch vessels fish only beyond 12nm as they have no historical rights. A number of commercial fishing restrictions are already in existence (listed in Annex E1).

Estimated annual value of landings from the rMCZ: £1.023m/yr.

Baseline description of UK commercial fisheries	**Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1**
Bottom trawls: Vessel numbers unknown. Estimated total value of landings from the rMCZ: £0.268m/yr (MCZ Fisheries Model).	The estimated annual value of UK bottom trawl landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.268 | 0.268
Dredges: Vessel numbers unknown. Estimated total value of landings from the rMCZ: £0.602m/yr (MCZ Fisheries Model).	The estimated annual value of UK dredge landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.602 | 0.602
Hooks and lines: Vessel numbers unknown. Estimated total value of landings from the rMCZ: £0.008m/yr (MCZ Fisheries Model).	The estimated annual value of UK hook and line landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.000 | 0.008 In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with hooks and lines at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.
Nets: Vessel numbers unknown. Estimated total value of landings from the	The estimated annual value of UK net landings affected is expected to fall

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 29, East Meridian</th></tr>
<tr><td>rMCZ: £0.104m/yr (MCZ Fisheries Model).</td><td>within the following range of scenarios:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.104</td></tr></table>In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with nets at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Pots and traps: Vessel numbers unknown. Estimated total value of landings from the rMCZ: £0.004m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK pot and trap landings affected is expected to fall within the following range of scenarios:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.004</td></tr></table>In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with pots and traps at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Total direct impact on UK commercial fisheries under Policy Option 1</td><td></td></tr>
<tr><td></td><td>The estimated annual value of UK landings and GVA affected is expected to fall within the following range of scenarios:<table><tr><td>£million/yr</td><td>Scenario 1</td><td>Scenario 2</td><td>Best estimate</td></tr><tr><td>Value of landings affected</td><td>0.218</td><td>0.986</td><td>0.225</td></tr><tr><td>GVA affected</td><td>0.100</td><td>0.451</td><td>0.103</td></tr></table>The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas.</td></tr>
<tr><td>Baseline description of non-UK fisheries</td><td>Costs of impact of rMCZ on non-UK commercial fisheries under Policy Option 1</td></tr>
<tr><td>The rMCZ is heavily fished by large non-UK scallop dredgers and beam trawlers, and by several non-UK vessels under 10 metres. The smaller vessels derive income mainly from scallop dredging followed by set netting</td><td>Scenario 1: Non-UK vessels using bottom trawls and dredges throughout the site (notably French and Belgian vessels) will be affected by this management</td></tr>
</table>

Table 2b. Commercial fisheries	rMCZ 29, East Meridian
and bottom trawling (RSG meeting, July 2011). Vessels from France: • Nord-Pas de Calais/Picardie fleet: about 40 scallop dredgers from Boulogne-sur-Mer and Dunkirk use this rMCZ February–May (Direction des Pêches Maritimes et de l' Aquaculture, 2011); vessels also target red mullet and squid as they are high-value, non-quota species (A.Viera., Email feedback response to first tranche IA material, 13 January 2012). • Basse Normandie fleet: about 41 vessels (of which 13 are under 15 metres) fish in the rMCZ. • Haute Normandie fleet: 15 vessels are highly dependent on this rMCZ targeting scallop, Dover sole, bass (mostly high-value species) with trawls, scallop dredgers and gill nets (Direction des Pêches Maritimes et de l' Aquaculture , 2011). There is no information on number of Dutch vessels or their landings for this site. The Belgian fleet fishes the area heavily but no details are available. Estimated value of landings from the rMCZ by French vessels: bottom trawls/dredges: £1.03m/yr; static gears: £0.001m/yr; other gears: £0.006m/yr (Direction des Pêches Maritimes et de l' Aquaculture, 2011). Estimates are not available for other countries.	scenario for the rMCZ. The estimated value of French landings affected will be: £1.03m/yr (bottom trawls/dredges) (Direction des Pêches Maritimes et de l' Aquaculture , 2011). No information on the effect on other non-UK vessels is available. ***Scenario 2:*** Non-UK vessels using static gear and bottom trawls/dredges will be affected by this management scenario for the rMCZ, particularly French vessels. In the event of a full closure of the rMCZ, the estimated value of French landings affected will be: £1.03m/yr (bottom trawls/dreges) and £0.001m/yr (static gears) (Direction des Pêches Maritimes et de l' Aquaculture , 2011). No information on the effect on other non-UK vessels is available.

Table 2c: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 29, East Meridian
Oil and gas related activities (including carbon capture and storage)	
This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the rMCZ under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 29, East Meridian
Cables (existing interconnectors and telecom cables)	

Table 3. Human activities in the site that are not negatively affected by the rMCZ under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 29, East Meridian
Commercial fisheries (mid-water trawls) Recreation Shipping	

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[19]

✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.

rMCZ 29, East Meridian

ENG Feature	Represent-ativity	Replication	Adequacy	Viability	Gaps or shortfalls in relation to ENG minimum guidelines	Recommended conservation objective	Quantitative considerations at regional MCZ level	Ecological Importance at regional MCZ level	Ecological Importance at wider scale
Ross worm *Sabellaria spinulosa* reefs*[1]	FOCI	✓	✓	✓	None	Recover			**BAP and OSPAR habitat**
Subtidal sands and gravels	FOCI	✓	✓	✓	None	Recover			**BAP habitat**
A5.2 Subtidal sand	BSH	✓	✓	✓	None	Recover			
A5.4 Subtidal mixed sediments	BSH	✓	✓	✓	None	Recover			
Site considerations									

[19] copied from the JNCC and Natural England's advice to Defra on rMCZs

Connectivity	✓
Geological/Geomorphological features of interest	✓ * [2]
Appropriate boundary	✓
Areas of Additional Ecological Importance	✓ * [3]
Overlaps with existing MPAs	None

Additional comments and site benefits:

- [1] There is uncertainty as to whether current data are for *Sabellaria spinulosa* reef or just an occurrence of *Sabellaria spinulosa* species. Further evidence will need to be gathered to confirm whether the reef feature is present (see Section 5.1 of JNCC and Natural England's Advice on rMCZs). Final advice is pending further discussion with Defra regarding potential overlaps between Natura designation processes and MCZs.
- [2] This site overlaps the English Channel outburst flood geological feature, but it is not recommended as a feature for designation. The regional MCZ project report states that this feature was only identified after the final stakeholder meeting and so was not considered for designation. They do state that this would be a good site to protect this feature given that it covers the majority of the site (Balanced Seas 2011a). This is a very large scale Glacial Process (erosion) feature, formed by a catastrophic flood that occurred some 400,000 years before present, when a land barrier at the Straits of Dover that had trapped meltwater in the North Sea became breached. The event left megaflood erosion features on the English Channel seabed including deeply-eroded channels.
- [3] Although it is not clear whether this site was selected on the basis of it being an area of additional ecological importance there are a number of ecological benefits which could be considered important and add value to this recommendation (see Annex 5 of JNCC and Natural England's advice on rMCZs for more detail on these). This site overlaps with areas of high and medium benthic species biodiversity and also overlaps with an area of medium benthic biotope biodiversity (Langmead, et al. 2010). The regional MCZ project recommendations suggest that the presence of an ancient river system increases the complexity of the bathymetry and topographic seafloor features. The area has high benthic species and biotope richness, and being located on the southern edge of a thermal front creates high pelagic diversity within the north area of the site (Balanced Seas 2011a).

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the rMCZ contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption	**rMCZ 29, East Meridian**
Baseline	**Beneficial impact under Policy Option 1**

Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Circalittoral rock is an important location for commercial inshore fishing activity, particularly for crab and lobster. Subtidal sand and mixed sediment habitats are important nursery areas for many species and thus often important for fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see Table 1 for details). The site is heavily fished by large UK scallop dredgers and beam trawlers, and by several under 10 metre vessels that mainly dredge for scallops, but also set net and bottom trawl. A description of on-site fishing activity and the value derived from it is set out in Table 2b.	If the conservation objectives of the features are achieved, all features will be recovered to favourable condition. New management of fishing activities is expected (above the baseline situation), the costs of which are set out in Table 2b, which may reduce the impacts on fish and shellfish habitats and harvesting of stocks. As most of the commercial species targeted by fishers in this area are mobile fish and shellfish, it is unclear whether the scale of habitat recovered and the magnitude of reduced (on-site) harvesting will be enough to have any significant positive impact on commercial stocks. Potential benefits may arise on-site, for fishers permitted to fish within the rMCZ, and off-site from spill-over benefits.	Anticipated direction of change: ⇧ Confidence: Low

Table 5b. Recreation	**rMCZ 29, East Meridian**	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. Circalittoral rock habitat supports rich biodiversity within the site while subtidal sand and subtidal mixed sediments support spawning and nursery grounds for many juvenile commercial fish species, all of which are therefore important habitats for fish and shellfish fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see Table 1 for details). The rMCZ is too far offshore for private angling boats, but may be	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the broad scale habitats to favourable condition may improve their functioning as a nursery area, potentially benefiting fisheries exploited within and outside the rMCZ (see Table 4a). As no additional management of angling is expected, fishers will be able to benefit from any on-site and off-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers. The designation may lead to an increase in angling visits to the	Anticipated direction of change: ⇧ Confidence: Low

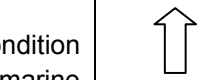
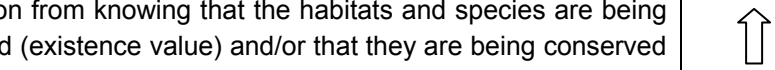
Table 5b. Recreation		rMCZ 29, East Meridian
used for fishing by charter vessels on their way over to fish French waters. The potential spawning ground for fish and generally high biodiversity, due to the complex habitats within the site, are likely to help support potential on-site and off-site fisheries. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site which result from the potential spawning and nursery area.	site, which may benefit the local economy. This increase is likely to arise from a change in anglers' preferred angling locations rather than an increase in days spent angling or the number of anglers at a national scale.	
Diving: Diving is not known to take place in the rMCZ.	N/A	N/A
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. Circalittoral rock, subtidal sand and subtidal mixed sediments support internationally important fish and shellfish fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see Table 1 for details). The rMCZ has particularly high biodiversity and abundant fish populations, which potentially support a number of foraging sea birds and marine mammals. Since it lies within an area of the English Channel used by ferries, which often carry wildlife watchers, particularly those interested in marine mammals. It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the broad scale habitats to favourable condition may improve their functioning as support for fish, bird and marine mammal populations. Any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in wildlife watching trips at the national scale. Visitors in transit across the Channel may benefit from any increased biodiversity through more regular sightings of birds and marine mammals. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change:  Confidence: Low
Other recreation: Other recreational activities are not known to take place in the rMCZ.	N/A	N/A

Table 5c. Research and education	rMCZ 29, East Meridian
Baseline	**Beneficial impact under Policy Option 1**

Table 5c. Research and education		rMCZ 29, East Meridian
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. No known formal research activities are currently carried out in the rMCZ. However, ferries crossing the English Channel are often utilised by marine mammal observers whose data contribute to national databases. It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. No known education activity occurs in the area of the rMCZ.	As the rMCZ is approximately 15km offshore and therefore relatively inaccessible, no benefits are likely to arise from direct use of the site for education. Non-visitors may benefit if the rMCZ contributes to external education programmes (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools)	Anticipated direction of change: ⇧ Confidence: Low

Table 5d. Regulating services		rMCZ 29, East Meridian
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: The features of the site (subtidal sediments and *Sabellaria*) contribute to both the bioremediation of waste and sequestration of carbon (Fletcher and others, 2011). ***Environmental resilience:*** The features of the site (*Sabellaria*) contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** As the site is offshore, its features are not thought to contribute to the delivery of this service. It has not been possible to estimate the value derived from regulating services associated with the rMCZ.	If the conservation objectives of the features are achieved, all of the features will be recovered to favourable condition. Recovery of all the features and a potential reduction in the use of bottom towed fishing gear may increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 5e. Non-use and option values		rMCZ 29, East Meridian
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the rMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the rMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change:  Confidence: Moderate

Option to rMCZ No. 29: rMCZ 29.2 East Meridian (Eastern Side) **Site area (km^2): 201.46 km^2**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts			**rMCZ 29.2, East Meridian (Eastern Side)**	
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) would protect the eastern half of the larger rMCZ 29 and it is a smaller alternative to the large rMCZ 29.2. Lying over the Northern Palaeovalley and Palaeovalley Banks, which are the geological remnants of the deeper ancient river system, the sea bed within the site is comprised of deep circalittoral rock overlain with a thin veneer of either sands or mixed sediments, or areas of thicker sands and mixed sediments. The south-eastern quarter of the site overlaps an area supporting the region's top 10% of species richness, with pelagic data showing that the north of the site is higher in biodiversity. The site's sea bed shows geomorphological evidence of the eastern English Channel outburst flood, which occurred some 200,000 years ago when a huge glacial lake in the North Sea burst through the Dover Straits Isthmus which contained it, thus separating England from mainland Europe. Sonar evidence of the sea bed reveals deeply gouged channels where the floodwaters broke through. This site is not associated with any existing designation. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A5.2 Subtidal sand	58.67	-	Unfavourable condition	Recover to favourable condition
A5.4 Subtidal mixed sediments	142.79	-	Unfavourable condition	Recover to favourable condition
Habitats of conservation importance				
Subtidal sands and gravels	47.38	-	Unfavourable condition	Recover to favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone on human activities (over 2013 to 2032 inclusive)

Table 2a. Aggregate Extraction	**rMCZ 29.2 (Eastern Section)**
Source of costs of the rMCZ under Policy Option 1	
Scenario 1: Increase in costs of assessing environmental impacts for future licence applications for existing production licences and current licence applications within 1km of an rMCZ. Also additional costs for provision of information that will be used for these assessments, which will be incurred for the entire suite of sites. This provides the best estimate of impact.	
Scenario 2: Increase in costs of assessing environmental impacts for future licence applications, which is assessed for the entire suite of sites and is not attributed to specific sites.	
Baseline description of activity	**Costs of effect of MCZ on the sector under Policy Option 1**

Table 2a. Aggregate Extraction	rMCZ 29.2 (Eastern Section)
There are 2 licensed aggregate extraction production areas (Nos. 464/1 and 464/2) within 1km of the rMCZ. It is anticipated that the Environmental Impact Assessment for renewal of this licence will be conducted in 2021(based on information provided by The Crown Estate (pers. comm., 2012).	<table><tr><td>Average annual site-specific costs £m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Cost to the operator</td><td>0.003</td><td>Assessed for the suite of sites</td></tr></table> ***Scenario 1:*** It is assumed that additional costs are incurred for future applications for renewal of existing production licences within 1km of this site. These costs arise from assessing the potential effects of aggregate extraction on the features protected by the pMCZ and are estimated to cost the operator an additional £27,000 per licence application (based on information provided by BMAPA (pers. comm.., 2011). An additional cost will also be incurred in provision of information by the British Marine Aggregate Producers Association for these assessments. This cost will be incurred as a result of the entire suite of MCZs and is not included here. Further details of the costs are provided in Annex N1. ***Scenario 2:*** An assessment of the additional costs of Scenario 2 is provided for the entire suite of sites, which is summarised in the Evidence Base. Details are provided in Annex H2 and N1.

Table 2b. Commercial fisheries	rMCZ 29.2, East Meridian (Eastern Side)
Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1** The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of commercial fishing gears will be required for certain features protected by this rMCZ. Therefore, two scenarios have been employed in the Impact Assessment (IA) for these fisheries to reflect this uncertainty. Should the site be designated, the management that will be required will fall somewhere within this range. ***Management scenario 1:*** No additional management. ***Management scenario 2:*** Closure of entire rMCZ to bottom trawls, dredges, lines, nets, pots and traps (Statutory Nature Conservation Bodies (SNCB) informed scenario).	
Summary of all fisheries: This rMCZ is an alternative option to rMCZ 29, representing a smaller area that might be more acceptable to stakeholders, but that protects slightly fewer features. The rMCZ is situated in the westbound Channel shipping lane, about half of it is between the 6nm and 12nm limits and	

half beyond the 12nm limit. Most UK vessels fishing the site are based in Shoreham and Newhaven and comprise of both under 15 metres and over 15 metres in length. For those vessels that carry out scallop dredging and beam trawling, these activities have a high revenue, withabout 40% of their earnings come from scallop dredging within this rMCZ (Regional Stakeholder Group (RSG) meeting, July 2011). This area is heavily fished by large UK scallop dredgers and beam trawlers, and by several vessels under 10 metres. These smaller vessels derive income mainly from scallop dredging followed by set netting and bottom trawling (MCZ Fisheries Model). Many Scottish scallopers land into Shoreham as a result of having been displaced from their northern grounds.

This area is heavily fished by large UK, Dutch, Belgian and French scallop dredgers and beam trawlers. Belgian and French vessels have historical rights to fish between 6nm and 12nm; Dutch vessels fish beyond 12nm. A number of commercial fishing restrictions are already in existence (listed in Annex E1). More detail on the approach used for the fisheries method is provided at Annexes H7 and N4.

Estimated annual value of landings from the rMCZ: £0.299m/yr.

<table>
<tr><th>Baseline description of UK commercial fisheries</th><th>Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1</th></tr>
<tr><td>Bottom trawls Vessel numbers unknown.Estimated total value of landings from the rMCZ: £0.133m/yr.</td><td>The estimated annual value of UK bottom trawl landings affected is expected to fall within the following range of scenarios:
<table>
<tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr>
<tr><td>Value of landings affected</td><td>0.000</td><td>0.133</td></tr>
</table></td></tr>
<tr><td>Dredges Vessel numbers unknownEstimated total value of landings from the rMCZ: £0.132m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK dredge landings affected is expected to fall within the following range of scenarios:
<table>
<tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr>
<tr><td>Value of landings affected</td><td>0.000</td><td>0.132</td></tr>
</table></td></tr>
<tr><td>Hooks and lines: Vessel numbers unknown.Estimated total value of landings from the rMCZ: £0.005m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK hook and line landings affected is expected to fall within the following range of scenarios:
<table>
<tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr>
<tr><td>Value of landings affected</td><td>0.000</td><td>0.005</td></tr>
</table>
In establishing the draft conservation objectives, the site’s features may have been assessed as having low vulnerability to fishing with hooks and lines at current levels and, where this is the case, this activity was not the primary reason for assigning the ‘recover’ conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Nets Vessel numbers unknown.Estimated total value of landings from the</td><td>The estimated annual value of UK net landings affected is expected to fall</td></tr>
</table>

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 29.2, East Meridian (Eastern Side)</th></tr>
<tr><td>rMCZ: £0.025m/yr (MCZ Fisheries Model).</td><td>within the following range of scenarios:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.025</td></tr></table>In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with nets at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Pots and traps: Vessel numbers unknown.Estimated total value of landings from the rMCZ: £0.004m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK pot and trap landings affected is expected to fall within the following range of scenarios:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.004</td></tr></table>In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with pots and traps at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Total direct impact on UK commercial fisheries under Policy Option 1</td><td></td></tr>
<tr><td></td><td>The estimated annual value of UK landings and gross value added (GVA) affected is expected to fall within the following range of scenarios:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td><td>Best estimate</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.299</td><td>0.035</td></tr><tr><td>GVA affected</td><td>0.000</td><td>0.134</td><td>0.016</td></tr></table>The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas.</td></tr>
<tr><td>Baseline description of non-UK fisheries</td><td>Costs of impact of rMCZ on non-UK commercial fisheries under Policy Option 1</td></tr>
<tr><td>The rMCZ is heavily fished by large non-UK scallop dredgers and beam trawlers, and by several non-UK vessels under 10 metres. The smaller vessels derive income mainly from scallop dredging followed by set netting</td><td>Scenario 1: No impacts are anticipated under Scenario 1

Scenario 2: Non-UK vessels using static gear and bottom trawls/dredges will</td></tr>
</table>

Table 2b. Commercial fisheries	rMCZ 29.2, East Meridian (Eastern Side)
and bottom trawling (RSG Meeting, July 2011). Information on numbers of vessels using the larger rMCZ 29 is provided for that site; it is not known what proportion uses this smaller area. There is no information on use on numbers of vessels or landings for the Dutch fleet that use this area . The Belgian fleet fishes the area heavily but no details are available. Estimated value of landings from the rMCZ by French vessels: bottom trawls/dredges: £0.630m/yr; static gears: <£0.001m/yr; other gears: £0.003 (Direction des Pêches Maritimes et de l' Aquaculture , 2011). Estimates are not available for other countries.	be affected by this management scenario for the rMCZ, particularly French vessels. In the event of a full closure of the rMCZ, the estimated value of French landings affected will be: £0.630m/yr (bottom trawls/dreges) and <£0.001m/yr (static gears) (Direction des Pêches Maritimes et de l' Aquaculture, 2011). No information on the effect on other non-UK vessels is available.

Table 2c: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 29.2, East Meridian (Eastern side)
Oil and gas related activities (including carbon capture and storage)	
This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the rMCZ under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 29.2, East Meridian (Eastern Side)
Cables (existing interconnectors and telecom cables) Commercial fisheries (mid-water trawls) Recreation Shipping	

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[20] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.									rMCZ 29.2 East Meridian (Eastern Side)
ENG Feature	**Represent-ativity**	**Replication**	**Adequacy**	**Viability**	**Gaps or shortfalls in relation to ENG minimum guidelines**	**Recommended conservation objective**	**Quantitative considerations at regional MCZ level**	**Ecological Importance at regional MCZ level**	**Ecological Importance at wider scale**
Subtidal sands and gravels	FOCI	✓	✓	✓	None	Recover			**BAP habitat**
A5.2 Subtidal sand	BSH	✓	✓	✓	None	Recover			
A5.4 Subtidal mixed sediments	BSH	✓	✓	✓	None	Recover			
Site considerations									
Connectivity					✓				
Geological/Geomorphological features of interest					✓ * [1]				
Appropriate boundary					✓				
Areas of Additional Ecological Importance					✓ * [2]				
Overlaps with existing MPAs					None				

Additional comments and site benefits:

[20] copied from the JNCC and Natural England's advice to Defra on rMCZs

- [1] This site overlaps the English Channel outburst flood geological feature which is listed as a feature of interest in the ENG, but has not been recommended as feature for designation. This is a very large scale Glacial Process (erosion) feature, formed by a catastrophic flood that occurred some 400,000 years before present, when a land barrier at the Straits of Dover that had trapped meltwater in the North Sea became breached. The event left megaflood erosion features on the English Channel seabed including deeply-eroded channels.
- [2] Although it is not clear whether this site was selected on the basis of it being an area of additional ecological importance there are a number of ecological benefits which could be considered important and add value to this recommendation (see Annex 5 of JNCC and Natural England's advice on rMCZs for more detail on these). This site overlaps with areas of high and medium benthic species biodiversity and an area of of medium benthic biotope biodiversity (Langmead, et al. 2010). The regional MCZ project recommendations suggest that the presence of an ancient river system increases the complexity of the bathymetry and topographic seafloor features. The area is high in benthic species richness, with pelagic data showing the north of the site is higher in biodiversity (Balanced Seas 2011a) This rMCZ overlaps with an area of moderate benthic biotope richness in the north-west corner of the site (Langmead, et al. 2010).This rMCZ is located on the southern edge of a thermal front creates high pelagic diversity within the north area of the site.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the rMCZ contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption	**rMCZ 29.2, East Meridian (Eastern Side)**	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Circalittoral rock is an important location for commercial inshore fishing activity, particularly for crab and lobster. Subtidal sand and mixed sediment habitats are important nursery areas for many species and thus often important for fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see Table 1 for details).	If the conservation objectives of the features are achieved, all features will be recovered to favourable condition. New management of fishing activities is expected (above the baseline situation), the costs of which are set out in Table 2b, which may reduce the impacts on fish and shellfish habitats and harvesting of stocks. As most of the commercial species targeted by fishers in this area are mobile fish and shellfish, it is unclear whether the scale of habitat recovered and the magnitude of reduced (on-site) harvesting will be enough to have any significant positive impact on	Anticipated direction of change:  Confidence: Low

The site is heavily fished by large UK scallop dredgers and beam trawlers, and by several under 10 metre vessels that mainly dredge for scallops, but also set net and bottom trawl. A description of on-site fishing activity and the value derived from it is set out in Table 2b.	commercial stocks. Potential benefits may arise on-site, for fishers permitted to fish within the rMCZ, and off-site from spill-over benefits.	

Table 5b. Recreation	**rMCZ 29.2, East Meridian (Eastern Side)**	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. Circalittoral rock habitats support rich biodiversity within the site while subtidal sand and subtidal mixed sediments support spawning and nursery grounds for many juvenile commercial fish species, all of which are therefore important habitats for fish and shellfish fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see Table 1 for details). The rMCZ is too far offshore for private angling boats, but may be used for fishing by charter vessels on their way over to fish French waters. The potential spawning ground for fish and generally high biodiversity, due to the complex habitats within the site, are likely to help support potential on-site and off-site fisheries. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site which result from the potential spawning and nursery area.	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the broad scale habitats to favourable condition may improve their functioning as a nursery area, potentially benefiting fisheries exploited within and outside the rMCZ (see Table 4a). As no additional management of angling is expected, fishers will be able to benefit from any on-site and off-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers. The designation may lead to an increase in angling visits to the site, which may benefit the local economy. This increase is likely to arise from a change in anglers' preferred angling locations rather than an increase in days spent angling or the number of anglers at a national scale. The adjacent popular angling spot, the Varne Bank may benefit from possible spill-over effects.	Anticipated direction of change:  Confidence: Low
Diving: Diving is not known to take place in the rMCZ.	N/A	N/A
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services.	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition.	Anticipated direction of change: 

Table 5b. Recreation		rMCZ 29.2, East Meridian (Eastern Side)
Circalittoral rock habitats, subtidal sand and subtidal mixed sediments support internationally important fish and shellfish fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see Table 1 for details). The rMCZ has particularly high biodiversity and abundant fish populations, which potentially support foraging sea birds and marine mammals. It lies within an area of the English Channel used by ferries, which often carry wildlife watchers, particularly those interested in marine mammals. Visitors in transit across the Channel may benefit from any increased biodiversity through more regular sightings of birds and marine mammals. It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	The recovery of the broad scale habitats to favourable condition may improve their functioning as support for fish, bird and marine mammal populations. Any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in wildlife watching trips at the national scale. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Confidence: Low
Other recreation: Other recreational activities are not known to take place in the rMCZ.	N/A	N/A

Table 5c. Research and education		rMCZ 29.2, East Meridian (Eastern Side)
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. No known formal research activities are currently carried out in the rMCZ. However, ferries crossing the English Channel may be used by marine mammal observers whose data contribute to national databases. It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education	As the rMCZ is approximately 15km offshore and therefore relatively inaccessible, no benefits are likely to arise from direct	Anticipated direction of

Table 5c. Research and education	rMCZ 29.2, East Meridian (Eastern Side)	
services. No known education activity occurs in the area of the rMCZ.	use of the site for education. Non-visitors may benefit if the rMCZ contributes to external education programmes (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	change: ⇧ Confidence: Low

Table 5d. Regulating services	rMCZ 29.2, East Meridian (Eastern Side)	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: The features of the site contribute to the bioremediation of waste (subtidal sediments and subtidal sands and gravels) and sequestration of carbon (subtidal sediments) (Fletcher and others, 2011). ***Environmental resilience:*** The features of the site are not known to contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011). ***Natural hazard protection:*** As the site is offshore, its features are not thought to contribute to the delivery of this service. It has not been possible to estimate the value derived from regulating services associated with the rMCZ.	If the conservation objectives of the features are achieved, all of the features will be recovered to favourable condition. Recovery of all the features and a potential reduction in the use of bottom towed fishing gear may increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 5e. Non-use and option values	rMCZ 29.2, East Meridian (Eastern Side)	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the rMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the rMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 30 Kentish Knock East **Site area (km^2): 96.30**

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts				rMCZ 30, Kentish Knock East
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) would protect predominantly subtidal coarse sediments and small patches of subtidal sand, and contains moderate species richness in relation to other rMCZs in the region. Persistent thermal fronts and regular summer/winter bird foraging areas highlight the fact that the area has high pelagic biodiversity. The majority of the site's sea bed shows geomorphological evidence of the eastern English Channel outburst flood, which occurred some 200,000 years ago when a huge glacial lake in the North Sea burst through the Dover Straits Isthmus which contained it, thus separating England from mainland Europe. Sonar evidence of the sea bed reveals deeply gouged channels where the floodwaters broke through. This site is in close proximity to the Margate and Long Sands Special Area of Conservation in the north-west and overlaps with the Outer Thames Estuary Special Protection Area. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A5.1 Subtidal coarse sediment	81.65	-	Unfavourable condition	Recover to favourable condition
A5.2 Subtidal sand	2.82		Unfavourable condition	Recover to favourable condition
A5.4 Subtidal mixed sediments	11.52		Unfavourable condition	Recover to favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone (rMCZ) on human activities (over 2013 to 2032 inclusive)

Table 2a. Commercial fisheries	rMCZ 30, Kentish Knock East
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of commercial fishing gear will be required for certain features protected by this rMCZ. Therefore, two scenarios have been employed in the Impact Assessment (IA) for these fisheries to reflect this uncertainty. Should the site be designated, the management that will be required will fall somewhere within this range. ***Management scenario 1:*** No additional management (Statutory Nature Conservation Bodies (SNCB) informed scenario). ***Management scenario 2:*** Closure of entire rMCZ to bottom trawls and dredges (SNCB informed scenario)*. * There is no information to indicate that dredging occurs in this site and so there is no assessment of this gear type below.
Summary of all fisheries: The rMCZ lies mainly between the 6nm limit and 12 nm limit, but extends outside the 12nm limit in the south east. Trawlers from

<table>
<tr><th colspan="2">Table 2a. Commercial fisheries rMCZ 30, Kentish Knock East</th></tr>
<tr><td colspan="2">West Mersea, Whitstable, Leigh-on-Sea and Southend work this area including both under 15 metre and over 15m vessels and derive 25% of their earnings from the site (IA questionnaire response from Southend vessel owner, August 2011). Several UK vessels deploy long lines in the area seasonally.. A fishing representative indicated that there are 15 vessels that fish wthin the rMCZ, 5 of which are over 10 metres, the rest under 10 metres (Interview with fisheries representative for this site, July 2011). The French and Belgian fleets have historical fishing rights from 6nm to 12nm, and the Dutch fleet is active beyond the 12nm limit. A number of commercial fishing restrictions are already in existence (listed in Annex E1). More detail on the approach used for the fisheries method is provided in Annexes H7 and N4.

Estimated annual value of landings from the rMCZ: £0.073m/yr.</td></tr>
<tr><th>Baseline description of UK commercial fisheries</th><th>Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1</th></tr>
<tr><td>Bottom trawls: Vessel numbers are unknown.Estimated total value of landings from the rMCZ: £0.024m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK bottom trawl landings affected is expected to fall within the following range of scenarios:
<table>
<tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr>
<tr><td>Value of landings affected</td><td>0.000</td><td>0.024</td></tr>
</table></td></tr>
<tr><th>Total direct impact on UK commercial fisheries under Policy Option 1</th><th></th></tr>
<tr><td></td><td>The estimated annual value of UK landings and gross value added (GVA) affected is expected to fall within the following range of scenarios:
<table>
<tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td><td>Best estimate</td></tr>
<tr><td>Value of landings affected</td><td>0.000</td><td>0.024</td><td>0.003</td></tr>
<tr><td>GVA affected</td><td>0.000</td><td>0.010</td><td>0.001</td></tr>
</table>
The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas.
A representative of Southend fishermen who was interviewed explained that closure of the entire rMCZ to bottom trawls (under Scenario 2) is expected to affect trawlers in particular from West Mersea, Whitstable, Leigh-on-Sea and Southend (15 trawlers). Displacement is viewed as a non-viable alternative as: (i) all other fishing grounds have existing users and any increased effort within them could lead to conflict; and (ii) all available species are already fished using appropriate gears. Trawlers would experience a major loss of revenue which would force them to leave the fleet (see Annex J3a for more detail). Associated shore-based jobs could be lost and the closure would result in an important social cost to local fishing communities.</td></tr>
</table>

Table 2a. Commercial fisheries	rMCZ 30, Kentish Knock East
	It will also have indirect impacts on local fish markets, restaurants, fish retailers, and activities linked to the fishing fleet such as repairs, fuel services and gear suppliers (IA questionnaire response from vessel owner representing the Southend Fleet, August 2011).
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries under Policy Option 1**
Vessels from France: The rMCZ is used by 10–40 French trawlers under 15 metres from the Nord-Pas de Calais and Picardie fleet (from Boulogne-sur-Mer) which target red mullet and squid as they are high-value, non- quota species. (Direction des Pêches Maritimes et de l' Aquaculture, 2011). Vessels from the Netherlands: the Dutch fleet operate in part of the site using chainless gears to fish for sole (Balanced Seas Final Report, Site Assessment Document). Vessels from Belgium: vessels traverse the site on the way to other fishing grounds but there is no information as to their fishing activities in the site. Estimated value of landings from the rMCZ by French vessels: bottom trawls/dredges: £0.012m/yr (Direction des Pêches Maritimes et de l' Aquaculture, 2011). Estimates are not available for other countries.	***Scenario 1:*** No impacts are anticipated under Scenario 1 ***Scenario 2:*** Non-UK vessels using static gear and bottom trawls/dredges will be affected by this management scenario for the rMCZ, particularly French vessels. In the event of a full closure of the rMCZ, the estimated value of French landings affected will be: £0.012m/yr (bottom trawls/dredges) (Direction des Pêches Maritimes et de l' Aquaculture, 2011). No information on the effect on other non-UK vessels is available.

Table 2b. Ports, harbours, shipping and disposal sites	rMCZ 30, Kentish Knock East
Source of costs of the recommended Marine Conservation Zone (rMCZ) **under Policy Option 1** ***Management scenario 1:*** Not applicable to this site. ***Management scenario 2:*** Increase in costs of assessing environmental impacts for future licence applications. This applies to future licence applications for disposal of dredged material within 5 km of the rMCZ.	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
Disposal sites: There are two sites (Area 108/3 and NS100 Britned) within 5km of the rMCZ which are licensed for disposal of channel dredge material. The average number of licence applications received for both of these disposal sites is 0.1 per year (based on number of licence	*£m/yr* | Scenario 1 | Scenario 2 Cost to the operator | N/A | 0.001 ***Scenario 1:*** Not applicable to this site.

Table 2b. Ports, harbours, shipping and disposal sites	rMCZ 30, Kentish Knock East
applications received between 2001 and 2010 (Cefas, pers. comm., 2011).	***Scenario 2:*** Future licence applications for disposal of material within 5km of this rMCZ will need to consider the potential effects of the activity on the features protected by the rMCZ. Additional costs will be incurred as a result (a breakdown of these by activity is provided in Annex N11).

Table 2c: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	rMCZ 30, Kentish Knock
Oil and gas related activities (including carbon capture and storage)	
This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the rMCZ under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	rMCZ 30, Kentish Knock East
Cables (existing interconnectors and telecom cables)	
Commercial fisheries (hooks and lines, mid-water trawls, nets, pots and traps)	
Recreation	
Shipping	

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[21] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.	rMCZ 30, Kentish Knock East

[21] copied from the JNCC and Natural England's advice to Defra on rMCZs

ENG Feature	Represent-ativity	Replication	Adequacy	Viability	Gaps or shortfalls in relation to ENG minimum guidelines	Recommended conservation objective	Quantitative considerations at regional MCZ level	Ecological Importance at regional MCZ level	Ecological Importance at wider scale
A5.1 Subtidal coarse sediment	BSH	✓	✓	✓	None	*Recover*	**This is a significant contributor to the adequacy target, in the BS region.**		**Regionally important in relation to biogeographic representivity for the Southern North Sea – Region 2**
A5.2 Subtidal sand	BSH	✓	✓	✓	None	*Recover*			
A5.4 Subtidal mixed sediment	BSH	✓	✓	✓	None	Recover			**Regionally important in relation to biogeographic representivity for the Southern North Sea – Region 2.**
Site considerations									
Connectivity						✓			
Geological/Geomorphological features of interest						✓ * [2]			
Appropriate boundary						✓			
Areas of additional ecological importance						✓ * [1, 2, 3]			
Overlaps with existing MPAs						✓			

Additional comments and site benefits:

- [1] This rMCZ falls within the foraging radii for seabird colonies (RSPB data) and there are also nursery and spawning grounds for a number of fish species (Ellis, et al. 2012).The rMCZ overlaps with an SPA and is a regular summer/winter bird foraging area (Balanced Seas 2011a)
- [2] This site overlaps the English Channel Glacial outburst flood geological feature but this has not been recommended by the RSG as a feature for designation within this rMCZ. This is a very large scale Glacial Process (erosion) feature, formed by a catastrophic flood that occurred some 400 000 years before present, when a land barrier at the Straits of Dover that had trapped meltwater in the North Sea became breached. The event left megaflood erosion features on the English Channel seabed including deeply-eroded channels. In addition to this primary feature this rMCZ hosts secondary features such as tunnel valleys and the Paleo Thames paleovalley.
- [3] SeaSearch data has identified possible Sabellaria sp. and mussel beds here but further research is needed to determine this.

Anticipated Benefits to Ecosystem Services

The habitats, species and other ecological features of the rMCZ contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption		**rMCZ 30, Kentish Knock East**
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Subtidal coarse sediment, sand, and mixed sediment habitats are important nursery areas for many species and thus often important for fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the	If the conservation objectives of the features are achieved, all features will be recovered to favourable condition. New management of fishing activities is expected (above the baseline situation), the costs of which are set out in Table 2a, which may reduce the impacts on fish and shellfish habitats and harvesting of stocks. As most of the commercial species targeted by fishers in this area are mobile fish and shellfish, it is unclear whether the scale of	Anticipated direction of change: ⇧ Confidence: Low

Table 5a. Fish and shellfish for human consumption		**rMCZ 30, Kentish Knock East**
site when in unfavourable condition (see Table 1 for details). Trawlers from West Mersea, Whitstable, Leigh-on-Sea and Southend fish within this area and derive 25% of their earnings from this site (Impact Assessment questionnaire response from Southend vessel owner, August 2011). Several UK vessels deploy long lines in the area seasonally. A description of on-site fishing activity and the value derived from it is set out in Table 2a.	habitat recovered and the magnitude of reduced (on-site) harvesting will be enough to have any significant positive impact on commercial stocks. Potential benefits may arise on-site, for fishers permitted to fish within the rMCZ, and off-site from spill-over benefits.	

Table 5b. Recreation		**rMCZ 30, Kentish Knock East**
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. Subtidal mixed sediment, subtidal sand and subtidal coarse sediments support high biodiversity within the site, providing spawning and nursery grounds for many juvenile commercial fish species, all of which are therefore important habitats for fish and shellfish fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see Table 1 for details). The rMCZ is too far offshore for private angling boats, but may be used for fishing by charter vessels from Mersea, Felixstowe, Ramsgate and Harwich. The potential spawning ground for fish and generally high biodiversity, due to the complex habitats within the site, are likely to help support potential on-site and off-site fisheries.	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the broad scale habitats to favourable condition may improve their functioning as a nursery area, potentially benefiting fisheries exploited within and outside the rMCZ (see Table 4a). As no additional management of angling is expected, fishers will be able to benefit from any on-site and off-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers. The designation may lead to an increase in angling visits to the site, which may benefit the local economy. This increase is likely to arise from a change in anglers' preferred angling locations rather than an increase in days spent angling or the number of anglers at a national scale.	Anticipated direction of change:  Confidence: Low

Table 5b. Recreation		**rMCZ 30, Kentish Knock East**
It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site which result from the potential spawning and nursery area.		
Diving: Diving is not known to take place in the rMCZ.	N/A	N/A
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. Subtidal mixed sediment, subtidal sand and subtidal coarse sediments support internationally important fish and shellfish fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see Table 1 for details). Due to its offshore location, the rMCZ has not been identified as a popular area for wildlife watching. However, the site has particularly high biodiversity and abundant fish populations, which support a number of foraging sea birds including the red throated diver and potentially marine mammals. It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the broad scale habitats to favourable condition may improve their functioning as support for fish, bird and marine mammal populations. Any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in wildlife watching trips at the national scale. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low
Other recreation: Other recreational activities are not known to take place in the rMCZ.	N/A	N/A

Table 5c. Research and education	**rMCZ 30, Kentish Knock East**
Baseline	**Beneficial impact under Policy Option 1**

Table 5c. Research and education		**rMCZ 30, Kentish Knock East**
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. No known formal research activities are currently carried out in the rMCZ. However, ferries crossing the English Channel are often utilised by marine mammal observers whose data contribute to national databases. It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. No known education activity occurs in the rMCZ.	As the rMCZ is approximately 34km offshore and therefore relatively inaccessible, no benefits are likely to arise from direct use of the site for education. Non-visitors may benefit if the rMCZ contributes to external education programmes (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Low

Table 5d. Regulating services		**rMCZ 30, Kentish Knock East**
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: The features (subtidal sediments) of the site contribute to the sequestration of carbon (Fletcher and others, 2011). ***Environmental resilience:*** The features of the site are not known to contribute to the resilience and continued regeneration of marine ecosystems. ***Natural hazard protection:*** As the site is offshore, its features are not thought to contribute to the delivery of this service. It has not been possible to estimate the value derived from regulating	If the conservation objectives of the features are achieved, all of the features will be recovered to favourable condition. Recovery of all the features and a potential reduction in the use of bottom towed fishing gear may increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation	Anticipated direction of change: ⇧ Confidence: Low

services associated with the rMCZ.	from pressures caused by human activities.	

Table 5e. Non-use and option values	**rMCZ 30, Kentish Knock East**	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the rMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the rMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

rMCZ 31 Inner Bank (rMCZ No 31) Site area (km^2): 199.03

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts			**rMCZ 31, Inner Bank**	
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) would protect moderate energy circalittoral rock which is fully exposed from the surrounding subtidal sand. This rock exposure forms the end of the Palaeochannel, the geological remnant of an ancient river system, and is surrounded by a number of finer-scale habitats, including part of the deeper sand of the Palaeovalley itself. The area is in the top 25% richest areas for benthic species in the Balanced Seas Project Area and the northern edge of the site demonstrates relatively high pelagic biodiversity. This site is not associated with any existing designation. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact**
Broad-scale habitats				
A5.1 Subtidal coarse sediment	2.96	-	Unfavourable condition	Recover to favourable condition
A3.2 Moderate energy infralittoral rock	-	-	Unfavourable condition	Recover to favourable condition

A4.2 Moderate energy circalittoral rock	96.45	-	Unfavourable condition	Recover to favourable condition
A5.2 Subtidal sand	79.78		Unfavourable condition	Recover to favourable condition
Habitats of conservation importance				
Native Oyster beds	-	1 record	Unfavourable condition	Recover to favourable condition
Species of conservation importance				
Native Oyster (*Ostrea edulis*)	-	1 record	Unfavourable condition	Recover to favourable condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone (rMCZ) on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage **rMCZ 31, Inner Bank**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

Increase in costs of assessing environmental impacts for future licence applications (it is not anticipated that any additional mitigation of impacts on features protected by the MCZ 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.

Baseline description of activity	Costs of impact of MCZ on the sector under Policy Option 1
Wrecked vessels of British origin are recorded in the site as well as several unidentified seabed obstructions. There is one wreck in the site (the *HR Submarine A1*) that is protected under the Protection of Wrecks Act 1973 by a 300m exclusion zone. Since 2003, one survey licence has been granted each year for the *HR Submarine A1* wreck (English Heritage,2012).	An extra cost would be incurred in the assessment of environmental impact made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known, so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost of one licence application could be in the region of £500–£10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). No further impacts on activities related to archaeology are anticipated.

Table 2b. Commercial fisheries **rMCZ 31, Inner Bank**

Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1

The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of commercial fishing gears will be required for certain features protected by this rMCZ. Therefore, two scenarios have been employed in the Impact Assessment (IA) for these fisheries to reflect this uncertainty. Should the site be designated, the management that will be required will fall somewhere within this range.

Table 2b. Commercial fisheries **rMCZ 31, Inner Bank**

Management scenario 1: No additional management (Statutory Nature Conservation Bodies (SNCB) informed scenario).

Management scenario 2: Closure of entire rMCZ to bottom trawls, dredges, lines, nets, pots and traps (SNCB informed scenario).

Summary of all fisheries: This site lies mainly between 6nm and 12nm but straddles the 12nm limit in the south west; the north-east corner extends inside the 6nm limit. The area is fished heavily by UK fleets, by about 40–50 vessels including both under 15 metre and over 15 metre vessels (Regional Stakeholder Group (RSG) meeting, August 2011). Trawling takes place mainly in the northern part of the site and scalloping in the southern part. This area is important to under 15 metre UK vessels based at ports between Shoreham and Dungeness for set netting, scallop dredging and bottom trawling (MCZ Fisheries Model). There is a seasonal high intensity of static netting by under-10-metre vessels in the north-east part of the site on the Bullock Bank. A number of commercial fishing restrictions are already in existence (listed in Annex E1). More detail on the approach used for the fisheries method is provided at Annexes H7 and N4.

The French and Belgian fleets have historical rights between 6nm and 12nm, and the Dutch fleet is active beyond the 12nm limit.
Estimated annual value of landings from the rMCZ: £0.389m/yr.

Baseline description of UK commercial fisheries	**Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1**
Bottom trawls: Vessel numbers unknown.Estimated total value of landings from the rMCZ: £0.106m/yr (MCZ Fisheries Model).	The estimated annual value of UK bottom trawl landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.000 | 0.106
Dredges: Vessel numbers unknown.Estimated total value of landings from the rMCZ: £0.143m/yr (MCZ Fisheries Model).	The estimated annual value of UK dredge landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.000 | 0.143
Hooks and lines: Vessel numbers unknown.Estimated total value of landings from the rMCZ: £0.001m/yr.	The estimated annual value of UK hook and line landings affected is expected to fall within the following range of scenarios: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.000 | 0.001 In establishing the draft conservation objectives, the site features may have been assessed as having low vulnerability to fishing with hooks and lines at current levels and, where this is the case, this activity was not the primary

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 31, Inner Bank</th></tr>
<tr><td></td><td>reason for assigning 'recover' conservation objectives. As such, it is anticipated that, if management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Nets: Vessel numbers unknown.Estimated total value of landings from the rMCZ: £0.131m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK net landings affected is expected to fall within the following range of scenarios:
<table>
<tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr>
<tr><td>Value of landings affected</td><td>0.000</td><td>0.131</td></tr>
</table>
In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with nets at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objectives. As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><td>Pots and traps: Vessel numbers unknown.Estimated total value of landings from the rMCZ: £0.008m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK pot and trap landings affected is expected to fall within the following range of scenarios:
<table>
<tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr>
<tr><td>Value of landings affected</td><td>0.000</td><td>0.008</td></tr>
</table>
In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with pots and traps at current levels and, where this is the case, this activity was not the primary reason for assigning the 'recover' conservation objective(s). As such, it is anticipated that, if additional management is required, it may be towards the lower end of the range, and is likely to be less restrictive than that required for other gears.</td></tr>
<tr><th>Total direct impact on UK commercial fisheries under Policy Option 1</th><th></th></tr>
<tr><td></td><td>The estimated annual value of UK landings and gross value added (GVA) affected is expected to fall within the following range of scenarios:
<table>
<tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td><td>Best estimate</td></tr>
<tr><td>Value of landings affected</td><td>0.000</td><td>0.389</td><td>0.040</td></tr>
<tr><td>GVA affected</td><td>0.000</td><td>0.175</td><td>0.018</td></tr>
</table></td></tr>
</table>

Table 2b. Commercial fisheries	**rMCZ 31, Inner Bank**
	The best estimate is based on an assumption on the likelihood of the lowest and highest cost scenario occurring, and an assumption that 75% of value is displaced to other areas.
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries under Policy Option 1**
The rMCZ is a key fishing ground for French trawlers and scallop dredgers: • Nord-Pas de Calais and Picardie fleet: 40–45 vessels from Boulogne-sur-Mer and Dunkirk; vessels also target red mullet and squid as they are high-value, non-quota species (Direction des Pêches Maritimes et de l' Aquaculture, 2011). • Haute Normandie fleet: 12 vessels targeting scallop, Dover sole and bass. Estimated value of landings from the rMCZ by French vessels: bottom trawls/dredges: £0.147m/yr; static gear: £0.001m/yr (Direction des Pêches Maritimes et de l' Aquaculture, 2011). Estimates are not available for other countries.	***Scenario 1:*** No impacts are anticipated under Scenario 1. ***Scenario 2:*** Non-UK vessels using static gear and bottom trawls/dredges will be affected by this scenario for the rMCZ, particularly French vessels. In the event of a full closure of the rMCZ, the estimated value of French landings affected will be: £0.147m/yr (bottom trawls/dreges) and £0.001m/yr (static gear) (Direction des Pêches Maritimes et de l' Aquaculture, 2011). No information on the effect on other non-UK vessels is available.

Table 2c: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	**rMCZ 31, Inner Bank**
Oil and gas related activities (including carbon capture and storage) This rMCZ overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 26th or 27th Seaward Licensing Rounds). However, the area is not necessarily viable to develop. Impacts of rMCZs on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the rMCZ under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ 31, Inner Bank**
Cables (existing interconnectors and telecom cables) Commercial fisheries (mid-water trawls)	

Recreation Shipping

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[22] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.								rMCZ 31, Inner Bank	
ENG Feature	**Repre sent-ativity**	**Replicatio n**	**Adequacy**	**Viability**	**Gaps or shortfalls in relation to ENG minimum guidelines**	**Recommended conservation objective**	**Quantitative considerations at regional MCZ level**	**Ecological Importance at regional MCZ level**	**Ecological Importance at wider scale**
Native oyster *Ostrea edulis* beds	FOCI								
Native oyster *Ostrea edulis*	FOCI								
A3.2 Moderate energy infralittoral	BSH	✓	✓	✓	None	Recover	**Of all the rMCZs and existing MPAs, this**		

[22] copied from the JNCC and Natural England's advice to Defra on rMCZs

rock [*1]							**site contributes the largest area of moderate energy infralittoral rock within the regional MCZ project area.**		
A4.2 Moderate energy circalittoral rock	BSH	✓	✓	✓	None	Recover		**This feature is not currently protected within existing MPAs.**	
A5.1 Subtidal coarse sediment	BSH	✓	✓	✓* [2]	None	Recover			
A5.2 Subtidal sand	BSH	✓	✓	✓	None	Recover			

Site considerations	
Connectivity	✓
Geological/Geomorphological features of interest	None
Appropriate boundary	✓
Areas of Additional Ecological Importance	✓ * [3]
Overlaps with existing MPAs	None

Additional comments and site benefits:

- [1] There is uncertainty surrounding the presence of moderate energy infralittoral rock (see Section 5.1 of JNCC and Natural England's Advice on rMCZs). and so it may not be suitable as a feature for designation at this point. If the presence and extent of the feature was confirmed by further data gathering, there is potential for this rMCZ to contribute the largest area of this feature out of all of the rMCZs and existing MPAs in the regional MCZ project area. However as the data is yet to be fully analysed we have continued to consider it in the assessment of this feature in relation to the ENG guidelines.
- [2] The site is viable for the features that are proposed for designation, however the patch of subtidal coarse sediment habitat is very small.
- [3] Although it is not clear whether this site was selected on the basis of it being an area of additional ecological importance there are a number of ecological benefits which could be considered important and add value to this recommendation (see Annex 5 of JNCC and Natural England's advice on rMCZs for more detail on these). This site overlaps with areas of high and medium benthic species biodiversity (Langmead, et al. 2010). The regional MCZ project recommendations suggest that the presence of an ancient river system increases the complexity of the bathymetric and topographic seafloor features. The area is high in benthic species richness, with pelagic data showing the north of the site is higher in biodiversity (Balanced Seas 2011a).

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the rMCZ contribute to the delivery of a range of ecosystem services. Designation of the rMCZ and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions can be found in Annex H.

Table 5a. Fish and shellfish for human consumption		**rMCZ 31, Inner Bank**
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption. Infralittoral and circalittoral rock are important locations for commercial inshore fishing activity, particularly for crab and lobster. Subtidal sand and coarse sediment habitats are important nursery areas for many species and thus often important for fisheries (Fletcher and others,	If the conservation objectives of the features are achieved, all features will be recovered to favourable condition. New management of fishing activities is expected (above the baseline situation), the costs of which are set out in Table 2b, which may reduce the impacts on fish and shellfish habitats and harvesting of stocks.	Anticipated direction of change:  Confidence: Low

Table 5a. Fish and shellfish for human consumption		**rMCZ 31, Inner Bank**
2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see Table 1 for details). Trawling takes place mainly in the northern part of the site and scalloping in the southern part; there is also seasonal high-intensity static netting by under 10 metre vessels in the north-east part of the site, on the Bullock Bank. A description of on-site fishing activity and the value derived from it is set out in Table 2b.	As most of the commercial species targeted by fishers in this area are mobile fish and shellfish, it is unclear whether the scale of habitat recovered and the magnitude of reduced (on-site) harvesting will be enough to have any significant positive impact on commercial stocks. Potential benefits may arise on-site, for fishers permitted to fish within the rMCZ, and off-site from spill-over benefits.	

Table 5b. Recreation		**rMCZ 31, Inner Bank**
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of fish and shellfish for human consumption and recreation services. Infralittoral and circalittoral rock habitats support rich biodiversity within the site while subtidal sand and subtidal coarse sediments support spawning and nursery grounds for many juvenile commercial fish species, all of which are therefore important habitats for fish and shellfish fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see Table 1 for details). The rMCZ is too far offshore for private angling boats, but may be used for fishing by charter vessels on their way over to fish French waters. The potential spawning ground for fish and generally high	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the broad scale habitats to favourable condition may improve their functioning as a nursery area, potentially benefiting fisheries exploited within and outside the rMCZ (see Table 4a). As no additional management of angling is expected, fishers will be able to benefit from any on-site and off-site beneficial effects. If the rMCZ results in an increase in the size and diversity of species caught then this is expected to increase the value derived by anglers. The designation may lead to an increase in angling visits to the site, which may benefit the local economy. This increase is likely to arise from a change in anglers' preferred angling locations rather than an	Anticipated direction of change: ⇧ Confidence: Low

Table 5b. Recreation		**rMCZ 31, Inner Bank**
biodiversity, due to the complex habitats within the site, are likely to help support potential on-site and off-site fisheries. It has not been possible to estimate the value derived from angling on-site or the proportion of the value derived from angling off-site which result from the potential spawning and nursery area.	increase in days spent angling or the number of anglers at a national scale.	
Diving: Diving is not known to take place in the rMCZ.	N/A	N/A
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation and tourism services. Infralittoral rock, circalittoral rock, subtidal sand and subtidal coarse sediments support internationally important fish and shellfish fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when in unfavourable condition (see Table 1 for details). The rMCZ has particularly high biodiversity and abundant fish populations which potentially support foraging sea birds and marine mammals. It lies within an area of the English Channel used by ferries, which often carry wildlife watchers, particularly those interested in marine mammals. Visitors in transit across the Channel may benefit from any increased biodiversity through more regular sightings of birds and marine mammals. It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	If the conservation objectives of the features are achieved, some of the features will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the broad scale habitats to favourable condition may improve their functioning as support for fish, bird and marine mammal populations. Any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent a redistribution of location preferences rather than an overall increase in wildlife watching trips at the national scale. Designating the rMCZ will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change:  Confidence: Low
Other recreation: Other recreational activities are not known to take place in the rMCZ.	N/A	N/A

Table 5c. Research and education		**rMCZ 31, Inner Bank**
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) can contribute to the delivery of research services. No known formal research activities are currently carried out in the rMCZ. However, ferries crossing the English Channel are often utilised by marine mammal observers, whose data contribute to national databases. It has not been possible to estimate the value derived from research activities associated with the rMCZ.	Monitoring of the rMCZ will help inform understanding of how the marine environment is changing and is impacted on by anthropogenic pressures and management interventions. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of education services. No known education activity occurs in this rMCZ.	As the rMCZ is approximately 10km offshore and therefore relatively inaccessible, no benefits are likely to arise from direct use of the site for education. Non-visitors may benefit if the rMCZ contributes to external education programmes (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Low

Table 5d. Regulating services		**rMCZ 31, Inner Bank**
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: The features of the site contribute to the bioremediation of waste (Native oyster beds) and sequestration of carbon (Native oyster beds and subtidal sediments) (Fletcher and others, 2011). ***Environmental resilience:*** The features of the site (Native oyster beds) contribute to the resilience and continued regeneration of marine ecosystems (Fletcher and others, 2011).	If the conservation objectives of the features are achieved, all of the features will be recovered to favourable condition. Recovery of all the features and a potential reduction in the use of bottom towed fishing gear may increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the rMCZ will protect its features and the ecosystem	Anticipated direction of change: ⇧ Confidence: Low

Natural hazard protection: As the site is offshore, its features are not thought to contribute to the delivery of this service. It has not been possible to estimate the value derived from regulating services associated with the rMCZ.	services that they provide against the risk of future degradation from pressures caused by human activities.	

Table 5e. Non-use and option values		**rMCZ 31, Inner Bank**
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the rMCZ and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option value services associated with the rMCZ.	The rMCZ will benefit the proportion of the UK population that values conservation of the rMCZ features and its contribution to an ecologically coherent network of MPAs. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ will protect the features and the ecosystem services provided, and thereby the option to benefit from these services in the future, from the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate

Reference Area 18 St Catherine's Point West — Site area (km^2): 13.81

- This site has been proposed for designation under Policy Option 1 only.

Table 1. Conservation impacts			**rMCZ Reference Area 18 St Catherine's Point West**	
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) Reference Area lies off the south-west coast of the Isle of Wight, extending from 150 metres offshore to the seaward boundary of the South Wight Maritime Special Area of Conservation (SAC). The area contains four rock and sediment broad-scale habitats, covering the infralittoral and circalittoral zones and including the entire range of energy levels, a combination which occurs only in one other place in the Balanced Seas Project Area, the Dover Straits. St Catherine's Point is at the transition zone between warmer south-western and colder North Sea waters, where several species reach their eastern limit of distribution along the English Channel (Natural England, 2001). The suite of infralittoral rocks and other broad-scale habitats here support a rich and diverse community of flora and fauna. Kelp forests and subtidal faunal turf communities (highly diverse assemblages of attached animals growing on subtidal hard substrata), ranging from low encrusting forms, such as sea mats and sponges, to tall erect forms, such as soft corals and sea fans, occur within the shallower subtidal area of the site. Beneath the canopy of the kelp forests, subtidal red algal communities flourish in water depths that brown and green algae cannot tolerate. These communities also include prominent mobile organisms associated with the attached fauna, such as decapod crustaceans, echinoderms, molluscs and fish. This site lies within the South Wight Maritime SAC. Source: Balanced Seas Final Recommendations (2011).				
1b. Baseline condition of MCZ features and impact of the MCZ				
Feature	**Area of feature (km2)**	**No. of occurrences**	**Baseline**	**Impact of the MCZ**
Broad-scale Habitats				
A3.1 High energy infralittoral rock	2.11	-	Unfavourable condition	Recover to reference condition
A3.2 Moderate energy infralittoral rock	6.03		Unfavourable condition	Recover to reference condition
A3.3 Low energy infralittoral rock	3.73		Unfavourable condition	Recover to reference condition
A4.1 High energy circalittoral rock	0.94		Unfavourable condition	Recover to reference condition
A4.2 Moderate energy circalittoral rock	0.52		Unfavourable condition	Recover to reference condition
A5.4 Subtidal mixed sediments	0.51		Unfavourable condition	Recover to reference condition
Habitats of Conservation Importance				
Subtidal sands and gravels	2.11	-	Unfavourable condition	Recover to reference condition

Site-specific costs arising from the effect of the recommended Marine Conservation Zone (rMCZ) on human activities (over 2013 to 2032 inclusive)

Table 2a. Archaeological heritage	**Reference Area 18, St Catherine's Point West**
Source of costs of the recommended Marine Conservation Zone (rMCZ) under Policy Option 1 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.	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
Vessel wrecks of British, French, Dutch and Belgian origin are recorded in the site, as well as one British World War II Spitfire (English Heritage, 2012).	An extra cost would be incurred in the assessment of environmental impacts made in support of any future licence applications for archaeological activities in the site. The likelihood of a future licence application being submitted is not known, so no overall cost to the sector of this rMCZ has been estimated. However, the additional cost of one licence application could be in the region of £500–£10,000 depending on the size of the MCZ (English Heritage, pers. comm., 2012). 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 Impact Assessment (IA). 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.

Table 2b. Commercial fisheries	**Reference Area 18, St Catherine's Point West**
Source of costs of the recommended Marine Conservation Zone (rMCZ) Reference Area under Policy Option 1 Closure of entire site to all gear types.	
Summary of all fisheries: The rMCZ Reference Area lies 150 metres offshore, within the 6nm limit and within the South Wight Maritime Special Area of Conservation (SAC). It is a major potting and netting (static gear) fishing ground. Vessels from across the Solent and Isle of Wight all use the area heavily. The area is worked for most of the year and is one of the main potting areas (for crabs) around the Isle of Wight. At least 1,000 pots are laid down the slope of the seabed within the site at depths of 18-50 metres (Impact Assessment (IA) questionnaire responses from Isle of Wight vessel owners, August 2011) and the site provides a staple fishing ground for vessels from Bembridge, Freshwater, Ventnor, Yarmouth and a larger vessel from Lymington (IA questionnaire responses from Isle of Wight vessel owners, August 2011). Several fishing businesses earn the majority of their income from this site including 1 fisher who has fished in the site for 47 years and obtains 95% of his earnings from the area; 1 fisher based in Yarmouth who earns 90% of his revenue from the site; and 1 fisher based in Ventnor who earns 70% of his revenue from this site (IA questionnaire response from Isle of Wight vessel owners, August 2011). More detail on the approach used for the fisheries method is provided at Annexes H7 and N4. Estimated annual value of landings from the rMCZ RA: £0.016m/yr. (Due to resolution issues of the MCZ Fisheries Model and the small size of many rMCZ Reference Areas in the Balanced Seas region, some fisheries	

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries Reference Area 18, St Catherine's Point West</th></tr>
<tr><td colspan="2">landings values may be inaccurate. They have been included as a precautionary measure and to avoid underestimating the economic impact of a site.)</td></tr>
<tr><th>Baseline description of UK commercial fisheries</th><th>Costs of impact of rMCZ on UK commercial fisheries under Policy Option 1</th></tr>
<tr><td>Bottom trawls: Fishers operating at least 2 vessels indicated that their areas of operation overlapped with the rMCZ RA (FisherMap Data 2010). The vessels target Dover sole using trawls and beam trawls. In both cases, the rMCZ Reference Area only represents a small proportion of the businesses' areas of operation.

Estimated value of UK bottom trawl landings from the rMCZ Reference Area: £0.001m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK bottom trawl landings affected:<table><tr><td>£m/yr</td><td></td></tr><tr><td>Value of landings affected</td><td>0.001</td></tr></table></td></tr>
<tr><td>Hooks and lines: Fishers operating at least 4 vessels (1 from Hardway Fishermen's Association, 1 from the Isle of Wight Commercial Fishermen's Association, 2 unaffiliated to a fishing association) who use rod and lines indicated that their areas of operation overlap with the rMCZ Reference Area (FisherMap Data 2010). They target bass and mackerel. In one case, there is appreciable overlap between the rMCZ Reference Area and the business's area of operation.</td><td>The estimated annual value of UK hook and line landings affected is expected to fall within the following range of scenarios:<table><tr><td>£m/yr</td><td></td></tr><tr><td>Value of landings affected</td><td><0.001</td></tr></table></td></tr>
<tr><td>Nets: Four stakeholders who were interviewed (no fishing association affiliations given) indicated that their areas of operation overlap with the rMCZ RA (FisherMap 2010). They target bass, Dover sole and European eel using drift, gill and fixed nets. In two cases, there is an appreciable overlap between the businesses' areas of operation and the rMCZ RA.

Estimated value of UK net landings from the rMCZ RA: £0.003m/yr (MCZ Fisheries Model).</td><td>The estimated annual value of UK net landings affected:<table><tr><td>£m/yr</td><td></td></tr><tr><td>Value of landings affected</td><td>0.003</td></tr></table></td></tr>
<tr><td>Pots and traps: Eight stakeholders who were interviewed (from Hardway Fishermen's Association, Isle of Wight Commercial Fishermen's Association and unaffiliated) indicated that the rMCZ Reference Area</td><td>The estimated annual value of UK pots and trap landings affected:<table><tr><td>£m/yr</td><td></td></tr><tr><td>Value of landings affected</td><td>0.012</td></tr></table></td></tr>
</table>

<table>
<tr><th>Table 2b. Commercial fisheries</th><th>Reference Area 18, St Catherine's Point West</th></tr>
<tr><td>overlapped with their areas of operation, where they target whelks and common lobsters (FisherMap 2010). Brown crabs and edible crabs are also recorded as a main target species in this area (Southern Inshore Fisheries and Conservation Authority (IFCA), pers. comm., 2012).

Estimated value of UK pot and trap landings from the rMCZ RA: £0.012m/yr (MCZ Fisheries Model).</td><td></td></tr>
<tr><td>Total direct impact on UK commercial fisheries under Policy Option 1</td><td></td></tr>
<tr><td></td><td>The estimated annual value of UK landings and gross value added (GVA) affected:
<table><tr><th>£m/yr</th><th>Scenario 1 and Best Estimate</th><th>Scenario 2</th></tr><tr><td>Value of landings affected</td><td>0.004</td><td>0.016</td></tr><tr><td>GVA affected</td><td>0.002</td><td>0.008</td></tr></table>
Local fishery representatives indicated that restrictions on commercial fishing, particularly potting, in this rMCZ Reference Area are expected to have a considerable impact on the Isle of Wight fleets (interviews with four Isle of Wight vessel owners, August 2011). Displacement was not thought to be a viable option by stakeholders (see Annex J3a for more detail) due to:
the size and range of the vessels currently working the area;
maximum capacity having been reached in other nearby potting grounds;
wind farms and marine aggregate dredging around the island reducing the amount of seabed available for static gear;
increased costs of fuel. Currently, fuel consumption is low due to the proximity of the grounds to vessel bases.
The 4 Isle of Wight vessel owners who were interviewed (25-27 August 2011) indicated that, as a result of the closure, at least 10 vessels will either leave the industry or try to work other areas where gear conflict will be inevitable and the</td></tr>
</table>

Table 2b. Commercial fisheries	**Reference Area 18, St Catherine's Point West**
	fishers will experience a reduction in quality and quantity of catch. The vessel owners predicted that supplies to regional and national shellfish markets would be affected as a result of the closure, as well as supplies to markets in France and Spain and the newly developing market in China for autumn crab with coral. The 4 Isle of Wight vessel owners who were interviewed (25-27 August 2011) indicated that at least two businesses that rely on this area for income and employ people from the island (one business employs 12 people directly and 10 boat crews and the other employs 12 people directly) will be affected by the closure as well as the many restaurants, retailers and other seafood outlets that are supplied by these businesses. A Bembridge fisher who uses the area employs his family and 16 other people directly as part of his crab dressing business. Other businesses that would be affected include gear suppliers, chandlers, bait suppliers, fuel suppliers, mooring authorities, fish retail outlets in Bembridge, Freshwater and Lymington, local pubs, restaurants, stalls and the tourist industry (IA questionnaire response from Isle of Wight vessel owners, 25-27August 2011).
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries**
	None.

Table 2c. National defence	**Reference Area 18, St Catherine's Point West**
Source of costs of the recommended Marine Conservation Zone (rMCZ) Reference Area under Policy Option 1 Mitigation of impacts of Ministry of Defence (MOD) activities on features protected by the suite of rMCZs will be provided by additional planning considerations during operations and training. It is not known whether mitigation will be required for features protected by this site. The MOD will also incur costs in revising environmental tools and charts to include MCZs.	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
The entire rMCZ RA is covered by national defence covering the air, water column and seabed. The main impacts on the rMCZ RA are (a) air and water surface – noise, physical and visual disturbance; (b) water column noise; and (c) seabed – fixed equipment, extraction and physical	It is not known whether this rMCZ RA will impact on the MOD's use of the site. Impacts of rMCZs on national defence are assessed in Annex H10 and N9 (they are not assessed for this site alone).

disturbance.	

Table 2d. Recreational anchoring	**Reference Area 18, St Catherine's Point West**
Source of costs of the recommended Marine Conservation Zone (rMCZ) Reference Area under Policy Option 1	
Closure of entire site to all recreational anchoring (except in emergency circumstances).	
Baseline description of activity	**Costs of impact of MCZ on the sector under Policy Option 1**
The Solent Local Group representative for the Royal Yachting Association considers that anchoring is minimal within the site (John Pockett, email 14th November 2011). and both he and a local commercial fisher based in Ventnor have said that no recreational vessels have been seen anchoring in the rMCZ Reference Area during the Round the Island Race which attracts thousands of boats every year and which is the key period when anchoring would occur(Geoff Blake via John Pockett, email, 14th November 2011) However, Royal Lymington Yacht Club stated that many boats taking part in the Round the Island Race and other races anchor on the eastern end of this rMCZ Reference Area when the tide turns against them. (RYA BS IA 2nd Tranche Feedback, February, 2012). 49 StakMap interviewees (representing clubs throughout southern England and a combined total of 14,012 people/yr) indicated that yachting interests overlap with the rMCZ RA, with nine interviewees saying that the area was used more than once a week. However, only one interviewee (representing 240 people/yr) indicated that the area they use for anchoring (the whole of the western Channel and Solent) overlapped with the rMCZ Reference Area. Levels of recreational sea angling and charter boat activity in this rMCZ Reference Area are high at certain times of year and these vessels are known to anchor here (Regional Stakeholder Group (RSG) meeting, August 2011), especially during the summer (A. Savage, Solent/IOW/Hants Local Group charter boat representative, pers.comm., January 2012)	It is anticipated that recreational sailing vessel users will respond to the closure by anchoring in alternative areas to the east, outside the Reference Area. During most of the year relatively few vessel users will be impacted on, though the number of vessel users affected will be higher during certain conditions a few times a year during races. It is not anticipated that the closure will result in significant costs to recreational vessel users who are not angling. Impacts on recreational angling are considred in Table 2e.

Table 2e. Recreational angling	**Reference Area 18, St Catherine's Point West**
Source of costs of the recommended Marine Conservation Zone (rMCZ) Reference Area under Policy Option 1	
Closure of the entire site to all recreational angling.	
Description of activity and its impact on interest features	**Costs of effect of rMCZ on the sector under Policy Option 1**
Eighteen StakMap interviews indicate that areas used for recreational angling overlapped with the rMCZ Reference Area. Two interviews were with private boat fishing clubs (235 people/yr), and 16 were with charter boat operators representing 3,185 anglers/yr. Local Group discussions confirmed that there is a high intensity of private boat and charter boat use of the rMCZ Reference Area at certain times of year (Solent Sites Meeting, July 2011). There may be up to 24 private angling boats within the rMCZ Reference Area at any given time, depending on the season (Williams, T., Isle of Wight Angling Intensity Report, December 2010). The site is heavily used by about 25 charter vessels from Lymington, Keyhaven and Yarmouth and some from Portsmouth and Langstone Harbour. It is estimated that these each fish in the site for 40 days per year with revenue of £385 per vessel per day. In addition, vessels from Weymouth in the Finding Sanctuary MCZ Project Area travel to fish in this site (A. Savage, Solent/IOW/Hants Local Group charter boat representative, pers. comm., January 2012). Shore angling does not take place in the site as the landward boundary of the rMCZ Reference Area is 150 metres offshore.	Anglers may respond to the closure to angling by angling in other areas, though there are no alternative sites nearby that offer comparable fishing marks and high quality of fishing (A. Savage, Solent/IOW/Hants Local Group charter boat representative, pers comms., January 2012). They will incur increased travel costs to travel to other grounds (and increased greenhouse gas emissions will result from the increased travel). It is anticpated that the closure will impact significantly on Solent and Isle of Wight-based private sea anglers (Balanced Seas Solent/IOW/Hants Sites Meeting Report and RSG Meeting Report, July 2011). Angling charter boat operators who use the site are likely to incur a substantial reduction in earnings as a result of the closure. To avoid underestimation of costs, it is assumed that all revenue to charter boat operators from trips that visit the rMCZ RA is lost as a result of the closure. The cost is estimated based on the assumption that each of the 25 operators fish for 40 days/yr in the rMCZ Reference Area, with revenue of £385 per vessel per day. These trips may represent 20% of the total annual turnover of the individual operator (A. Savage, Solent/IOW/Hants Local Group charter boat representative, pers. comm., 2012). This estimate is only for vessels based in the project region. It underestimates the loss of revenue to all charter boats that use the site. *£m/yr* — Scenario 1 Estimated value of charter boat revenue affected — 0.385 GVA affected — 0.165

Table 2f. Renewable energy – tidal energy	**Reference Area 18, St Catherine's Point West**
Source of costs of the recommended Marine Conservation Zone (rMCZ) Reference Area (RA) under Policy Option 1:	

Table 2f. Renewable energy – tidal energy	**Reference Area 18, St Catherine's Point West**
Installation of devices and cables not permitted within the rMCZ. Increase in costs of assessing environmental impacts for licence applications within 1km of the 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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector under Policy Option 1**
There is potential for future developments that generate electricity using the tidal energy resource in this rMCZ Reference Area as it overlaps with approximately 4km^2 of the Solent Energy offshore deployment site. This is part of the tidal energy project implemented by the Solent Ocean Energy Centre (SOEC), longer-term development of which will take place in 2020–25. SOEC has a plan for an installed capacity of 21MW around the Isle of Wight (J. Fawcett, e-mail 7 March 2012). The Isle of Wight Council has indicated that this is one of the few areas in the UK where tidal energy technology could be implemented. It is assumed, for the purposes of the analysis, that licence applications for the development will be submitted between 2010–15 and 2020–25 (Department of Energy and Climate Change (DECC), pers. comm., 2012).	The rMCZ Reference Area would be closed to tidal energy development because it involves deposition of cables and devices. It is not known whether either of these would be proposed in the site in the absence of the MCZ and what if any mitigation of impacts on MCZ features would be required. The impacts have not been estimated but could be potentially significant. Costs of mitigation could arise from siting devices and cables to avoid the rMCZ Reference Area, from mitigation of impacts of cable protection and, if necessary, from a reduction in the number of devices installed as a result of the rMCZ Reference Area. It is estimated that cables cost £1.010m/km/cable (average of estimates provided by four developers) and that use of frond mattressing to mitigate impacts of cable protection costs £1.000m/km more than the cable protection that would be used in the absence of the rMCZ. It may be that part of the deployment site would be excluded from development as a result of the rMCZ Reference Area. The rMCZ Reference Area could also increase the costs of assessing environmental impacts for future licence applications for the development. It is assumed, for the purposes of the analysis, that additional one-off costs for future licence applications will be incurred, one in in 2015 and the other in 2020 each for an individual cost of £0.014m (based on, per broad-scale habitat assessed, 6 days of a consultant's time at £700/day + 1 day for legal review at £800/day). The total cost for two licence applications will therefore be £0.028m with a present value of £0.024m. ***Concerns raised by stakeholders:*** The industry has not been able to provide further details of estimated costs of impact (which it anticipates may arise in undertaking monitoring, avoiding

Table 2f. Renewable energy – tidal energy	**Reference Area 18, St Catherine's Point West**
	impacts on sensitive features, for cable protection, repowering and recommissioning) since tidal energy is still a very new industry and there are many unknown contributing factors (Fawcett, J, tidal energy lead for the Isle of Wight Council, email., 7 March 2012). Designation of this rMCZ Reference Area may deter potential developers from taking forward a commercial-scale project and therefore local impacts on the Isle of Wight economy, aspirations to be a green island and the wider environmental impacts on carbon emissions should also be considered (Merry, S., email, feedback response to first tranche of IA material, 13 January 2012).). It may be that closure of the rMCZ Reference Area to development would make any proposed tidal energy development no longer financially viable. The cost to the operator would be significant and would include loss of sunk investment in development of the site. The costs to the economy (the focus of this Impact Assessment) would be the increased costs of installing the development at an alternative location which, it is assumed would be at increased cost, though the magnitude of these costs is not known. Assuming that the alternative location is not in the vicinity, this would impact on local businesses that would have provided goods and services for the development, thereby affecting the local economy. As SOEC is conceived as a test and demonstration facility for tidal energy devices, the rMCZ Reference Area may delay the development and demonstration of devices (Fawcett. J tidal energy lead for the Isle of Wight Council, email, 7 March 2012).

Table 2g: Other impacts that are assessed for the suite of MCZs under Policy Option 1 and not for this site alone	**Reference Area 18 St Catherine's Point**
Oil and gas related activities (including carbon capture and storage)	
This rMCZ Reference Area overlaps with an area that has potential for future oil and gas exploration and production (it overlaps licensed blocks in the 27th Seaward Licensing Rounds). However, it is unlikely that any oil and gas (including carbon capture and storage) infrastructure will be proposed in future in this rMCZ Reference Area due to its location and size (DECC, pers. comm., 2012). Impacts of rMCZ Reference Areas on oil and gas related activities are assessed in the Evidence Base, Annex H11 and Annex N10 (they are not assessed for this site alone).	

Human activities in the site that are not negatively affected by the rMCZ (over 2013 to 2032 inclusive)

Table 3. Human activities in the site that are not negatively affected by the MCZ under Policy Option 1 (existing activities at their current levels and future proposals known to the regional MCZ projects)	**Reference Area 18, St Catherine's Point West**
Recreation (except for the activities listed above in table 2) Research and education Shipping Water abstraction, discharge and diffuse pollution*.	

*The IA assumes that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process (based on advice provided by Natural England, pers. comm., 2010).

Contribution to Ecological Network Guidance

Table 4. An overview of features proposed for designation and how these contribute to the ENG guidelines for the regional MCZ project area and at a wider scale[23] ✓ = ENG guideline is achieved and X = ENG guideline is not achieved. Green cells represent key considerations and any greyed-out rows indicate where SNCBs do not agree with a feature being proposed for designation. Recommended conservation objectives in italics indicate where SNCBs do not agree with the conservation objective recommended by the regional MCZ project (see Section 4.2). Where an asterisk (*) has been given in the table, more detail is provided in the narrative.								Reference Area 18, St Catherine's Point West	
ENG Feature	**Repre sent-ativity**	**Replicati on**	**Adequacy**	**Viability**	**Gaps or shortfalls in relation to ENG minimum guidelines**	**Recommended conservation objective**	**Quantitative considerations at regional MCZ level**	**Ecological Importance at regional MCZ level**	**Ecological Importance at wider scale**

[23] copied from the JNCC and Natural England's advice to Defra on rMCZs

A3.1 High energy infralittoral rock	BSH	✓	✓	X	Not viable	Recover to reference condition		One of only two areas in region containing a range of rock and sediment habitats, spanning infralittoral and circalittoral zones, and entire range of energy levels	
A3.2 Moderate energy infralittoral rock	BSH	✓	✓	X	Not viable	Recover to reference condition			
A3.3 Low energy infralittoral rock	BSH	✓	✓	X	Not viable	Recover to reference condition	This BSH is currently only reaching the minimum replication target		
A4.1 High energy circalittoral rock	BSH	✓	✓	X	Not viable	Recover to reference condition	Site provides one of only three replicates for this feature		
A4.2 Moderate energy circalittoral rock	BSH	✓	✓	X	Not viable	Recover to reference condition			
A5.4 Subtidal mixed sediments	BSH	✓	✓	X	Not viable	Recover to reference condition			
Subtidal sands and gravels	FOCI Habitat	✓	✓	✓	None	Recover to reference condition			BAP habitat
Site considerations									

Connectivity	✓
Geological/Geomorphological features of interest	None
Appropriate boundary	X
Areas of Additional Ecological Importance	✓
Overlaps with existing MPAs	✓

Additional comments and site benefits:

- Area of high biodiversity, including large populations of Lusitanian littoral species, kelp forests, subtidal faunal turf communities, and a variety of mobile species (Natural England 2001).
- This area ensures that the guidelines for reference areas are met for several features and is therefore spatially efficient.

Anticipated benefits to ecosystem services

The habitats, species and other ecological features of the recommended Marine Conservation Zone (rMCZ) Reference Area contribute to the delivery of a range of ecosystem services. Designation of the rMCZ Reference Area and its subsequent management may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of ecosystem services may occur as a result of the designation, management and/or achievement of the conservation objectives of the rMCZ Reference Area. Further discussion on the potential benefits to ecosystem services can be found in Annex L and definitions in Annex H.

Table 5a. Fish and shellfish for human consumption	**rMCZ Reference Area 18 St Catherine's Point West**	
Baseline	**Beneficial impact under Policy Option 1**	
Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption. Infralittoral and circalittoral rock are the predominant habitats in the rMCZ Reference Area, providing a firm substrate for species attachment and a key habitat for inshore crab and lobster fisheries (Fletcher and others, 2011). The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Additional management (above that in the baseline situation) of fishing activities is expected which will prohibit fishing within the rMCZ Reference Area. The costs of this are set out in Table 2b. Achievement of the conservation objectives may improve the contribution of the habitats to the provision of fish and shellfish for human consumption.	Anticipated direction of change: ⇧ Confidence: Low

Table 5a. Fish and shellfish for human consumption	**rMCZ Reference Area 18 St Catherine's Point West**	
the features of the site when not in reference condition. Brown (edible) crab *Cancer pagurus* is the commercially targeted species. A description of the on-site fisheries and their value is given in Table 2b.	Management of fishing activity within the rMCZ Reference Area will reduce the on-site fishing mortality of species which may benefit commercial stocks. As no fishing will be permitted within the rMCZ Reference Area, no on-site benefits will be realised. Low mobility and site-attached species populations, such as crab and lobster, may improve as a result of reduced fishing pressure. Localised beneficial spill-over effects may occur around the rMCZ Reference Area.	

Table 5b. Recreation	**rMCZ Reference Area 18 St Catherine's Point West**	
Baseline	**Beneficial impact under Policy Option 1**	
Angling: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of fish and shellfish for human consumption and recreation services. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by features of the site when not in reference condition. Infralittoral and circalittoral rock are the predominant habitats in the rMCZ Reference Area, and provide a firm substrate for species attachment and habitat for crabs and lobsters (Fletcher and others, 2011). The high biodiversity of the area supports mobile fish species of value to recreational fisheries. Angling is an important activity in this rMCZ Reference Area and a description of this activity is set out in Table 2e. It has not been possible to estimate the value derived from angling at	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of habitats may have benefits for fish populations. It is unclear whether any benefits for fish populations would arise as a result of reduced fishing mortality due to management of commercial fishing (see Table 4a). As angling will not be permitted within the rMCZ Reference Area, any benefits will be limited to those occurring as a result of spill-over effects of finfish species targeted by anglers outside the rMCZ Reference Area. Such benefits may be insignificant.	Anticipated direction of change:  Confidence: Low

Table 5b. Recreation	**rMCZ Reference Area 18 St Catherine's Point West**	
the site.		
Diving: Diving takes place in the site, predominantly on the wrecks.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. The recovery of the features to reference condition may improve their functioning as support for fish and other marine wildlife (including increases in size and diversity of species) potentially benefiting diving within the rMCZ Reference Area. Any increase may represent a redistribution of dive location preferences rather than an overall increase in diving.	Anticipated direction of change: ⇧ Confidence: Low
Wildlife watching: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of recreation and tourism services. Circalittoral rock is the predominant habitat in the rMCZ Reference Area, and provides a firm substrate for species attachment and habitat for crabs and lobsters (Fletcher and others, 2011). The high biodiversity of the area will support mobile fish species which will support foraging birds and marine mammals. The baseline quantity and quality of the ecosystem service provided is assumed to be commensurate with that provided by the features of the site when not in reference condition. The rMCZ Reference Area is a popular area for wildlife watching, particularly bird and marine mammal watching. It has not been possible to estimate the value derived from wildlife watching in the rMCZ Reference Area.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. An improvement in the condition of site features and any associated increase in abundance and diversity of species that are visible to wildlife watchers may improve the quality of wildlife watching at the site and therefore the value of the ecosystem service. The designation may lead to an increase in wildlife watching visits to the site, which may benefit the local economy. This increase may represent an overall increase in UK wildlife watching visits and/or a redistribution of location preferences. Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low
Other recreation: The rMCZ Reference Area is a destination for recreational sailing. Boats taking part in regattas and the Round the Island Race frequently traverse the site.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition.	Anticipated direction of change: ⇧

Table 5b. Recreation	**rMCZ Reference Area 18 St Catherine's Point West**	
It has not been possible to estimate the value derived from tourism in the rMCZ Reference Area.	Designating the rMCZ Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities (as, if necessary, mitigation would be introduced, with the associated costs and benefits).	Confidence: Low

Table 5c. Research and education	**rMCZ Reference Area 18 St Catherine's Point West**	
Baseline	**Beneficial impact under Policy Option 1**	
Research: Fletcher and others (2011) identify that the features to be protected by the recommended Marine Conservation Zone (rMCZ) Reference Area can contribute to the delivery of research services. The rMCZ Reference Area overlaps with a Special Area of Conservation, and a number of research activities have been undertaken relating to this larger site. It has not been possible to estimate the value derived from research activities associated with the rMCZ Reference Area.	The rMCZ Reference Area will provide an opportunity to demonstrate the state of designated marine features in the absence of many anthropogenic pressures (Natural England and JNCC, 2010). It will provide a control area against which the impacts of pressures caused by human activities can be compared as part of long-term monitoring and assessment. Other research benefits are unknown.	Anticipated direction of change: ⇧ Confidence: High
Education: Fletcher and others (2011) identify that the features to be protected by the rMCZ Reference Area can contribute to the delivery of education services. No known education activity takes place in the site.	MCZ Reference Area designation may provide an opportunity to expand the focus of education events into the marine environment. Designation may aid additional local (to the rMCZ Reference Area) provision of education (e.g. events and interpretation boards), from which visitors would derive benefit. Non-visitors may benefit if the rMCZ Reference Area contributes to wider provision of education (e.g. television programmes, articles in magazines and newspapers, and educational resources developed for use in schools).	Anticipated direction of change: ⇧ Confidence: Low

Table 5d. Regulating services	**rMCZ Reference Area 18 St Catherine's Point West**

Table 5d. Regulating services	**rMCZ Reference Area 18 St Catherine's Point West**	
Baseline	**Beneficial impact under Policy Option 1**	
Regulation of pollution: N/A ***Environmental resilience:*** N/A ***Natural hazard protection:*** As the site is offshore, its features do not contribute to the delivery of this service.	If the conservation objectives of the features are achieved, the features will be recovered to reference condition. Recovery of the broad-scale habitats and closure to fishing could increase the site's benthic biodiversity and biomass, improving the regulating capacity of its habitats. Designating the recommended Marine Conservation Zone (rMCZ) Reference Area will protect its features and the ecosystem services that they provide against the risk of future degradation from pressures caused by human activities (as, if necessary, mitigation would be introduced, with the associated costs and benefits).	Anticipated direction of change: ⇧ Confidence: Low

Table 5e. Non-use and option values	**rMCZ Reference Area 18 St Catherine's Point West**	
Baseline	**Beneficial impact under Policy Option 1**	
Some people gain satisfaction from the existence of marine habitats, species and other features. They also gain from having the option to benefit in the future from the habitats and species in the recommended Marine Conservation Zone (rMCZ) Reference Area and the ecosystem services provided, even if they do not currently benefit from them. It has not been possible to estimate the value derived from non-use and option values associated with the rMCZ Reference Area.	The rMCZ Reference Area will benefit the proportion of the UK population that values conservation of its features and its contribution to an ecologically coherent network of Marine Protected Areas. Some people will gain satisfaction from knowing that the habitats and species are being conserved (existence value) and/or that they are being conserved for use by others in the current generation (altruistic value) or future generations (bequest value). The rMCZ Reference Area will recover and protect both the features in reference condition and the option to benefit from the services in the future, from past degradation and the risk of future degradation.	Anticipated direction of change: ⇧ Confidence: Moderate