Annex I1 Impacts of individual recommended Marine Conservation Zones (Balanced Seas) Part 2

Contents

1 Introduction

1.1.1 This annex sets out the direct impacts of each of the Balanced Seas recommended Marine Conservation Zones (rMCZs) and rMCZ Reference Areas. The rMCZs and rMCZ Reference Areas are presented in geographical order, split over the three separate documents. The reference list for all three documents can be found at the end of document three.

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 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 11.1, Dover to Deal

Site area (km^2): 10.40

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).

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
A3.2 Moderate energy infralittoral rock	0.63	-	Unfavourable condition	Recover to favourable condition
A5.1 Subtidal coarse sediment	1.80	-	Favourable condition	Maintain at favourable condition

Table 1. Conservation impacts				**rMCZ 11.1, Dover to Deal**
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
Subtidal chalk	0.06		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. Archaeological heritage	**rMCZ 11.1, Dover to Deal**
Source of costs of the recommended Marine Conservation Zone (MCZ)	
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**
Several World War II defence structures are present within the site, e.g. 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).	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 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

Table 2a. Archaeological heritage	**rMCZ 11.1, Dover to Deal**
	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)

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.

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**

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 11.1, Dover to Deal</th></tr>
<tr><td>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).</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>0.001</td></tr></table>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.</td></tr>
<tr><td>Dredges: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £180/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><0.001*</td></tr></table>* £180/yr</td></tr>
<tr><td>Nets: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £0.005m/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>0.005</td></tr></table>In establishing the draft conservation objectives, the site's features may have been assessed as having low vulnerability to fishing with 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>
</table>

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 11.1, Dover to Deal</th></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</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></tr><tr><td>Value of landings affected</td><td>0.001</td><td>0.008</td></tr><tr><td>GVA affected</td><td>0.000</td><td>0.004</td></tr></table></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>
<tr><th>Table 2c. Ports, harbours, shipping and disposal sites rMCZ 11.1, Dover to Deal</th></tr>
<tr><td>Source of costs of the recommended Marine Conservation Zone (MCZ)

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</td></tr>
</table>

Table 2c. Ports, harbours, shipping and disposal sites **rMCZ 11.1, Dover to Deal**

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
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 (www.doverport.co.uk). Detailed forecasting by both DHB and the UK	*£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**
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 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) (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).

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 4a. Fish and shellfish for human consumption		**rMCZ 11.1, Dover to Deal**
Baseline	**Beneficial impact**	
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).	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 4a. Fish and shellfish for human consumption		**rMCZ 11.1, Dover to Deal**
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.		

Table 4b. Recreation		**rMCZ 11.1, Dover to Deal**
Baseline	**Beneficial impact**	
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

Table 4b. Recreation		**rMCZ 11.1, Dover to Deal**
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
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	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	Anticipated direction of change:  Confidence: Low

Table 4b. Recreation		**rMCZ 11.1, Dover to Deal**
association with ORCA (DFDS Seaways 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 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). 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 4c. Research and education		**rMCZ 11.1, Dover to Deal**
Baseline	**Beneficial impact**	
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

Table 4c. Research and education		**rMCZ 11.1, Dover to Deal**
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 4d. Regulating services		**rMCZ 11.1, Dover to Deal**
Baseline	**Beneficial impact**	
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, *Sabellaria* and subtidal chalk) recovered to favourable condition. 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.	Anticipated direction of change: ⇧ Confidence: Low

Table 4e. Non-use and option values		**rMCZ 11.1, Dover to Deal**
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 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 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).	Anticipated direction of change: ⇧ Confidence: Moderate

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

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)	
Increase in costs of assessing environmental impacts for future licence applications. Archaeological excavations, surface recovery and intrusive surveys will	

Table 2a. Archaeological heritage	**rMCZ 11.1, Reference Area 7 South Foreland Lighthouse**
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**
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 observation post; (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 11.1, Reference Area 7 South Foreland Lighthouse**
Source of costs of the recommended Marine Conservation Zone (rMCZ)	
Closure of entire site to all gear types.	
Baseline description of activity	**Costs of impact of rMCZ on the sector**
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	

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 11.1, Reference Area 7 South Foreland Lighthouse</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 value of a site.)</td></tr>
<tr><td>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 total value of landings from the rMCZ Reference Area: £80/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>* £80</td></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>* £10</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.

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>* £230</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</td><td>Estimated annual value of UK vessel landings affected:</td></tr>
</table>

Table 2b. Commercial fisheries — **rMCZ 11.1, Reference Area 7 South Foreland Lighthouse**

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).

£m/yr	Scenario 1
Value of landings affected	0.001

Total direct impact on UK commercial fisheries

Estimated annual value of UK vessel landings and gross value added (GVA) affected:

£m/yr	Scenario 1
Value of landings affected	0.001
GVA affected	0.000

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 11.1, Reference Area 7 South Foreland Lighthouse**

Source of costs of the recommended Marine Conservation Zone (rMCZ)

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

Costs of impact of rMCZ on the sector

£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

Table 2c. Ports, harbours, shipping and disposal sites	**rMCZ 11.1, Reference Area 7 South Foreland Lighthouse**
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 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.	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 2d. Recreational angling	**rMCZ 11.1, Reference Area 7 South Foreland Lighthouse**
Source of costs of the recommended Marine Conservation Zone (rMCZ) Closure of the entire site to recreational angling.	
Baseline description of activity	**Costs of impact of rMCZ on the sector**
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	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)

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

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)

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 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) (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,arge 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).

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**	
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**	
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 Reference Area, as described in Table 2d. It has not been possible to estimate the value derived from this.	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 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.	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 11.1, Reference Area 7 South Foreland Lighthouse**	
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 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.	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 (as, if necessary, mitigation would be introduced, with the associated costs and benefits).	⇧ 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 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**	
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. 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. 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**	
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**	
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 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

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
A3.2 Moderate energy infralittoral rock	0.18	-	Unfavourable condition	Recover to favourable condition
A5.1 Subtidal coarse sediment	17.50	-	Favourable condition	Maintain at favourable condition

Table 1. Conservation impacts				**rMCZ 11.2, Dover to Folkestone**
Habitats of Conservation Importance				
Blue mussel beds	3,516 m^2	-	Unfavourable condition	Recover to favourable condition
Intertidal underboulder communities		3 records	Favourable condition	Maintain at favourable condition
Littoral chalk communities	0.74		Unfavourable condition	Recover to 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
Subtidal chalk	0.13	-	Unfavourable condition	Recover to 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)	
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**
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	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 11.2, Dover to Folkestone**
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).	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) 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.
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

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

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
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 In establishing the draft conservation objectives, the site's features may have

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 11.2, Dover to Folkestone</th></tr>
<tr><td></td><td>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</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></tr><tr><td>Value of landings affected</td><td>0.006</td><td>0.035</td></tr><tr><td>GVA affected</td><td>0.003</td><td>0.016</td></tr></table></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)

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

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.

Costs of impact of rMCZ on the sector

£m/yr	Scenario 1	Scenario 2
Total	0.007	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

Table 2c. Ports, harbours, shipping and disposal sites	**rMCZ 11.2, Dover to Folkestone**
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 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	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 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 11.2, Dover to Folkestone
on the regeneration work undertaken on the seafront and harbour. In December 2011, updated designs went out for public consultation (Folkestone Seafront, 2012).	

Table 2d: Other impacts that are assessed for the suite of MCZs and not for this site alone	rMCZ 11.2, Dover to Folkestone
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) (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).

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 4a. Fish and shellfish for human consumption		**rMCZ 11.2, Dover to Folkestone**
Baseline	**Beneficial impact**	
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 4b. Recreation	**rMCZ 11.2, Dover to Folkestone**	
Baseline	**Beneficial impact**	
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.	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	Anticipated direction of change: ⇧

Table 4b. Recreation		**rMCZ 11.2, Dover to Folkestone**
(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.	an overall increase in diving trips at the national scale.	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 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)	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

Table 4b. Recreation		**rMCZ 11.2, Dover to Folkestone**
It has not been possible to estimate the value derived from wildlife watching in the rMCZ.		
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 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 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 4c. Research and education		**rMCZ 11.2, Dover to Folkestone**
Baseline	**Beneficial impact**	
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.	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

Table 4c. Research and education		**rMCZ 11.2, Dover to Folkestone**
It has not been possible to estimate the value derived from research activities associated with the rMCZ.		
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 4d. Regulating services		**rMCZ 11.2, Dover to Folkestone**
Baseline	**Beneficial impact**	
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,	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	Anticipated direction of change: ⇧ Confidence: Low

Table 4d. Regulating services		**rMCZ 11.2, Dover to Folkestone**
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.	ecosystem services that they provide against the risk of future degradation from pressures caused by human activities.	

Table 4e. Non-use and option values		**rMCZ 11.2, Dover to Folkestone**
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 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 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	Anticipated direction of change: ⇧ Confidence: Moderate

Table 4e. Non-use and option values		**rMCZ 11.2, Dover to Folkestone**
	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, Folkestone Pomerania — Site area (km^2): 33.71

Table 1. Conservation impacts — **rMCZ 11.4, Folkestone Pomerania**

1a. Ecological description

This recommended Marine Conservation Zone (rMCZ) was identified as it contains one of only two examples of fragile sponge and anthozoan communities on subtidal rocky habitats in the region, and one of only two examples of honeycomb worm reefs. It is also particularly notable for the large depressions in the sea bed that drop from around 22 metres to 30 metres. The top edges of the depressions are exposed rock ledges with outcropping greensand, providing an unusually hard and complex subtidal reef habitat, and a flat or gently sloping boulder-strewn platform, supporting a rich attached fauna of sponges, anemones, sea squirts, hydroids and bryozoans, and providing holes and crevices for mobile species such as crab and squat lobster and fish. The slopes of the depressions are relatively steep, the sides and bases being of boulders and mixed sediment, also supporting a rich variety of species. Elsewhere in the rMCZ there are boulder fields covered with both attached and mobile animals and colonies of the slow-growing Ross coral, whose delicate colonies provide further habitat structure for an assemblage of other species. The site supports dense Ross worm reefs on muddy sediment which are very unusual as they contain many of the animals associated with both Ross worm reef and offshore mud and bivalve mollusc communities. 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				
A4.2 Moderate energy circalittoral rock	1.6	-	Unfavourable condition	Recover to favourable condition
A5.1 Subtidal coarse sediments	24.58	-	Favourable condition	Maintain at favourable condition
A5.2 Subtidal sand	7.12	-	Unfavourable condition	Recover to favourable condition
Habitats of Conservation Importance				
Blue mussel beds	312.57 m^2		Unfavourable condition	Recover to favourable condition
Fragile sponge & anthozoan communities	-	3 records	Unfavourable condition	Recover to favourable condition
Honeycomb worm (*Sabellaria alveolata*) reef	0.01	-	Unfavourable condition	Recover to favourable condition
Rossworm (*Sabellaria spinulosa*) reef	0.07	-	Unfavourable condition	Recover to favourable condition
Subtidal sands and gravels (modeled)	29.15	-	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. Archaeological heritage	**rMCZ 11.4, Folkestone Pomerania**
Source of costs of the recommended Marine Conservation Zone (rMCZ)	
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.	
Baseline description of activity	**Costs of impact of rMCZ on the sector**
Named and dated wrecks of British, German, French, Dutch, Danish and Norwegian origin have been recorded in the site, along with several unidentified wrecks. A World War I German submarine has also been recorded in the site, as well as World War II aircraft of British and German origin (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 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 11.4, Folkestone Pomerania**
Source of costs of the recommended Marine Conservation Zone (rMCZ)	
The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of	

Table 2b. Commercial fisheries **rMCZ 11.4, Folkestone Pomerania**

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 and honeycomb worm *Sabellaria alveolata* 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 moderate energy circalittoral rock, blue mussel *Mytilus edulis* beds, fragile sponge and anthozoan communities, Ross worm *Sabellaria spinulosa* reef and honeycomb worm *Sabellaria alveolata* reef (SNCB informed scenario).

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

Summary of all fisheries: This site is wholly within the 6nm limit and is fished only by UK vessels. The main commercial fishing fleets operating in the site are based in Folkestone and Dungeness. The most important fisheries for vessels below 15 metres are static nets, scallop dredging, bottom trawling and potting (MCZ Fisheries Model). Several larger UK trawlers/beam trawlers have historical 'grandfather rights' to fish between 3nm (nautical miles) and 6nm and have a different quota allocation to the smaller local trawlers. There are also 3 Brixham vessels with grandfather rights to this area, but these are likely to gradually cease operating. The site is small and activity is limited due to the geography and adjacent shipping channels. The main activities are netting for bass, and potting for lobsters and crabs. Effort in a trap fishery for cuttlefish is increasing because cuttlefish are a non-quota species. 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: £0.062 m/yr.

Baseline description of UK commercial fisheries	**Costs of impact of rMCZ on UK commercial fisheries**
Bottom trawls: Number of vessels unknown. Estimated total value of landings from the rMCZ: £0.013m/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 | 0.013 | 0.013 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

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries</th><th colspan="2">rMCZ 11.4, Folkestone Pomerania</th></tr>
<tr><td></td><td colspan="3">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.</td></tr>
<tr><td>Dredges: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £0.008m/yr (MCZ Fisheries Model).</td><td colspan="3">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>0.008</td><td>0.008</td></tr></table></td></tr>
<tr><td>Nets: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £0.034m/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></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.034</td></tr></table></td></tr>
<tr><td>Pots and traps: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £0.006m/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>0.006</td></tr></table></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></tr><tr><td>Value of landings affected</td><td>0.021</td><td>0.061</td></tr><tr><td>GVA affected</td><td>0.009</td><td>0.027</td></tr></table></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>
</table>

Table 2b. Commercial fisheries	**rMCZ 11.4, Folkestone Pomerania**
	None.

Table 2c: Other impacts that are assessed for the suite of MCZs and not for this site alone	**rMCZ 11.4, Folkestone Pomerania**
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) (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ 11.4, Folkestone Pomerania**
Commercial fisheries (mid-water trawls) Disposal sites (licensed disposal at two sites (DV013 East Wear Bay and DV020 Sandgate Bell) within 5km of the rMCZ for which there are no anticipated licence applications) Recreation 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).

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 4a. Fish and shellfish for human consumption		**rMCZ 11.4, Folkestone Pomerania**
Baseline	**Beneficial impact**	
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 subtidal sands and gravels, are important for spawning and nursery grounds. These habitats can provide important nursery grounds for juvenile commercial species such as flatfishes and bass and support internationally important fish and shellfish fisheries. Moderate energy infralittoral rock may support commercial inshore fishing activity, particularly crab and lobster. The subtidal blue mussel beds provide habitat for fish and shellfish (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 Folkestone and Dungeness commercial fishing fleets are active in this rMCZ, with static nets, scallop dredgers, bottom trawlers and potting; there are also a small number of larger trawlers/beam trawlers with 'grandfather rights'. The main activities are netting and lining for bass, potting for lobster and crab, and a growing cuttlefish trap fishery. 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, some of the features will recover to favourable condition. One (A5.1 subtidal coarse sediments) 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 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. 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 4a. Fish and shellfish for human consumption		**rMCZ 11.4, Folkestone Pomerania**
It has not been possible to estimate the value of the off-site benefits that derive from spawning and nursery areas.		

Table 4b. Recreation		**rMCZ 11.4, Folkestone Pomerania**
Baseline	**Beneficial impact**	
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 supports a diverse array of species and it is a potential location for angling due to the high concentration of animal life (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 private boat angling and charter boat fishing. It is mainly used for wreck fishing (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 potentially results from the high biodiversity of the site.	If the conservation objectives of the features are achieved, some of the features, including the circalittoral rock, will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the circalittoral rock to favourable condition may improve its functioning as a support for a diverse array of species 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

Table 4b. Recreation		**rMCZ 11.4, Folkestone Pomerania**
Diving: Fletcher and others (2011) identify that the features to be protected by the rMCZ can contribute to the delivery of recreation services. Circalittoral rock supports a diverse array of species and is a potential location for SCUBA diving due to the high concentration of animal life (Expert opinion in Fletcher and others, 2011). The rMCZ is a popular wreck and general diving spot (South Kent site meeting, 2011).	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 fragile sponge and anthrozoan 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
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). Circalittoral rock supports a diverse array of species and mussel beds are important habitat for foraging birds (Fletcher and others, 2011). Habitat complexity and the generally high biodiversity of the site support foraging birds and marine mammals that may frequent the site. Birdwatching within this site may still be possible along the cliff walk within rMCZ 11.2 due to the elevated height providing a vantage point. The rMCZ is offshore and will only be visited by charter vessels conducting wildlife watching trips out of Dover and Folkestone. 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 circalittoral rock, will be recovered to favourable condition. Others will be maintained in favourable condition. The recovery of the circalittoral rock to favourable condition may improve its functioning as a support 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 degradation from pressures caused by human activities.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation	**rMCZ 11.4, Folkestone Pomerania**	
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. 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 or Folkestone Harbour (StakMap, 2010). It has not been possible to estimate the value derived from tourism in the rMCZ.	Since this rMCZ lies offshore, it is unlikely that any additional benefits would be accrued from other recreational activities as a result of designation . .	Anticipated direction of change: ⇧ Confidence: Low

Table 4c. Research and education	**rMCZ 11.4, Folkestone Pomerania**	
Baseline	**Beneficial impact**	
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 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 6km 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 pMCZ contributes to wider provision of educational resources (e.g. television programmes, articles in magazines and newspapers, and educational	Anticipated direction of change: ⇧

Table 4c. Research and education		**rMCZ 11.4, Folkestone Pomerania**
	resources developed for use in schools).	Confidence: Low

Table 4d. Regulating services		**rMCZ 11.4, Folkestone Pomerania**
Baseline	**Beneficial impact**	
Regulation of pollution: the features of the site contribute to the bioremediation of waste (subtidal sediments), water filtration (Blue Mussel beds, *Sabellaria*) and sequestration of carbon (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:*** 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, subtidal sand, subtidal sands & gravels, fragile sponge & anthozoan communities, *Sabellaria* and blue mussel beds) recovered to favourable condition. Recovery of the circalittoral 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 4e. Non-use and option values		**rMCZ 11.4, Folkestone Pomerania**
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 rMCZ and the ecosystem services provided, even if they do not currently benefit from them.	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	Anticipated direction of change: ⇧

Table 4e. Non-use and option values		**rMCZ 11.4, Folkestone Pomerania**
It has not been possible to estimate the value derived from non-use and option value services associated with the rMCZ.	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.	Confidence: Moderate

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

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)	
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**
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.

Table 2a. Archaeological heritage	**rMCZ 11.4, Reference Area 25 Flying Fortress**
	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) 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.)	
Baseline description of UK commercial fisheries	**Costs of impact of rMCZ on UK commercial fisheries**
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.	The estimated annual value of UK bottom trawl landings affected: *£m/yr* | Scenario 1 Value of landings affected | <0.001*

<table>
<tr><th>Table 2b. Commercial fisheries</th><th>rMCZ 11.4, Reference Area 25 Flying Fortress</th></tr>
<tr><td>Estimated total value of landings from the rMCZ Reference Area: £390/yr (MCZ Fisheries Model).</td><td>* £390/yr

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.

Estimated total value of landings from the rMCZ Reference Area: £250/yr (MCZ Fisheries Model)..</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>* £250/yr</td></tr>
<tr><td>Mid-water trawls: . Number of vessels unknown.

Estimated total value of landings from the rMCZ Reference Area: £150/yr (MCZ Fisheries Model)..</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>* £150</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.

Estimated total value of landings from the rMCZ Reference Area: £180/yr (MCZ Fisheries Model).</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>* £180/yr</td></tr>
<tr><td>Total direct impact on UK commercial fisheries</td><td></td></tr>
</table>

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries</th><th>rMCZ 11.4, Reference Area 25 Flying Fortress</th></tr>
<tr><td colspan="2"></td><td>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>0.002</td></tr><tr><td>GVA affected</td><td>0.001</td></tr></table>
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).</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. Recreational anchoring</th><th>rMCZ 11.4, Reference Area 25 Flying Fortress</th></tr>
<tr><td colspan="3">Source of costs of the recommended Marine Conservation Zone (rMCZ)

Closure of entire site to all recreational anchoring (except in emergency circumstances).</td></tr>
<tr><th colspan="2">Baseline description of activity</th><th>Costs of impact of rMCZ on the sector</th></tr>
<tr><td colspan="2">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)</td><td>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</td></tr>
</table>

Table 2c. Recreational anchoring	**rMCZ 11.4, Reference Area 25 Flying Fortress**
	(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) Closure of the entire site to all recreational angling.	
Baseline description of activity	**Costs of impact of rMCZ on the sector**
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

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

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**	
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**	
Angling: Fletcher and others (2011) identify that the features to be	If the conservation objectives of the features are achieved, the	Anticipated

Table 4b. Recreation	**rMCZ 11.4, Reference Area 25 Flying Fortress**	
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. 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.	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.	direction of change: ⇧ Confidence: Low
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

Table 4b. Recreation	**rMCZ 11.4, Reference Area 25 Flying Fortress**	
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**	
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. 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 11.4, Reference Area 25 Flying Fortress**
Baseline	**Beneficial impact**

Table 4d. Regulating services		**rMCZ 11.4, Reference Area 25 Flying Fortress**
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**	
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

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
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)

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
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	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

Table 2a. Archaeological heritage	**rMCZ 13.1, Beachy Head East**
site (English Heritage, 2012).	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 13.1, Beachy Head East**
Source of costs of the recommended Marine Conservation Zone (rMCZ) 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	

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

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
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.

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries</th><th colspan="2">rMCZ 13.1, Beachy Head East</th></tr>
<tr><td colspan="2">Hooks and lines: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £0.015m/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></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.015</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 colspan="2">Nets: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £0.499m/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>0.499</td></tr></table></td></tr>
<tr><td colspan="2">Pots and traps: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £0.554m/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>0.206</td></tr></table></td></tr>
<tr><td colspan="2">Total direct impact on UK commercial fisheries</td><td colspan="2"></td></tr>
<tr><td colspan="2"></td><td colspan="2">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></tr><tr><td>Value of landings affected</td><td>0.043</td><td>0.931</td></tr></table></td></tr>
</table>

Table 2b. Commercial fisheries	**rMCZ 13.1, Beachy Head East**
	GVA affected: 0.019 | 0.422 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).
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) ***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	

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

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).
- **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

Costs of impact of rMCZ on the sector

£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 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

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

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 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	**Costs of impact of rMCZ**
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	*£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

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

Table 2d. Ports, harbours, shipping and disposal sites	rMCZ 13.1, Beachy Head East
possible that mitigation options may need to be considered in the future.	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 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) (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).

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 4a. Fish and shellfish for human consumption		**rMCZ 13.1, Beachy Head East**
Baseline	**Beneficial impact**	
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 Model)	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 4a. Fish and shellfish for human consumption		**rMCZ 13.1, Beachy Head East**
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 4b. Recreation		**rMCZ 13.1, Beachy Head East**
Baseline	**Beneficial impact**	
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).	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

Table 4b. Recreation		**rMCZ 13.1, Beachy Head East**
The rMCZ is a popular area for shore angling, private boat angling and charter boat fishing. Angling is most concentrated around the various 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	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.	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation		**rMCZ 13.1, Beachy Head East**
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 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.	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. 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 4c. Research and education		**rMCZ 13.1, Beachy Head East**
Baseline	**Beneficial impact**	
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	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: ⇧

Table 4c. Research and education		**rMCZ 13.1, Beachy Head East**
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.		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 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 4d. Regulating services		**rMCZ 13.1, Beachy Head East**
Baseline	**Beneficial impact**	
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	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.	Anticipated direction of change:

Table 4d. Regulating services		**rMCZ 13.1, Beachy Head East**
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.	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.	 Confidence: Low

Table 4e. Non-use and option values		**rMCZ 13.1, Beachy Head East**
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 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	Anticipated direction of change:  Confidence: Moderate

Table 4e. Non-use and option values		rMCZ 13.1, Beachy Head East
	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)	

rMCZ 13.2, Beachy Head West

Site area (km^2): 25.58

Table 1. Conservation impacts	rMCZ 13.2, Beachy Head West
1a. Ecological description	
This recommended Marine Conservation Zone (rMCZ) would protect some of the best examples of littoral chalk communities and subtidal chalk gullies and ledges found in the Balanced Seas project area. The abundant wildlife that these features support includes extensive blue mussel beds mixed with native oysters, and large sea squirt beds. Populations of both long- and short-snouted seahorse occur here, and European eel elvers migrate along the coastline into the estuaries. The sea-bed habitats include moderate energy intertidal rock, intertidal coarse sediment and mud, subtidal mud, and sand and mixed sediment. The rMCZ provides good foraging areas for black-legged kittiwake, common tern and Sandwich tern. Near Birling Gap, notable algal communities are found on the chalk foreshore reef (identified as an Important Plant Area). The calcite rings, 2 metres in diameter, on the chalk at Hope Gap are noteworthy geological features. Running along the base of the Seven Sisters cliffs, the site covers part of the Seven Sisters Voluntary Marine Conservation Area, borders the South Downs National Park and partially overlaps the Seaford to Beachy Head Site of Special Scientific Interest (SSSI) and the Brighton to Newhaven Cliffs SSSI.	

Table 1. Conservation impacts				**rMCZ 13.2, Beachy Head 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**
Broad-scale habitats				
A1.2 Moderate energy intertidal rock	0.02	-	Favourable condition	Maintain at favourable condition
A2.1 Intertidal coarse sediment	733.92 m^2		Favourable condition	Maintain at favourable condition
A5.2 Subtidal Sand	8.1		Favourable condition	Maintain at favourable condition
A5.3 Subtidal mud of which	1.97		Favourable condition	Maintain at favourable condition
A5.4 Subtidal mixed sediments of which	5.03	-	Favourable condition	Maintain at favourable condition
Habitats of Conservation Importance				
Blue mussel beds	1,954 m^2	-	Favourable condition	Maintain at favourable condition
Littoral chalk communities	1.03		Unfavourable condition	Recover to favourable condition
Subtidal chalk	0.09	-	Favourable condition	Maintain at favourable condition
Species of Conservation Importance				
Native Oyster (*Ostrea edulis*)	-	10 records	Favourable condition	Maintain at favourable condition
Short snouted seahorse (*Hippocampus hippocampus*)	-	2 records	Favourable condition	Maintain at favourable condition
Long snouted seahorse (*Hippocampus hippocampus*)	-	1 record	Favourable condition	Maintain at favourable condition
European Eel (*Anguilla Anguilla*)	-	N/A	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 13.2, Beachy Head West**
Source of costs of the recommended Marine Conservation Zone (rMCZ)	
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.	

Table 2a. Archaeological heritage	**rMCZ 13.2, Beachy Head West**
Baseline description of activity	**Costs of impact of rMCZ on the sector**
Several World War II defence aids/structures are recorded in the site, e.g. a watch tower, anti-tank trap and pillboxes. Artefacts of Roman, Iron Age, Palaeolithic, Bronze Age, Neolithic and Mesolithic origin have been found within the site. Vessel wrecks of British, Dutch, Swedish, German, Norwegian, Spanish, American, French and Prussian origin have been recorded in the site, as well as a Viking vessel dated to 896. There is evidence of an Iron Age or Roman settlement within the site (English Heritage, pers. comm., 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.

Table 2b. Commercial fisheries	**rMCZ 13.2, Beachy Head West**
Source of costs of the recommended Marine Conservation Zone (rMCZ) The Joint Nature Conservation Committee (JNCC) 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 site to bottom trawls and dredges to protect littoral chalk communities and 50% reduction in activity of lines, nets, pots and traps (SNCB informed scenario). Though the conservation objective of recover for littoral chalk communities was identified in the vulnerability assessment for pressures caused specifically by anchoring of recreational vessels, for the purpose of the IA it is assumed that additional restrictions on fisheries will also be required for this feature because of the conservation objective of recover (the assumption is based on the advice provided by Natural England and JNCC on fisheries management scenarios in the fisheries technical paper).	
Summary of all fisheries: The site is within the 6nm (nautical mile) limit. It covers a narrow (0.5nm wide) strip along the coastline which broadly	

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 13.2, Beachy Head West</th></tr>
<tr><td colspan="2">corresponds with the area within which trawlers are excluded under a Sussex InIand Fisheries and Conservation Authority (IFCA) byelaw. Scallop and oyster dredging are also prohibited throughout the site under existing byelaws. Trawling and dredging therefore do not occur although the resolution of the MCZ Fisheries Model is such that it suggests that these gear types are used (see below).. This area is heavily fished with static gear (pots and nets). More detail on the approach used is provided in Annexes H7 and N4.

Estimated annual value of landings from the rMCZ: £0.112m/yr.</td></tr>
<tr><th>Baseline description of UK commercial fisheries</th><th>Costs of impact of rMCZ on UK commercial fisheries</th></tr>
<tr><td>Bottom trawls: Number of vessels unknown

Estimated total value of landings from the rMCZ: £0.030m/yr (MCZ Fisheries Model).

This is likely to be an overestimate due to the resolution of the Fisheries Model as the site is located within 3nm and most of the site is closed to trawling under an existing byelaw.</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>0.030</td></tr></table>In establishing the draft conservation objectives, the site's features 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 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.

Furthermore, The value of this impact is likely to be overestimated as a Sussex IFCA byelaw restricts trawling within part of this site (for more detail see Annex E1).</td></tr>
<tr><td>Dredges Number of vessels unknown.

Estimated total value of landings from the pMCZ: £0.003m/yr.

This is an overestimate due to the resolution of the MCZ Fisheries Model as the site is located within 3nm and is thus closed to dredging under an existing byelaw. However, since this figure is part of the estimated total value of landings for the site, it is included here.</td><td>The estimated annual value of UK dredge landings 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></tr><tr><td>Value of landings affected</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 dredges at current levels and,</td></tr>
</table>

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 13.2, Beachy Head West</th></tr>
<tr><td></td><td>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.

Furthermore, the value of this impact is likely to be overestimated as a Sussex IFCA byelaw restricts dredging within this site (for more detail see Annex E1).</td></tr>
<tr><td>Hooks and lines: Number of vessels unknownEstimated total value of landings from the rMCZ: £0.001/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 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: £0.024m/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>0.024</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>
</table>

Table 2b. Commercial fisheries — **rMCZ 13.2, Beachy Head West**

Pots and traps: Number of vessels unknown Estimated total value of landings from the rMCZ: £0.014m/yr (MCZ Fisheries Model).	The estimated annual value of UK pot and trap landings affected is expected to fall within the following range of scenarios: *£m/yr* — Scenario 1: 0.000 — Scenario 2: 0.014 (Value of landings affected) 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	
	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 Value of landings affected: 0.000 — 0.070 GVA affected: 0.000 — 0.031
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 13.2, Beachy Head West**

Source of costs of the recommended Marine Conservation Zone (rMCZ)

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.

Table 2c. Flood and coastal erosion risk management (coastal defence)	**rMCZ 13.2, Beachy Head West**
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	**Costs of impact of rMCZ on the sector**
At Seaford a Hold The Line policy is applied through shingle recharge and beach reprofiling. 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 – monitoring will need to take account of this. In Seaford 300 properties are at risk and the scheme is currently maintained on the basis of the chance of one flood event in 100 years; this is estimated to increase to one flood event every 75 years in 2 years and will continue to increase rapidly if the current beach maintenance activities cease (Natural England and Environment Agency Flood and Coastal Erosion Risk Management Workshop for the Balanced Seas Project Area, 17 November 2011). 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.	***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 a shingle tracer (placing a Global Positioning System (GPS) chip in a number of pebbles and tracking the process). This would be a one-off cost for both sites (rMCZs 13.1 and 13.2) and is discussed in Table 2c above in the assessment for rMCZ 13.1. ***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 13.2, Beachy Head West**
Source of costs of the recommended Marine Conservation Zone (rMCZ)	

Table 2d. Ports, harbours, shipping and disposal sites **rMCZ 13.2, Beachy Head West**

Management scenario 1: Increase in costs of assessing environmental impacts for future license applications. This applies to future license 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 MCZ 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 license applications. This applies to future license 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 Newhaven. 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 2 sites (WI010 Newhaven and WI020 Brighton/Rottingdean) within 1km of the rMCZ which are licensed for disposal of channel dredge material. These are likely to be used by Brighton Marina. The average number of licence applications received for all of these disposal sites is 1.4 per year (based on number of licence applications received between 2001 and 2010 (Cefas, pers. comm., 2011).

There are two sites (WI010 Newhaven and WI020 Brighton/Rottingdean) within 5km of the rMCZ which are licensed for disposal of channel dredge material likely to be used by Brighton Marina, Newhaven and Sovereign Harbour. The average number of licence applications received for all of these disposal sites is 1.4 per year (based on number of licence applications received between 2001 and 2010 (Cefas, pers. comm., 2011).

Navigational dredge areas: It is probable that there is licensed navigational dredging within 1km of this rMCZ associated with Brighton Marina and Newhaven Port Authority. 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 is licensed navigational dredging in the River Ouse within 5km of this

Costs of impact of rMCZ on the sector

£m/yr	Scenario 1	Scenario 2
Cost to the operator	0.012	0.015

Scenario 1: Future licence applications for disposal of material, 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 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 potentially significant costs of mitigation could arise.

Scenario 2: Future licence applications for disposal of material, navigational dredging and known port or harbourdevelopment plans or 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 these by activity is provided in Annex N11).

Table 2d. Ports, harbours, shipping and disposal sites	**rMCZ 13.2, Beachy Head West**
rMCZ associated with Brighton Marina and Newhaven Port Authority. 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 areas will be covered by a potential new MDP for Newhaven, it is assumed that the assessment of environmental impact is not changed over the 20 year period of the IA. ***Port development:*** There are 3 ports and harbours within 5km of the rMCZ which may undergo development at some point in the future: Eastbourne, Newhaven and Brighton (Ports & Harbours UK, 2012). This may not represent a full list of all ports and harbours impacted by the site. Newhaven Port is within 1km of the rMCZ and has a planned regeneration project to develop its port, marinas and leisure facilities (Natural England, pers. comm., 2012). The five key strategic objectives are to maintain the Newhaven–Dieppe ferry route, invest in clean technology and renewable energy, increase international trade, continue to develop the fishing and leisure marine sectors, and enhance the natural marine environment by establishing a public access conservation area on port land (Newhaven Port, 2012).	Also, additional costs will be incurred to include MCZ features protected by the rMCZ in a new potential 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 2e. Recreational anchoring	**rMCZ 13.2, Beachy Head West**
Source of costs of the recommended Marine Conservation Zone (rMCZ) Creation of a no-anchoring zone (except in emergency circumstances) over littoral chalk communities.	
Baseline description of activity	**Costs of impact of rMCZ on the sector**
Littoral chalk communities occur all along the coast of this rMCZ between Beachy Head Point and Brighton Marina. Local Group members (Balanced Seas East Sussex Sites Meeting Report, July 2011) said that it is unlikely that experienced mariners would try to anchor in chalk as it is very hard to do so; anyone doing this would be either new to seafaring or in an	Given that there is probably very little anchoring over littoral chalk communities, the creation of no-anchoring zones where these features occur is not expected to have a significant impact on recreational vessel users. No costs are expected.

Table 2e. Recreational anchoring	**rMCZ 13.2, Beachy Head West**
emergency situation. Anchoring in the area is thus largely limited to Cuckmere Haven and Seaford Bay where there is no chalk. Beachy Head is a popular spot for recreational boating due to its dramatic scenery of chalk cliffs, and also for angling. Ten yacht clubs (StakMap 2010), 13 sea angling clubs (StakMap, 2010; Angling Trust Website), and 37 charter vessels (for divers and anglers) use the rMCZ (StakMap, 2010). Higher levels of angling occur in the extreme eastern part of the rMCZ around Beachy Head and to the east of the mouth of the River Cuckmere. Vessels may anchor anywhere (due to the nature of angling) within the rMCZ depending on the weather but are unlikely to anchor over chalk due to the unsuitability of chalk for anchoring. No interviewees confirmed exact anchoring locations (StakMap, 2010). There are already a number of byelaws along this stretch of coast that restrict anchoring (e.g. designated swimming areas) and local stakeholders would like to see management of anchoring rationalised and brought together (Balanced Seas East Sussex Sites Meeting Report, July, 2011).	

Table 2f: Other impacts that are assessed for the suite of MCZs and not for this site alone	**rMCZ 13.2, Beachy Head West**
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) (existing activities at their current levels and future proposals known to the regional MCZ projects)	**rMCZ 13.2, Beachy Head West**
Cables (existing interconnectors and telecom cables) 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).

Table 4. 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 4a. Fish and shellfish for human consumption	**rMCZ 13.2, Beachy Head West**	
Baseline	**Beneficial impact**	
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. Intertidal coarse sediment provides a scavenging area for fish which supports commercial fisheries. Subtidal mud and subtidal mixed sediments are important for spawning and nursery grounds. These habitats can provide important nursery grounds	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	Anticipated direction of change: 

Table 4a. Fish and shellfish for human consumption	**rMCZ 13.2, Beachy Head West**	
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 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 is heavily fished with static gear (pots and nets) targeting lobster and crab, but no mobile gear is used. A description of on-site fishing activity and the value derived from it is set out in Table 2b.	are 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.	Confidence: Low

Table 4b. Recreation		**rMCZ 13.2, Beachy Head West**
Baseline	**Beneficial impact**	
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. 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 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	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation		**rMCZ 13.2, Beachy Head West**
The rMCZ is a relatively popular area for shore angling and private boat angling throughout. 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.	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.	
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 mostly intertidal so there is little diving within it but there may be some diving in subtidal areas of the site and one shore diving spot is popular near to the western arm of Newhaven Harbour (British Sub-Aqua Club website forum).	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 subtidal chalk 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. The site lies within the Seven Sisters Voluntary Marine Conservation Area and borders the South Downs National Park	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	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation		**rMCZ 13.2, Beachy Head West**
(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). Beachy Head cliffs provide an 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.	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. Coastal walking in the accessible parts of the site and along the cliff tops alongside the site is very popular, as well as coastal swimming (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 4c. Research and education		**rMCZ 13.2, Beachy Head West**
Baseline	**Beneficial impact**	
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 undertakes sea-floor surveys through Seasearch, and is collaborating with the Sussex Inshore Fisheries and Conservation	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: ⇧

Table 4c. Research and education		**rMCZ 13.2, Beachy Head West**
Authority on research to improve the health of the marine environment (www.sussexwildlifetrust.org.uk/livingseas). The Beaches At Risk project (2003–8), an Anglo-French project that 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 in the area between Selsey Bill and Beachy Head, which includes the rMCZ (Standing Conference on Problems Associated with the Coastline website). It has not been possible to estimate the value derived from research activities associated with the rMCZ.		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 undertakes educational activities at their centres or as outreach in schools which may involve the rMCZ (Sussex Wildlife Trust website). Seven Sisters Country Park provides educational resources relating 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 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 4d. Regulating services		**rMCZ 13.2, Beachy Head West**
Baseline	**Beneficial impact**	

Table 4d. Regulating services		**rMCZ 13.2, Beachy Head West**
Regulation of pollution: the features of the site contribute to the bioremediation of waste (subtidal sediments), water filtration (Blue Mussel beds, Native oyster) and sequestration of carbon (intertidal rock, Blue Mussel beds, Native oyster, subtidal sediments) (Fletcher and others, 2011). ***Environmental resilience:*** the features of the site (intertidal rock, Blue Mussel beds 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, (infralttoral rock, Blue Mussel beds 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.	If the conservation objectives of the features are achieved, some features will be maintained in favourable condition and some (littoral chalk communities) recovered to favourable condition. 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 4e. Non-use and option values		**rMCZ 13.2, Beachy Head West**
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 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,	Anticipated direction of change: ⇧ Confidence: Moderate

Table 4e. Non-use and option values		**rMCZ 13.2, Beachy Head West**
	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 '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 as well as contributions to their well-being and protection for future generations. Furthermore, it is considered to have economic value in terms of tourism, with the high visitor numbers contributing to income to the surrounding area. Its unusual geology and topography are also noted as key attractions. Seafloor protection in this area is thought by many to be a logical extension of the South Downs National Park as it is a wonderful landscape - and the partnership between sea and land is what makes it so special'. In particular MCS nominated the Seven Sisters, which is mainly contained within this rMCZ but also partly in rMCZ 13.1, as this site is considered 'such a special area enjoyed and appreciated by so many people in the crowded South East' and important for national heritage. In addition, its importance to the local and national economy through tourism is highlighted as it 'is a beautiful stretch of coastline with spectacular cliffs and attracts large numbers of visitors from the locality, nationwide and internationally' and its unique habitat 'the chalk wave cut platform is teeming with life' which attracts recreational users such as sea anglers to the site, providing economic benefit to the local community. Source: Ranger et al. (2011)	

rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head — Site area (km^2): 0.72

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)	
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**
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)	
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	

Table 2b. Commercial fisheries **rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head**

(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
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 (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. Estimated total value of landings from the rMCZ Reference Area: £250/yr (MCZ Fisheries Model).	Estimated annual value of UK vessel landings affected: *£m/yr* | Scenario 1 Value of landings affected | <0.001* * £250 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 total value of landings from the rMCZ Reference Area: £430/yr (MCZ Fisheries Model).	Estimated annual value of UK vessel landings affected: *£m/yr* | Scenario 1 Value of landings affected | <0.001* * £430
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	Estimated annual value of UK vessel landings affected: *£m/yr* | Scenario 1 Value of landings affected | 0.001

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head</th></tr>
<tr><td>of material, 10 January 201)

Estimated total value of landings from the rMCZ Reference Area: £0.001 m/yr (MCZ Fisheries Model).</td><td></td></tr>
<tr><td>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 total value of landings from the rMCZ Reference Area: £40/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>* £40</td></tr>
<tr><th>Total direct impact on UK commercial fisheries</th><th></th></tr>
<tr><td>Estimated annual value of landings from the rMCZ Reference Area: £0.004m/yr (MCZ Fisheries Model).</td><td>Estimated annual value of UK vessel landings and 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>0.001</td></tr></table></td></tr>
<tr><th>Baseline description of non-UK fisheries</th><th>Costs of impact of rMCZ on non-UK commercial fisheries</th></tr>
<tr><td></td><td>None.</td></tr>
</table>

<table>
<tr><th>Table 2c. Ports, harbours, shipping and disposal sites rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head</th></tr>
<tr><td>Source of costs of the recommended Marine Conservation Zone (rMCZ)

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.</td></tr>
</table>

Table 2c. Ports, harbours, shipping and disposal sites	**rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head**
Baseline description of activity	**Costs of impact of rMCZ on the sector**
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) Closure of entire site to all recreational angling.	
Baseline description of activity	**Costs of impact of rMCZ on the sector**
Seventeen StakMap interviews indicated that areas used for recreational 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).	The local angling sector has agreed to cease angling in the site if it is 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 and not for this site alone	**rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head**

Table 2e: Other impacts that are assessed for the suite of MCZs 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) (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).

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**	
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**

Table 4b. Recreation	**rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head**	
Baseline	**Beneficial impact**	
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	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation	**rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head**	
	represent an overall increase in UK diving and/or a redistribution of location preferences.	
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). 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.	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

Table 4b. Recreation	**rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head**	
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**	
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	MCZ Reference Area designation may provide an opportunity	Anticipated

Table 4c. Research and education	**rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head**	
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.	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).	direction of change: ⇧ Confidence: Moderate

Table 4d. Regulating services	**rMCZ 13.2, Reference Area 9 Belle Tout to Beachy Head**	
Baseline	**Beneficial impact**	
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). ***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 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.	Anticipated direction of change: ⇧ 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

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)	
The Joint Nature Conservation Committee and Natural England have advised that there is considerable uncertainty about whether additional management of	

Table 2a. Commercial fisheries **rMCZ 14, Offshore Brighton**

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 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
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	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 2a. Commercial fisheries rMCZ 14, Offshore Brighton</th></tr>
<tr><td>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>0.341</td><td>0.341</td></tr></table></td></tr>
<tr><td>Hooks and lines: Number of vessels 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 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:</td></tr>
</table>

<table>
<tr><th colspan="2">Table 2a. Commercial fisheries rMCZ 14, Offshore Brighton</th></tr>
<tr><td></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>0.000</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><th>Total direct impact on UK commercial fisheries</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></tr>
<tr><td>Value of landings affected</td><td>1.174</td><td>1.228</td></tr>
<tr><td>GVA affected</td><td>0.511</td><td>0.537</td></tr>
</table>
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).
</td></tr>
<tr><th>Baseline description of non-UK fisheries</th><th>Costs of impact of rMCZ on non-UK commercial fisheries</th></tr>
<tr><td>Vessels from France: At least 82 French fishing vessels use the rMCZ (some only seasonally) (Direction des Pêches Maritimes et de l'Aquaculture, 2011):</td><td>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'</td></tr>
</table>

Table 2a. Commercial fisheries	**rMCZ 14, Offshore Brighton**
• 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. • 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.	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 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)

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
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 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).

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 No. 14 Offshore Brighton**
Cables (existing interconnectors and telecom cables) Commercial fisheries (mid-water trawls) Recreation Shipping	

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 4a. Fish and shellfish for human consumption		**rMCZ 14, Offshore Brighton**
Baseline	**Beneficial impact**	
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 4b. Recreation		**rMCZ 14, Offshore Brighton**
Baseline	**Beneficial impact**	
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	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	Anticipated direction of change: ⇧

Table 4b. Recreation		**rMCZ 14, Offshore Brighton**
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.	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.	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 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. 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	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation		**rMCZ 14, Offshore Brighton**
It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	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 4c. Research and education		**rMCZ 14, Offshore Brighton**
Baseline	**Beneficial impact**	
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 4d. Regulating services		**rMCZ 14, Offshore Brighton**
Baseline	**Beneficial impact**	
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 4e. Non-use and option values		**rMCZ 14, Offshore Brighton**
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 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

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	
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	

Table 2a. Commercial fisheries **rMCZ 14, Reference Area 10 Dolphin Head**

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.

Baseline description of UK commercial fisheries	Costs of impact of rMCZ on UK commercial fisheries
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.	Estimated annual value of UK vessel landings affected: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.058 | 0.058
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).	Estimated annual value of UK vessel landings affected: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.039 | 0.039
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).	Estimated annual value of UK vessel landings affected: *£m/yr* | Scenario 1 | Scenario 2 Value of landings affected | 0.001 | 0.001
Pots and traps: Number of vessels unknown, but one stakeholder interview,	Estimated annual value of UK vessel landings affected:

<table>
<tr><th colspan="2">Table 2a. Commercial fisheries</th><th colspan="2">rMCZ 14, Reference Area 10 Dolphin Head</th></tr>
<tr><td colspan="2">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 colspan="2"><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>
<tr><td colspan="2">Mid-water trawling: It is unknown how many vessels use mid-water trawls in the rMCZ Reference Area.</td><td colspan="2">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>0.000</td><td>0.000</td></tr></table>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</td></tr>
<tr><td colspan="2">Total direct impact on UK commercial fisheries</td><td colspan="2"></td></tr>
<tr><td colspan="2"></td><td colspan="2">Estimated annual value of UK vessel landings and gross value added (GVA) affected:<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.101</td><td>0.101</td></tr><tr><td>GVA affected</td><td>0.045</td><td>0.045</td></tr></table></td></tr>
<tr><td colspan="2">Baseline description of non-UK fisheries</td><td colspan="2">Costs of impact of rMCZ on non-UK commercial fisheries</td></tr>
<tr><td colspan="2">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.</td><td colspan="2">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.</td></tr>
</table>

Table 2b. National defence	**rMCZ 14, Reference Area 10 Dolphin Head**
Source of costs of the recommended Marine Conservation Zone (rMCZ)	
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**
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)	
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**
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	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.

Table 2c. Recreational angling	**rMCZ 14, Reference Area 10 Dolphin Head**
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.	

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 (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	

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**	
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	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	Anticipated direction of change: ⇧

Table 4a. Fish and shellfish for human consumption		**rMCZ 14, Reference Area 10 Dolphin Head**
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 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.	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 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.	Confidence: Low

Table 4b. Recreation		**rMCZ 14, Reference Area 10 Dolphin Head**
Baseline	**Beneficial impact**	
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	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 14, Reference Area 10 Dolphin Head**
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.		
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 14, Reference Area 10 Dolphin Head**
Baseline	**Beneficial impact**	
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	Anticipated direction of change: ⇧ Confidence:

Table 4c. Research and education	**rMCZ 14, Reference Area 10 Dolphin Head**	
	educational resources developed for use in schools).	Low

Table 4d. Regulating services	**rMCZ 14, Reference Area 10 Dolphin Head**	
Baseline	**Beneficial impact**	
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. 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 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, mitigation would be introduced, with the associated costs and benefits).	Anticipated direction of change: ⇧ Confidence: Low

Table 4e. Non-use and option values	**rMCZ 14, Reference Area 10 Dolphin 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 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	Anticipated direction of change: ⇧ Confidence: Moderate

Table 4e. Non-use and option values		**rMCZ 14, Reference Area 10 Dolphin Head**
	future degradation.	

rMCZ 16. Kingmere

Site area (km^2): 47.84

Table 1. Conservation impacts				**rMCZ 16, Kingmere**
1a. Ecological description				
This recommended Marine Conservation Zone (rMCZ) would protect several excellent examples of rocky habitats, subtidal chalk outcropping reef systems and chalk gullies and hard rock reefs, in particular Kingmere Rocks and Worthing Lumps (both designated as marine Sites of Nature Conservation Importance). These rocky outcrops of sandstone and boulders support a wide range of marine life (e.g. wild populations of native oysters, coralline algae, sea squirts, sponges and starfish) and most notably the most important and productive black bream nesting and spawning area in the Balanced Seas Project Area. Kingmere Rocks encompass a large area of uneven sea bed, consisting of outcrops of sandstone rising 2–3 metres above the surrounding sea bed, with boulders and mixed sediment areas in between. Each level of the outcrops supports different types of marine life, from red algae to encrusting species. Areas between the reefs have a sea bed of mixed sediments (e.g. cobbles, gravel and shells). Most of the wildlife here is mobile, reflecting the unstable nature of the sediments (e.g. hermit crabs and netted dogwhelks). This site is not associated with any Special Area of Conservation, Special Protection Area, Site of Special Scientific Interest or Ramsar site, although, as mentioned above, Worthing Lumps and Kingmere Rocks are marine Sites 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, where this corresponds to A3.94 Moderate energy infralittoral rock & thin sediments	26.44	-	Unfavourable condition	Recover to favourable condition
Habitats of Conservation Importance				
Subtidal chalk	0.02	-	Unfavourable condition	Recover to favourable condition
Species of Conservation Importance				
Native oyster (*Ostrea edulis*)		2 records	Favourable condition	Maintain at favourable condition
Non-ENG Feature				
Black bream (*Spondyliosoma cantharus*)		4 records	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 16, Kingmere**

Source of costs of the recommended Marine Conservation Zone (rMCZ)

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. A 3-month closure of marine aggregate extraction to mitigate impacts on habitats of nesting black bream *Spondyliosoma cantharus*, where any shortfall in supply is met by nearby licence areas at no additional cost. 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. A 3-month closure of marine aggregate extraction to mitigate impacts on habitats of nesting black bream, which is assumed to result in additional costs because shortfalls in supply cannot be met by nearby licence areas.

Baseline description of activity

There are 3 licensed aggregate extraction production areas within 1km of the rMCZ and 2 additional areas for which licence applications have 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 nos. 396/1, 396/2, and 453/2: in 2019 (based on information provided by The Crown Estate (pers. comm., 2012));
- for the applications that are currently being considered for licence nos. 453 and 488: in 2027 (based on information provided by BMAPA (pers. comm., 2011) and assuming that the licences are awarded).

Costs of impact of rMCZ on the sector

Average annual site-specific costs £m/yr	Scenario 1	Scenario 2
Additional costs to the operator for future licence applications	0.003	Assessed for the suite of sites
Costs to operator of mitigation	0.000	0.831 plus unknown costs
Total	0.003	0.831 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

Table 2a. Aggregate extraction	**rMCZ 16, Kingmere**
	as a result of the entire suite of MCZs and is not included here. Further details of the costs are provided in Annex N1. The operators for both licence application areas (CEMEX UK Marine Limited and Tarmac Marine Dredging Limited) have been engaged in the discussions relating to rMCZ 16 from the outset, and at an early stage offered a 3-month closure on extraction of both areas during the nesting period for black bream as a possible form of mitigation (Balanced Seas Final Recommendations Report, 2011). This is a condition that would be applied to the marine licence for the full 15-year term. From discussions with the aggregate industry, it is not anticipated that the overall tonnage available to the operators would be affected by this mitigation. In Scenario 1 it is assumed that the 3-month closure results in no costs to the operators. ***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. In Scenario 2 it is assumed that the 3 month closure to aggregate extraction to mitigate impacts on black bream impacts on the supply of aggregates. Additional costs could arise if there is not sufficient capacity in other nearby licence areas to maintain supplies to existing markets during the temporal restriction. In particular, if suitable replacement production licence areas are not within a 12-hour cycle time of the receiving wharves at Shoreham and Newhaven, the cost implications to both operators could be considerable. The costs are estimated at £0.831m/yr (£0.415m/yr per operator) (based on information provided by the British Marine Aggregate Producers Association (BMAPA), pers. comm., 2012). This is based on the annual cost of closure to the business costing £1.662m/yr (using the highest estimate for larger vessels provided by BMAPA to avoid underestimation). This estimated cost does not 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.

Table 2b. Commercial fisheries	**rMCZ 16, Kingmere**

Source of costs of the recommended Marine Conservation Zone (rMCZ)

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 (Statutory Nature Conservation Bodies (SNCB) informed scenario).

Management scenario 2:* Closure of entire rMCZ to bottom trawls, dredges, lines, nets, pots and traps during the black bream *Spondyliosoma cantharus* breeding season (end of April to end of June) to protect black bream nesting habitat; for the rest of the year, zoned closure of site to bottom trawls and dredges, to protect areas of medium energy infralittoral rock, leaving a trawling access corridor from north to south through the MCZ (Balanced Seas informed scenario based on stakeholder recommendations).

Management scenario 3: Closure of the rMCZ to bottom trawls, dredges, lines, nets, pots and traps to protect areas of medium energy infralittoral rock (SNCB informed scenario).

*This rMCZ recommendation was put forward by the Regional Stakeholder Group on the basis that seasonal restrictions on all activities throughout the site during the black bream nesting period and a permanent restriction on trawling over the thin mixed sediments (REC-specified habitat) would be the agreed management scenario.

Summary of all fisheries: The rMCZ is wholly within the 6 nautical mile (nm) limit and is only fished by UK vessels. The site is mainly fished by vessels based in Shoreham, Newhaven and Littlehampton. Several Selsey-based potters also fish here. The main fishery is potting, followed by set netting and trawling. Most vessels fishing in the site are small static gear boats under 10 metres. Vessels fishing in the site include both under and over 15 metre vessels and e a few larger trawlers based in Shoreham, as well as some based in Newhaven. Bass is an important non-quota species, as is cuttlefish which is caught in trawls, traps and static nets during the spring. The important target species in spring and summer are plaice, Dover sole and black bream, and in winter the target species are whiting, lemon sole and cod (if quota is available) (information from Fishermap interviews).

A number of vessels obtain the majority of their earnings from the rMCZ which is heavily fished by trawlers, netters and potters using lobster and whelk pots and cuttlefish traps. The cuttlefish season coincides with the black bream spawning season. Black bream in the Kingmere rMCZ are not currently protected under any byelaws, although the Sussex Inshore Fisheries and Conservation Authority has technical conservation regulations in place that require large mesh

Table 2b. Commercial fisheries **rMCZ 16, Kingmere**

cod-ends to be used on trawls during the spawning season, which reduce the incidence of juvenile fish capture.

As part of the recommendation for this rMCZ, the fishing industry agreed to cease all fishing activities in the rMCZ during the black bream nesting season if the rMCZ is designated. 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: £0.304m/yr.

Baseline description of UK commercial fisheries	Costs of impact of rMCZ on UK commercial fisheries
Bottom trawls: Number of vessels unknown. Estimated total value of landings from the rMCZ: £0.060m/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 | 0.010 | 0.060
Dredges: Number of vessels unknown. Estimated total value of landings from the rMCZ: £0.029m/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 | 0.005 | 0.029
Hooks and lines: Number of vessels unknown. Estimated total value of landings from the rMCZ: £0.006 m/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 | Scenario 3 Value of landings affected | 0.000 | 0.001 | 0.006 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

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 16, Kingmere</th></tr>
<tr><td></td><td>other gears.</td></tr>
<tr><td>Nets: Number of vessels unknown.

Estimated total value of landings from the rMCZ: £0.076m/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><td>Scenario 3</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.013</td><td>0.076</td></tr></table></td></tr>
<tr><td>Pots and traps: Number of vessels unknown

Estimated total value of landings from the rMCZ: £0.133m/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><td>Scenario 3</td></tr><tr><td>Value of landings affected</td><td>0.000</td><td>0.022</td><td>0.133</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 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>0.051</td><td>0.304</td></tr><tr><td>GVA affected</td><td>0.000</td><td>0.023</td><td>0.141</td></tr></table>As part of the recommendation for this rMCZ, the fishing industry agreed to cease all fishing activities during the black bream nesting season (end of April to end of June) within the rMCZ if designated, provided a trawler access channel across the site is allowed for (Balanced Seas Final Recommendations Report, 2011). However, because the cuttlefish season coincides with the black bream breeding season the closure is likely to impact on businesses that are heavily dependent on cuttlefish landings from the closed area. If fishers respond to the seasonal closure by fishing in the surrounding area this is likely to cause gear conflict and result in financial losses. The surrounding area is saturated with gear and working vessels (IA questionnaire response from Brock, B., Shoreham vessel owner and RSG</td></tr>
</table>

Table 2b. Commercial fisheries	**rMCZ 16, Kingmere**
	commercial fishing representative, 24 August 2011).
Baseline description of non-UK fisheries	**Costs of impact of rMCZ on non-UK commercial fisheries**
	None.

Table 2c. Recreational anchoring	**rMCZ 16, Kingmere**
Source of costs of the recommended Marine Conservation Zone (rMCZ) ***Scenario 1***: recreational anchoring does not impact on sensitive features in the site and so no mitigation of impacts is required. ***Scenario 2***: recreational anchoring impacts on sensitive features in the site and a seasonal closure to anchoring over these features by recreational vessels is required (except in emergency circumstances). The seasonal closure would be during the Black Bream breeding season (flexibly for 3 months according to the breeding season, during the summer) and would be over the black bream nesting sites.	
Baseline description of activity	**Costs of impact of rMCZ Reference Area on the sector**
Charter angling vessels anchor off the rocks, which is where the sensitive features are located, and fish into the rocks, whereas smaller private angling vessels anchor directly on the rocks using small sacrificial anchors all year round including during black bream breeding season (Balanced Seas Kingmere Site Meeting Report, February 2011). Information is not available on the numbers of vessels. The reefs and wrecks within the site are also popular areas for diving (Balanced Seas East Sussex Site Meeting Report, February 2011) and are used by diving charter boats based at Littlehampton and Brighton and many clubs throughout East Sussex. Numbers of diving boats that anchor over or in the vicinity of the Black Bream nesting sites is not known.	***Scenario 1***: no impact arises because no mitigation is required. ***Scenario 2***: The angling sector representatives have agreed that both charter vessels and private boats would cease anchoring on the rocks during the Black Bream breeding season. This would have no impact on the charter boat sector since they anchor off the rocks, but it would impact private boat anglers. However, since both private boat anglers and charter boats have agreed to cease fishing during the black bream breeding season it is anticipated that the impacts on private anglers would not be significant. The diving sector should be able to continue their activities if vessels can anchor outside the nesting areas. If this is not possible then divers and charter boats that currently anchor over the black bream nesting sites during the black bream breeding season will be impacted on during this time.

Table 2d. Recreational angling	**rMCZ 16, Kingmere**
Source of costs of the recommended Marine Conservation Zone (rMCZ) Reference Area	
Scenario 1: recreational angling does not impact on sensitive features in the site and so no mitigation of impacts is required.	
Scenario 2: recreational angling impacts on sensitive features in the site and a seasonal closure is required. The seasonal closure would be during the Black Bream breeding season (flexibly for 3 months according to the timing of the breeding season, during the summer) and would be over the black bream nesting sites. . This management scenario was proposed by the Sussex Inshore Fisheries and Conservation Authority (including its angling sector representatives), supported by the Balanced Seas Regional Stakeholder Group	
Description of activity and its impact on interest features	**Costs of effect of rMCZ on the sector**
This is a popular spot for angling with both local and non-local anglers all year round (including during the black bream breeding season). This site is renowned nationally for having one of the best populations of black bream in the south-east and as such attracts anglers from all over the country at certain times of year (Stakmap 2010). Charter boats in the area particularly depend on black bream fishing, including vessels based in Chichester (5 vessels), Shoreham (1 vessel), Selsey (2 vessels) and Brighton (11 vessels) with the closest fleet based at Littlehampton (15 vessels) (Stakmap 2010; Balanced SeasKingmere Site Meeting Report, February 2011). Charters launched from Littlehampton have a maximum radius of activity of 10 miles from their home port due to the conditions needed to enter and exit Littlehampton harbour (Stakmap 2010), which makes the Kingmere area particularly important for them.	***Scenario 1***: no impact arises because no mitigation is required. ***Scenario 2***: Representatives of both private recreational sea anglers and of charter boat operators from Littlehampton and further afield said the impact of seasonal closure of this area would be acceptable in order to protect the black bream brood stock and that they could continue to operate by using other adjacent areas (Sussex Sea Angling Network letter to Balanced Seas read out at the Kingmere Site Meeting, February 2011). As numbers of anglers using the exact location concerned is unknown, it is not possible to quantify the impact, but stakeholders have indicated that it would be sufficiently small as to be negligible.

Table 2e: Other impacts that are assessed for the suite of MCZs and not for this site alone	**rMCZ 16, Kingmere**
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 . 16, Kingmere**
Cables (existing interconnectors and telecom cables) Commercial fisheries (mid-water trawls) Recreation Research and education Shipping	

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 4a. Fish and shellfish for human consumption		**rMCZ 16, Kingmere**
Baseline	**Beneficial impact**	
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. This rMCZ comprises predominantly subtidal mixed sediments which are an important nursery area for many species and can provide important nursery grounds for juvenile commercial species such as flatfishes and bass. The area of primary conservation interest is where this sediment overlays moderate energy infralittoral rock which is an important location for commercial inshore fishing activity, particularly crab and lobster (Fletcher and others, 2011). The site contains the most important black bream nesting and spawning area in the Balanced Seas Project Area (Balanced Seas Final Recommendations Report, 2011).	If the conservation objectives of the features are achieved, some of the features will recover to favourable condition. One (native oyster) 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.	Anticipated direction of change:  Confidence: Low

Table 4a. Fish and shellfish for human consumption		**rMCZ 16, Kingmere**
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 is potting, followed by set netting and trawling. Important target species in spring and summer are plaice, Dover sole and black bream and in winter the target species are whiting, lemon sole and cod (if quota is available). Bass is an important non-quota species, as is cuttlefish. 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.	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 4b. Recreation		**rMCZ 16, KIngmere**
Baseline	**Beneficial impact**	
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 subtidal mixed sediments support high biodiversity within the site and provide 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 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 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.	Anticipated direction of change:  Confidence: Low

Table 4b. Recreation		**rMCZ 16, KIngmere**
The rMCZ is an extremely popular angling destination all year round with activity particularly intense at certain times of the year due to this being the best known area for black bream. 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. A description of on-site angling activity and the value derived from it 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.	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.	
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. However, the site has particularly high biodiversity and abundant fish populations, which may support foraging birds and potentially marine mammals. The site occurs within an area of the Channel used by ferries, which may carry wildlife watchers. 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.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	Anticipated direction of change:  Confidence: Low

Table 4b. Recreation		**rMCZ 16, KIngmere**
	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 4c. Research and education		**rMCZ 16, Kingmere**
Baseline	**Beneficial impact**	
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 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
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 6km 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 4d. Regulating services	**rMCZ 16, Kingmere**	
Baseline	**Beneficial impact**	
Regulation of pollution: the features of the site contribute to the bioremediation of waste (subtidal sediments), water filtration (Native oyster) and sequestration of carbon (intertidal rock, Native oyster, subtidal sediments) (Fletcher and others, 2011). ***Environmental resilience:*** the features of the site (Native oyster) 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 (infralittoral rock, subtidal mixed sediments and subtidal chalk) recovered to favourable condition. Recovery of the infralittoral rock and subtidal mixed sedminets 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 pMCZ 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 16, Kingmere**	
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 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 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

Table 4e. Non-use and option values		**rMCZ 16, Kingmere**
	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 nominated locations within this pMCZ should be protected, with people frequently attaching value to biodiversity and its importance for their recreational pursuit particularly divers and sea anglers who value the 'wide range of plants and animals'. Allowing species recovery, particularly fish and shellfish, was perceived as an important management reason to protect the site. The MCS nominated site Worthing Lumps occurs in this site and the 'sealife there is extensive, and we have seen many small fish, recently hatched, as well as a huge variety of sponges and corals' highlighting the area as biodiverse and a nursery area for fish which would benefit recreation and tourism in 'a heavily populated suburban and urban sprawl with a long history of fishing. Currently there is little local awareness of the richness of the natural coast line or of the remaining reservoir of marine species to be found along the submerged cliffs' Source: Ranger et al. (2011).	

rMCZ 17, Offshore Overfalls

Site area (km^2): 592.97

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 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

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
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 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).	<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>0.009</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 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

Table 2a. Aggregate Extraction	**rMCZ 17, Offshore Overfalls**
	provided in Annex H2 and N1.

Table 2b. Archaeological heritage	**rMCZ 17, Offshore Overfalls**
Source of costs of the recommended Marine Conservation Zone (rMCZ)	
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**
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 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)	
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	

Table 2c. Commercial fisheries **rMCZ 17, Offshore Overfalls**

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
Bottom trawls: Number of vessels not known. Estimated total value of landings from the rMCZ: £0.238m/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 | 0.002 | 0.238 | 0.238
Dredges: Number of vessels not known. Estimated total value of landings from the rMCZ: £0.241m/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

<table>
<tr><th colspan="2">Table 2c. Commercial fisheries</th><th colspan="2">rMCZ 17, Offshore Overfalls</th></tr>
<tr><td></td><td colspan="3"><table><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="3">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="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>0.004</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 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>0.023</td></tr></table></td></tr>
</table>

<table>
<tr><th colspan="2">Table 2c. Commercial fisheries rMCZ 17, Offshore Overfalls</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 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><th>Total direct impact on UK commercial fisheries</th><th></th></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:

<table><tr><th>£m/yr</th><th>Scenario 1</th><th>Scenario 2</th><th>Scenario 3</th></tr><tr><td>Value of landings affected</td><td>0.002</td><td>0.047</td><td>0.520</td></tr><tr><td>GVA affected</td><td>0.001</td><td>0.214</td><td>0.235</td></tr></table>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).</td></tr>
<tr><th>Baseline description of non-UK fisheries</th><th>Costs of impact of rMCZ on non-UK commercial fisheries</th></tr>
<tr><td>The eastern and southern parts of the rMCZ (beyond 12nm) are heavily used by Belgian, Dutch and French vessels employing trawls, pots and 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</td><td>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 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</td></tr>
</table>

Table 2c. Commercial fisheries	**rMCZ 17, Offshore Overfalls**
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.	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) 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**
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**

Table 2e. Ports, harbours, shipping and disposal sites **rMCZ 17, Offshore Overfalls**

Source of costs of the recommended Marine Conservation Zone (rMCZ)

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	Costs of impact of rMCZ on the sector
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).	*£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)

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

Table 2f. Renewable energy – tidal energy **rMCZ 17, Offshore Overfalls**

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, 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.

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 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 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) (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	

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 4a. Fish and shellfish for human consumption		**rMCZ 17, Offshore Overfalls**
Baseline	**Beneficial impact**	
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 fisheries. In particular, such habitats can provide important nursery grounds for juvenile commercial species such as flatfishes and bass (Fletcher and others, 2011).	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. As most of the commercial species targeted by fishers in this area are mobile fish and shellfish, it is unclear whether the scale	Anticipated direction of change: ⇧ Confidence: Low

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.	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 4b. Recreation	**rMCZ 17, Offshore Overfalls**	
Baseline	**Beneficial impact**	
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	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 4b. Recreation		**rMCZ 17, Offshore Overfalls**
the Isle of Wight and from Selsey; hundreds of anglers use the area annually either on charter or private boats, coming from some 50 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	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	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation		**rMCZ 17, Offshore Overfalls**
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. It has not been possible to estimate the value derived from wildlife watching in the rMCZ.	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: Other forms of recreation are not known to take place in the rMCZ.	N/A	N/A

Table 4c. Research and education		**rMCZ 17, Offshore Overfalls**
Baseline	**Beneficial impact**	
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.	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.	Anticipated direction of change:

Table 4c. Research and education		**rMCZ 17, Offshore Overfalls**
No known education activity occurs in this rMCZ.	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).	⇧ Confidence: Low

Table 4d. Regulating services		**rMCZ 17, Offshore Overfalls**
Baseline	**Beneficial impact**	
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 4e. Non-use and option values		**rMCZ 17, Offshore Overfalls**
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 rMCZ and the	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	Anticipated direction of change:

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.	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.	⇧ Confidence: Moderate

rMCZ 19 Norris to Ryde

Site area (km^2): 19.82

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
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)	
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-	

Table 2a. Archaeological heritage	**rMCZ 19, Norris to Ryde**
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**
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) 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 19, Norris to Ryde**

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).

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**
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).

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 19, Norris to Ryde</th></tr>
<tr><td>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 area for 3 weeks (Southern IFCA, feedback response to first tranche of IA material, 16 January 2012).</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>0.025</td><td>0.070</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 sea grass 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</td></tr>
</table>

<table>
<tr><th colspan="2">Table 2b. Commercial fisheries rMCZ 19, Norris to Ryde</th></tr>
<tr><td></td><td>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>0.018</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:

<table><tr><td>£m/yr</td><td>Scenario 1</td><td>Scenario 2</td></tr><tr><td>Value of landings affected</td><td>0.029</td><td>0.153</td></tr><tr><td>GVA affected</td><td>0.014</td><td>0.072</td></tr></table>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)

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).</td></tr>
</table>

Table 2b. Commercial fisheries	**rMCZ 19, Norris to Ryde**
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)	
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**
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 listed as physical disturbance to the sea bed through amphibious activities.	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 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)	
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	

Table 2d. Ports, harbours, shipping and disposal sites **rMCZ 19, Norris to Ryde**

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
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 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	*£m/yr* — Scenario 1: Cost to the operator 0.004; Scenario 2: 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 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 2d. Ports, harbours, shipping and disposal sites	**rMCZ 19, Norris to Ryde**
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).	

Table 2e. Recreational anchoring	**rMCZ 19, Norris to Ryde**
Source of costs of the recommended Marine Conservation Zone (rMCZ) ***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**
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 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–	***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 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.

Table 2e. Recreational anchoring	**rMCZ 19, Norris to Ryde**
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.	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

Table 2e. Recreational anchoring	**rMCZ 19, Norris to Ryde**
	frequent here as in Studland Bay due to the lack of onshore access and facilities (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 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) (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).

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 4a. Fish and shellfish for human consumption		**rMCZ 19, Norris to Ryde**
Baseline	**Beneficial impact**	
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).	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	Anticipated direction of change: ⇧ Confidence: Low

Table 4a. Fish and shellfish for human consumption		**rMCZ 19, Norris to Ryde**
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.	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.	

Table 4b. Recreation		**rMCZ 19, Norris to Ryde**
Baseline	**Beneficial impact**	
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.	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	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation		**rMCZ 19, Norris to Ryde**
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.	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.	
Diving: Diving is not known to take place in the rMCZ, although it is possible that some wrecks are visited.	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). 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	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	Anticipated direction of change: ⇧ Confidence: Low

Table 4b. Recreation		**rMCZ 19, Norris to Ryde**
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.	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 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 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.	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 4c. Research and education		**rMCZ 19, Norris to Ryde**
Baseline	**Beneficial impact**	
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 4d. 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 4e. Non-use and option values		**rMCZ 19, Norris to Ryde**
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) 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

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)

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
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).	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

Table 2a. Archaeological heritage	**rMCZ 19, Reference Area 16 Wootton Old Mill Pond**
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).	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. 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)

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**
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 — 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 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) (existing activities at their current levels and future proposals known to the regional MCZ projects)	**MCZ 19, Reference Area 16. Wootton Old Mill Pond**

Table 3. Human activities in the site that are not negatively affected by the recommended Marine Conservation Zone (rMCZ) (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).

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**	
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**	
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

Table 4b. Recreation	**rMCZ 19, Reference Area 16 Wootton Old Mill Pond**	
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**	
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**	
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

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)	
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**
Osborne House (property and grounds managed by English Heritage)	An extra cost would be incurred in the assessment of environmental impacts

Table 2a. Archaeological heritage	**rMCZ 19, Reference Area 17 King's Quay**
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).	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 (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) Entire site closed to activities.	
Baseline description of activity	**Costs of impact of rMCZ on the sector**
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) ***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	

Table 2c. Ports, harbours, shipping and disposal sites	**rMCZ 19, Reference Area 17 King's Quay**
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**
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, Operations Director, Wightlink, letter, 11 February 2011). At present, there are no known proposals for development at Cowes or Fishbourne.	*£m/yr* | Scenario 1 | Scenario 2 Cost to the operator | N/A | 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 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) 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**
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) Closure of entire site to all bait collection.	
Baseline description of activity	**Costs of impact of rMCZ on the sector**

Table 2e. Recreational bait collection	**rMCZ 19, Reference Area 17 King's Quay**
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) (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).

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**	
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). 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.	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 4b. Recreation		**rMCZ 19, Reference Area 17 King's Quay**
Baseline	**Beneficial impact**	
Angling: Fletcher and others (2011) identify that the features to be	If the conservation objectives of the features are achieved, the	Anticipated

Table 4b. Recreation		**rMCZ 19, Reference Area 17 King's Quay**
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).	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.	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: 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**

Table 4c. Research and education		**rMCZ 19, Reference Area 17 King's Quay**
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**	
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	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.	Anticipated direction of change: ⇧

Table 4d. Regulating services		**rMCZ 19, Reference Area 17 King's Quay**
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.	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 4e. Non-use and option values		**rMCZ 19, Reference Area 17 King's Quay**
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 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