

Satellite derived ocean front maps inform the designation of national and international areas for marine protection

This report combines the site selection documents, or other appropriate evidence, as corroboration of the impact of PML research in the MPA planning process.

Contents

Section 1: Designated sites in England and Wales

Section 2: Additional proposed sites not yet designated in England and Wales

Section 3: Designated sites in Scotland

Section 1: Designated sites in England and Wales

Impact	Name	Area (km2)	Evidence source: (reference to Dr Miller's front maps)	Page
MCZ designated - 2013	Canyons	661	Finding Sanctuary Final Report section 3	3
MCZ designated - 2016	Western Channel	1,614	Finding Sanctuary Final Report section 3	19
MCZ designated - 2019	South Rigg	143	Irish Sea Conservation Zones Selection Assessment Documents for recommended MCZs	33
MCZ designated - 2019	Holderness Offshore	1176	Net Gain Final Recommendations, 2011	50
MCZ designated - 2019	Goodwin Sands	277	Goodwin Sands Selection Assessment Document	77
MCZ designated - 2019	Kentish Knock East	96	Balanced Seas site selection	30
MCZ designated - 2013	The Manacles	3.5	Finding Sanctuary Report section 4	101
		3,970.5		

Section 2: Recommended sites in England and Wales

Impact	Name	Area (km ²)	Evidence Source: (reference to Dr Miller's front maps)	Page
Recommended MCZ	Celtic Deep		Finding Sanctuary section 3	122
	East of Celtic Deep		Finding Sanctuary section 3	136
	North St George's channel		Irish Sea Conservation Zones Selection Assessment Documents	148
	Mid St George's Channel:		Irish Sea Conservation Zones Selection Assessment Documents	171
	North of Celtic Deep		Irish Sea Conservation Zones Selection Assessment Documents	189
	Compass Rose		Net Gain Final Recommendations, 2011	203
	East Meridian		East Meridian rMCZ no 29: Selection Assessment Document	236
	South-East of Falmouth		Finding sanctuary report section 4	239
	South of Falmouth		Finding sanctuary report section 4	253

Section 3: Designated sites in Scotland

Impact	Name	Area (km ²)	Evidence Source: (reference to Dr Miller's front maps)	Page
Designated MCZ	Clyde Sea Sill	711.63	Data confidence assessment	268
Recommended MCZ	Southern Trench	2536	Data confidence assessment	280
Recommended MCZ	Sea of the Hebrides	10039	Data confidence assessment	305
		13,286.6		

II.3.1 The Canyons rMCZ

Basic site information

Site centre location (datum used: ETRS89):

Decimal Degrees		Degrees Minutes Seconds	
Lat	Long	Lat	Long
48.3333	-9.6799	48° 20' 0"N	9° 40' 47" W

Site surface area: 660.58 km² (calculated in ETRS89 – LAEA)

Biogeographic region:

JNCC regional sea: On the boundary between Western Channel and Celtic Sea, and Atlantic South West Approaches

OSPAR region: Region III: Celtic Waters

Site boundary: The shape of the site is a simple rectangle, in line with ENG guidelines. The northern, north-western and southern boundary sections align with the UK Continental Shelf Limit. The western and eastern boundary sections were drawn as straight N-S lines. The site was placed on the top edge of the shelf break, and it includes small slivers of continental shelf broad-scale habitats along the eastern boundary, in addition to the deep sea broad-scale habitat beyond the shelf break. This positioning was deliberate, in order to capture as much of the depth range along the steep shelf slopes as possible, thereby maximising the biodiversity within the site.

Sites to which the site is related: The Canyons rMCZ contains a recommended reference area called ‘The Canyons’. The shortest distances to its two nearest neighbouring rMCZs are approximately 30km to South-West Deeps (East), and around 40km to South-West Deeps (West), respectively.

Maps of the site are included at the end of this site report. The main site map shows points with coordinates along the site boundary (in WGS84 UTM29N).

Features proposed for designation within The Canyons rMCZ

Table II.3.1.a Draft conservation objectives for the Canyons rMCZ. ‘Maintain’ = maintain in favourable condition, ‘recover’ = recover to favourable condition. This is an extract of the conservation objective summary tables in section II.2.6. The full text of the draft conservation objectives can be found in appendix 15.

Feature	Conservation Objective
Deep-sea bed	recover
Subtidal coarse sediment ¹	recover
Subtidal sand ¹	recover
Cold-water coral reefs	recover

¹During the vulnerability assessment discussions, it was highlighted that setting conservation objectives for these two features may not be achievable as they only cover very small slivers of the seafloor within the site boundaries (see site map series, and table II.3.1b). The primary feature to be protected within the site is the deep-sea bed beyond the shelf break. However, a decision was ultimately taken to include them, meaning that the entire seafloor area within the site would be protected.

The inclusion of conservation objectives for seabirds and common dolphins on the conservation objective feature list for this site was discussed at length at the Joint Working Group meeting in May 2011, in the full understanding of SAP feedback following progress report 3, and the JNCC’s position that they would not support conservation objectives for mobile species in offshore rMCZs. The JWG could not reach a conclusion on the matter.

The following tables show ENG-related statistics for this site, reported from spatial data available in Finding Sanctuary’s GIS datasets. Greyed out rows indicate features for which GIS data exists within the site boundary, but which have not been included on the list of draft conservation objectives (the reasons are stated in table footnotes).

Table II.3.1b Subtidal broad-scale habitats recorded in this rMCZ, based on an analysis of Finding Sanctuary’s EUNIS level 3 broad-scale habitat GIS data (see appendix 8). Data sources: 1 - UKSeaMap, 2 - MESH, 3 - Environment Agency.

Habitat	Area covered within rMCZ (km ²)	% of total in study area	Source(s)
Subtidal coarse sediment	0.12	<0.1%	1, 2
Subtidal sand	3.95	<0.1%	1
Deep-sea bed	655.54	41.1%	1, 2

Table II.3.1c Habitats mapped by JNCC from seafloor survey data (Davies et al. 2008), represented within this rMCZ.

Subtidal broad-scale habitats (EUNIS level 3)		
Habitat	Area covered within rMCZ (km ²)	% of total in study area
Communities of Deep-Sea Corals	0.17	100
Deep Circalittoral Coarse Sediment	5.22	7.4
Deep-Sea Bedrock	27.93	65.6
Deep-Sea Biogenic Gravel	57.08	92.3
Deep-Sea Mixed Substrata	160.37	54.8
Deep-Sea Mud	114.46	81.9
Deep-Sea Sand	15.24	61.3

Table II.3.1d FOCI habitats recorded in this rMCZ, based on an analysis of Finding Sanctuary’s amalgamated GIS FOCI datasets (see appendix 8). Data sources: 1 - MB102; 2 - JNCC/ MESH Canyons survey data; 3 - ERCCIS/Isles of Scilly Wildlife Trust; 4 - DORIS.

Habitat	Area covered (km ²)	Number of point records (total)	Number of point records (pre-1980)	Source(s)
Cold-water coral reefs		1		2
Subtidal sands and gravels ¹	12.24			1

¹ Conservation objectives have not been included for subtidal sands and gravels as we have considered any conservation requirements met by listed broad-scale habitats.

For additional understanding on how this site is located in relation to environmental data layers, including areas of high benthic biodiversity, offshore bird aggregation areas, or areas of seasonal sea surface temperature fronts, please refer to the interactive PDF maps presented alongside this report.

Site summary

This site is located in the far south-west corner of our study region and of the UK's continental shelf area. It is more than 330 km from Land's End. The area is unique within the context of England's extensive, but largely shallow shelf seas. It is located on the continental shelf break, which drops steeply from the continental shelf to the oceanic abyss. The depth within the site ranges from 200m at the eastern edge of the site, to 2000m in the west. Within the site, there are two large canyons that indent the shelf break, further adding to the topographic complexity of the seafloor.

The site boundaries were drawn for the site to be located on the steep part of the shelf break, to cover areas of diverse seafloor habitat within the 'deep sea' broad-scale habitat, including canyons and deep sea corals, mapped from survey data supplied by the JNCC (collected during the research cruise described in Davies *et al.*, 2008). This is high-quality seafloor habitat data, which has been used in addition to our EUNIS level 3 habitat data (described in appendix 8), and it is shown on one of the maps at the end of this site report (map FR_009c). It shows a range of seafloor habitats present, including bedrock and a range of sediments varying from mud to coarse sediments.

There is a small patch of live deep-water coral reef (*Lophelia pertusa* reef), located on the northern flank of the northernmost canyon in the site. This is the only living deep-water coral reef recorded within England's seas (other deep-water coral reefs occur along the continental shelf break off Scotland and Ireland). There are more extensive patches of biogenic rubble present in the site, on the shallower spurs separating the deep canyons. This is an indication that the coral reef habitat may have been much more extensive in the past.

The site also covers an area of additional ecological importance in terms of its pelagic environment. There is upwelling of deep, nutrient-rich waters along the shelf break, as is indicated by **persistent sea surface temperature fronts located along the sea surface above the shelf break** (see the biophysical interactive PDF presented along with this report). The area attracts higher than average numbers of seabirds and cetaceans.

Detailed site description

Detailed multibeam and backscatter survey work was carried out in the area of the south-west Canyons in 2007, which focused on the canyons flanks, or interflaves, was undertaken, along with a boomer and sparker survey by Davies *et al.* (2008). Ground-truthing was undertaken using a drop frame equipped with high resolution digital stills and video. EUNIS habitats were classified from video analysis of the Canyons, including communities of deep-sea corals, i.e. patches of cold water coral (Davies *et al.* 2008). Habitats Directive Annex 1 bedrock reef and biogenic reef were all observed within the area of the study. Cold water coral (*Lophelia pertusa*) reef was observed at the seaward entrance to, and within Explorer Canyon between 743–925m (Davies *et al.* 2008).

Howell (2010a) collected biological data from the South West Canyons (SWC) over a thirteen day period in June 2007 on the RV 'Celtic Explorer'. Forty-five video transects were undertaken in total. Transects were selected to cover a range of substrates, depths and geomorphological features using existing multibeam bathymetry and backscatter data. Howell *et al.* (2010b) undertook an extensive review of the benthic faunal studies from the region.

During the period 2000–2006, Ellis *et al.* (2007a) carried out approximately 150 tows with 2m-beam trawl during groundfish surveys of the South West offshore area. Catches along the edge of the continental shelf (130–350 m deep) were characterised by large numbers of the anemone *Actinauge richardi*, with the hermit crab *Pagurus prideaux* dominating on coarse grounds in shallower waters.

The study described the spatial distribution of the epibenthic fauna. Wilson *et al.* 2001 analysed the benthic biodiversity of the Southern Irish Sea which may have included part of the Canyons.

Duineveld *et al.* (2001) compared the sediment and its community on the Celtic continental slope (Goban Spur) with those in a branch of the nearby Whittard Canyon in search for evidence of canyon mediated transport of (labile) organic matter. They studied the megabenthos and macrobenthos biomass and taxonomic composition. Macro-infauna were collected with a 50 cm diameter box-corer. Megafauna were collected using an Agassiz trawl with an opening of 1 m height and 3.5 m width and a net with a mesh size of 1 cm. Three stations were sampled during July 1996.

Stakeholder narrative: Assumptions and Implications

As explained in part I, the stakeholder narrative is a vital underpinning of the site recommendations. Working assumptions and implications are presented here, and additional comments are presented in the following section.

The following fundamental assumption was recorded to apply to all activities in all sites: **The fundamental assumption about human activities within MCZs is that activities can continue (under current licensing regimes where applicable), as long as they do not prevent the conservation objectives from being achieved. This assumption applies to all activities.** Table II.3.1e shows more specific working assumptions and implications that were recorded for this site over the course of the planning process.

Following that, table II.3.1f shows the vulnerability assessment (VA) snapshot for this site. The VA meetings took place at the end of the project, and they did not involve the Steering Group. They started to discuss site management, but did not reach any firm conclusions. The VA snapshot table reflects the point that the VA discussions had reached at the time of the last Joint Working Group meeting in May 2011. Many Steering Group members expressed concerns about the VA process and its outcomes (see section II.2.1 for full details).

Table II.3.1e Specific assumptions and implications relating to The Canyons rMCZ. Black text reflects the working assumptions and implications recorded throughout the planning discussions. The development of the narrative recorded in black can be traced back through the Working Group and Steering Group meeting reports from 2009 to 2011. Red and green text in the first column comments on how the snapshot of the vulnerability assessment (VA) relates to each of the working assumptions that had been made as planning took place (refer to part I for a full explanation of the VA snapshot).

Activities assumed to not be allowed within the site	
Assumptions	Implications
<p>Bottom-towed fishing gear will not be allowed.</p> <p>This activity was discussed during the VA meetings, and it was determined that the activity would be prohibited in the whole site.</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o Loss of ground for bottom-towed gear fishermen, both UK and non-UK (For this specific rMCZ, the implications for the non-UK fleet will be the most significant. This is relevant to longliners more than bottom-towed gear fishermen). o Displacement of bottom-towed gear o Increased competition for fishing grounds o Reduced diversity and flexibility of fishing o Cumulative impact on bottom-towed gear fleet where protected areas are close together o No tow zones will be inundated with pots & static gear & cause difficulties for sea anglers (This comment was recorded during one of the early planning meetings. Several stakeholder representatives have since stated that the comment is unrealistic.) o Potential environmental implications derived from concentrating effort in alternative grounds or due to new fishing ground searching activity.
<p>Anchoring of large vessels will not be allowed (except in emergencies).</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings.</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o There is a general right of anchoring as a consequence of and incidental to the Public Right of Navigation.
<p>Aggregate extraction will not be allowed.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings.</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o Aggregate dredging can only occur where the mineral resources are geologically located – in highly localised and discrete areas. If aggregate operations are not allowed in MCZs (subject to appropriate monitoring, mitigation and management), and MCZs coincide with aggregate resource, then this will have significant impact on national construction aggregate supply and coast defence. o If aggregate operations (subject to appropriate monitoring, mitigation and management) are restricted in areas adjacent to an MCZ, then this will have significant impact on national construction aggregate supply and coast defence.

	<p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o If aggregate operations (subject to appropriate monitoring, mitigation and management) are restricted in areas adjacent to an MCZ, then this will have significant impact on national construction aggregate supply and coast defence.
<p>Dumping and disposal will not be allowed. That includes dumping of fish waste from processing vessels and munitions.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o

Activities assumed to possibly need restricting (limiting or mitigating) within the site or parts of the site	
Assumptions	Implications
<p>Static fishing gear (except netting and longlining) will be permitted, but there may need to be a limit on the amount of static gear used in the area.</p> <p>This activity was discussed during the VA and it was determined that demersal static fishing gear (which impacts the seafloor, e.g. potting, set netting, set lines) should not be allowed where the most sensitive feature occurs: cold water coral reef (possibly to include biogenic rubble areas).</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o No tow zones will be inundated with pots & static gear & cause difficulties for sea anglers (This comment was recorded during one of the early planning meetings. Several stakeholder representatives have since stated that the comment is unrealistic.) <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o Static gear fishermen might face possible additional costs for mitigation measures, should they be necessary o There would be costs if monitoring is needed (e.g. the introduction of static gear controls would require monitoring)
<p>The installation, operation and maintenance of renewable energy devices will be permitted</p> <p>Based on SAP feedback the assumption cannot apply to all sites in the network, although it can apply to any given site on its own.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o The MCZ designation may mean that additional management requirements are defined for renewable energy developments. This could result in: <ul style="list-style-type: none"> - additional costs to the renewables industry, e.g. for licensing mitigation and monitoring - delays to renewables development - delays, lost revenue and additional costs associated with

	<p>cable repair activity restrictions</p> <ul style="list-style-type: none"> o Costs and delays associated with co-location of renewables in MCZs, could result in long term implications in terms of renewables deployment which could have serious implications for industry and Government in terms of loss of operational revenue and missing EU climate change targets. o Enforced co-location with MCZs would dramatically restrict deployment. <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o If co-location assumptions are not correct the impacts would/could be: site locations that can't be developed, increased costs (the implications could be re-routing of cables around a feature could cost an additional £600,000 - £1.3m/km depending on cable type, size and seabed geology), construction delays, failure to meet renewables targets, impacts on acidification, additional monitoring requirements, increased uncertainty and declining investor confidence in renewables activities. o Increased competition for sea space with other sea users. o Excellent wind and wave resource area but unlikely to be developed in short or medium term due to distance from shore.
<p>Anchoring of small vessels will be permitted. <i>There isn't a clear, agreed Working Group definition for what constitutes a 'small vessel'.</i></p> <p><i>In this site, anchoring would not be permitted where the sensitive habitat (coral reefs, biogenic rubble?) occurs, as the impact would theoretically not be compatible with the conservation objectives - but this activity is unlikely to happen in reality.</i></p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o No clear working group definition exists of what counts as a 'small' vessel . 24m was proposed some time ago by the RYA, but no decision was reached as to whether we would adopt that size in MCZ planning.
<p>Anchoring for maintenance and access for licensed visitors to heritage wrecks will be permitted.</p> <p><i>In this site, anchoring would not be permitted where the sensitive habitat (coral reefs, biogenic rubble?) occurs, as the impact would theoretically not be compatible with the conservation objectives - but this activity is unlikely to happen in reality</i></p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o (No heritage wrecks currently present in the site)

Activities assumed to be allowed to continue / occur within the site	
Assumptions	Implications
<p>Handlining (recreational angling and commercial handlining) will be permitted. Handlining includes sea angling and trolling.</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o Handliners might face possible additional costs for mitigation measures, should they be necessary o There would be costs if monitoring is needed <p>Benefits:</p> <ul style="list-style-type: none"> o
<p>Pelagic trawls will be permitted</p> <p>Mobile species (seabirds and cetaceans) not considered as features needing protection when the vulnerability assessment was carried out with JNCC specialists.</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>The installation and maintenance of cables will be permitted and will not be made prohibitively expensive within the site. This applies to power cables (including cables for renewable energy devices), and telecommunications cables.</p> <p>In this site, any new cables would have to be routed around the most sensitive canyon seafloor habitat, (areas of live deep-sea coral and biogenic rubble, where coral may recover).</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption there are still the following concerns:</p> <ul style="list-style-type: none"> o Cable installation cost increases and delay o Cable repair cost, delays and lost revenue could increase due to activity restrictions on cable repair. o There is no definition of what ‘prohibitively expensive’ means; the cables representative would like assurance that no additional cost will result from MCZ designation (beyond costs associated with existing management and mitigation requirements). <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o For renewables/power cables, re-routing of cables around a feature or site might mean longer cable routes, at a cost of £600,000 - £1.3 million/km depending on cable type, size and seabed geology. o There may be other costs, e.g. costs associated with licensing, mitigation measures and monitoring requirements. o Increased licensing requirements and costs of cabling may have serious implications for industry and Government in terms of loss of operational revenue, missing EU climate change targets etc.

<p>The operation of cables (power and telecommunications) & pipelines will be permitted (i.e. any existing cables will be allowed to stay operational).</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o Two inactive telecoms cables.
<p>Tourism and recreational activities will be permitted.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings.</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Passage of ships will be permitted.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings.</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Acoustic survey work (geological surveys) will not be allowed.</p> <p>Military Sonar will not be allowed.</p> <p>This activity was discussed during the VA and it is likely that no added restrictions on acoustic work or military sonar would result from an MCZ designation in this site. (Cetaceans were not considered as a feature for protection in this site when the vulnerability assessment was carried out with JNCC experts.)</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o

Table II.3.1f VA Snapshot table: This table records the point which the vulnerability assessment discussions had reached regarding site management, at the time of the final Joint Working Group meeting in May 2011. The outcome is not definitive, and the VA did not carry out an exhaustive review of all the working assumptions recorded in the longer table above. The Steering Group were not directly involved in the VA discussions, and at their final meeting, expressed considerable reservations about the VA outcome (see section II.2.1). The reason this VA snapshot table is included here is so that readers have a record of what the VA snapshot was showing at the time the final stakeholder comments were recorded for this site. For a full explanation of the VA snapshot, please refer to part I. The maps in appendix 13 show a visual representation of the information in all the VA snapshot tables in the rMCZ site reports.

Sector	Potential Management
Commercial Fishing – all mobile bottom gears	Management: - Prohibition of fishing in the rMCZ Measure: - Common Fisheries Policy
Commercial Fishing – all mobile and static bottom gears	Management: - Prohibition of fishing over specific BSH/FOCI. These are: cold-water coral reefs (possibly including biogenic rubble). Measure: - Common Fisheries Policy

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

The most significant uncertainty faced by the project was the lack of knowledge on management of MCZs, and this uncertainty still applies to all rMCZs in the network. There was uncertainty over what activities will be affected by MCZ designations: what activities will be permitted to continue within (or near) MCZs, what activities will not be permitted, and what activities will require mitigation or some form of restriction other than a complete ban. There was also uncertainty over what measures will be taken to ensure any activity restrictions are put in place (e.g. byelaws, voluntary measures).

The following additional uncertainty has been highlighted for this site:

- There have been conflicting statements as to whether or not the UN Convention on the Law of the Seas (UNCLOS) allows the permanent right to lay cables in the offshore outside of 12 nautical miles or whether this activity can be managed following MCZ designation.

Additional comments

The following is a set of additional comments made by stakeholder representatives over the course of the planning work. Some of these comments were made specifically about this site, others were more generic comments which the project team consider to be relevant to this site.

- *Fishing*
 - This site is important to almost twenty fishing vessels from South Normandy.
 - Seasonal closures of bottom-towed mobile gear are an inappropriate measure for benthic conservation.

- *Pelagic gear*
 - As this site had previously been considered to provide protection for pelagic and mobile species, assumptions had been made that netting and longlining would not be permitted, and pelagic trawls would be permitted, but with mitigation against bycatch for seabirds.
- *General benefits of MCZs*
 - Some stakeholder representatives would like the following recorded and for these to be considered during the impact assessment:
 - Fisheries spill-over.
 - Improvements for the local economy.
 - Education opportunities.
 - Benefits to science.
 - Focus for voluntary groups.
 - Potential increase in the amount and quality of recreational activities (diving, sea angling, environmental tourism, etc).
 - The designation as an MCZ will be a selling point and will undoubtedly be used as an identifier to the area to highlight it as somewhere to visit.
- *Monitoring*
 - There are two main types of monitoring which will need to take place within rMCZs:
 - Monitoring the activities within a site and the various levels at which they are occurring.
 - Monitoring the ENG features for changes in condition.
- *Management measures*
 - For sites beyond 6nm, stakeholder representatives repeatedly voiced concern over how the activity of non-UK fishing vessels might be managed, and stated opposition to any unilateral measures that would apply to UK vessels only. At the time of the third progress report, we had received the following statement from the SNCBs and Defra: ‘When considering the impacts of fishing restrictions on non UK vessels, it is the Government’s intention that fishing restrictions will not be imposed unilaterally on UK vessels before they can be applied to equivalent EU vessels operating within the relevant areas. In the case of those EU fishing vessels with historic fishing rights in UK waters between 6 and 12 nm, Defra will negotiate with the relevant Member States and the European Commission before introducing byelaws, or orders that are applicable to all EU vessels, or seeking Common Fisheries Policy (CFP) regulation measures. Once introduced, these would apply to all EU vessels (including UK vessels) equally and at the same time.’
- *Vulnerability assessment*
 - Steering Group representatives voiced general concern over the process and outcome of the vulnerability assessments. This was mainly in relation to inshore sites, however, please refer to the Steering Group statement in section II.2.1.

Levels of support

The network report (section II.2) includes a project team reflection on levels of support for the network recommendations as a whole, and the site specific reflection presented here should be read within the wider network context.

This area was one of the earliest that was drawn by stakeholder representatives as an area to include in the network (see first progress report), and there is a general recognition from a wide range of stakeholder representatives that the shelf break and coral reef habitat are unique ecological areas. Furthermore, the site is located a long way offshore, so the diversity of interests that might generate conflicts over the site designation is much more limited than closer to shore. Therefore, the site has relatively wide support.

The fishing sector have questioned the rationale for the selection of such a large proportion of the deep sea habitat feature within the region as a rMCZ, when the ENG does not set any quantitative guidelines, and some concern has been raised over possible impacts on non-UK fishermen (including Spanish longliners) who use the area of the shelf break. NCS comments from non-UK fishermen reflect these concerns.

Supporting documentation

GIS data used for reporting the quantitative habitat and species figures in the tables above includes the following sources: UKSeaMap modelled broad-scale habitat data, MESH, MB102, and JNCC/MESH Canyons survey data (Davies *et al.* 2008). Refer to appendix 8 for details, and to the tables above for data sources for specific features in this site.

Further evidence underpinning the site can be found in the publications and datasets referred to in the detailed site description. There may be additional information relevant to this rMCZ in Stewart & Davies (2007).

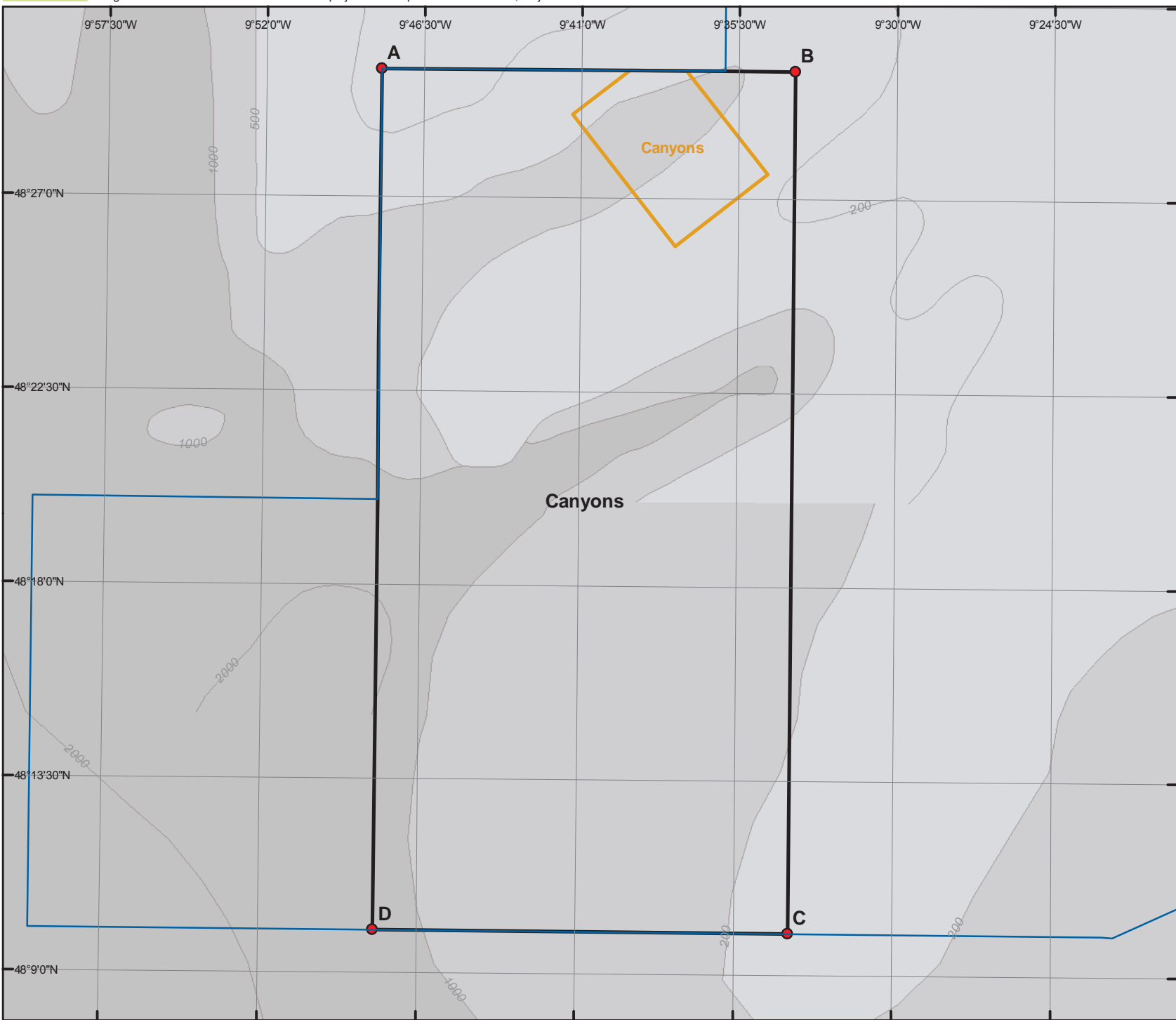
Site map series

On the following pages there are three maps of this site.

- The first map (FR_009a) is the main site map showing the rMCZ boundary and includes points with coordinates (in WGS84 UTM29N). The map also shows charted depth and existing Marine Protected Areas for reference. Please note: the lat/long coordinates of the vertices in the following maps have been calculated in decimal degrees, and in degrees, minutes and seconds. For plotting on a standard Admiralty (UKHO) chart, the seconds of each coordinate need to be converted to decimal. An MS Excel table showing all coordinates in degrees, minutes and decimal seconds has been provided in the additional materials section (see Appendix 14) for plotting purposes.
- The second map (FR_009b) shows the rMCZ boundary over broad-scale habitats, and records of habitat and species FOCI.
- The third map (FR_009c) shows the detailed seabed habitat data from the JNCC/MESH survey referred to above (Davies *et al.* 2008). The data shown on maps FR_009b and FR_009c corresponds with the information in tables II.3.1b to II.3.1d, data sources are indicated in the tables.
- Most site reports include a map showing socio-economic information, but this one does not, because there is not a lot of spatial data indicating activities occurring this far offshore (except for fisheries data, which is included in interactive PDF maps provided along with this report – see appendix 14). One of the maps included in the South-west Deeps (East) rMCZ

site report (map FR_011c) shows a cable that clips the south-eastern corner of The Canyons rMCZ.

- Because of the large number of features shown on the site maps (especially inshore biophysical maps), it has not been possible to embed comprehensive legends within the site maps themselves. A comprehensive map legend is therefore provided in appendix 7, which explains the symbology used on all the maps within this final report.
- Appendix 8 describes the data sources for the information shown on the final report maps in detail.



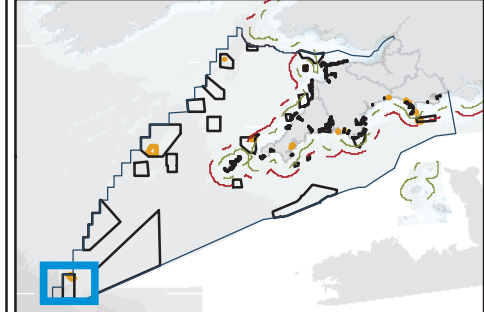
Lat/Long Co-ordinates (WGS84)

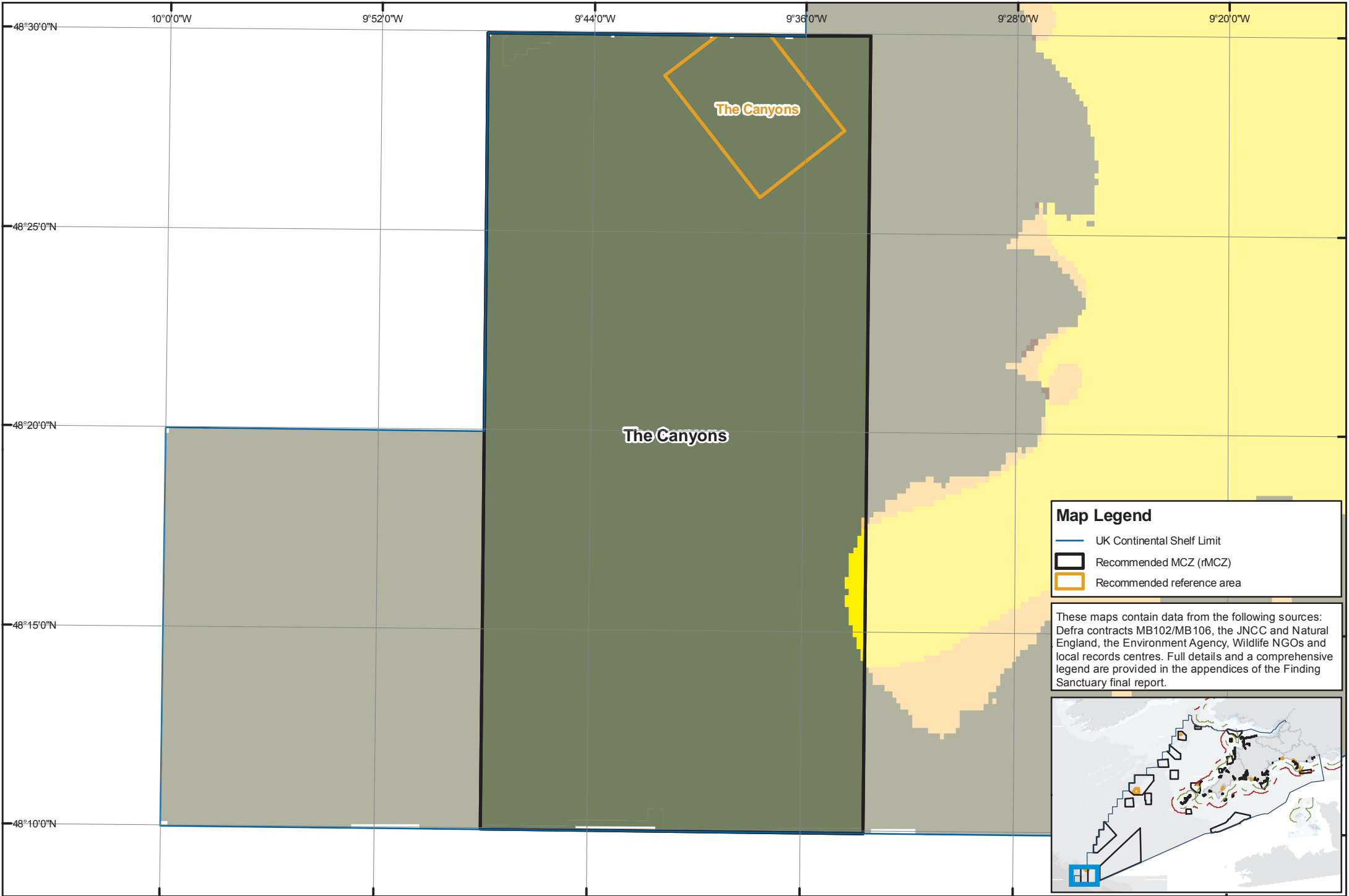
	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	48.5000	-9.8000	48° 29' 59" N	9° 47' 59" W
B	48.5000	-9.5593	48° 29' 59" N	9° 33' 33" W
C	48.1663	-9.5603	48° 9' 58" N	9° 33' 37" W
D	48.1667	-9.8001	48° 10' 0" N	9° 48' 0" W

Map Legend




- UK Continental Shelf Limit
- Recommended MCZ (rMCZ)
- Recommended reference area

A comprehensive legend is provided in the appendices of the Finding Sanctuary final report.

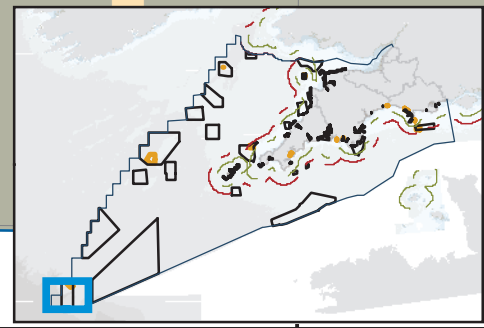




Map Legend

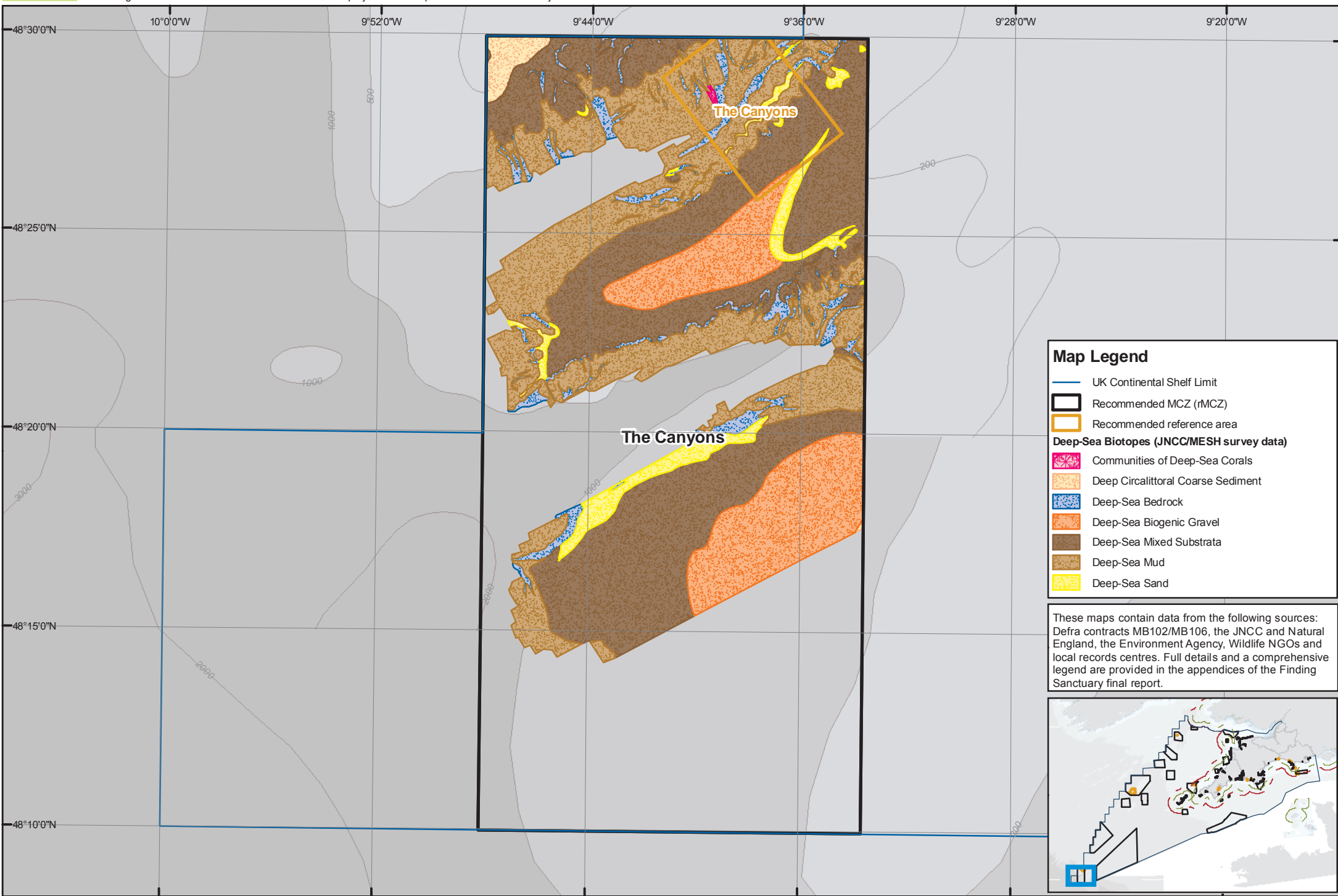
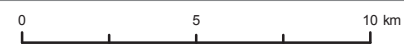
-  UK Continental Shelf Limit
-  Recommended MCZ (rMCZ)
-  Recommended reference area

These maps contain data from the following sources: Defra contracts MB102/MB106, the JNCC and Natural England, the Environment Agency, Wildlife NGOs and local records centres. Full details and a comprehensive legend are provided in the appendices of the Finding Sanctuary final report.



This is one of a series of maps showing Finding Sanctuary's final MCZ recommendations, with deep-sea biotope information. It is designed to be viewed within the context of the project's final report. Datum: WGS84. Projection: UTM29N.

Maritime basemap © British Crown and SeaZone Solutions Limited, 2010.
All Rights Reserved. Data Licence No. 062006.004. Land basemap part
© OpenStreetMap & contributors, CC-BY-SA. Not to be used for navigation.
Contains OS data © Crown copyright 2011.



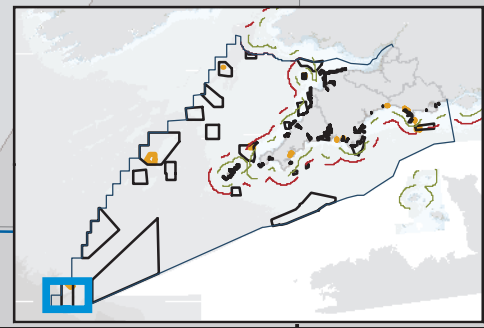
Map Legend

- UK Continental Shelf Limit
- Recommended MCZ (rMCZ)
- Recommended reference area

Deep-Sea Biotopes (JNCC/MESH survey data)

- Communities of Deep-Sea Corals
- Deep Circalittoral Coarse Sediment
- Deep-Sea Bedrock
- Deep-Sea Biogenic Gravel
- Deep-Sea Mixed Substrata
- Deep-Sea Mud
- Deep-Sea Sand

These maps contain data from the following sources: Defra contracts MB102/MB106, the JNCC and Natural England, the Environment Agency, Wildlife NGOs and local records centres. Full details and a comprehensive legend are provided in the appendices of the Finding Sanctuary final report.



II.3.12 Western Channel rMCZ

Basic site information

Site centre location (datum used: ETRS89):

Decimal Degrees		Degrees Minutes Seconds	
Lat	Long	Lat	Long
49.4186	-4.8071	49° 25' 6" N	4° 48' 25" W

Site surface area: 1,613.5 km² (calculated in ETRS89 – LAEA)

Biogeographic region:

JNCC regional sea: Western Channel and Celtic Sea

OSPAR region: On the boundary between Region III: Celtic Waters, and Region II: Greater North Sea

Site boundary: The southern boundary of the site follows the UK Continental Shelf Limit. The other boundaries have been drawn to include an area of higher than average benthic biodiversity, to avoid overlap with the Mid-Channel Potting Agreement area to the east, and to maximise overlap with busy shipping areas in the Channel.

Sites to which the site is related: The Western Channel rMCZ does not overlap with any existing protected areas. The nearest other rMCZ is the South of Falmouth rMCZ, approximately 36km to the north.

Maps of the site are included at the end of this site report. The main site map shows points with coordinates along the site boundary (in WGS84 UTM30N).

Features proposed for designation within Western Channel rMCZ

Table II.3.12a Draft conservation objectives for the Western Channel rMCZ. 'Maintain' = maintain in favourable condition, 'recover' = recover to favourable condition. This is an extract of the conservation objective summary tables in section II.2.6. The full text of the draft conservation objectives can be found in appendix 15.

Feature	Conservation Objective
Subtidal coarse sediment	recover
Subtidal mixed sediments	recover
Moderate energy circalittoral rock	recover

The inclusion of conservation objectives for seabirds and common dolphins on the conservation objective feature list for this site was discussed at length at the Joint Working Group meeting in May 2011, in the full understanding of SAP feedback following progress report 3, and the JNCC's position that they would not support conservation objectives for mobile species in offshore rMCZs. The JWG could not reach a conclusion on the matter.

The following tables show ENG-related statistics for this site, reported from spatial data available in Finding Sanctuary's GIS datasets. Greyed out rows indicate features for which GIS data exists within

the site boundary, but which have not been included on the list of draft conservation objectives (the reasons are stated in table footnotes).

Table II.3.12b **Subtidal broad-scale habitats** recorded in this rMCZ, based on an analysis of Finding Sanctuary's EUNIS level 3 broad-scale habitat GIS data (see appendix 8). Data sources: 1 - UKSeaMap, 2 - MESH, 3 - Environment Agency.

Habitat	Area covered within rMCZ (km ²)	% of total in study area	Source(s)
Moderate energy circalittoral rock	676.23	3.6%	1
Subtidal coarse sediment	756.20	2.6%	1, 2
Subtidal mixed sediments	175.42	4.9%	1

Table II.3.12c **FOCI habitats** recorded in this rMCZ, based on an analysis of Finding Sanctuary's amalgamated GIS FOCI datasets (see appendix 8). Data sources: 1 - MB102; 2 - JNCC/ MESH Canyons survey data; 3 - ERCCIS/Isles of Scilly Wildlife Trust; 4 - DORIS.

Habitat	Area covered (km ²)	Number of point records (total)	Number of point records (pre-1980)	Source(s)
Subtidal sands and gravels ¹	1038.75			1

¹ Conservation objectives have not been included for subtidal sands and gravels as we have considered any conservation requirements met by listed broad-scale habitats.

For additional understanding on how this site is located in relation to environmental data layers, including areas of high benthic biodiversity, offshore bird aggregation areas, or areas of seasonal sea surface temperature fronts, please refer to the interactive PDF maps presented alongside this report.

Site summary

The northern tip of the Western Channel rMCZ is located approximately 54km to the south-east of the Lizard Peninsula. The site depth of the seabed is in the 50-100m range, with the western end of the site dipping below the 100m contour. The seabed habitat is characterised by coarse sediment, rock and mixed sediment. There is anecdotal evidence (supported by VMS data showing bottom-towed fishing gears being used) that the rock habitat here consists of cobbles, not bedrock. **The area is of additional ecological importance, in that it is an area of productive frontal systems, of importance for seabirds and cetaceans** (reflected in the data mapped on maps FR_081).

Detailed site description

A literature search was carried out on this site, but as for other for non-coastal sites in the network it has proved difficult to find information associated with this specific site.

Wilson *et al.* (2001) sampled benthic biodiversity in the area, but the exact location is not defined. Field sampling was undertaken during four cruises from 2004–2007 by Ellis *et al.* (2007b) with each cruise targeting specific habitat types. Sampling examined included the mud habitat of the Celtic Deep and the shell-gravel habitat of the western English Channel.

During the period 2000–2006, Ellis *et al.* (2007a) carried out approximately 150 tows with a 2m-beam trawl during groundfish surveys of the South West offshore area. Catches along the edge of the continental shelf (130–350 m deep) were characterised by large numbers of the anemone *Actinauge richardi*, with the hermit crab *Pagurus prideaux* dominating on coarse grounds in shallower waters. The study described the spatial distribution of the epibenthic fauna.

Stakeholder narrative: Assumptions and Implications

As explained in part I, the stakeholder narrative is a vital underpinning of the site recommendations. Working assumptions and implications are presented here, and additional comments are presented in the following section.

The following fundamental assumption was recorded to apply to all activities in all sites: **The fundamental assumption about human activities within MCZs is that activities can continue (under current licensing regimes where applicable), as long as they do not prevent the conservation objectives from being achieved.** This assumption applies to all activities. Table II.3.12d shows more specific working assumptions and implications that were recorded for this site over the course of the planning process.

Following that, table II.3.12e shows the vulnerability assessment (VA) snapshot for this site. The VA meetings took place at the end of the project, and they did not involve the Steering Group. They started to discuss site management, but did not reach any firm conclusions. The VA snapshot table reflects the point that the VA discussions had reached at the time of the last Joint Working Group meeting in May 2011. Many Steering Group members expressed concerns about the VA process and its outcomes (see section II.2.1 for full details).

Table II.3.12d Specific assumptions and implications relating to Western Channel rMCZ. Black text reflects the working assumptions and implications recorded throughout the planning discussions. The development of the narrative recorded in black can be traced back through the Working Group and Steering Group meeting reports from 2009 to 2011. Red and green text in the first column comments on how the snapshot of the vulnerability assessment (VA) relates to each of the working assumptions that had been made as planning took place (refer to part I for a full explanation of the VA snapshot).

Activities assumed to not be allowed within the site	
Assumptions	Implications
Bottom-towed fishing gear will not be allowed. This activity was discussed during the VA meetings, and it was determined that the activity would be prohibited in the whole site.	Direct implications: <ul style="list-style-type: none"> o Loss of ground for bottom-towed gear fishermen, both UK and non-UK o Displacement of bottom-towed gear o Increased competition for fishing grounds o Reduced diversity and flexibility of fishing o Cumulative impact on bottom-towed gear fleet where protected areas are close together o No tow zones will be inundated with pots and static gear and cause difficulties for sea anglers (This comment was recorded during one of the early planning meetings. Several stakeholder representatives have since stated that the comment is unrealistic.) o Implications from loss of ground around previous 3 sites, which has increased impacts to fleet. o The South West Fishing Industry MCZ planning group has concerns that the new proposed Western Channel site has increased in area compared to the 3 previously proposed sites. o Potential environmental implications derived from concentrating effort in alternative grounds or due to new fishing ground searching activity.

<p>Anchoring of large vessels will not be allowed (except in emergencies)</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o There is a general right of anchoring as a consequence of and incidental to the Public Right of Navigation.
<p>Aggregate extraction will not be allowed.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o Aggregate dredging can only occur where the mineral resources are geologically located – in highly localised and discrete areas. If aggregate operations are not allowed in MCZs (subject to appropriate monitoring, mitigation and management), and MCZs coincide with aggregate resource, then this will have significant impact on national construction aggregate supply and coast defence. o If aggregate operations (subject to appropriate monitoring, mitigation and management) are restricted in areas adjacent to an MCZ, then this will have significant impact on national construction aggregate supply and coast defence. <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o If aggregate operations (subject to appropriate monitoring, mitigation and management) are restricted in areas adjacent to an MCZ, then this will have significant impact on national construction aggregate supply and coast defence.
<p>Dumping and disposal will not be allowed. That includes dumping of fish waste from processing vessels and munitions.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o

Activities assumed to possibly need restricting (limiting or mitigating) within the site or parts of the site.	
Assumptions	Implications
<p>Static fishing gear will be permitted, but there may need to be a limit on the amount of static gear used in the area (in particular, static gear which impacts on the sea floor). Current levels are assumed to be ok.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o No tow zones will be inundated with pots and static gear and cause difficulties for sea anglers (This comment was recorded during one of the early planning meetings. Several stakeholder representatives have since stated that the comment is unrealistic.) <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o There are important potting grounds in the Western Channel o Static gear fishermen might face possible additional costs for mitigation measures, should they be needed o There would be costs if monitoring is needed
<p>The installation, operation and maintenance of renewable energy devices will be permitted</p> <p><i>Based on SAP feedback the assumption cannot apply to all sites in the network, although it can apply to any given site on its own.</i></p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o The MCZ designation may mean that additional management requirements are defined for renewable energy developments. This could result in: <ul style="list-style-type: none"> - additional costs to the renewables industry, e.g. for licensing mitigation and monitoring - delays to renewables development - delays, lost revenue and additional costs associated with cable repair activity restrictions o Costs and delays associated with co-location of renewables in MCZs, could result in long term implications in terms of renewables deployment which could have serious implications for industry and Government in terms of loss of operational revenue and missing EU climate change targets. o Enforced co-location with MCZs would dramatically restrict deployment. <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o If co-location assumptions are not correct the impacts would/could be: site locations that can't be developed, increased costs (the implications could be re-routing of cables around a feature could cost an additional £600,000 - £1.3m/km depending on cable type, size and seabed geology), construction delays, failure to meet renewables targets, impacts on acidification, additional monitoring requirements, increased uncertainty and declining investor

	<p>confidence in renewables activities.</p> <ul style="list-style-type: none"> o Increased competition for sea space with other sea users. o Good wind and wave resource area but unlikely to be developed in short or medium term.
--	---

Activities assumed to be allowed to continue / occur within the site

Assumptions	Implications
<p>Handlining (recreational angling and commercial handlining) will be permitted. Handlining includes sea angling and trolling.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o Handliners might face possible additional costs if mitigation measures are needed o There would be costs if monitoring is needed <p>Benefits:</p> <ul style="list-style-type: none"> o
<p>Pelagic trawls will be permitted.</p> <p>Mobile species (seabirds and cetaceans) not considered as features needing protection when the vulnerability assessment was carried out with JNCC specialists</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>The installation and maintenance of cables will be permitted and will not be made prohibitively expensive within the site. This applies to power cables (including cables for renewable energy devices), and telecommunications cables.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption there are still the following concerns:</p> <ul style="list-style-type: none"> o Cable installation cost increases and delay o Cable repair cost, delays and lost revenue could increase due to activity restrictions on cable repair. o There is no definition of what ‘prohibitively expensive’ means; the cables representative would like assurance that no additional cost will result from MCZ designation (beyond costs associated with existing management and mitigation requirements). <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o For renewables/power cables, re-routing of cables around a feature or site might mean longer cable routes, at a cost of £600,000 - £1.3 million/km depending on cable type, size and seabed geology. o There may be other costs, e.g. costs associated with licensing, mitigation measures and monitoring requirements. o Increased licensing requirements and costs of cabling may have serious implications for industry and Government in terms of loss of operational revenue, missing EU climate change targets etc.

<p>The operation of cables (power and telecommunications) & pipelines will be permitted (i.e. any existing cables will be allowed to stay operational)</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o Three active and fifteen inactive telecoms cables.
<p>Tourism and recreational activities will be permitted.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Passage of ships will be permitted</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Anchoring of small vessels will be permitted</p> <p><i>There isn't a clear, agreed Working Group definition for what constitutes a 'small vessel'.</i></p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o No clear working group definition exists of what counts as a 'small' vessel. 24m was proposed some time ago by the RYA, but no decision was reached as to whether we would adopt that size in MCZ planning.
<p>Anchoring for maintenance and access for licensed visitors to heritage wrecks will be permitted</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o (No heritage wrecks currently present in the site)

Table II.3.12d VA Snapshot table: This table records the point which the vulnerability assessment discussions had reached regarding site management, at the time of the final Joint Working Group meeting in May 2011. The outcome is not definitive, and the VA did not carry out an exhaustive review of all the working assumptions recorded in the longer table above. The Steering Group were not directly involved in the VA discussions, and at their final meeting, expressed considerable reservations about the VA outcome (see section II.2.1). The reason this VA snapshot table is included here is so that readers have a record of what the VA snapshot was showing at the time the final stakeholder comments were recorded for this site. For a full explanation of the VA snapshot, please refer to part I. The maps in appendix 13 show a visual representation of the information in all the VA snapshot tables in the rMCZ site reports.

Sector	Potential Management
Commercial Fishing – all mobile bottom gears	Management: - Prohibition of fishing in the rMCZ Measure: - Common Fisheries Policy

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

The most significant uncertainty faced by the project was the lack of knowledge on management of MCZs, and this uncertainty still applies to all rMCZs in the network. There was uncertainty over what activities will be affected by MCZ designations: what activities will be permitted to continue within (or near) MCZs, what activities will not be permitted, and what activities will require mitigation or some form of restriction other than a complete ban. There was also uncertainty over what measures will be taken to ensure any activity restrictions are put in place (e.g. byelaws, voluntary measures).

The following additional uncertainty has been highlighted for this site:

- There have been conflicting statements as to whether or not the UN Convention on the Law of the Seas (UNCLOS) allows the permanent right to lay cables in the offshore outside of 12 nautical miles or whether this activity can be managed following MCZ designation.

Additional comments

The following is a set of additional comments made by stakeholder representatives over the course of the planning work. Some of these comments were made specifically about this site, others were more generic comments which the project team consider to be relevant to this site.

- *Fishing*
 - This site is important to almost twenty fishing vessels from South Normandy and would have massive economic impacts on the Belgian fishing fleet.
 - This is an area of high fishing activity and after the original three sites were combined into one there are further implications in that there are no trawl corridors for boats to navigate through and so boats will have to lift their gear to pass through the site.

- *Mobile bottom gear*
 - Seasonal closures are an inappropriate measure for benthic conservation.
 - This site is used by vessels from Brixham, Plymouth, Newlyn for beam trawling and scallop dredging. It is also used by French trawlers and Belgian beam trawlers and is a commercially productive site.

- *Pelagic gear*
 - As this site had previously been considered to provide protection for pelagic and mobile species, assumptions had been made that netting and longlining would not be permitted, and pelagic trawls would be permitted, but with mitigation against bycatch for seabirds.

- *General benefits of MCZs*
 - Some stakeholder representatives would like the following recorded and for these to be considered during the impact assessment:
 - Fisheries spill-over.
 - Improvements for the local economy.
 - Education opportunities.
 - Benefits to science.
 - Focus for voluntary groups.
 - Potential increase in the amount and quality of recreational activities (diving, sea angling, environmental tourism, etc).
 - The designation as an MCZ will be a selling point and will undoubtedly be used as an identifier to the area to highlight it as somewhere to visit.

- *Monitoring*
 - There are two main types of monitoring which will need to take place within rMCZs:
 - Monitoring the activities within a site and the various levels at which they are occurring.
 - Monitoring the ENG features for changes in condition.

- *Management measures*
 - For sites beyond 6nm, stakeholder representatives repeatedly voiced concern over how the activity of non-UK fishing vessels might be managed, and stated opposition to any unilateral measures that would apply to UK vessels only. At the time of the third progress report, we had received the following statement from the SNCBs and Defra: 'When considering the impacts of fishing restrictions on non UK vessels, it is the Government's intention that fishing restrictions will not be imposed unilaterally on UK vessels before they can be applied to equivalent EU vessels operating within the relevant areas. In the case of those EU fishing vessels with historic fishing rights in UK waters between 6 and 12 nm, Defra will negotiate with the relevant Member States and the European Commission before introducing byelaws, or orders that are applicable to all EU vessels, or seeking Common Fisheries Policy (CFP) regulation measures. Once introduced, these would apply to all EU vessels (including UK vessels) equally and at the same time.'

- **Vulnerability Assessment**
 - Steering Group representatives voiced general concern over the process and outcome of the vulnerability assessments. This was mainly in relation to inshore sites, however, please refer to the Steering Group statement made in section II.2.1.

Levels of support

The network report (section II.2) includes a project team reflection on levels of support for the network recommendations as a whole, and the site specific reflection presented here should be read within the wider network context.

This site is located in a productive fishing area, and an area of additional ecological importance (pelagic productivity, **seasonal fronts**). It is supported by conservationists, and forms an important contribution to the ENG in terms of connectivity and its additional ecological importance. The elongated shaping of the site was an attempt to align the site with shipping lanes in the Channel, in order to minimise impacts on fishermen. The boundary was also adjusted to avoid overlap with the Mid Channel Potting Agreement areas, following feedback from fishing representatives. Nevertheless, the site remains controversial with offshore fishing interests.

During earlier discussions in the planning process, there had been some provisional acceptance from offshore fishing representatives that a site would be needed in this area in order to meet the ENG. Three separate sites were drawn at the time, and there was a recognition from fishing representatives that efforts had been made by the group to shape and locate them to lessen negative impacts (see progress report 3).

In order to make the site boundaries manageable, the project team suggested amalgamating the three sites into a single site, with much simplified boundaries, presenting two alternative options for the Joint Working Group to discuss early in 2011. The group agreed and chose the current rMCZ, as it would be more enforceable, and make the site ecologically more viable (lower edge-to-area ratio). However, subsequently concerns about the amalgamation of the site were raised by the offshore fishing representative, who would have preferred the three separate sites, which would have had higher levels of support from fishing interests: After the original three sites were combined into one there are further implications in that there are no trawl corridors for boats to navigate through and so boats will have to lift their gear to pass through the site.

Supporting documentation

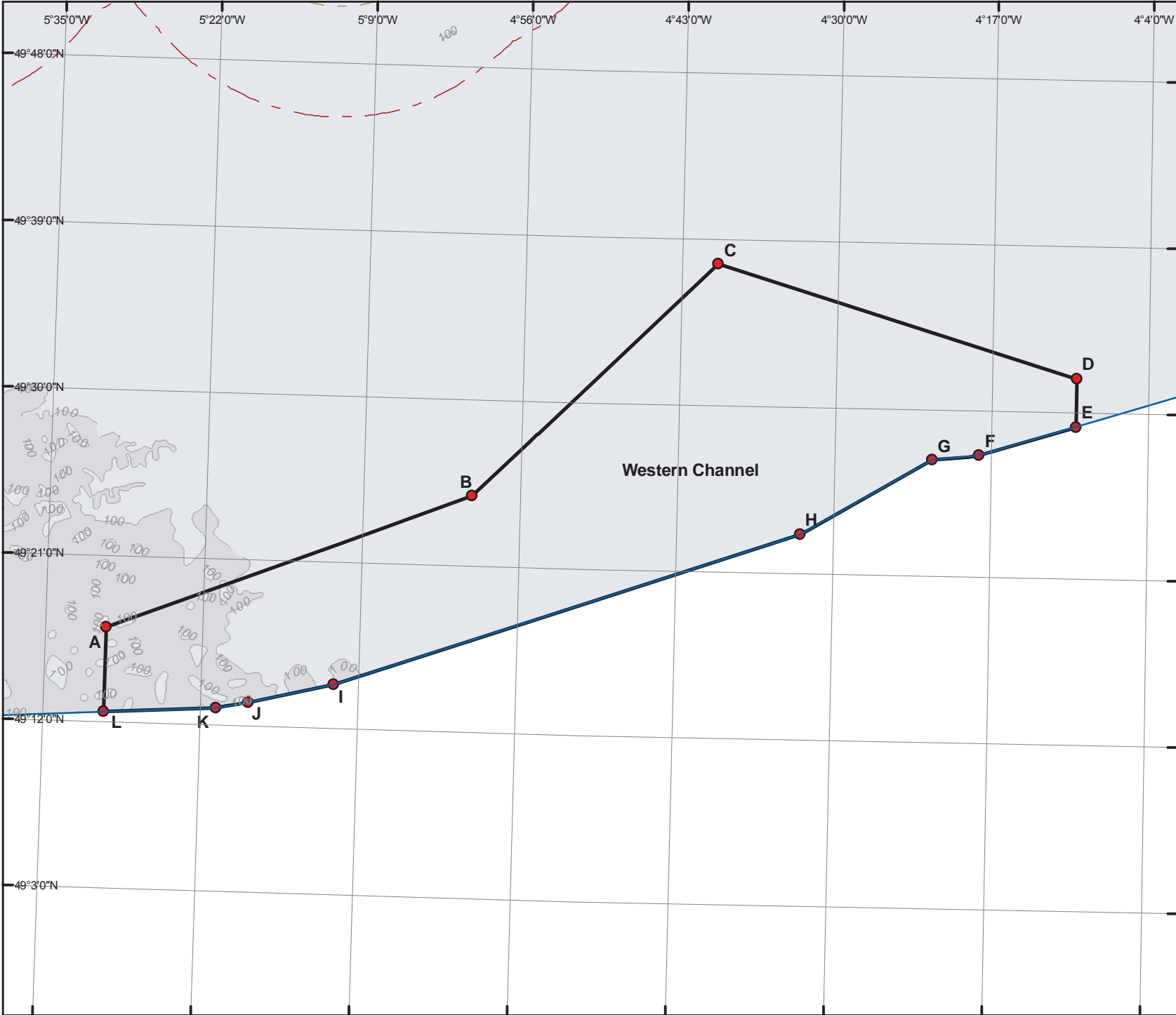
GIS data used for reporting the quantitative habitat and species figures in the tables above includes the following sources: UKSeaMap modelled broad-scale habitat data, MESH, and **MB102**. Refer to appendix 8 for details, and to the tables above for data sources for specific features in this site.

Further evidence underpinning the site can be found in the publications and datasets referred to in the detailed site description. There may be additional information relevant to this rMCZ in Dauvin *et al.* (1994), Garrard (1997), Holme (1966), Kaiser *et al.* (1998), Larsonner *et al.* (1982), Southward *et al.* (2005), Vallet & Dauvin (1998), and Zouhiri & Dauvin (1996).

Site map series

On the following pages there are three maps of this site.

- The first map (FR_020a) is the main site map showing the rMCZ boundary and includes points with coordinates (in WGS84 UTM30N). The map also shows charted depth and existing Marine Protected Areas for reference. Please note: the lat/long coordinates of the vertices in the following maps have been calculated in decimal degrees, and in degrees, minutes and seconds. For plotting on a standard Admiralty (UKHO) chart, the seconds of each coordinate need to be converted to decimal. An MS Excel table showing all coordinates in degrees, minutes and decimal seconds has been provided in the additional materials section (see Appendix 14) for plotting purposes.
- The second map (FR_020b) shows the rMCZ boundary over broad-scale habitats, and records of habitat and species FOCI. The data shown on this map corresponds with the information in table II.3.12b, data sources are indicated in the table.
- The third map (FR_020c) shows KISCA cable routes and some other human activity information, including areas of the Mid-Channel Potting Agreement to the east of this rMCZ. For spatial data showing the distribution of fishing effort, please refer to the interactive PDF maps supplied with the additional materials (see appendix 14).
- Because of the large number of features shown on the site maps (especially inshore biophysical maps), it has not been possible to embed comprehensive legends within the site maps themselves. A comprehensive map legend is therefore provided in appendix 7, which explains the symbology used on all the maps within this final report.
- Appendix 8 describes the data sources for the information shown on the final report maps in detail.



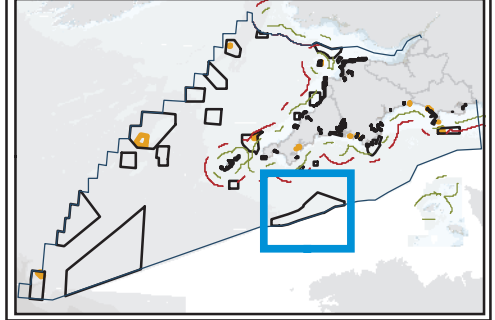
Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	49.2855	-5.5000	49° 17' 7" N	5° 29' 59" W
B	49.4141	-5.0000	49° 24' 50" N	4° 59' 59" W
C	49.6284	-4.6667	49° 37' 42" N	4° 39' 59" W
D	49.5308	-4.1667	49° 31' 51" N	4° 9' 59" W
E	49.4872	-4.1667	49° 29' 13" N	4° 9' 59" W
F	49.4601	-4.2998	49° 27' 36" N	4° 17' 59" W
G	49.4554	-4.3642	49° 27' 19" N	4° 21' 51" W
H	49.3862	-4.5456	49° 23' 10" N	4° 32' 44" W
I	49.2401	-5.1848	49° 14' 24" N	5° 11' 5" W
J	49.2218	-5.3014	49° 13' 18" N	5° 18' 5" W
K	49.2157	-5.3459	49° 12' 56" N	5° 20' 45" W
L	49.2093	-5.5000	49° 12' 33" N	5° 29' 59" W

Map Legend

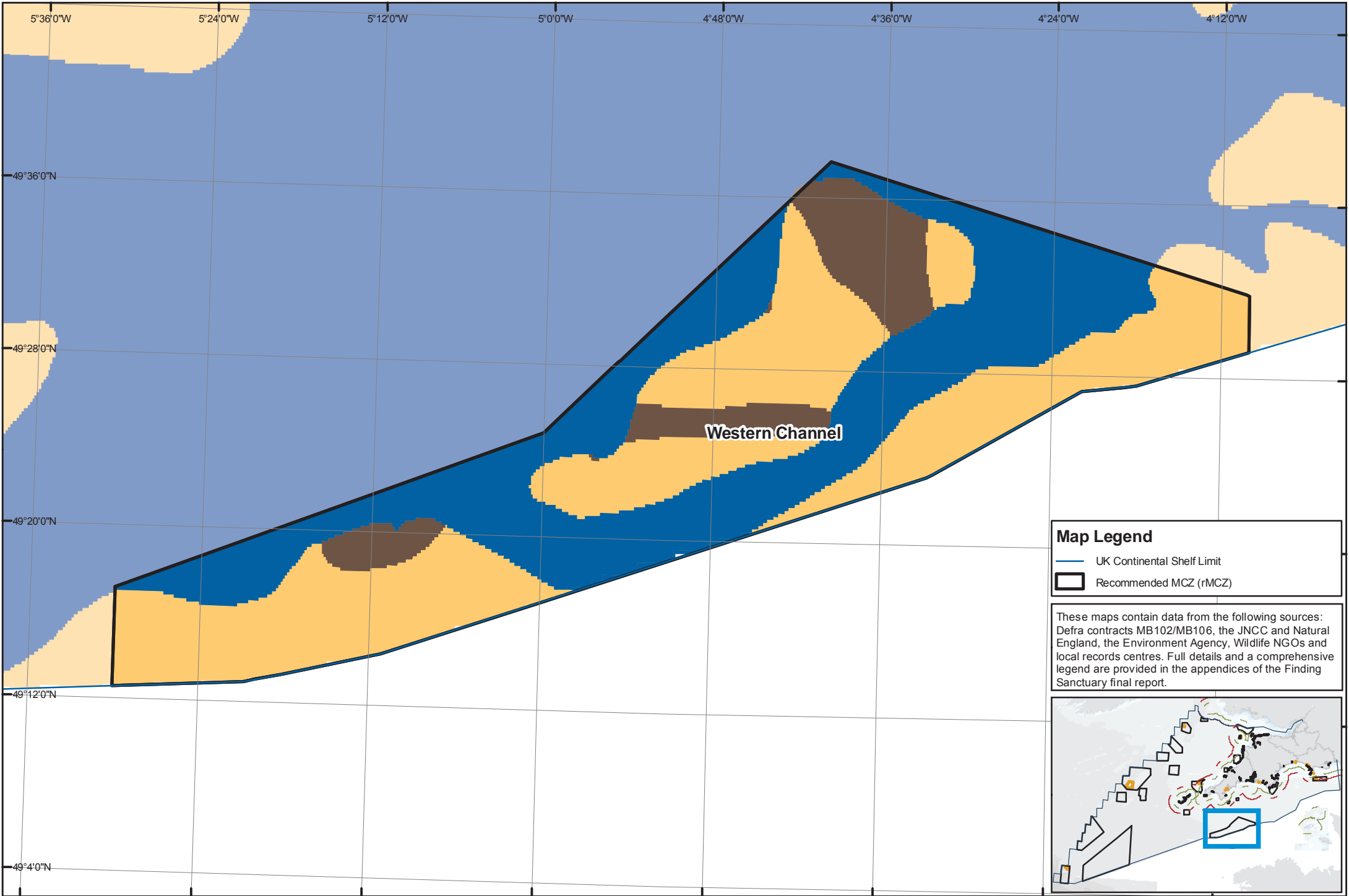
- UK Continental Shelf Limit
- 12 nautical mile limit
- Recommended MCZ (rMCZ)

A comprehensive legend is provided in the appendices of the Finding Sanctuary final report.



This is one of a series of maps showing Finding Sanctuary's final MCZ recommendations, with biophysical information. It is designed to be viewed within the context of the project's final report. Datum: WGS84. Projection: UTM30N.

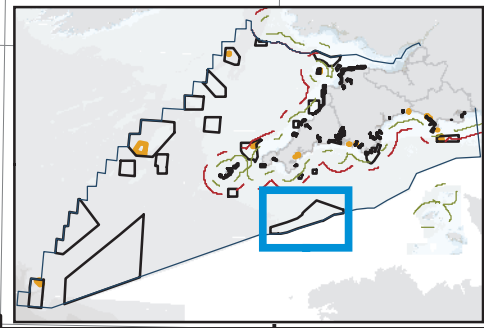
Maritime basemap © British Crown and SeaZone Solutions Limited, 2010. All Rights Reserved. Data License No. 062005.004. Land basemap part © OpenStreetMap & contributors, CC-BY-SA. Not to be used for navigation. Contains OS data © Crown copyright 2011.

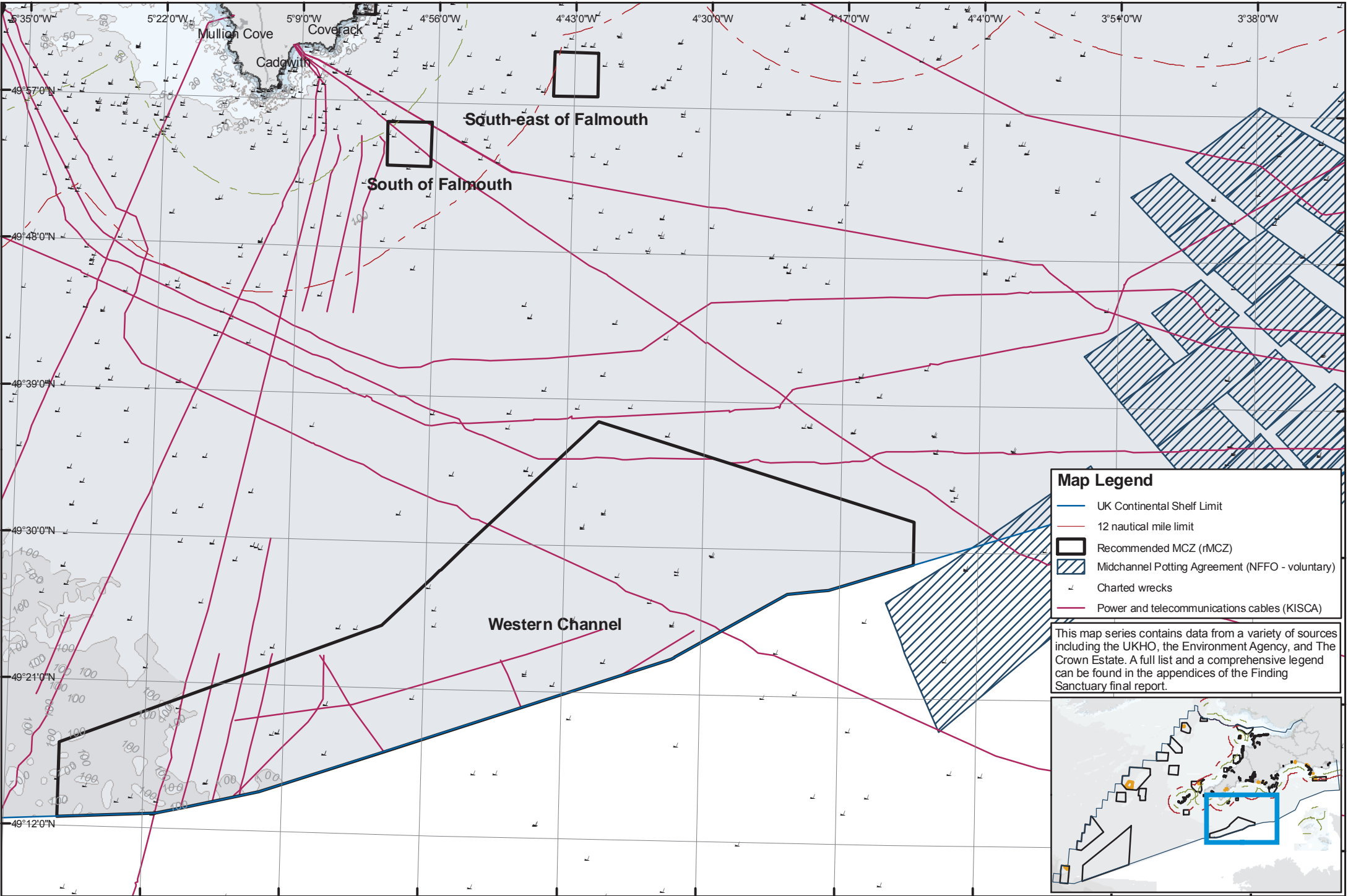
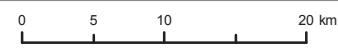


Map Legend







- UK Continental Shelf Limit
- Recommended MCZ (rMCZ)

These maps contain data from the following sources: Defra contracts MB102/MB106, the JNCC and Natural England, the Environment Agency, Wildlife NGOs and local records centres. Full details and a comprehensive legend are provided in the appendices of the Finding Sanctuary final report.

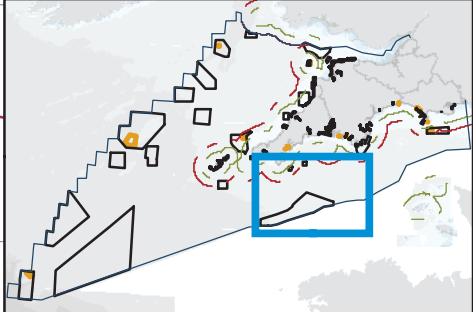




Map Legend

-  UK Continental Shelf Limit
-  12 nautical mile limit
-  Recommended MCZ (rMCZ)
-  Midchannel Potting Agreement (NFFO - voluntary)
-  Charted wrecks
-  Power and telecommunications cables (KISCA)

This map series contains data from a variety of sources including the UKHO, the Environment Agency, and The Crown Estate. A full list and a comprehensive legend can be found in the appendices of the Finding Sanctuary final report.



MARINE CONSERVATION ZONE: SELECTION ASSESSMENT DOCUMENT

RMCZ 6 SOUTH RIGG

Version and issue date	Amendments made
v1.0 August 2011	

1. Site name

rMCZ 6 - South Rigg (zone includes recommended reference area F)

2. Site centre location

rMCZ 6:

54° 23' 8.974" N , 5° 0' 5.536" W

54.385826 Lat, -5.001537 Long. Lambert Azimuthal Equal Area projection, ETRS89 datum

rRA F:

54° 24' 43.772" N, 4° 54' 13.501" W

54.412158 Lat, -4.90375 Long. Lambert Azimuthal Equal Area projection, ETRS89 datum

3. Site surface area

146.2 Km² (14619.87 Ha)

4. Biogeographic region

JNCC regional sea: Irish Sea.

OSPAR region III: Celtic Seas.

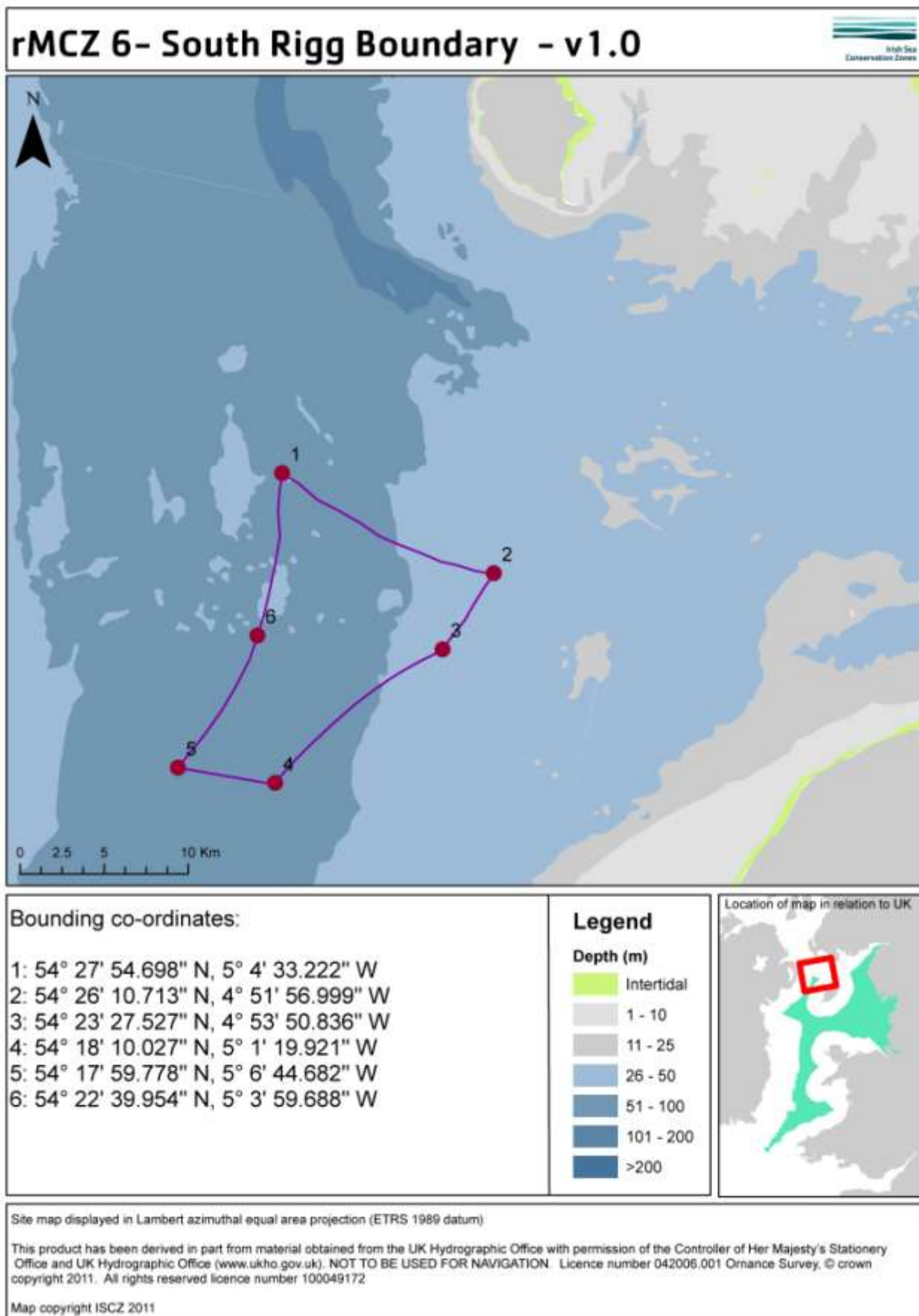
5. Features proposed for designation within rMCZ 6

Feature type	Feature name	Area covered within site (for broad scale habitats and habitats of conservation importance)
Broad scale habitat	A4.3 Low energy circalittoral rock	21.09 Km ² (2108.82 Ha)
	A5.2 Subtidal sand	28.83 Km ² (2883.39 Ha)
	A5.3 Subtidal mud	96.28 km ² (9627.63 Ha)
Habitat of conservation importance	Mud habitats in deep water	42.09 Km ² (4209.05 ha)
	Sea-pen and burrowing megafauna communities	-
Species of conservation importance	Ocean quahog <i>Arctica islandica</i>	-
Geological feature		
Other feature		

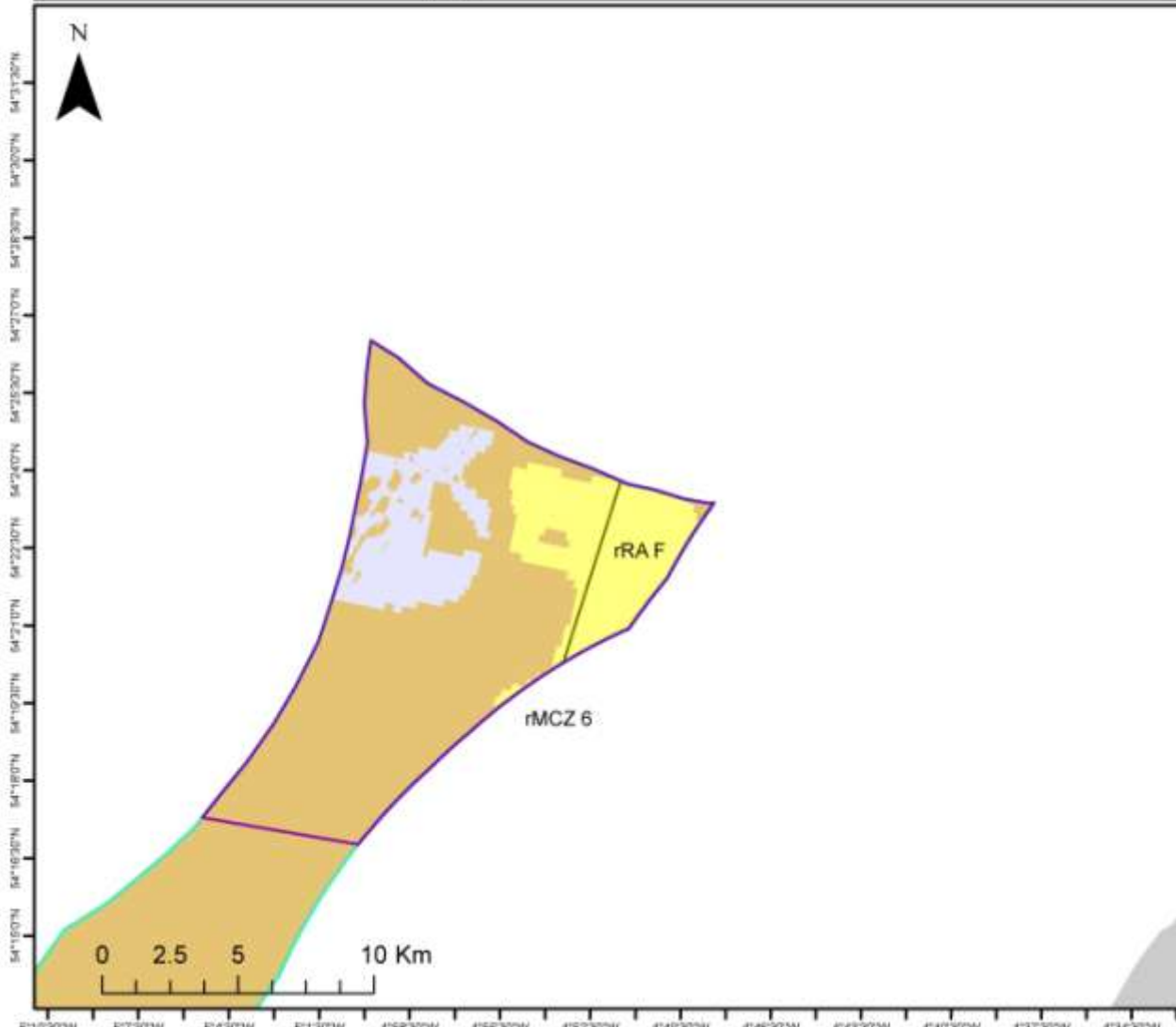
6. Features within rMCZ 6 not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad scale habitat	n/a	
Habitat of conservation importance	n/a	
Species of conservation importance	n/a	

7. Map of site



rMCZ 6 - South Rigg - Broad-scale Habitats



This area is designated for the following BSHT:

- A4.3, Low energy circalittoral rock
- A5.2, Subtidal sand
- A5.3, Subtidal mud

Area: 146.20 km²

Minimum dimension: 5.82 km

Key

- rRA
- Project Boundary
- rMCZ

Broad-scale Habitats

- A5.3, Subtidal mud
- A5.2, Subtidal sand
- A4.3, Low energy circalittoral rock

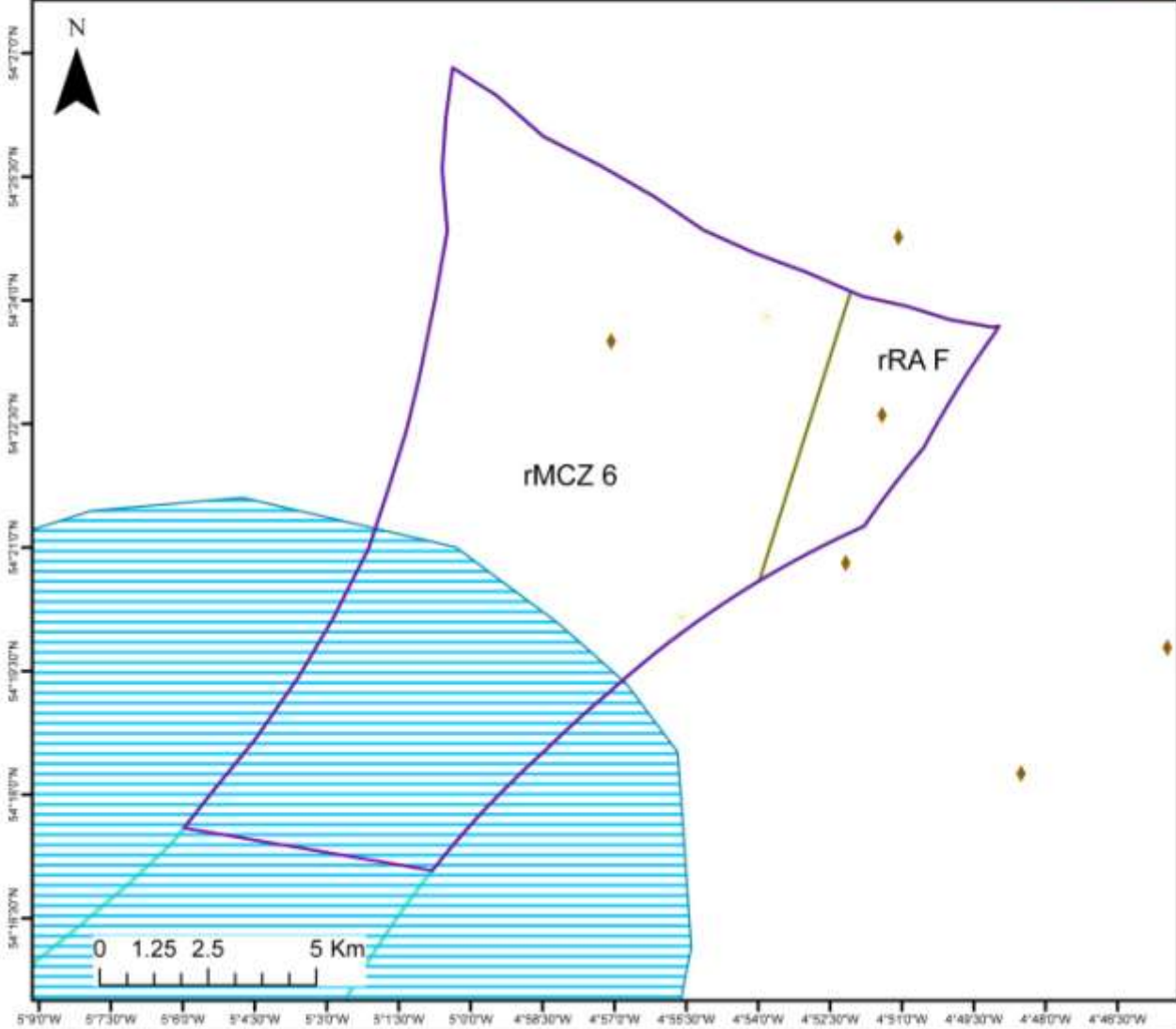


Site map displayed in Lambert azimuthal equal area projection (ETRS 1989 datum)

This product has been derived in part from material obtained from the UK Hydrographic Office with permission of the Controller of Her Majesty's Stationery Office and UK Hydrographic Office (www.ukho.gov.uk). NOT TO BE USED FOR NAVIGATION. Licence number 042006.001 Omance Survey, © crown copyright 2011. All rights reserved licence number 100049172

Map copyright IS CZ 2011

rMCZ 6 - South Rigg - FOCI



This area is designated for the following FOCI:

- Mud habitats in deep water
- Sea-pen and burrowing megafauna communities
- Ocean Quahog

Area: 146.20 km²

Minimum dimension: 5.82 km

Key

- rMCZ
- rRA
- Project Boundary

FOCI

- Mud habitats in deep water
- Ocean quahog
- Seapens

Location of map in relation to UK



Site map displayed in Lambert azimuthal equal area projection (ETRS 1989 datum)

This product has been derived in part from material obtained from the UK Hydrographic Office with permission of the Controller of Her Majesty's Stationery Office and UK Hydrographic Office (www.ukho.gov.uk). NOT TO BE USED FOR NAVIGATION. Licence number 042006.001 Omance Survey, © crown copyright 2011. All rights reserved licence number 100049172

Map copyright IS CZ 2011

8. Site summary

rMCZ 6 is located in the western Irish Sea between three different territorial seas - northern Irish waters to the west, Scottish waters to the north and the Isle of Man waters to the east. The depth of the seabed in the site ranges from 50 to 150 m.

The zone contains the NW Irish Sea mounds, an area in which the habitat has been mapped using models based on acoustic surveys that were subject to ground truthing through a combination of multibeam sonar, grab samples and towed video surveys (Mellor et al. 2008). This area contains seapens (specifically the slender seapen) and burrowing megafauna, such as the mud burrowing shrimp *Callianassa* sp, the commercially important Dublin Bay prawn *Nephrops norvegicus* and the heart urchin *Brissopsis lyrifera* (Briggs et al. 2010, Marine Institute/AFBI unpublished data).

Adjacent to this area of reef and subtidal mud is the most northerly patch of subtidal sand in the ISCZ project area. The ocean quahog, *Arctica islandica* occurs in this area of subtidal sand (Butler 2009). Live juveniles have been recorded within rMCZ6 and are indicative of a breeding population (Butler pers comm. 17th March 2011). rMCZ6 therefore represents the only region of breeding quahogs within the Irish Sea Conservation Zone project area.

9. Detailed site description

rMCZ6 is located in the north-west of the Irish Sea. The site overlaps with the North West Irish Sea Mounds, an area known to contain bedrock outcrops, or reef habitat which is listed as an Annex 1 feature in the Habitats Directive.

The habitat data for this site stems from the MESH project (Mapping European Seabed Habitats) which includes a JNCC commissioned survey, undertaken by the AFBI (Agri-Food and Biosciences), to ground truth habitat maps with grab and towed video surveys to sample the biological community (Mellor et al. 2008).

Amongst the rocky outcrops in rMCZ6 are areas of soft sediment. The rock outcrops themselves are associated with an abundance of the sea anemone *Utricina eques*, brittle stars and hydroids plus bryzoan turf (Mellor et al. 2008). Between the bedrock outcrops are areas of soft sediments which were dominated by burrowing *Nephrops* and tube worms. The annual AFBI and Marine Institute stock assessment surveys for *Nephrops norvegicus* for the ICES Working Group has collected slender sea pens *Virgularia mirabilis* alongside the heart urchin *Brissopsis lyrifera* and the burrowing mud shrimp *Callianassa* sp. These data confirm the presence of the FOCI habitats of seapens and burrowing megafauna, as well as mud habitats in deep water (Briggs et al. 2010, Marine Institute/AFBI unpublished data).

The habitat types mapped in the zone were a source of disagreement amongst the Regional Stakeholder Group. This is perhaps unsurprising given that a study over the Pisces Reef (located to the south of rMCZ6 - within rMCZ 7) and the JNCC commissioned survey over the Northwest Irish Sea Mounds both noted that, due to the low energy depositional conditions, a veneer of sediment covered the mapped areas of bedrock. Callaway et al. (2009) indicated that had these surveys not taken the multi-disciplinary approach of combining video, acoustic and biological survey techniques when surveying the Pisces reef, the area would

have been misclassified as a purely rocky area, without accounting for the soft mud habitat and the associated biological communities. The general consensus within the RSG was that the predominant habitat type present in rMCZ6 was subtidal mud, based on the understanding (and evidence) of *Nephrops* trawling in the area, in addition to the smaller areas of subtidal sands and bedrock. In response to this, the project team reclassified the transitional broad-scale habitat of subtidal coarse sediments that were originally present in the habitat mapping data (MESH). The project team believe this re-classification is justified based on the towed video survey data from the northwest Irish Sea mounds which found that the majority of the areas of coarse sediment were taken from areas of infill on top of the bedrock outcrop (Mellor et al. 2008).

With the exception of localised areas around the bedrock, there are slow tidal currents around rMCZ6 (and in this area in general: 0.3 ms^{-1} , compared to 1 ms^{-1} in the Eastern Irish Sea; Horsburgh et al. 2000). These deep water, low energy conditions lead to a seasonal stratification in the water column, where during spring and summer there is not enough tidal energy to vertically mix the cold deep water with the warmer surface waters (Brown et al. 2000). This results in a density driven cyclonic gyre (i.e. a vortex or rotating body of water) during summer and spring, which physically entrains *Nephrops* and pelagic juvenile fish larvae within the western Irish Sea gyre (Horsburgh et al. 2000).

In the northeast corner of rMCZ6 is an area of subtidal sand where the ocean quahog *Arctica islandica* has been recorded (Butler, 2009). The ocean quahog is a long-lived bivalve which, like trees, deposits an annual growth ring, the width of which can be used as a proxy for environmental conditions. Its shell material is an important palaeoclimatic tool that can be used to study the history of changes in sea temperature and other marine environmental variables on multi-centennial timescales (Butler 2009). In addition, breeding populations of quahogs are not generally found in the Irish Sea (possibly because the warmer seawater temperatures in recent years do not favour larval survival). Juvenile quahogs have, however, been collected in the subtidal sand patch within rMCZ6, making this possibly the only breeding population of this important species remaining in the ISCZ project area (P Butler, pers comm. 17th March 2011).

Site identification work was supported by knowledge and data for several important seabird species. rMCZ 6 is an important area for seabirds in the Irish Sea providing a foraging ground to a wide range of species. These include: guillemots (*Uria aalge*), gannets (*Morus bassanus*), Manx shearwaters (*Puffinus puffinus*) razorbill (*Alca torda*) and puffins (*Fratercula arctica*). These birds can have significant foraging radii (the gannet can travel up to 300 km) and will originate from Manx (Isle of Man) and Irish colonies (Gouldstone pers comm. 2011).

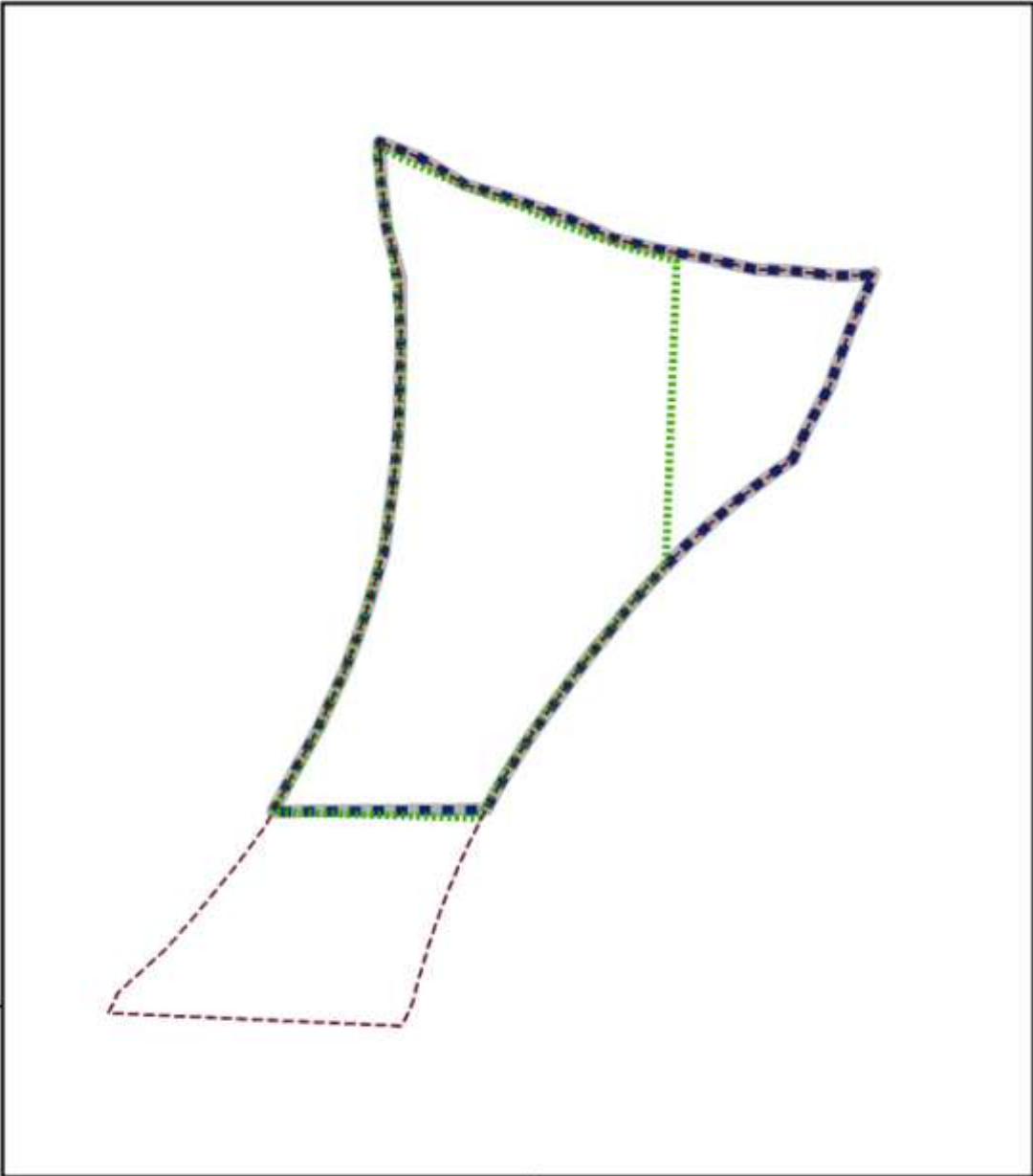
RSPB data incorporated in the Areas of Additional Ecological Importance GIS layer shows that the whole of the site, with its mix of mud, sand and rocky habitats, and also containing a **productive pelagic front**, is heavily used by a number of species. Locally, guillemots (*Uria aalge*) feed on sandeel, herring and sprat; puffins (*Fratercula arctica*) feed on sandeel and capelin; gannets (*Morus bassanus*) feed on mackerel, herring and sandeel; Manx shearwaters (*Puffinus puffinus*) feed on herring, sprat, whitebait and pilchards; razorbill (*Alca torda*) feed on sandeel, herring and sprat (Gouldstone pers comm. 2011).

10. Site boundary

The site was originally identified for the presence of the Northwest Sea mounds and the associated Annex 1 reef habitat (and low energy circalittoral rock broad-scale habitat). The boundary was extended to meet the boundaries of the neighbouring Isle of Man, Northern Irish and Scottish waters as well as contributing

to the ENG target for subtidal mud. During the course of the 3rd iteration, the boundary to the east was altered to remove the patch of subtidal sand which the scallop fishers from the Isle of Man occasionally access. In light of the Ocean quahog data that was made available before the draft final recommendations, the boundary was revised so that the eastern edge of the rMCZ6 aligned once again with the Isle of Man territorial waters. Preliminary discussions are underway between Defra and the Isle of Man government to investigate the possibility of an Isle of Man marine protected area in the subtidal sand patch that would abut onto rMCZ6. The development of the site boundary through the process is shown on the below map.

rMCZ 6- Iteration 1- Final Recommendations



- Final Recommendations
- Draft Final Recommendations
- Iteration 3
- Iteration 2 Option A

Map in Relation to UK

This product has been derived in part from material obtained from the UK Hydrographic Office with permission of the Controller of Her Majesty's Stationary Office and UK Hydrographic Office (www.ukho.gov.uk). NOT TO BE USED FOR NAVIGATION. Licence number 042006.001 Ordnance Survey, © crown copyright 2011. All rights reserved licence number 00049172 Map Copyright ISCZ 2011.

11. Conservation objectives

Conservation Objective	
1 Maintain/ recover	Subject to natural change, recover the Subtidal Mud to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of the Subtidal Mud in the biogeographic region are all recovered, such that the feature makes its contribution to the network.</p>
Advice on operations	
3 Pressures	<p>Subtidal Mud is sensitive to the pressures: (feature is not currently exposed to pressures in <i>italics</i>.)</p> <ul style="list-style-type: none"> • Removal of non-target species (lethal) • Removal of target species (lethal) • Structural abrasion/penetration: Structural damage to seabed >25mm • Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm • <i>Surface abrasion: damage to seabed surface features</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Organic enrichment</i> • <i>Physical change (to another seabed type)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Siltation rate changes (high)</i> • <i>Temperature changes - local</i> • <i>Temperature changes - regional/national</i> • <i>Salinity changes - local</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i>
4 Human activities	<p>Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas. Based on a current assessment of activities taking place in the site, the human activities that require additional management are benthic trawling and scallop/queenie dredging. Those activities that are known to take place in the site that will be managed through the current regulatory framework are telecom and power cables and military activity. Those activities that are deemed not to require management but are known to take place in the site are shipping, transit of vessels and other fisheries.</p>

Conservation Objective	
1 Maintain/ recover	Subject to natural change, recover the Mud Habitats in Deep Water to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of the Mud Habitats in Deep Water in the biogeographic region are all recovered, such that the feature makes its contribution to the network.</p>
Advice on operations	
3 Pressures	<p>Mud Habitats in Deep Water is sensitive to the pressures :(feature is not currently exposed to pressures in <i>italics</i>.)</p> <ul style="list-style-type: none"> • Removal of non-target species (lethal) • Removal of target species (lethal) • Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm • Structural abrasion/penetration: Structural damage to seabed >25mm • <i>Organic enrichment</i> • <i>Physical change (to another seabed type)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Siltation rate changes (high)</i> • <i>Siltation rate changes (low)</i> • <i>Temperature changes - regional/national</i>
4 Human activities	<p>Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas. Based on a current assessment of activities taking place in the site, the human activities that require additional management are benthic trawling and scallop/queenie dredging. Those activities that are known to take place in the site that will be managed through the current regulatory framework are telecom and power cables and military activity. Those activities that are deemed not to require management but are known to take place in the site are shipping, transit of vessels and other fisheries.</p>

Conservation Objective	
1 Maintain/ recover	Subject to natural change, recover the Subtidal Sand to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of Subtidal Sand in the biogeographic region are all recovered, such that the feature makes its contribution to the network.</p>
Advice on operations	
3 Pressures	<p>Subtidal Sand is sensitive to the pressures: (feature is not currently exposed to pressures in <i>italics</i>.)</p> <ul style="list-style-type: none"> • Removal of non-target species (lethal) • Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm • Surface abrasion: damage to seabed surface features • Structural abrasion/penetration: Structural damage to seabed >25mm • <i>Siltation rate changes (high)</i> • <i>Siltation rate changes (low)</i> • <i>Physical change (to another seabed type)</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Siltation rate changes (high)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Siltation rate changes (low)</i> • <i>Temperature changes - regional/national</i> • <i>Salinity changes - local</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i>
4 Human activities	<p>Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas. Based on a current assessment of activities taking place in the site, the human activities that require additional management are benthic trawling and scallop/queenie dredging. Those activities that are known to take place in the site that will be managed through the current regulatory framework are telecom and power cables and military activity. Those activities that are deemed not to require management but are known to take place in the site are shipping, transit of vessels and other fisheries.</p>

Conservation Objective	
1 Maintain/ recover	Subject to natural change, recover the Sea-pens and Burrowing Mega Fauna Communities to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of the Sea-pens and Burrowing Mega Fauna Communities in the biogeographic region are all recovered , such that the feature makes its contribution to the network</p>
Advice on operations	
3 Pressures	<p>Sea-pens and Burrowing Mega Fauna Communities are sensitive to the pressures: (feature is not currently exposed to pressures in <i>italics</i>.)</p> <ul style="list-style-type: none"> • Removal of non-target species (lethal) • Removal of target species (lethal) • Surface abrasion: damage to seabed surface features • Physical change (to another seabed type) • Siltation rate changes (high) • Structural abrasion/penetration: Structural damage to seabed >25mm • Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm • <i>Organic enrichment</i> • <i>Structural abrasion/penetration: Structural damage to seabed <25mm</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Salinity changes - local</i> • <i>Temperature changes - local</i> • <i>Temperature changes - regional/national</i>
4 Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas. Based on a current assessment of activities taking place in the site, the human activities that require additional management are benthic trawling and scallop/queenie dredging. Those activities that are known to take place in the site that will be managed through the current regulatory framework are telecom and power cables and military activity. Those activities that are deemed not to require management but are known to take place in the site are shipping, transit of vessels and other fisheries.

Conservation Objective	
1 Maintain/ recover	Subject to natural change, recover the Low Energy Circalittoral Rock to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of Low Energy Circalittoral Rock in the biogeographic region are all recovered such that the feature makes its contribution to the network.</p>
Advice on operations	
3 Pressures	<p>Low Energy Circalittoral Rock is sensitive to the pressures: (feature is not currently exposed to pressures in <i>italics</i>.)</p> <ul style="list-style-type: none"> • Removal of non-target species (lethal) • Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm • Surface abrasion: damage to seabed surface features • <i>Physical loss (to land or freshwater habitat)</i> • <i>Physical change (to another seabed type)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Siltation rate changes (high)</i> • <i>Structural abrasion/penetration: Structural damage to seabed >25mm</i> • <i>Temperature changes - regional/national</i> • <i>Water clarity changes</i> • <i>Salinity changes - local</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i> • <i>Siltation rate changes (low)</i>
4 Human activities	<p>Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas. Based on a current assessment of activities taking place in the site, the human activities that require additional management are benthic trawling and scallop/queenie dredging. Those activities that are known to take place in the site that will be managed through the current regulatory framework are telecom and power cables and military activity. Those activities that are deemed not to require management but are known to take place in the site are shipping, transit of vessels and other fisheries.</p>

Conservation Objective	
1 Maintain/ recover	Subject to natural change, recover the Ocean Quahog (<i>Arctica islandica</i>) to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • natural range, • habitat extent, • population structure, • population density, • size structure, • natural environmental quality*, and natural environmental processes* <p>representative of the Ocean Quahog (<i>Arctica islandica</i>) in the biogeographic region are all recovered, such that the feature makes its contribution to the network.</p>
Advice on operations	
3 Pressures	<p>Ocean Quahog (<i>Arctica islandica</i>) is sensitive to the pressures: (feature is not currently exposed to pressures in <i>italics</i>.)</p> <ul style="list-style-type: none"> • Removal of non-target species (lethal) • Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm • Structural abrasion/penetration: Structural damage to seabed >25mm • <i>Siltation rate changes (high)</i> • <i>Physical change (to another seabed type)</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Siltation rate changes (high)</i> • <i>Temperature changes - local</i> • <i>Wave exposure changes – local</i>
4 Human activities	<p>Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas. Based on a current assessment of activities taking place in the site, the human activities that require additional management are benthic trawling and scallop/queenie dredging. Those activities that are known to take place in the site that will be managed through the current regulatory framework are telecom and power cables and military activity. Those activities that are deemed not to require management but are known to take place in the site are shipping, transit of vessels and other fisheries.</p>

12. Sites to which this site is related

rMCZ 6 is approximately 26 km away from rMCZ 7 which is another site that has been recommended for designation for the same EUNIS level 2 habitat types, sublittoral sediment and sublittoral rock. There are a number of existing protected areas with marine components which fall within the vicinity of rMCZ6. Within 50 km on the northern Ireland side of rMCZ6 are the conservation areas with marine feature designations: Murlough (sea inlets), Strangford Lough (reefs and intertidal mud), Killough (SPA), Outer Ards (SPA, intertidal mud), Copeland Islands (SPA). Within 40 km of the Scottish boundary of rMCZ6 is the Mull of Galloway (SSSI including maritime cliffs). Within 80 km of the site is Luce Bay and sands (a Scottish SAC with marine designations) and Loch Ken.

13. Supporting documentation

This section should include the sources of the best available scientific and stakeholder information used to identify sites and conservation objectives presented in a table format:

Information	Type of information	Source
Location of Low energy circalittoral rock	Combined physical and biological surveying with habitat modelling	Robinson et al. 2007, Mellor et al 2008
Location of subtidal sand	Combined physical and biological surveying with habitat modelling	Robinson et al. 2007, Mellor et al 2008
Location of subtidal mud	Combined physical and biological surveying with habitat modelling	Robinson et al. 2007, Mellor et al 2008
Location of mud habitats in deep water	Combined physical and biological surveying with habitat modelling	Robinson et al. 2007, Mellor et al 2008
Location of sea-pen and burrowing megafauna communities	Video surveys and grab samples	Robinson et al. 2007, Mellor et al 2008
Location of subtidal sands and gravels		Robinson et al. 2007
Location of ocean quahog <i>Arctica islandica</i>		Butler 2009

14. Stakeholder considerations

Caveats:

16. The MOD expressed caution with regard to submarine activity (landing on sea floor) in this area, which would need to be allowed to continue.

Implications:

Stakeholder implications are explored further, on a site-by-site basis, in the management implications tables in Annex 3. The socio-economic implications of designation of this site will be costed in the Impact Assessment.

Stakeholder support:

Most stakeholders accepted the inclusion of rMCZ6 in the final network in order to satisfy the ENG targets. Strong concerns were raised by the Northern Irish fishing fleet due to the likelihood of losing *Nephrops* fishing grounds, and by the Isle of Man fishing representative due to the likelihood of losing refuge scallop grounds.

For a fuller context on the RSG discussions associated with this site, readers of this report are encouraged to consult meeting reports from the ISCZ RSG workshops - especially those from the May and July 2011 workshops (ISCZ, 2011b,d).

References

BUTLER, P. 2009. *Establishing the Arctica islandica archive: Development of the definitive shell-based proxy for the North Atlantic shelf seas*. PhD thesis, Bangor University.

BRIGGS, R. 2010. *Cruise report: CO31-10 R.V. Corystes Nephrops Trawl and UWTV Survey Irish Sea: ICES Division VIIa*. By permission of AFBI.

ISCZ. 2011b. Meeting report from the 6th Irish Sea Conservation Zones Stakeholder Group meeting. RK Partnership Ltd.

ISCZ. 2011d. Meeting report from the 8th Irish Sea Conservation Zones Stakeholder Group meeting. RK Partnership Ltd.

MELLOR, A. MITCHELL, A., STRONG, J., ROONEY, L., SERVICE, M. 2008. *North West Irish Sea mounds: hard and soft substrate habitats*. JNCC Report No. 410. Contract Reference No: F90-01-942(8).

CALLAWAY, A., SMYTH, J., BROWN, C.J., QUINN, R., SERVICE, M. & LONG, D. 2009. *The impact of scour processes on a smothered reef system in the Irish Sea*. Estuarine, Coastal and Shelf Science. 84: 409-418.

HORSBURGH, K.J., HILL, A.E., BROWN, J., FERNAND, L., GARVINE, R.W. ANGELICO, M.M.P. 2000. *Seasonal evolution of the cold pool gyre in the western Irish Sea*. Progress in Oceanography 46: 1-58.

SEELEY, B., LEAR, D., HIGGS, S., NEILLY, M., BILEWITCH, J., EVANS, J., WILKES, P. & ADAMS, L. 2010. *Assessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes*. Report No 16: Task 2C. Mapping of Protected Habitats. DEFRA Project Code: MB0102 Marine Biodiversity R&D Program.

ROBINSON, K., RAMSAY, K., WILSON, J., MACKIE A., WHEELER, A., O'BEIRN F., LINDENBAUM, C., VAN LANDEGHAM, K., MCBREEN, F., MITCHELL, N. 2007. *HABMAP: Habitat Mapping for conservation and management of the southern Irish Sea*. Report to the Welsh European Funding Office. CCW Science Report Number 810. Countryside Council for Wales, Bangor. 233 pp plus appendices.

7.9 Marine Conservation Zone: NG 9, Holderness Offshore

Version and issue date	Amendments made
V1.0 31 st August, 2011	Original release
V1.1 6 th September, 2011	Minor corrections and edits
V1.2 2 nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

NG 9, Holderness Offshore

Site centre location

53° 49' 05"N, 0° 26' 21"E

53.818208°, 0.439465°

Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

1,176.10km² / 117,609.87ha

Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

JNCC Regional Sea: Southern North Sea

OSPAR Region II: Greater North Sea

Table 7.60 Features proposed for designation within NG 9, Holderness Offshore

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A5.1: Subtidal coarse sediment	536.45km ²
Broad-scale habitat	A5.4: Subtidal mixed sediment	610.36km ²
Habitat of conservation importance	n/a	n/a
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Table 7.61 Features within NG 9, Holderness Offshore not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	A5.2: Subtidal sand	The site was originally identified purely for the contribution of subtidal coarse sediment and it was suggested that the site be designated for that feature alone. Subsequently more detailed data layers were received which showed that the site was equally important for subtidal mixed sediment as it was for subtidal coarse sediment and it was agreed that this feature should be recommended for designation as well. Subtidal sand was still disregarded.
Habitat of conservation importance	Subtidal sands and gravels, Subtidal sands and gravels (modelled)	The site was originally identified purely for the contribution of subtidal coarse sediment and it was suggested that the site be designated for that feature alone. Subsequently more detailed data layers were received which showed that the site was equally important for subtidal mixed sediment as it was for subtidal coarse sediment and it was agreed that this feature should be designated for as well. Subtidal sand and gravels were still disregarded.
Habitat of conservation importance	Ross worm (<i>Sabellaria spinulosa</i>) reefs	The site was put forward for broad-scale habitats and this feature was not considered.
Species of conservation importance	n/a	n/a

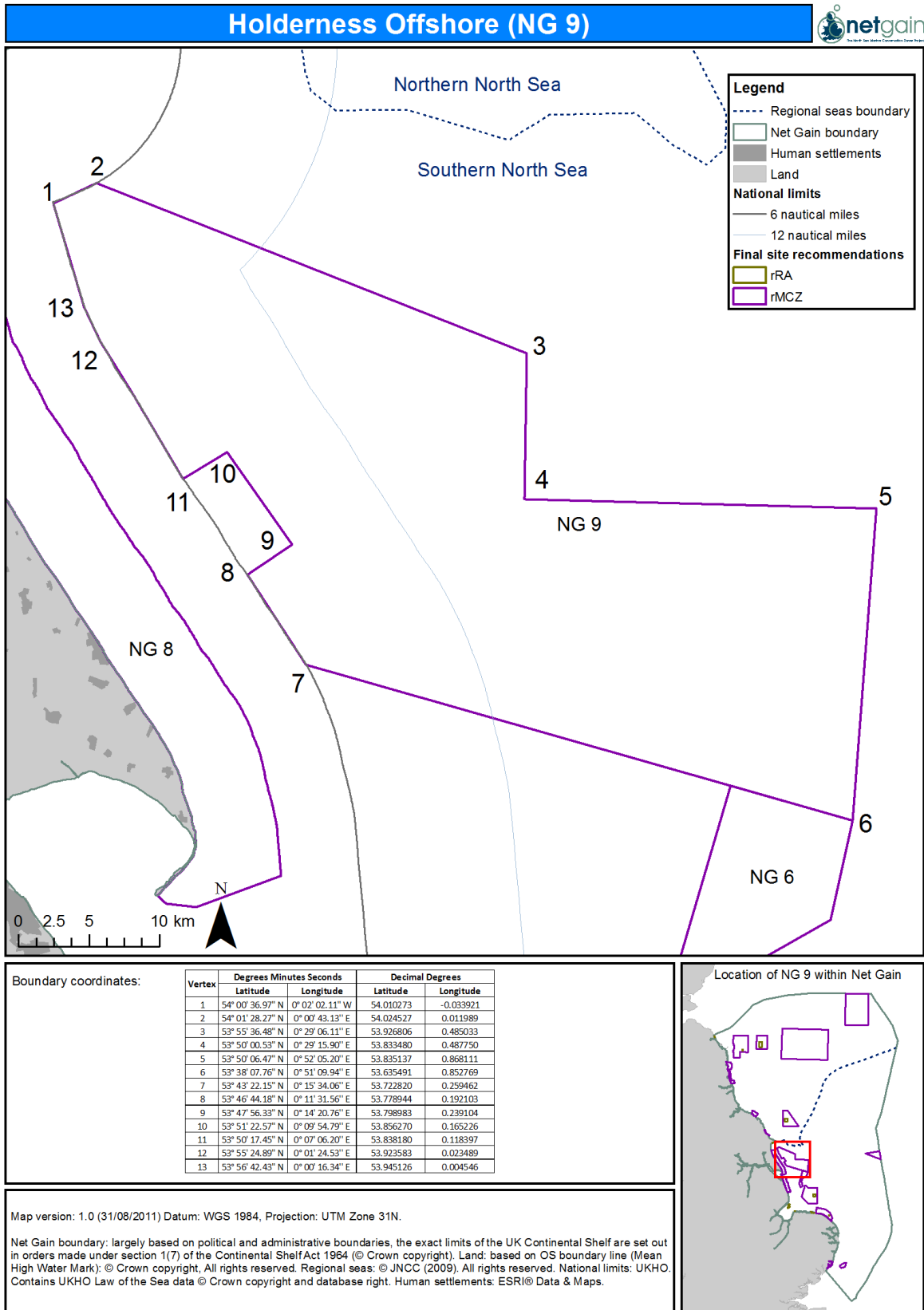


Figure 7.68 Location and extent of site NG9 (Holderness Offshore)

Site summary

NG 9 is located 11.4km offshore from NG 8, Holderness Inshore rMCZ site on the East Yorkshire coast of England. The depth range in the site is between 10 and 50m deep (Figure 7.73) and the seabed is mostly composed of sediment habitats, with subtidal coarse sediment and subtidal mixed sediment being put forward for recommendation. Encompassing the northern portion of the Inner Silver Pit geological feature (the southern portion being within rMCZ NG 6) this area of the site has good species biodiversity on the canyon walls, and is an ecologically important area providing substrate and habitat for many species. The northern portion of the site captures the Flamborough front with highest current speeds being reached in spring and summer. **The front provides areas of upwelling providing food for birds and cetaceans.**

Detailed site description

NG9 is being recommended for designation due to the presence of broad-scale habitat types A5.2: subtidal sands, A5.1: subtidal coarse sediment and A5.4: subtidal mixed sediments. The site also includes the habitats of conservation importance subtidal sands and gravels and Ross worm (*Sabellaria spinulosa*) reefs.

NG9 is situated offshore, starting 6 nm off the Holderness coast, level with Barmston in the north extending to Kilnsea in the south and continuing east approximately 50km. It is situated between the Humber Gateway and Westermost Rough Round two windfarm sites in the west/southwest and the Round three Hornsea windfarm site to the north east.

In addition to the data layers that Net Gain hold, reports by Evans, et al. 1998 have indicated that the area is underlain by chalk, covered by an extensive till sheet, parts of which are traversed by distinctive low, commonly asymmetrical ribs, running parallel to the coast, formed of cobbles and boulders (Evans, et al. 1998). In general the sea bed of the western side of the site is approximately 10-12m deep, sloping uniformly eastwards to about 30m over a distance of about 15km. Further offshore to the east this becomes slightly steeper attaining approximately 45m depth, a gentle slope then returns that falls to more than 50m (Evans, et al. 1998), this is consistent with the bathymetry data layer provided from UKOA which suggests that the site is between 10 and 50m deep (Figure 7.73).

The southeast of the site contains the northern channel of the Inner Silver Pit post glacial tunnel valley feature. The northern part of the channel contains circalittoral mixed sediment habitats including muddy sediments in deeper water and areas of thin mixed sediments over rock characterised by barnacles, ascidians and tubeworms (Tappin, et al. 2011). Several studies have been undertaken in the adjacent areas of NG 9 and correlate with sediment characteristics of the site (Allen, 2008; Allen, et al. 2006; Tappin, et al. 2011).

The majority of the site experiences moderate wave and current energy at the seabed with lower wave energy towards the east of the site (UK SeaMap, 2010). Tidal currents near NG9 primarily occur in a southwest and northeast direction; across the Hornsea zone tidal currents are thought to run at between 0.28 ms^{-1} and 0.62 ms^{-1} . A key oceanographic feature in the vicinity of NG9 is that of the 'Flamborough Front', an area of the sea where upwelling occurs: cold, deeper, stratified waters of the northern North Sea meet the warmer, shallower, well-mixed waters of the southern North Sea. This may give the site increased ecological significance as it provides nutrient rich warm waters enhancing primary production via plankton growth (IPC, 2010).

Offshore areas in deep waters are typically less perturbed by natural disturbance and are among the most diverse marine habitats (Maddock, 2008). Typical habitats in this area may include SS.SCS.OCS Offshore circalittoral coarse sediment, SS.SSa.OSa Offshore circalittoral sand and SS.SMx Sublittoral mixed sediment. Previous surveys near NG9 have shown a number of different functional communities usually dominated by infaunal invertebrates in sand oriented sediments overlain with gravels and/or shell fragments, although towards the south of the site localised muddy sediments

can occur (Tappin, et al. 2011). Typical species would include polychaetes such as *Ophelia borealis*, *Polycirrus* and *Spiophanes* species. Nemertean worms and the bivalves *Mysella bidentata* and *Goodallia triangularis* would occur along with burrowing amphipods, in particular *Urothoe elegans*, *Bathyporeia* and *Ampelisca* species. Where there is increased gravel content *Glycera* can occur. Depending on the amount of gravels in the site a number of epifaunal species can become attached such as small sea squirts, particularly *Dendrodoa grossularia*, the tube worm *Pomatoceros lamarckii* and a range of encrusting bryozoans (Tappin, et al. 2011).

The southeast of NG9, incorporates the northern section of the Inner Silver Pit, in which the brittle star, *Ophiothrix fragilis* has been identified in high abundances (Tappin, et al. 2011). It is notable that the commercially significant crustaceans European lobster (*Homarus gammarus*), edible or brown crab (*Cancer pagurus*) and scallops are abundant over much of the area and these species comprise a nationally important shellfishery. Fish species, lemon sole (*Microstomus kitt*), plaice (*Pleuronectes platessa*) and sprat (*Sprattus sprattus*) have known spawning and nursery areas in NG9 (Figure 7.78; Figure 7.79).

The biogenic reef building polychaete Ross worm (*Sabellaria spinulosa*), has been established in areas to the south, between Spurn and the perimeter of NG9 (Allen, 2008). This species is defined under Annex 1 of the EC Habitats Directive and is also included in the UK Biodiversity Action Plans priority habitats (Maddock, 2008). Although it has a wide distribution over the area, it occurs mainly in a low lying encrusting form (Allen, et al. 2006), with one record in reef form.

Due to the location of NG9 and its proximity to the Flamborough Head and Bempton Cliffs SPA and RSPB reserve, the site is of particular importance to several breeding seabird species. A number of species utilise the area for foraging due to the 'Flamborough front', these most notably include puffin (*Fratercula arctica*), common guillemot (*Uria aalge*), European shag (*Phalacrocorax aristotelis*), great cormorant (*P. Carbo*), black legged kittiwake (*Rissa tridactyla*), fulmar (*Fulmar glacialis*) (RSPB, 2010) and northern gannet (*Morus bassanus*) (EYRG, 2010).

Three main species of marine mammals have been documented in the NG9 site, common seal (*Phoca vitulina*), grey seal (*Halichoerus grypus*) and harbour porpoise (*Phocoena phocoena*) (Mander, et al. 2009). Although their distribution is seasonally variable harbour porpoise has been shown to follow a dispersal pattern similar to foraging aggregations of kittiwake and auk species trailing the 'Flamborough front' especially further offshore (Mander, et al. 2009).



Fulmar (*Fulmarus glacialis*)
©Jonathan Butterfield



Mollusc: Queen scallop (*Aequipecten opercularis*)
©Jonathan Butterfield

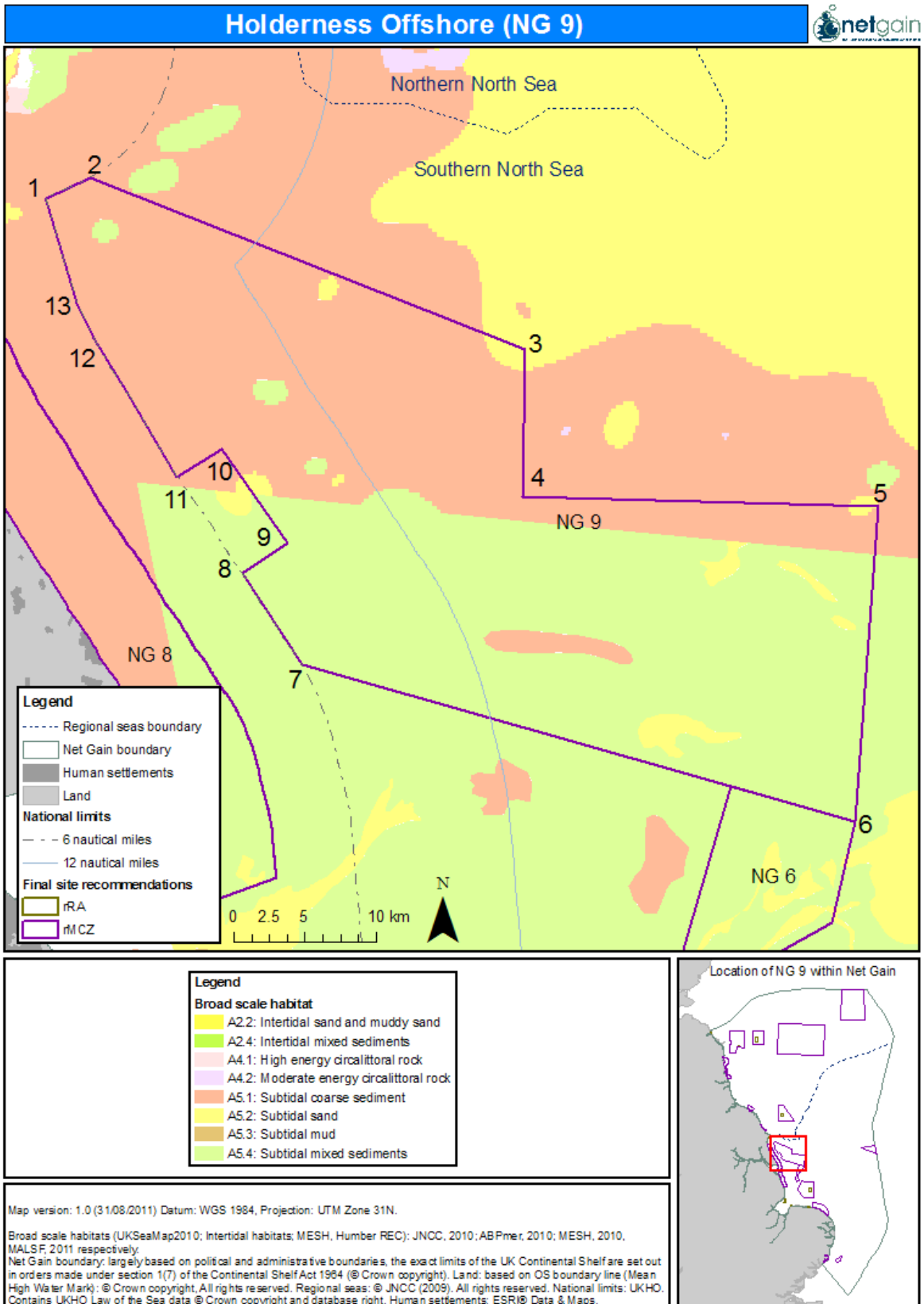


Figure 7.69 Broad-scale habitat present within NG 9

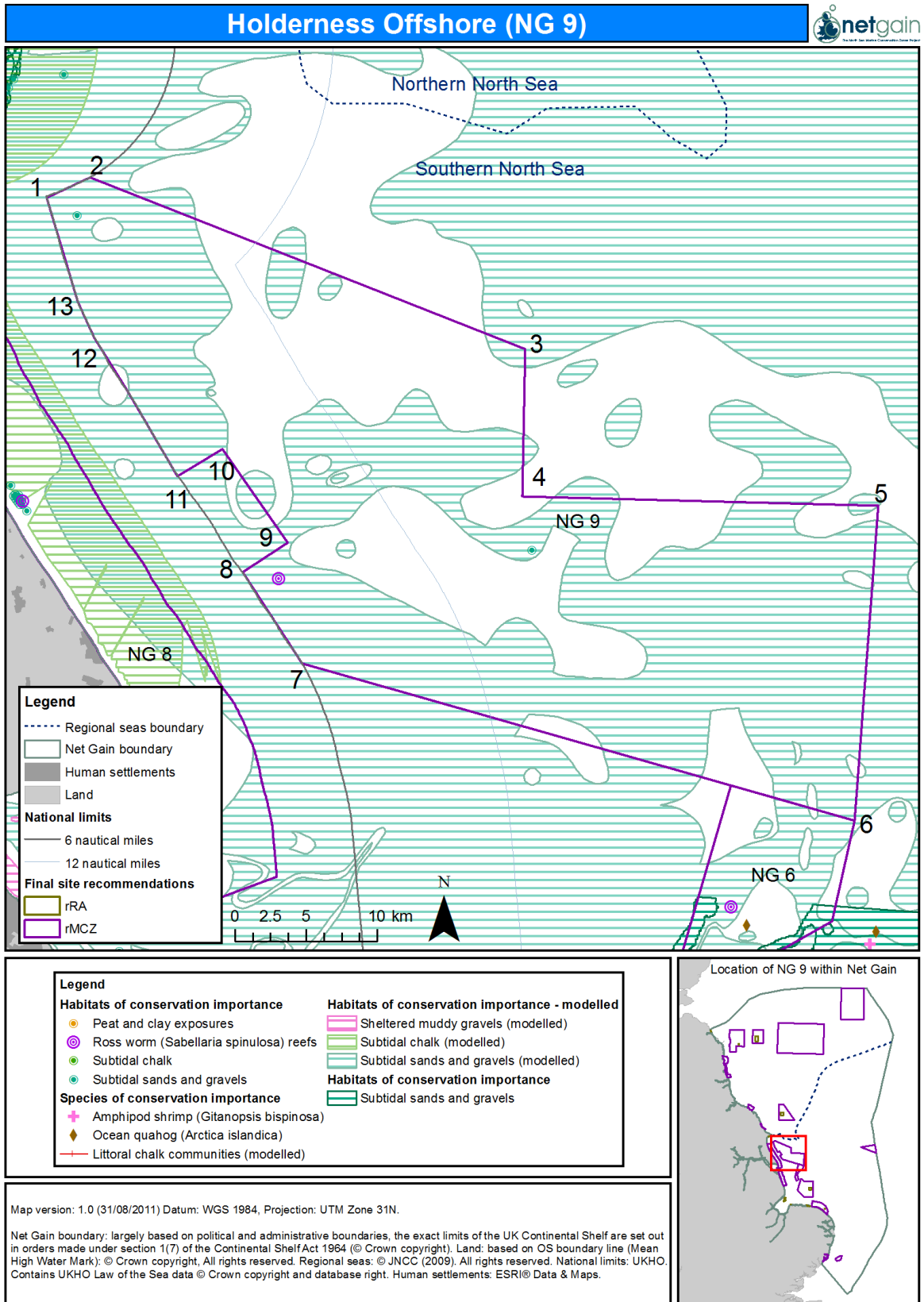


Figure 7.70 FOCI habitats and species present within NG 9

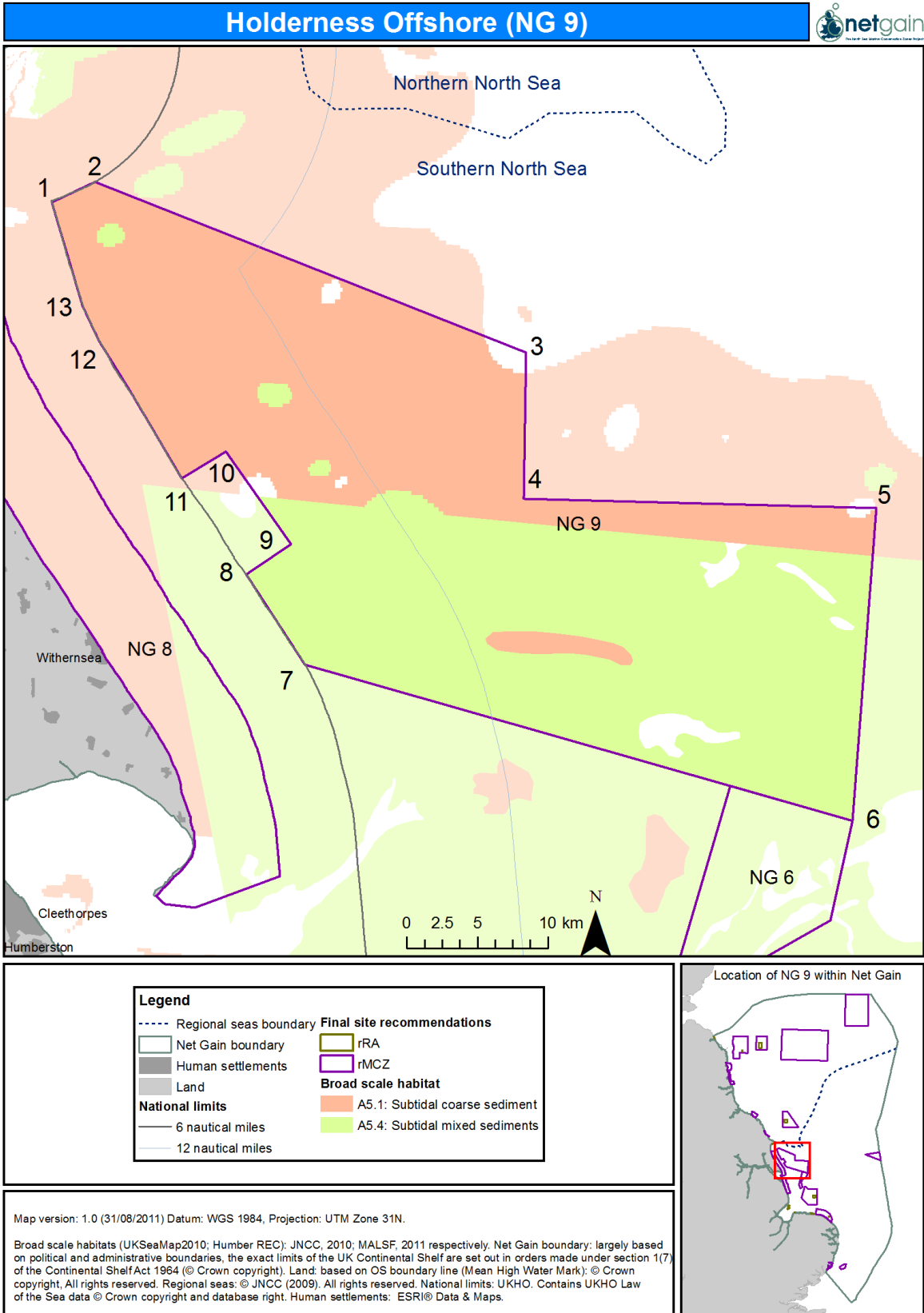


Figure 7.71 Features put forward for recommendation in NG 9

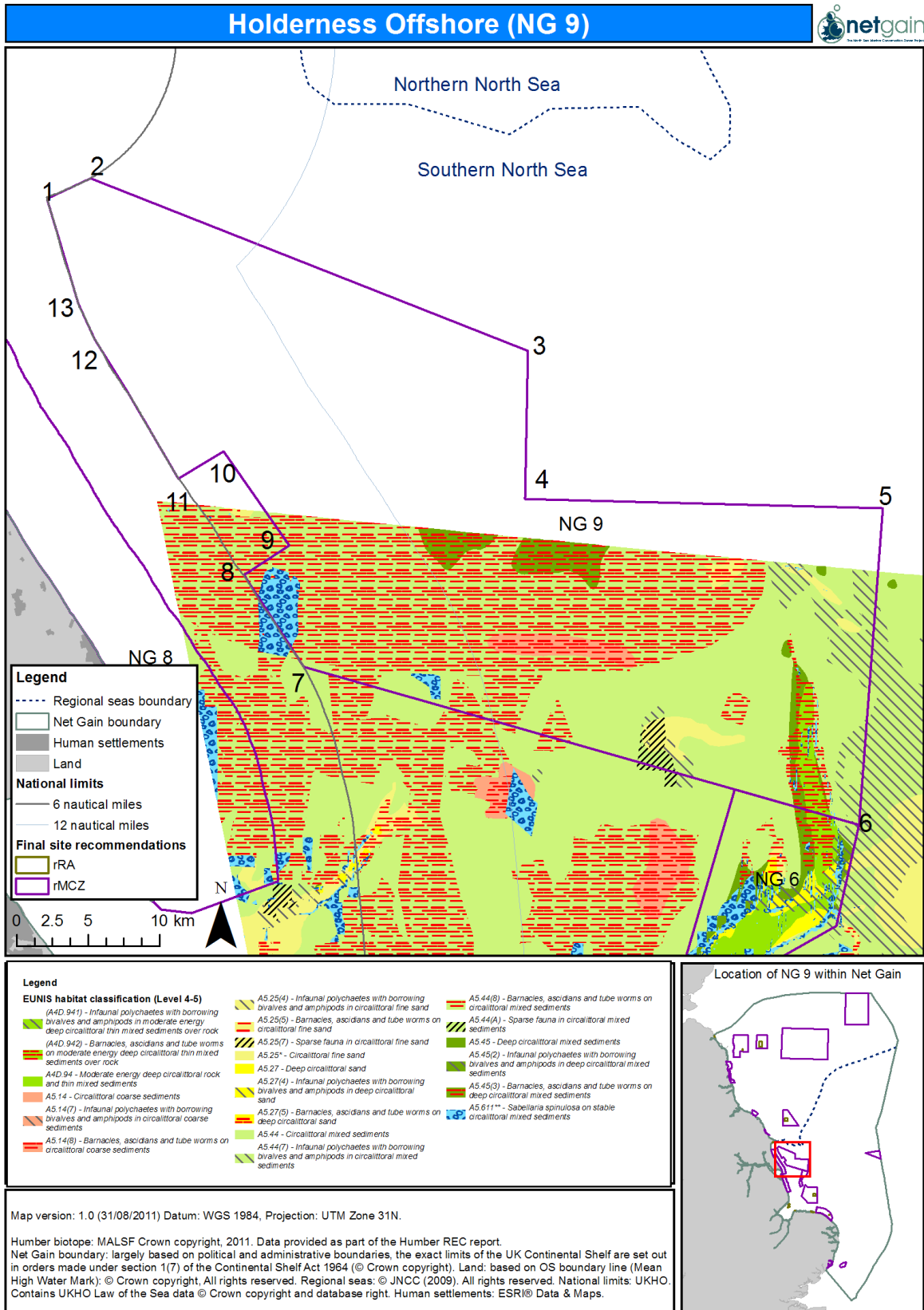
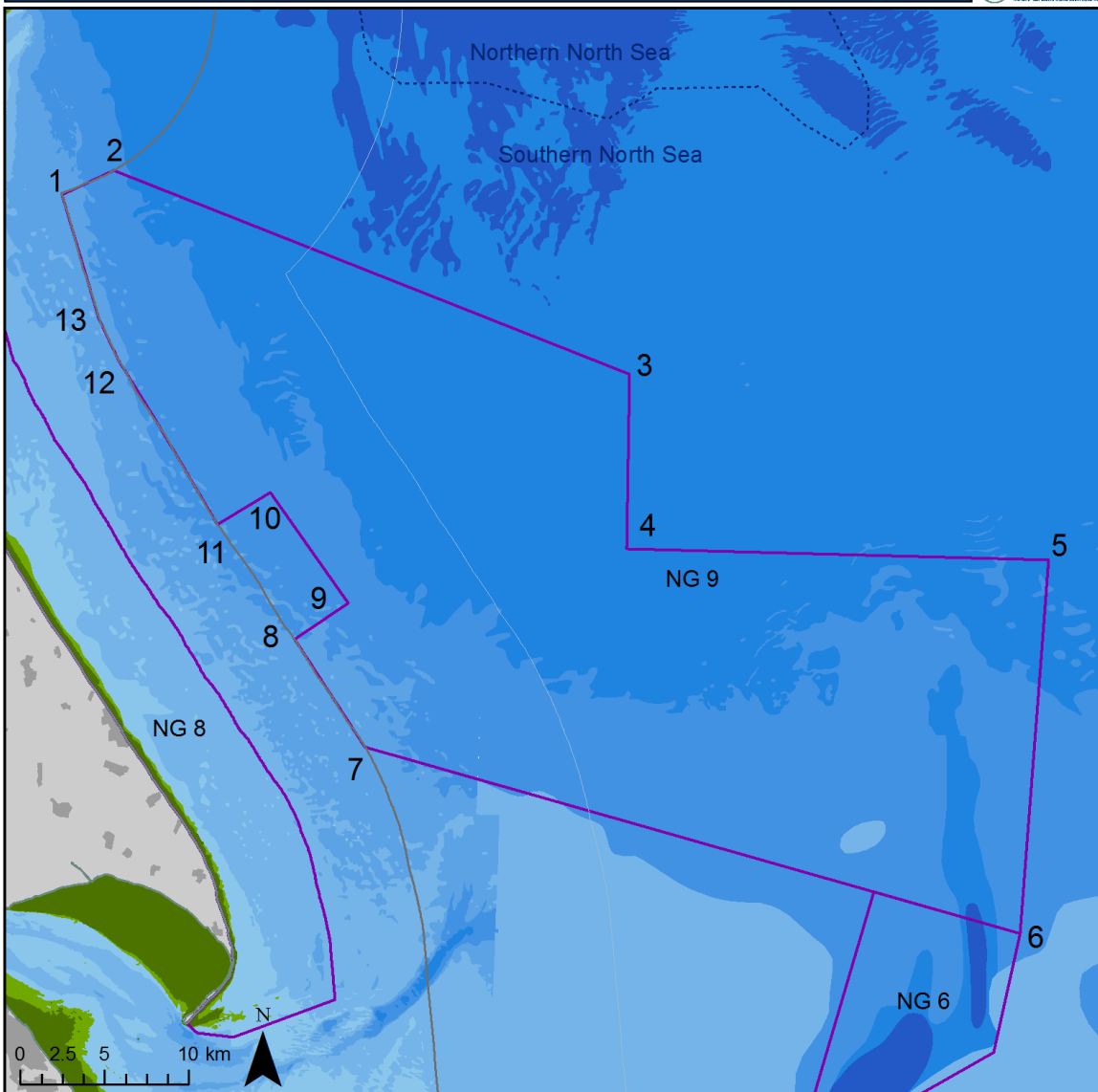
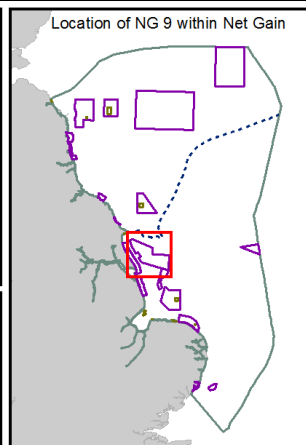


Figure 7.72 Additional broad-scale habitat data; Humber Regional Environmental Characterisation

Holderness Offshore (NG 9)



Legend		Final site recommendations	Depth class based on LMW Mark (m)
-----	Regional seas boundary	Green	<= 30
-----	Net Gain boundary	Light Green	<= 40
-----	Human settlements	Yellow	<= 50
-----	Land	Orange	<= 75
-----	National limits	Red	<= 100
-----	6 nautical miles	Dark Red	<= 150
-----	12 nautical miles	Dark Purple	<= 200
-----		Light Purple	
-----		Dark Purple	
-----		Very Dark Purple	
-----		Black	
-----		Dark Blue	
-----		Medium Blue	
-----		Light Blue	
-----		Very Light Blue	
-----		White	



Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.
 Contains data from the Ordnance Survey © Crown Copyright and database right 2011. Ordnance Survey 100022021. Contains data from the UK Hydrographic Office © Crown Copyright and/or database rights. Reproduced by permission of the Controller of Her Majesty's Stationery Office and the UK Hydrographic Office (www.ukho.gov.uk). Admiralty Charts © Crown Copyright, 2011. All rights reserved. License No. EK001-GOV001. NOT TO BE USED FOR NAVIGATION. Contains UKHO Law of the Sea data © Crown copyright and database right. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark); © Crown copyright, All rights reserved. Regional seas: © JNCC (2009). National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right.

Figure 7.73 Bathymetry of NG 9

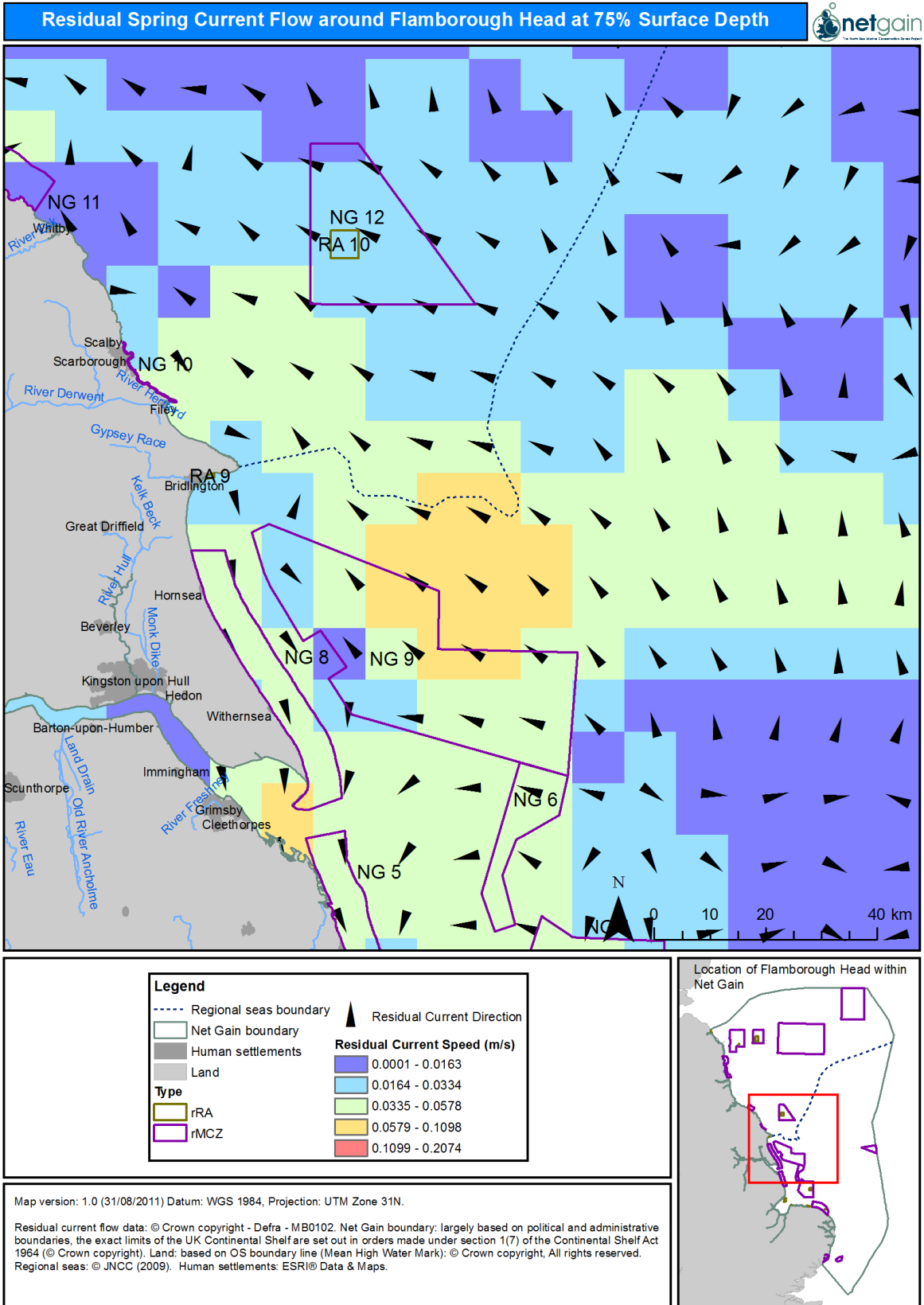


Figure 7.74 Residual spring current flow around Flamborough Head at 75% surface depth

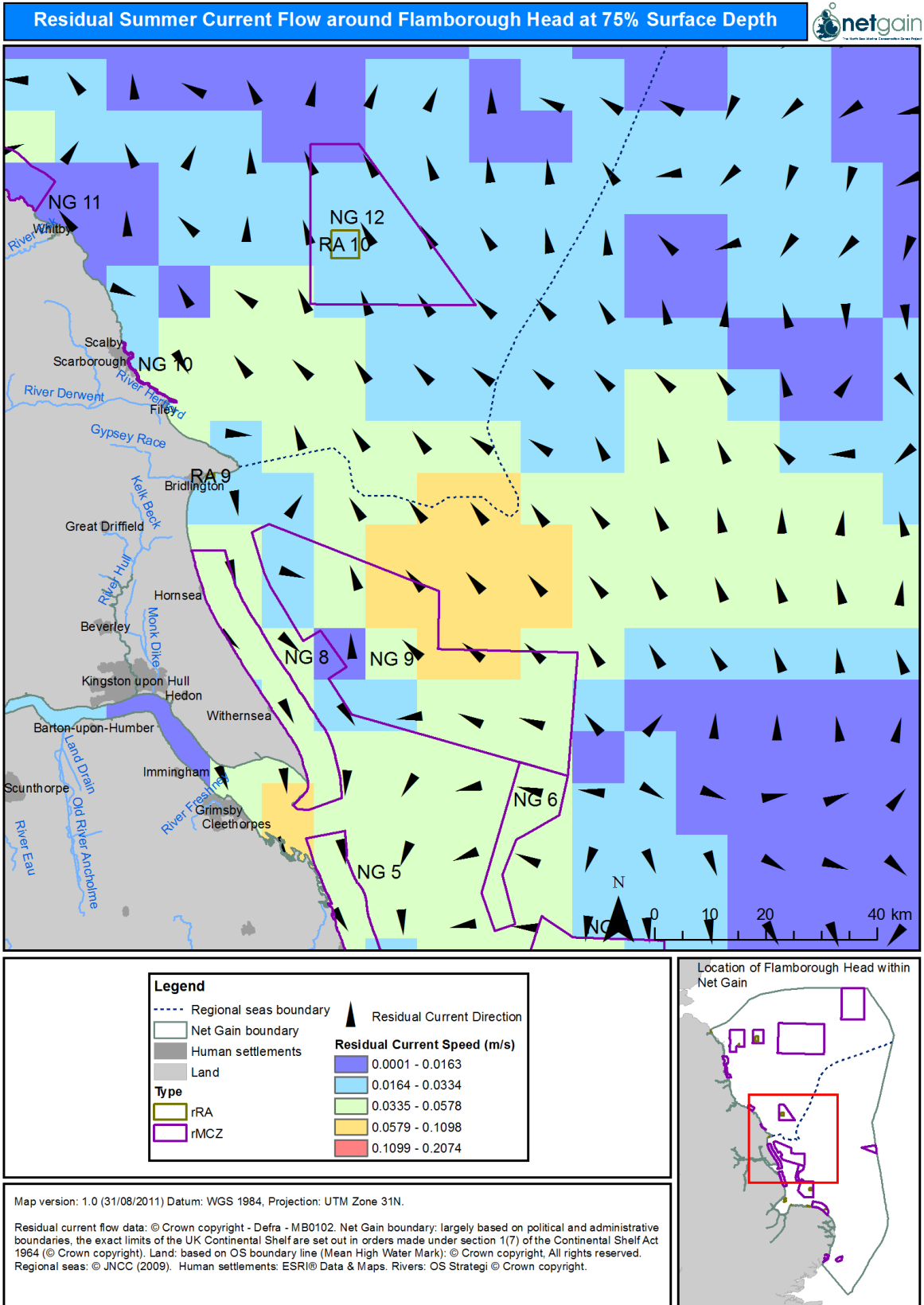


Figure 7.75 Residual summer current flow around Flamborough Head at 75% surface depth

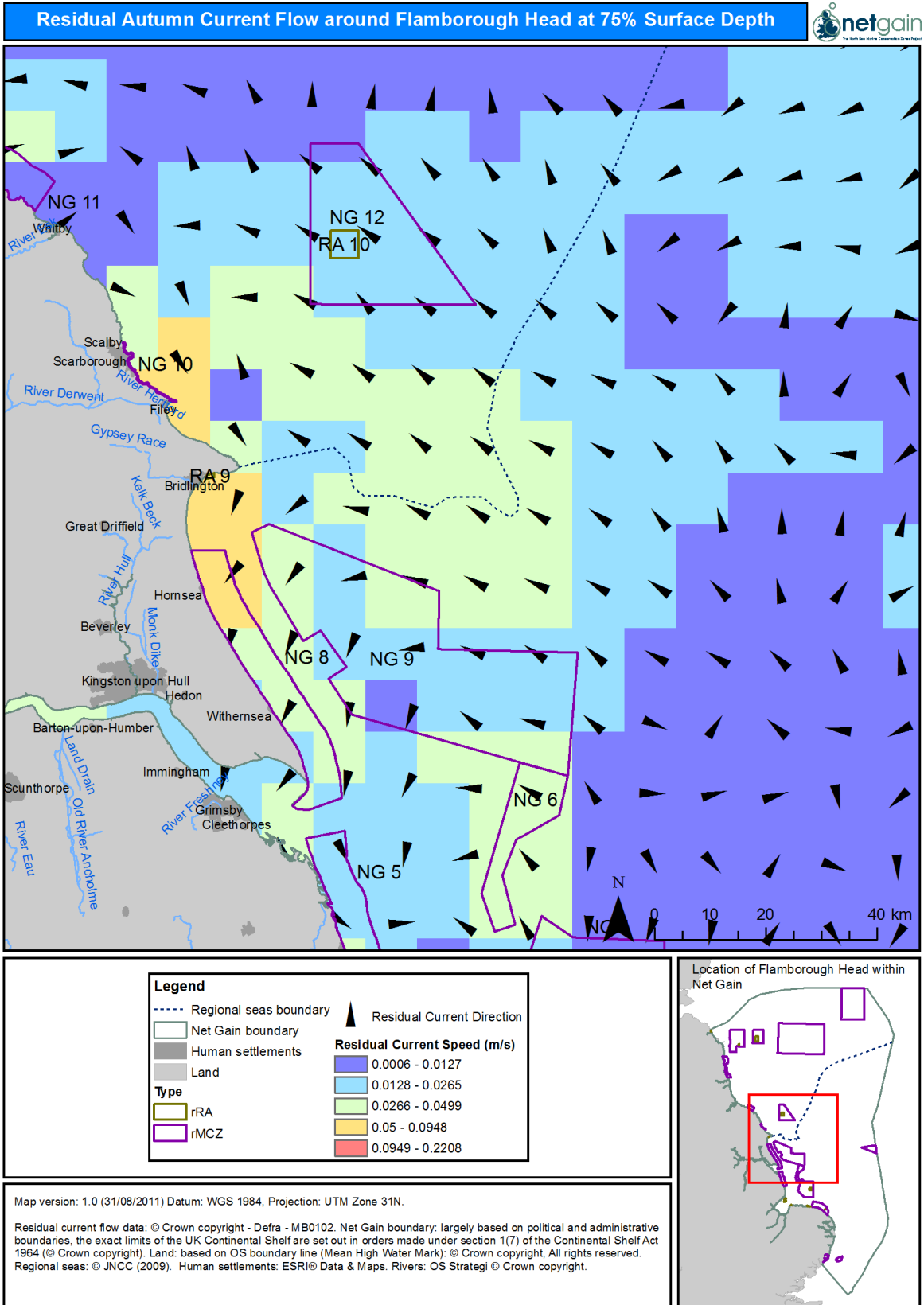


Figure 7.76 Residual autumn current flow around Flamborough Head at 75% surface depth

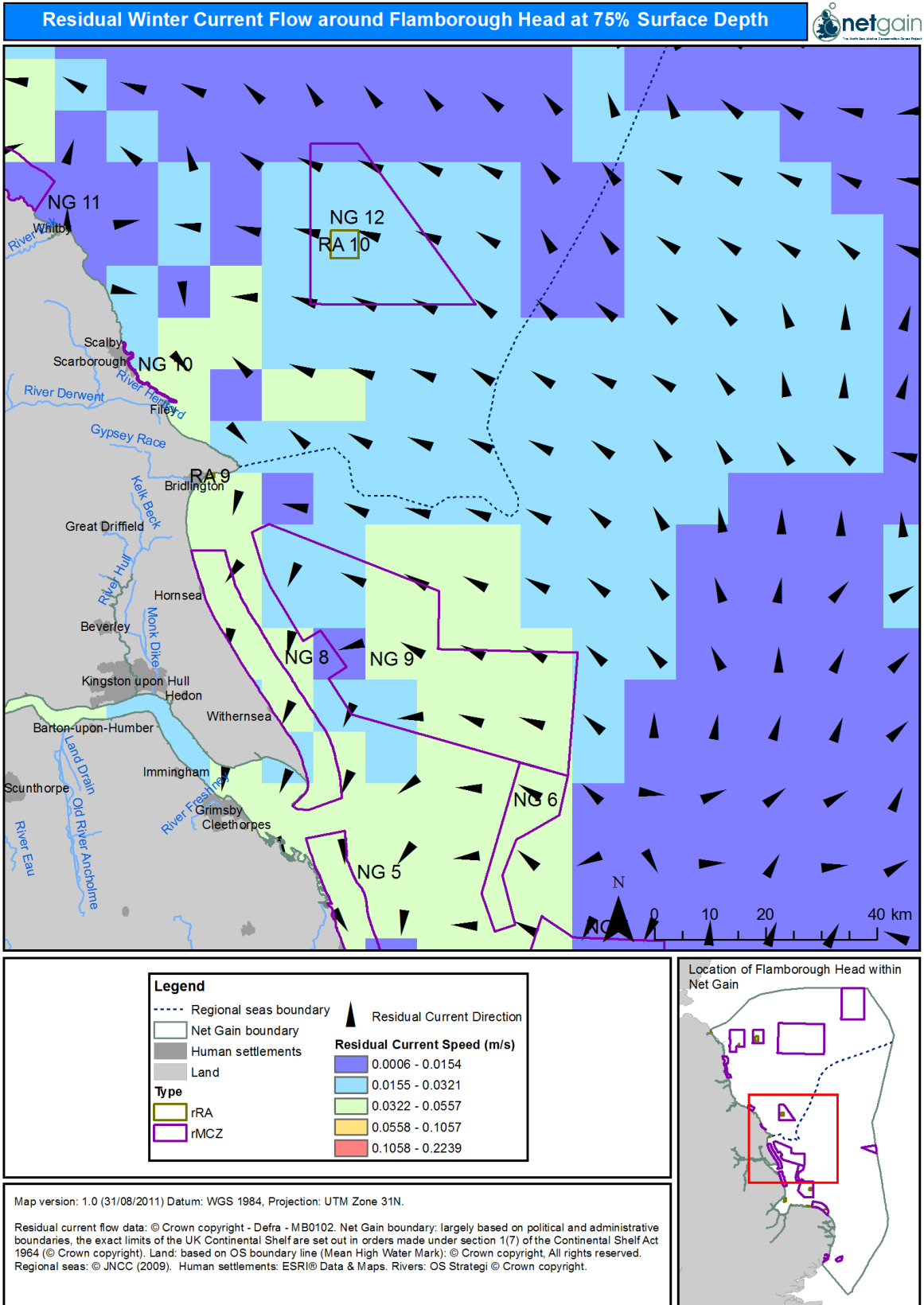


Figure 7.77 Residual winter current flow around Flamborough Head at 75% surface depth

Species spawning grounds (Map 1)

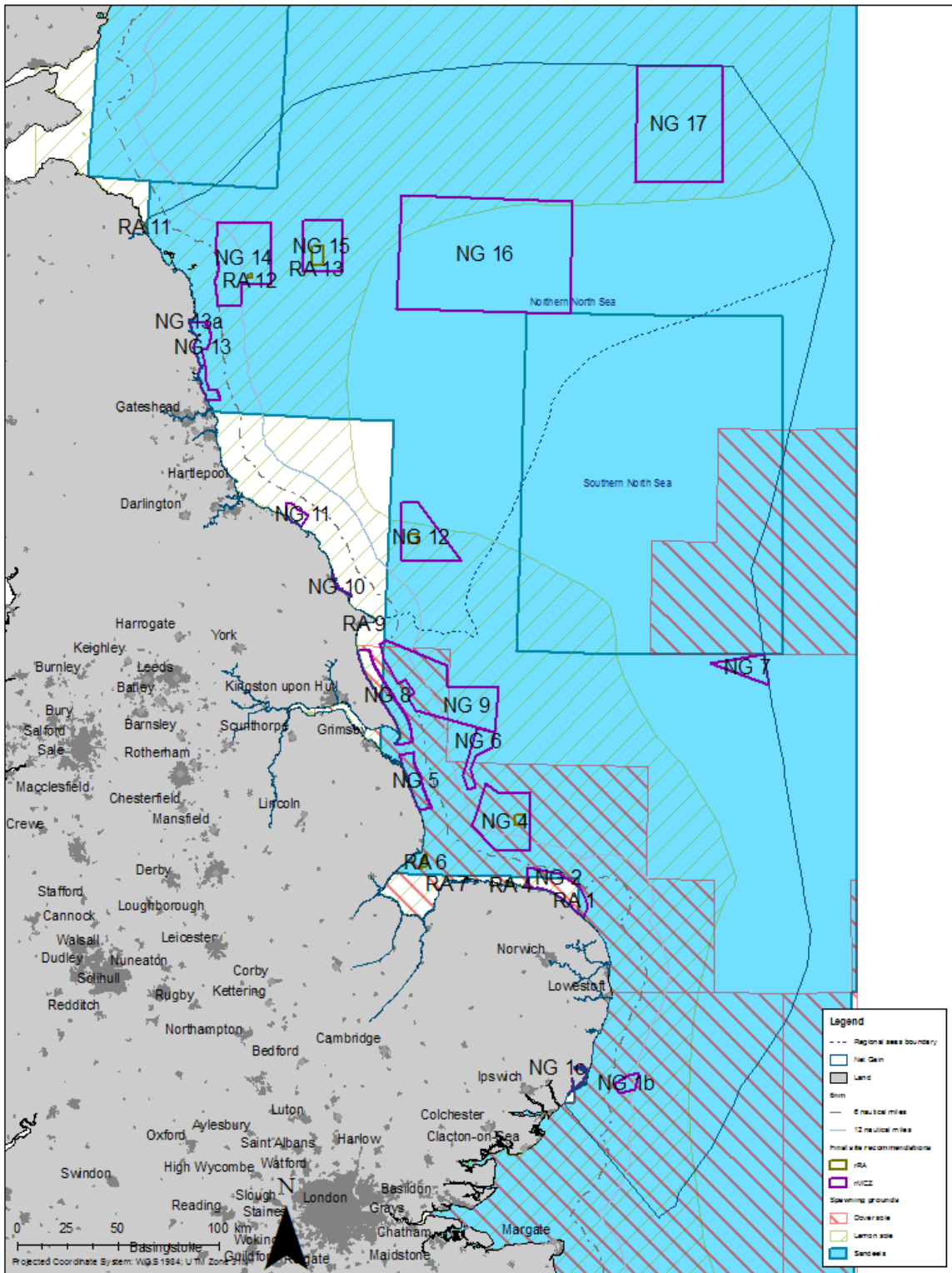
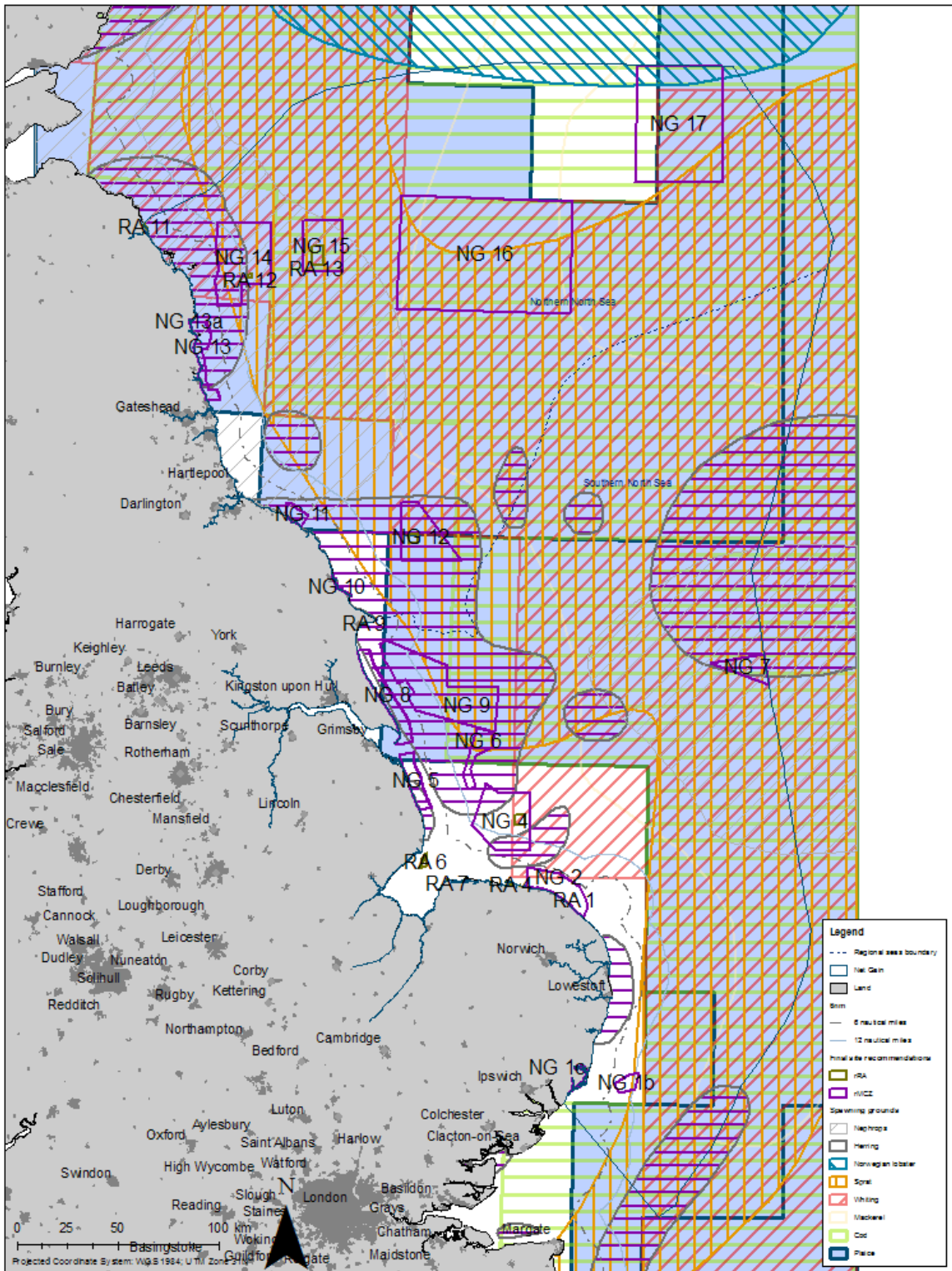


Figure 7.78 Spawning grounds (map 1)

Species spawning grounds (Map 2)



Spawning data: Data collected in BE301. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark) © Crown copyright. All rights reserved. Regional seas: © JNCC (2009). Regional seas: © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRB Data & Maps.

Figure 7.79 Spawning grounds (map 2)

Site boundary

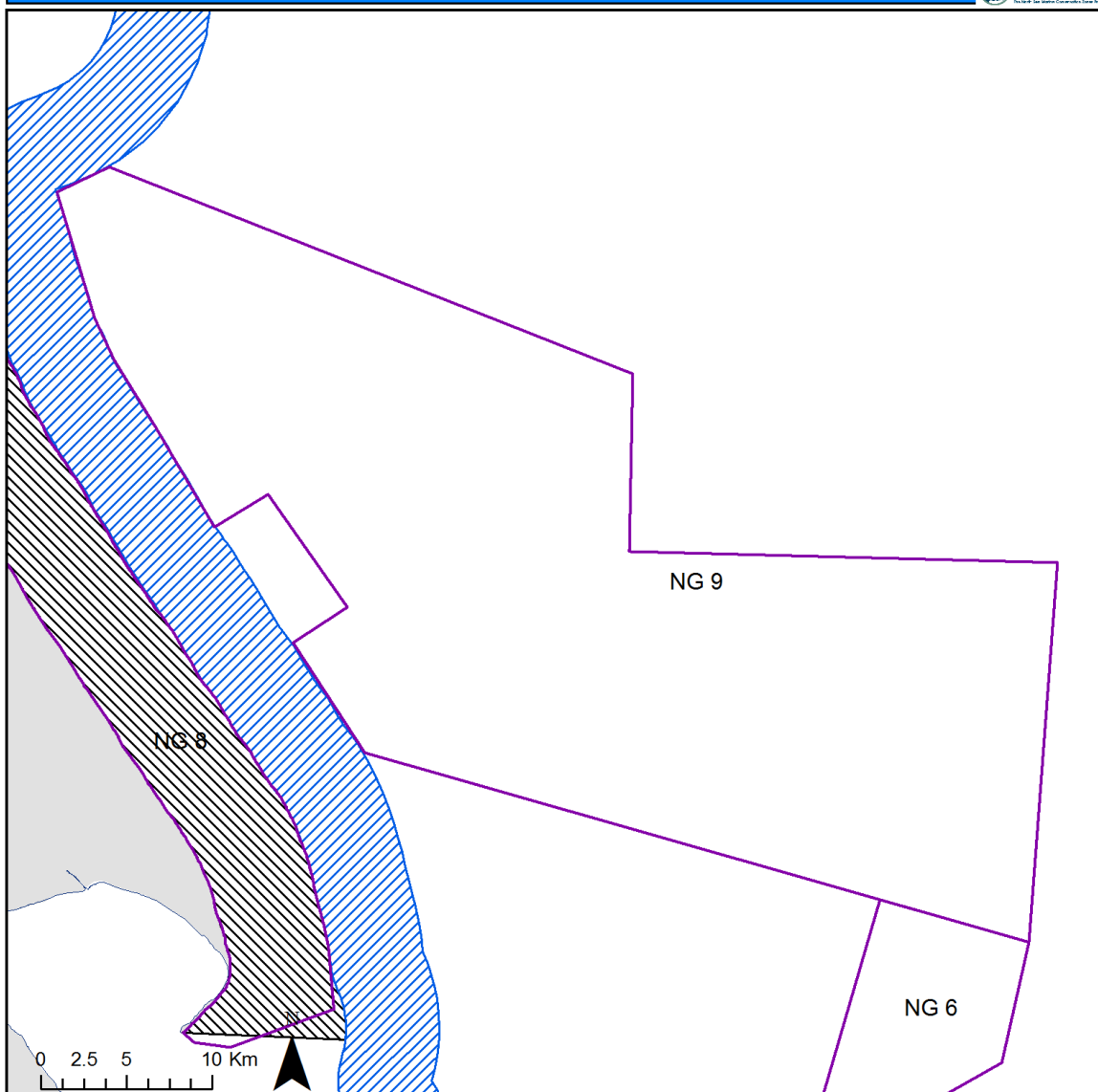
This site was developed from three previous overlapping sites (NG2.10, NG2.13 and the northern section of NG2.09) containing A5.1: Subtidal coarse sediment and A5.4 Subtidal mixed sediments. This combination of the three sites accommodates seabird “hotspots” and other areas of ecological importance.

Following discussions in the Hub, the western boundary was clipped to the 6nm limit, leaving a “corridor” between the adjacent NG 8, which is clipped to the 3nm limit to allow for limited and legitimate diversification for inshore fisheries and for offshore developers. This was additionally supported by the adequacy targets being met elsewhere for the recommended features. Alternative discussions that supported the option to join sites NG8 and NG9 included a simplification of boundaries for management purposes and the provision of a level of protection for static gear fisheries to avoid the displacement of static gear (if left open the corridor has the potential to become an area of high mobile gear activity which would be largely incompatible with the static gear operation), ultimately this would provide socio-economic benefits for static gear fishing, with increased buy-in from this sector.

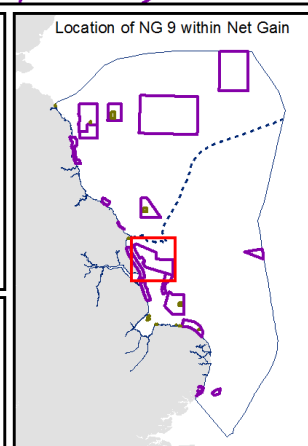
The 6nm boundary of the site aligns with a NESFC and ESFJC seasonal byelaw for any type of dredging gear from June 30th until October 1st.

The boundary that runs along the 6nm limit is clipped to the boundary of a windfarm and has provided a 500m buffer to accommodate. The north eastern boundary removed a triangle section from the original boundary to allow for a Round 3 windfarm footprint.

Holderness Offshore (NG 9)



Legend	
	Net Gain boundary
	Land
Final site recommendations	
	rRA
	rMCZ
NESFC and ESFJC byelaws	
Type	
	III. Trawling prohibition (All year)
	XXIII Method and area of fishing (dredged) byelaw (30th June to 1st October)



Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark); © Crown copyright, All rights reserved. Regional seas: © JNCC (2009). National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Byelaws and 1983 Limits provided by the NESFC and ESFJC.

Figure 7.80 NG 9 site boundary with associated fishery management locations

Conservation objectives

Table 7.62 Conservation objectives for site NG 9, A5.1: Subtidal coarse sediment

Conservation Objective			
1 Maintain/ recover	Subtidal coarse sediment is widespread around the British Isles and mainland Europe. Subject to natural change, recover the Subtidal coarse sediment to favourable condition by 2020, and maintain thereafter, such that the:		
2 Attributes and parameters (indicated by *) of feature	<p style="text-align: center;"><u>Habitat</u></p> <p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* <p>representative of Subtidal coarse sediment in the biogeographic region are recovered, such that the feature makes its contribution to the network.</p>		
Advice on operations			
3 Pressures	<p>Subtidal coarse sediment is sensitive to the pressures:</p> <p>Pressure</p> <p>Physical loss (to land or freshwater habitat)</p> <p>Physical removal (extraction of substratum)</p> <p>Surface abrasion: damage to seabed surface features</p>	<p>Sensitivity</p> <p>H</p> <p>L-H</p> <p>NS-H</p>	<p>Confidence</p> <p>L</p> <p>L</p> <p>L</p>

	Physical change (to another seabed type)	M	L
	Salinity changes - local	L-M	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	L
	Siltation rate changes (low)	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.63 Conservation objectives for site NG 9, A5.4: Subtidal mixed sediments

Conservation Objective			
1 Maintain/ recover	Subtidal mixed sediment is widespread around the British Isles and mainland Europe. Subject to natural change, recover the Subtidal mixed sediments to favourable condition by 2020, and maintain thereafter, such that the:		
2 Attributes and parameters (indicated by *) of feature	<p style="text-align: center;"><u>Habitat</u></p> <p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* <p>representative of Subtidal mixed sediments in the biogeographic region are recovered, such that the feature makes its contribution to the network.</p>		
Advice on operations			
3 Pressures	<p>Subtidal mixed sediments is sensitive to the pressures:</p> <p>Pressure</p> <p>Physical change (to another seabed type)</p> <p>Physical loss (to land or freshwater habitat)</p> <p>Physical removal (extraction of substratum)</p> <p>Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm</p>	<p>Sensitivity</p> <p>H</p> <p>H</p> <p>H</p> <p>H</p>	<p>Confidence</p> <p>L</p> <p>L</p> <p>L</p> <p>L</p>

	Structural abrasion/penetration: Structural damage to seabed >25mm	H	L
	Introduction of microbial pathogens (disease)	NS-H	L
	Salinity changes - local	NS-H	L
	Removal of non-target species (lethal)	M	M
	Siltation rate changes (high)	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - local	M	L
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	M
	Water clarity changes	NS-M	L
	Removal of target species (lethal)	L	M
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
	Wave exposure changes - local	NS-L	L
	Wave exposure changes - regional/national	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

NG 9, Holderness Offshore does not fall in any present MPA sites. The south eastern side of the site aligns with NG 6, to provide protection for the Inner Silver Pit geological feature. On the coastal side of the site NG 8 lies approximately 6km away.

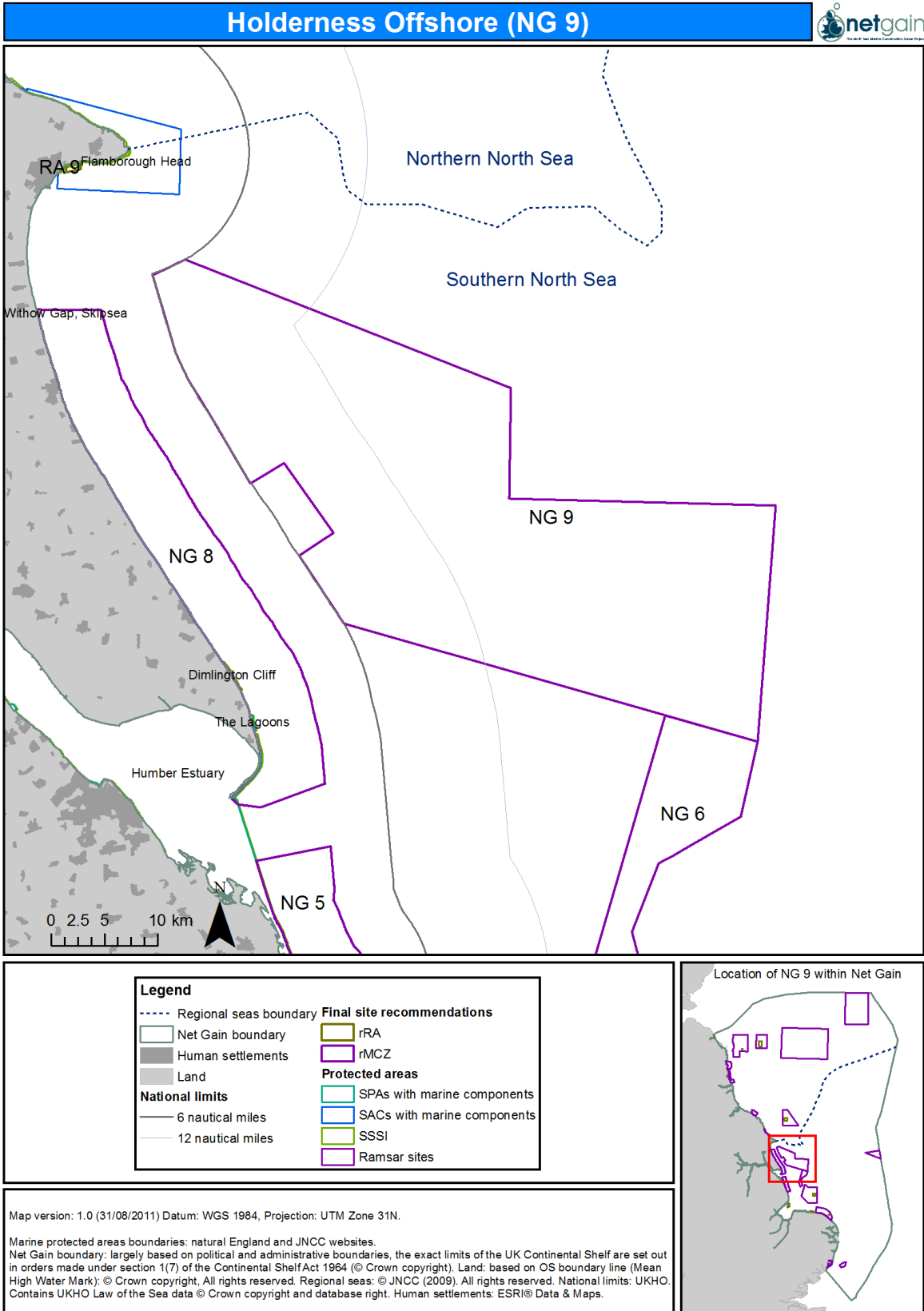


Figure 7.81 MPAs/rMCZs within or adjacent to NG 9

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The site received good support (two scores of '3' plus one of '4'). Its importance as a fish and shellfish breeding ground was highlighted. There was currently felt to be good support from local potters and fishing interests, which was expected to remain given that current activities should be allowed to continue.

Data quality was felt to be moderate to high; although there were some concerns over the reliability/quality of underlying data. The quality of data for the same feature may vary across an area - data may often be very site-specific so whilst it is of high quality at one location, it may be of lower quality at another. It is therefore difficult to extrapolate a view on its quality overall. The degree of confidence in the underlying data in the northern portion of site in particular was questioned.

Views on contention covered the full range, from 'L' through to 'H'. Whilst it was noted that contention would be dependent on the range of management measures that were adopted, it was pointed out that any impact of management measures on static gear fisheries and the renewable sector would be contentious. There may also be some concerns about the north-eastern vertex of the site with respect to implications for beam trawling. The site covers an international fishing area; there are seasonal benthic fisheries for ground fish/scallops, and the area is utilised by French otter trawlers and Dutch beam trawlers. The area would be contentious for mobile gear fishers, given the suggested restrictions on this activity. The site was however supported by static fishers on the proviso that there would be no additional restrictions resulting in a change to their activity. One group summarised the contention issues as 'general contention – low; benthic fishing – moderate-high'

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- French commercial fishing sector:- Strongly against due to likely restrictions on activity
- Marine Aggregates:- Against (but would move to support if buffer distances between MCZ boundary and aggregate interests are confirmed as being sufficient to mitigate for indirect pressures)
- Dutch commercial fishing sector:- Strongly against due to likely restrictions on activity
- RSPB:- Support
- The Crown Estate:- Accept – assumption that there will be no additional EIA requirements on renewables projects due to MCZ designation – concern however over recent NE/JNCC guidance on size of buffers required to avoid additional mitigation requirements on licensed aggregate sites
- The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement

Table 7.64 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	McBreen, 2010
Broad-scale habitat	Survey	Tappin, et al. 2011
European seabirds at sea (ESAS)	Modelled data	Kober, et al. 2010
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010
Ross worm (<i>Sabellaria spinulosa</i>) reefs	Survey	Tappin, et al. 2011
Ross worm (<i>Sabellaria spinulosa</i>) reef occurrences	Survey: records	CEFAS, 1989-2005
Subtidal sands and gravels	Combination of historical and recent records	Tyler-Walters, et al. 2009
Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

ALLEN, J.H., 2008, *Humber Gateway Offshore Windfarm Biotope & Cobble Reef Report*. Report to Environmental Resources Management Ltd. Institute of Estuarine and Coastal Studies. University of Hull.

ALLEN, J.H., BURLINSON, F. and BURDON, D., 2006. *Humber Gateway Offshore Windfarm Sabellaria Report*. Report to Environmental Resources Management Ltd, Institute of Estuarine and Coastal Studies, University of Hull.

CEFAS. 1989-2005. *Ross worm (Sabellaria spinulosa) occurrences from grab and beam trawl surveys*.

EAST YORKSHIRE RINGING GROUP-EYRG, 2010. *Gannet feeding ranges from Bempton cliffs via satellite tagging*, available from <http://www.eyrg.co.uk/Articles/Microsoft%20Word%20-%20Progress%20report%20Bempton%20gannets%20RHWL%2020211%20pdf.pdf> (accessed on 10/08/11).

EVANS, C.D.R., CROSBY, A., WINGFIELD, R.T.R., JAMES, J.W.C., SLATER, M.P. and NEWSHAM, R., 1998. *Inshore seabed characterisation of selected sectors of the English coast*. British Geological Survey Technical Report WB 98/45.

IPC, 2010. *SCOPING OPINION, Proposed Hornsea Project One Offshore Wind Farm, Infrastructure planning commission*.

JNCC AND NATURAL ENGLAND, 2010. *Marine conservation zone projects: identifying marine conservation zones, a quick reference guide*.

KOBER, K., WEBB, A., WIN, I., LEWIS, M., O'BRIEN, S., WILSON, L.J., REID, J.B. 2010. *An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs*. JNCC report No. 431.

MADDOCK, A. 2008. *UK Biodiversity Action Plan; Priority Habitat Descriptions*. Accessed from <http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf>

MANDER, L., EADES, R.A & CUTTS, N.D., 2009. *Occurrence and distribution of marine mammals off the Holderness coast: sightings made during aerial seabird surveys*. *Naturalist* 134: pp 129-134

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5)*. JNCC.

RSPB, 2010. *RSPB species foraging ranges, mean, mean maximum and maximum*, received from Martin Kerby 2010

TAPPIN, D.R., PEARCE, B., FITCH, S., DOVE, D., GEARY, B., HILL, J.M., CHAMBERS, C., BATES, R., PINNION, J., DIAZ DOCE, D., GREEN, M., GALLYOT, J., GEORGIU, L., BRUTTO, D., MARZIALETTI, S., HOPLA, E., RAMSAY, E., FIELDING, H. 2011. *The Humber Regional Environmental Characterisation*. British Geological Survey Open Report OR/10/54. 357pp. MALSF, Crown copyright.

THE WILDLIFE TRUSTS. 2010. *Areas of additional pelagic ecological importance (APEI) data layer*.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method*. ABP Marine Environmental Research Ltd.

UKSEAMAP, 2010. *Interactive Map* available from: <http://jncc.defra.gov.uk/page-5534&LAYERS=PredictedHabitats,UKCS> (accessed on 09/08/11).

Goodwin Sands rMCZ no 8

Marine Conservation Zone: Selection Assessment Document

Version and Issue date	Amendments made
V1.0 07.09.11	Draft final recommendations refined by the RSG and Local Groups in July 2011 and finalised by the RSG 2/3 August 2011.

1. Site name Goodwin Sands rMCZ no 8. Contains: Goodwin Knoll draft Reference Area no 6	3. Site surface area 27691 ha 276.91 km ²
2. Site centre location ETRS89 N51 15' 23.836" E1 35' 11.227" N51 15.397' E1 35.187' (N.B. WGS 84 UTM 31N coordinates are provided in the map vertices)	4. Biogeographic region Southern North Sea

5. Features proposed for designation within Goodwin Sands¹

Feature type	Feature name	Area ²
Broad-scale habitats	A3.2 mod energy infralittoral rock	0.65 km ²
	A4.2 mod energy circalittoral rock	0.58 km ²
	A5.1 subtidal coarse sediment	115.55 km ²
	A5.2 subtidal sand	159.97 km ²
Habitat FOCI	Blue mussel beds	312.57 m ²
	Rossworm (<i>Sabellaria spinulosa</i>) reef	625.29 m ²
Geology	Eastern English Channel outburst flood features	n/a

6. Features within Goodwin Sands not proposed for designation³

Feature type	Feature name	Reason
Species FOCI High mobility	European Eel (<i>Anguilla anguilla</i>)	Occurrence not certain
	Smelt (<i>Osmerus eperlanus</i>)	Occurrence not certain
	Undulate Ray (<i>Raja undulata</i>)	Occurrence not certain

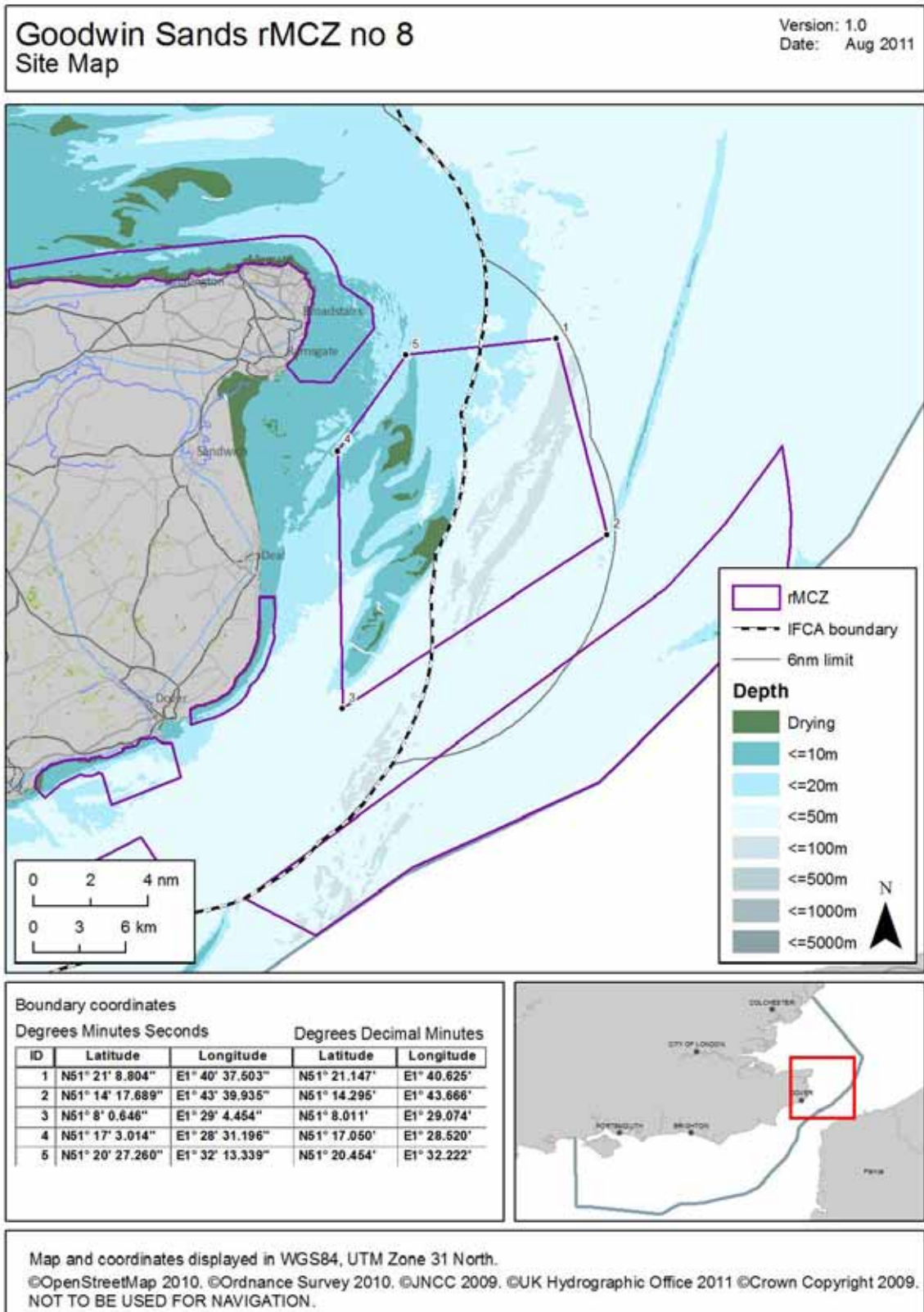
¹ Sources of information relating to these features are listed in Section 13.

² Areas have been calculated according to spatial GIS data and are indicative only.

³ Features may occur in both tables (sections 5 & 6) if the rMCZ overlaps with an existing MPA where the features are protected.

Goodwin Sands rMCZ no 8

7. Map of site



8. Site summary

The main feature of this site is the Goodwin Sands, a large dynamic and constantly changing area of subtidal sand and coarse sediments that is regularly exposed at low tide, providing an important haul out site for the Common and Grey Seal and good foraging grounds for certain bird species. Around the Sands themselves, the site includes deeper areas of subtidal coarse sediment that are known to be of particularly high biodiversity, as indicated by benthic species taxonomic distinctness and regular pelagic seasonal fronts. The site also contains Rossworm (*Sabellaria spinulosa*) reefs and a subtidal Blue Mussel bed. An extension was made to the site in May 2011 in order to capture shortfall ENG targets (A5.1 and A5.2) and an area of high biodiversity to the south east of the site. . The inner or IFCA 6 nm line divides the site, so that although it lies within the outer 6nm line as shown on charts, part of it lies outside the area of jurisdiction of the IFCA⁴.

The combination of dynamic sediment habitats and low levels of activity around the Goodwin Sands means that the draft conservation objectives for this site are currently all MAINTAIN, which means that management could be limited to monitoring, and that current activities would be able to continue at the same level.

9. Detailed Site Description



The following is a description of the site based on extracts from literature held by the Balanced Seas Project and stakeholder correspondence. It does not constitute a complete literature review or ecological description of the site.

The site boundaries encompass the Goodwin Sands, a collection of sandbars and shoals that become exposed at low tide, the permanently subtidal areas immediately surrounding them and a deeper channel running along their seaward side. According to the UKSeaMap/MESH data (JNCC 2011 v.7), the site contains small patches of moderate energy infralittoral and circalittoral rock and large areas of subtidal coarse sediment and subtidal sand (see Broad-scale habitats map.).

As a result of their shifting nature and the risk this poses to shipping, the Goodwin Sands are surveyed at regular intervals by the UK Hydrographic Office; the 2009 survey comprised a full survey of the whole area, the results of which are shown in UK Hydrographic Office (2010). A 2008 consultancy study (HR Wallingford Ltd, 2008) of recent changes in the bathymetry of the South Goodwin Sands, carried out for the Dover Harbour Board, showed that although the morphology of the South Goodwin Sands has changed significantly over time, the overall volume had remained the same indicating that the bank is in a state of dynamic equilibrium (i.e. although the morphology of bank is changing, the volume of sediment is remaining at/near a constant amount). Over most of the area looked at, surveys between the mid-1990s and 2006 showed that there has been accretion on the bank (up to 12 m vertically) apart from the eastern side of the bank where the sea bed has dropped by as much as 15m indicating that the bank has retreated landwards or eroded.

Examples of Blue Mussels beds and Rossworm (*Sabellaria spinulosa*) reef have been found within the site, and on the same spot (see FOCI map). Both are dependent on the underlying broad scale habitat (Wildlife Trusts, RSG meeting report, August 2011) with *Sabellaria* occurring particularly on coarser areas of sediment including pebbles and boulders (Essex/Thames/North Kent Local Group

⁴ The inner 6 NM limit is a line drawn 6 NM seaward from the baselines. The area inshore of this line represents the area over which the IFCA has responsibility, along with other authorities, for fisheries management. For the purposes of this paragraph "the baselines" means the baselines as they existed at 25th January 1983 in accordance with the Territorial Waters Order in Council 1964 (1965 111 p. 6452A) as amended by the Territorial Waters (Amendment) Order in Council 1979 (1979 11p. 2866).

Meeting Report 4, April 2011). It has been suggested that the two FOCI together could stabilize the sediment if their distribution and density were to increase across the southern part of the site (Wildlife Trusts, Balanced Seas North Kent Sites Meeting Report, July, 2011).

The highly mobile species Common Smelt, European Eel and Undulate Ray are thought to transit through the area although no records exist to confirm permanent or regular populations and the offshore conditions may be unsuitable for these species (Balanced Seas RSG 6 Meeting Report, January, 2011).

Part of the geological feature English Channel Outburst Flood Features occurs within the site forming the deep channel running through the eastern part of the site (National contract data DEFRA MB102 2A), and the RSG have selected this as a feature for protection (see Geology map.) This geomorphological feature is evidence of a megaflood which occurred some 200,000 years ago when a huge glacial lake in the North Sea burst through the Dover Straits Isthmus which contained it, thus separating England from mainland Europe. Sonar evidence of the seabed reveals deeply gouged channels where the floodwaters broke through (Gupta *et al.* 2007).

The Goodwin Sands complex is one of two primary seal haul-out sites in the South and S.E. England regions (the other is the Margate Sands complex to the north), with the Goodwin Sands being the most important for Grey Seals, particularly on the North Sand sandbank (Bramley and Lewis, 2004; Lewis, 2006). There are an estimated 1000 seals in the South and Southeast regions, two thirds of which are Grey or Atlantic Seals with a smaller number of Harbour or Common Seals. Haul out sites are assumed to be close to biodiversity hot-spots for a range of fish and crustacean species, given the foraging behaviour of seals (Lewis, email to project team, 2010).

This assumption is underpinned by the data held by the project from surveys indicating the importance of this area for benthic species taxonomic distinctness, benthic species richness, and regular pelagic seasonal fronts (National Contract Data DEFRA MB102 2F), areas of additional pelagic ecological interest (Wildlife Trusts), Great Cormorant and Black Kittiwake foraging ranges (RSPB), Fulmar and Gannet seasonal foraging areas (RSPB, Balanced Seas Essex/Thames/North Kent Inshore Task Group Meeting Report, December, 2010) and other additional species and biodiversity richness (EA, 2010-2011). The Goodwin Sands is one of the Key Inshore Biodiversity Areas in the Balanced Seas Region recommended as an MCZ (for mussels beds, Sabellaria reefs and seals), by the South East England Biodiversity Forum (SEEBF, 2010).

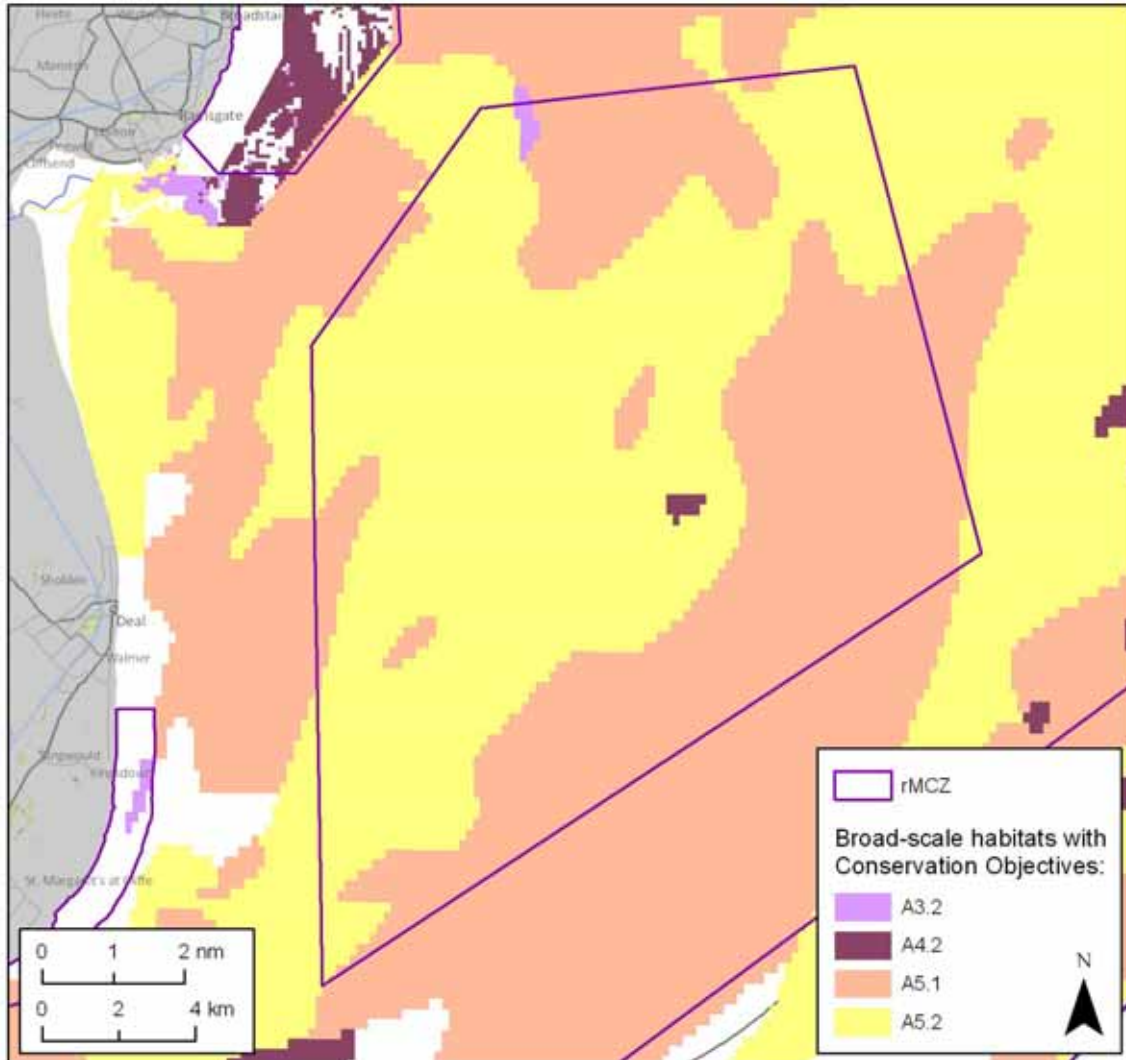
There have been frequent sightings of Thornback ray laying eggs mainly in Spring and September, which could mean that this site is an established spawning ground for this species. Females can take up to 9 years to mature and are thought not to travel far from the recruitment area. The diverse seabed and depths from dry at low water to over 40 metres around the sands suggests that it might also be important for spawning for other species such as Sand Eel and cod (B. Marshall, email, 16 March 2011). The area is also thought to be important for Sand eel, bass, mackerel, smoothhounds and sprat (Balanced Seas Essex/Thames/North Kent Local Group Meeting Report 3, November, 2010). More commercial species cod, whiting, red mullet, squid, plaice, Dover sole, and dogfish also occur in the area (Balanced Seas Offshore Task Group, March 2011). Crustacea such as lobster are found amongst the many wrecks in the site (Balanced Seas RSG 6 Meeting Report, January 2011).

The Goodwin Sands are famous for the many hundreds of wrecks that lie there, several of which are designated as protected and are managed by English Heritage, the most famous of which is the Rooswijk. These wrecks are in various stages of decay ranging from well preserved to near disintegration and serve as artificial habitats for wildlife.

Goodwin Sands dMCZ no 8

Version: 1.0
Date: Aug 2011

Broad-scale habitats (EUNIS Level 3) with Conservation Objectives



Broad-scale habitats with Conservation Objectives:

- A3.2 mod energy infralittoral rock
- A4.2 mod energy circalittoral rock
- A5.1 subtidal coarse sediment
- A5.2 subtidal sand

IMPORTANT: Only those broad-scale habitats with Conservation Objectives have been shown here. To see those habitats that have not been proposed for designation, please look at Section 6.



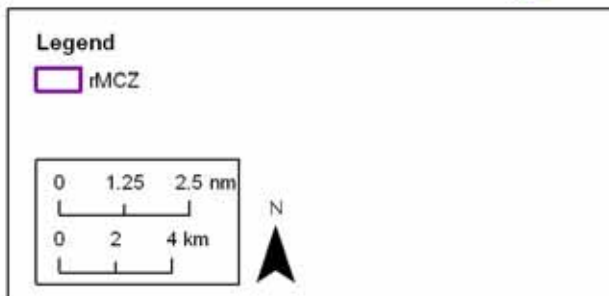
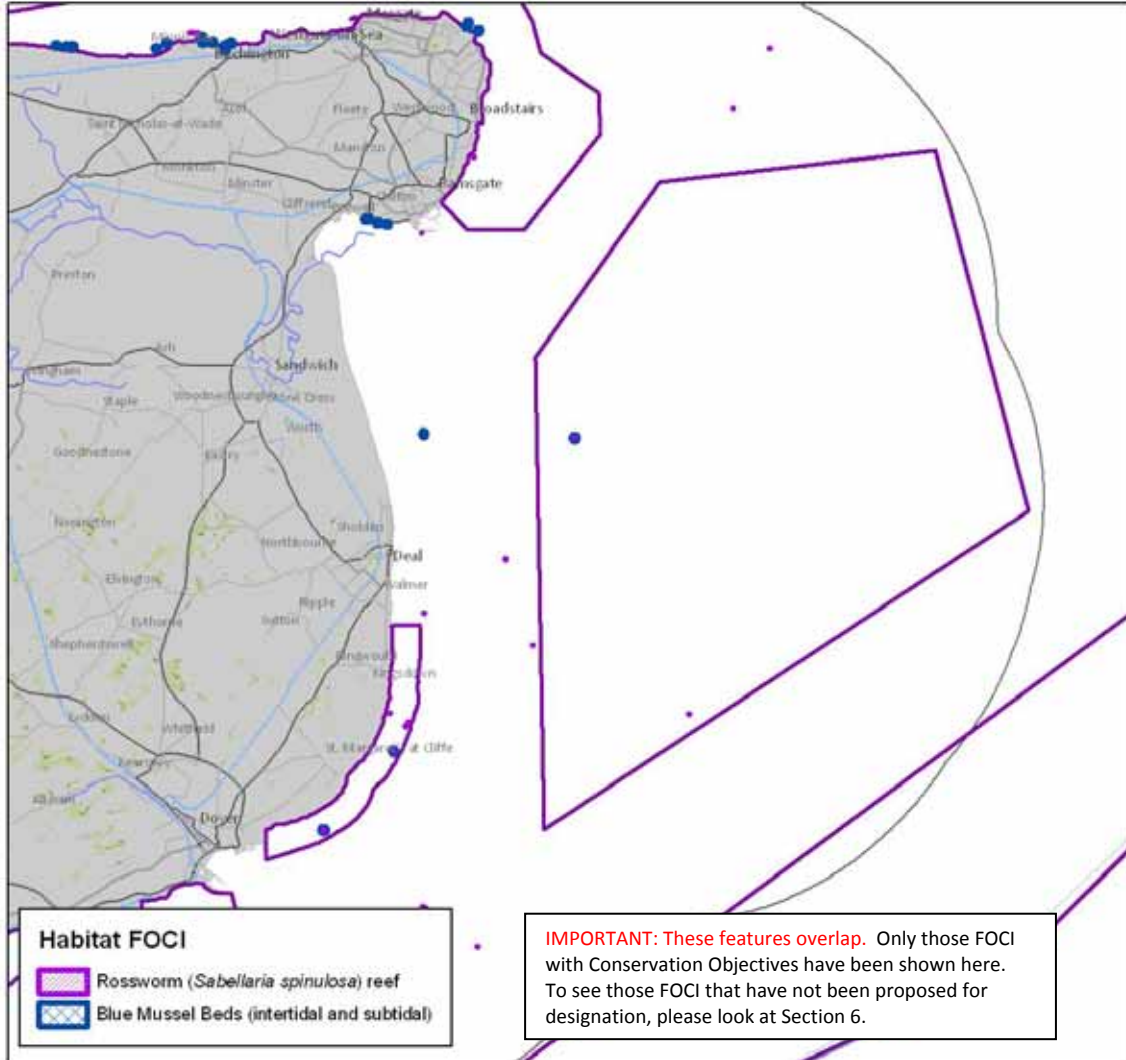
Map and coordinates displayed in WGS84, UTM Zone 31 North.

©OpenStreetMap 2010. ©Ordnance Survey 2010. ©JNCC 2009. ©Crown Copyright 2009.
NOT TO BE USED FOR NAVIGATION.

Goodwin Sands rMCZ no 8

Version: 1.0
Date: Aug 2011

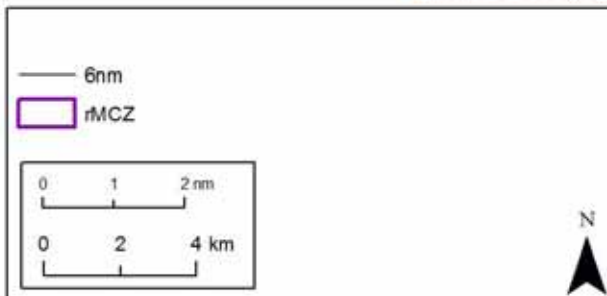
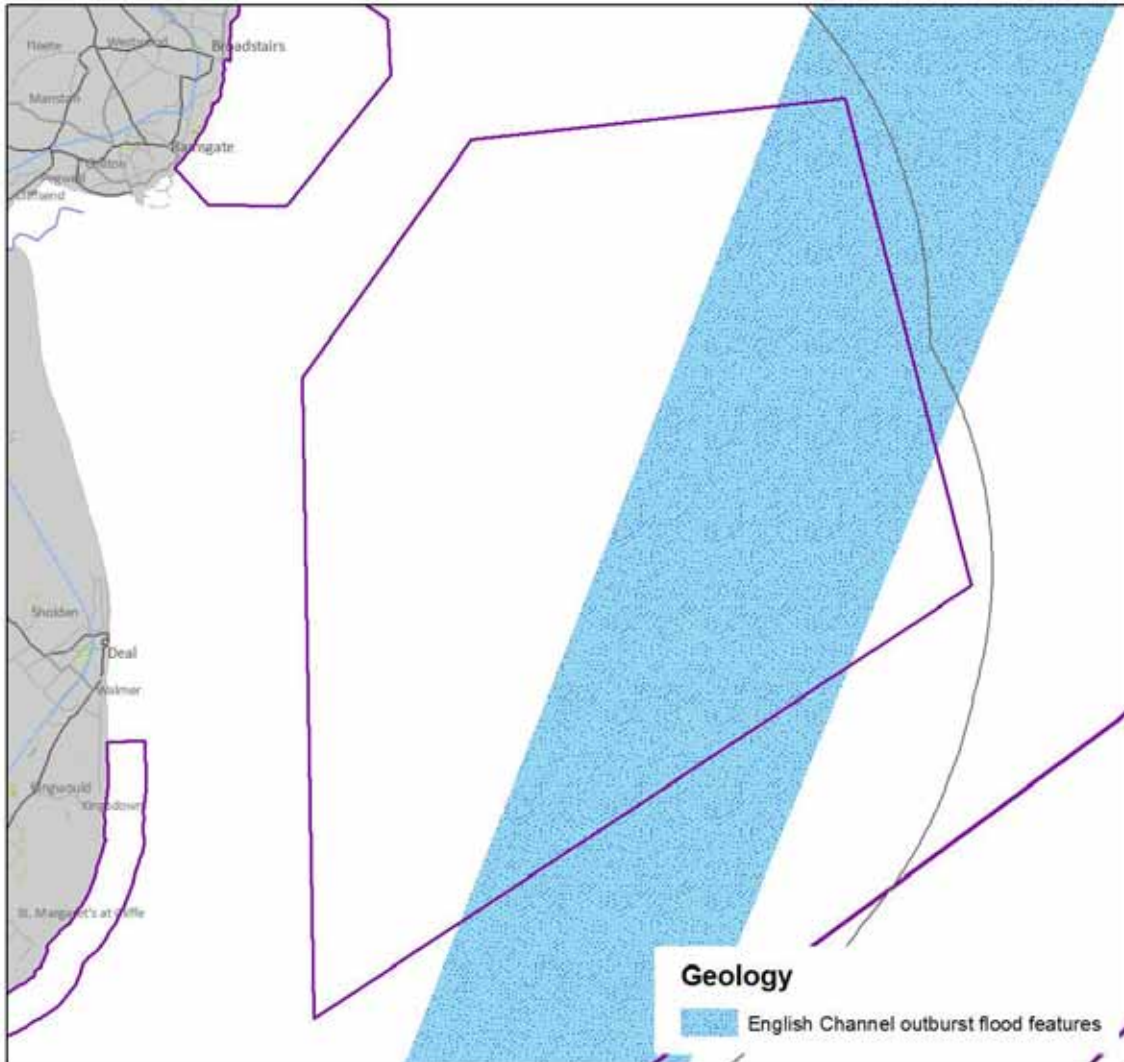
Habitat and Species FOCI Conservation Objectives



Map and coordinates displayed in WGS84, UTM Zone 31 North.
©OpenStreetMap 2010. ©Ordnance Survey 2010. ©JNCC 2009. ©Crown Copyright 2009.
NOT TO BE USED FOR NAVIGATION.

Goodwin Sands rMCZ no 8 Geology

Version: 1.0
Date: Aug 2011



Map and coordinates displayed in WGS84, UTM Zone 31 North.
©OpenStreetMap 2010. ©Ordnance Survey 2010. ©JNCC 2009. ©Crown Copyright 2009.
NOT TO BE USED FOR NAVIGATION.

10. Site boundary

The northernmost point of the site is described by the Goodwin Knoll Buoy, due east of Ramsgate Port. From there, the eastward boundary follows a straight line southwest to the 10m depth contour in Gull Stream which is due north of the SW Goodwin Buoy and drops down to just north of the Buoy to meet the 5m depth contour at the tail of the Goodwin Sands. The boundary then follows a straight line southeast to meet the South Falls Buoy, a straight line to a wreck due east of NE Goodwin Buoy and a straight line to meet the northernmost point. The IFCA 6 naut mi line crosses the site north to south which will have implications for management.

11. Conservation objectives

Individual conservation objective forms for each feature can be found in Appendix 1. For a site-based summary of the conservation objectives and proposed management measures, please see Section 15.

12. Sites to which this site is related

This site is not associated with any existing designation. There are a number of protected wrecks in the vicinity.

13. Supporting documentation (information relating to ENG features only)

Information	Type of information	Source	Name of survey	Date
Broad-scale habitats	Modelled and survey data	JNCC V.7 Combined UKSeaMap and MESH	Combined	June 2011
Rossworm (<i>Sabellaria spinulosa</i>) reef	Survey	Kent Wildlife Trust		31/08/2005
Rossworm (<i>Sabellaria spinulosa</i>) reef	Survey	Environment Agency database		31/12/2005
Blue mussel beds	Survey	Kent Wildlife Trust		31/08/2005

References (additional information can be found in the Bibliography)

BRAMLEY, J. AND LEWIS, B. 2004. *Pilot Survey of Seal Haul-Out Sites off of the North Kent Coast*. Proceedings of the Second North Kent Coastal Conference. English Nature Report 630.

BROOKS, A.J., ROBERTS, H. KENYON, N.H. & HOUGHTON, A.J. 2009. *Accessing and Developing the Required Biophysical Dataset and Data Layers for Marine Protected Areas Network Planning and Wider Marine Spatial Planning Purposes. Report No 8 Task 2A: Mapping of Geological and Geomorphological Features*. DEFRA, London.

JACKSON, E.L., LANGMEAD, O. HISCOCK, K. TYLER-WALTERS, H. MILLER, P. McQUATTERS-GOLLOP, A. SAUNDERS, J. & C. FOX. 2009. *Accessing and Developing the Required Biophysical Dataset and Data Layers for Marine Protected Areas Network Planning and Wider Marine Spatial Planning Purposes. Task 2F: Development of Marine Diversity Data Layer: Review of Approaches and Proposed Method*. DEFRA, London.

GUPTA, S., COLLIER, J.S. PALMER-FELGATE, A. & POTTER G. 2007. Catastrophic Flooding Origin of Shelf Valley Systems in the English Channel. *Nature* **448** : 342-345

HR WALLINGFORD LTD. 2008. *Goodwin Sands: Study of Historical Changes*. Technical Note Consultancy report DDM6067/TN01 for Dover Harbour Board: 12

LEWIS, B. 2006. Beyond the Sandbanks: An Introduction to the Use of Satellite Telemetry to Monitor the Movements of Harbour Seals (*Phoca vitulina*) around the Kent Coastline. In: Child, T. and Tittley, I. eds. *Natural England Research Report NERRO29. Current Marine and Coastal Issue for N. E. Kent: Proceedings of the Third N.E. Kent Coastal Conference 9 November 2006*. Natural England, Sheffield.

SEEBF (South East England Biodiversity Forum (SEEBF) 2010. Key Inshore Biodiversity Areas in the Balanced Seas Region for recommendation as Marine Conservation Zones. Letter and list to RSG and Balanced Seas Project Team, 22 Nov 2010.

UK HYDROGRAPHIC OFFICE. 2010. Goodwin Sands: Assessment on the analysis of routine resurvey areas GS1, GS2, GS3 & GS4, from the 2009 survey. UK Hydrographic Office, Taunton.

14. Stakeholder support for this site

The RSG as a group reached consensus that this site should be put forward in their final recommendations.

Goodwin Sands rMCZ no 8

Individual sectors wishing to note their support or concerns about the site recorded the following at the final RSG meeting in August 2011; their comments have been transcribed verbatim from the form that they completed:

SECTOR	ORGANISATION	COMMENT for Goodwin Sands rMCZ 8
Yachting	RYA	Support on basis there is no impact on recreational boating.
Sea Angling		Goodwin Sands is all maintain this would allow RSA to continue (charter boats) fishing.
Ports		Aspirations for Dover Port to extract aggregate from within this site for infill for future developments. Location of this <u>TBC</u> .
Fishing - under 10s (static gear)	NUTFA	(Tick)
Fishing - FPO, beam trawling		Parts of area fished heavily. No support for south and east of site. NW of site reasonable support.
Shipping	Chamber of Shipping	Especially if CO moved to recover, maintenance and expansion of navigational buoyage must be unfettered.
Birds	RSPB	Support site but CO for Sabellaria needs revisiting to see whether trawling overlaps, if so, CO should be recover. Consideration should be given to 'recover' for supporting broadscale habitats.
Wildlife Trusts	Hampshire Wildlife Trust	Support this site but the CO of maintain is based on no overlap but activity data is inconsistent as IFCA and Belgium fleet say activity does exist. BSH needs recover to support FOCI.
Marine ecology	Seasearch	Strongly support site, but CO needs to be recover for sensitive habitat FOCI and their supporting broadscale habitats, to allow these consolidating reef communities to spread.
Marine Wildlife	Marine Conservation Society	<u>Support site</u> . But is invalidated (made the equivalent of paper parks) by "maintain" objectives.
IFCA	Kent & Essex IFCA	<u>General Support</u>
Heritage and Archaeology	English Heritage	Support as long as excavation of wrecks allowed.

15. Site summary of conservation objectives (COs) and proposed management measures

A conservation objective (CO) is a statement describing the desired quality of the feature. Existing MPAs in the UK use the term *Favourable Condition* to represent the desired state of their features. Some pressures caused by human activities may stop the feature attaining favourable condition if present at sufficient intensity.

MAINTAIN means that, the *stated levels of activity* currently occurring on the feature are considered acceptable, but features will be monitored and restrictions may have to be introduced if the condition declines.

RECOVER means that restrictions may be necessary on the activity causing the pressure, in order to allow the feature to recover to favourable condition. It does not necessarily mean that the activity will be prohibited, as other mitigation measures might be appropriate (e.g. change in gear type, reduction of intensity, seasonal restrictions, etc)

The table below documents the draft COs for ALL the features listed for protection within the site, as established by JNCC and NE through the Vulnerability Assessment (VA) process⁵ and then sense-checked at the national level⁶. Where a RECOVER objective is noted, the associated activity causing the pressure is indicated. In some cases, where data and information warrant it, the RSG chose to adopt the changes to COs recommended by the public authorities: Inshore Fisheries and Conservation Authorities (IFCAs), Marine Management Organisation (MMO), Environment Agency (EA) or Natural England. Changes were only accepted when recommended by these authorities and have been clearly noted. Where the VA has not yet been undertaken, or there is considerable uncertainty surrounding the accuracy of the information being used to recommend a change to the conservation objective, it has been noted as 'TO BE ASSESSED'. Local and regional stakeholders were given the opportunity to comment on the COs and potential management measures and to provide additional information that might not have been taken into account in the VA work.

For greater detail on discussions relating to the site and the network, please refer to both RSG and Local Group stakeholder meeting reports at www.balancedseas.org.

⁵ The process of establishing conservation objectives is outlined in the [Conservation Objectives Guidance](#) (JNCC /NE 2011)

⁶ VA results were standardised across all four regional projects but the fisheries activity data is still undergoing assessment.

Goodwin Sands rMCZ no 8

Feature	Draft CO	Activity exerting pressure	IFCA/MMO/EA/NE Comments	Stakeholder comments on draft COs and potential management measures
A3.2 Moderate energy infralittoral rock	MAINTAIN		NE feel that level of trawling justifies this CO, but would need monitoring	Wildlife Sector concerned about levels of trawling
A4.2 Moderate energy circalittoral rock	MAINTAIN		NE stated that if levels of set netting increase, they may need review	Wildlife Sector concerned about this CO
A5.1 Subtidal coarse sediment	MAINTAIN			Wildlife sector is concerned that a MAINTAIN CO would not allow <i>Sabellaria</i> and blue mussels to gain a foothold and stabilise this sediment habitat.
A5.2 Subtidal Sand	MAINTAIN			Wildlife sector is concerned that a MAINTAIN CO would not allow <i>Sabellaria</i> and blue mussels to gain a foothold and stabilise this sediment habitat.
Blue Mussel beds	MAINTAIN			Wildlife sector is concerned that a MAINTAIN CO would not allow blue mussels to gain a foothold and stabilise this sediment habitat across the southern part of the site. (See below)
Rossworm (<i>Sabellaria spinulosa</i>) reef	MAINTAIN		<p>IFCA think there is a low level of trawling</p> <p>NE clarified that this will need re-assessing if activity is found to overlap with the feature.</p>	<ul style="list-style-type: none"> Wildlife sector is concerned that a MAINTAIN CO would not allow <i>Sabellaria</i> to gain a foothold and stabilise the sediment habitat across the southern part of the site, because of impact of benthic trawling; would want to see a RECOVER objective; concerns with both the level of activity of commercial fishing in the site and the types of gear – Dutch fleet have licences to use fishing gear that they consider to have less impact on the seabed; it could be explored as the only type of fishing allowed. UK fishing industry flagged that they would be disadvantaged as they do not have the license to use this gear type. Fishing industry don't think there is any overlap between feature and activity, as <i>Sabellaria</i> occurs in areas that are too shallow to trawl A RECOVER objective would cause concern for the shipping sector particularly with regards to the laying of new navigational buoys. RSA support a maintain objective.
English Channel Outburst Flood Features	MAINTAIN			The vulnerability assessment and associated COs had not been undertaken prior to the IFCA/MMO/EA and Local Group meeting in July 2011, so was not discussed at these meetings.

16. Evolution of the site recommendations

A Broad Area of Interest over this site was proposed in the first RSG meeting (RSG 1, April 2009) and was adjusted to follow the contours of the features more closely in subsequent early meetings. At the Essex and Kent Local Group meeting in November 2010, the boundaries were straightened and expanded slightly to include Rossworm reef records and an important seal haul out area. Following the incorporation of the MALSF Synthesis of the central and eastern English Channel REC data, ENG targets were below the minimum threshold and the RSG tasked the Project Team with suggesting suitable areas to incorporate into the network. Marxan (the conservation planning decision support tool) was used to suggest sites that met the necessary shortfall ENG target habitats and captured areas of high biodiversity in the region, one of which was an area to the southeast of the existing Goodwin Sands site (RSG 9A, 17.05.2011). The RSG extended the site boundaries to include this high biodiversity area in order to meet the additional ENG targets for A5.1 subtidal coarse sediment and A5.2 Subtidal sand.

For greater detail on discussions relating to the site and the network, please refer to both RSG and Local Group stakeholder meeting reports at www.balancedseas.org.

17. Implications for Stakeholders

The following issues affect this site:

- Dover Harbour Board has used part of the South Goodwin Sands to dredge for infill for port development due to its close proximity (thus reducing their carbon footprint during construction) and the quality of material for engineering purposes. Although not used at present, they have expressed concern that an MCZ here will conflict with any infill requirements in the future, particularly for construction of the planned second ferry terminal (Terminal 2). No licence is currently held and no application has been submitted yet for this activity.
- The IFCA 6 nm limit runs north-south through the centre of this rMCZ, and French, Belgian, Dutch and German fleets have historic rights in the eastern part of the site.
 - Belgium: historic fishing rights for demersal species and herring; the Belgian fleet uses the area beyond 6 n mi extensively for beam trawling, otter trawling and netting, and the Belgian fishing industry does not support the extension of this rMCZ beyond 6 n mi at all. The Belgian representative reported that some of the Belgian vessels use gear adaptations (pulse technology - an electrical system still under development) that might mitigate against potential damage. If this was the only type of beam trawling gear allowed within the site, as suggested by the Wildlife sector, the UK fishing fleet would be placed at a disadvantage due to lack of capital to make such adaptations, and MMO licence restrictions preventing use of such technology.
 - French: historic fishing rights for all species; French static fishing fleets from Calais use the area seasonally, and trawling fleets from Calais and Boulogne use the area all year round.
 - Dutch: historic rights for herring only within 12 nm and therefore the Dutch fishing representative has not expressed any problems with this site. The Dutch fleet is developing less damaging beam trawl fishing gear (the 'Sumwing' system) for use on trawling grounds.
 - German: historic fishing rights for herring only; have not engaged in the discussion
- Under IFCA byelaws, within the 6nm limit, there is a maximum size restriction of 17 m overall length for UK trawlers (except the few with 'Grandfather Rights') due to IFCA byelaws. This restriction does not apply beyond 6 nm and so there is greater potential pressure on habitats in the eastern part of the site from trawling. The UK over 10 m trawling fleet is not particularly

Goodwin Sands rMCZ no 8

concerned about the area within 6 nm, however they use the area outside 6 nm as a track to fish through to link with other adjacent fishing grounds;

- Under 10s commercial fishing fleets from Ramsgate and Deal using mainly static and drift fishing gear, depend on this area for their livelihoods, but with COs of MAINTAIN are willing to support this site;
- Parts of the Goodwin Sands provide important safe anchoring areas; Trinity Bay and The Downs, lying between the Goodwin Sands and Kent coast, provide a waiting area for ferry traffic in the event of the Port of Dover being closed and sheltered anchorage for large draught vessels as well as other commercial vessels and recreational craft (UK Hydrographic Office, 2010); commercial charter boats and the recreational sector support the rMCZ only if there is no impact on current anchoring usage.
- Shipping generally avoids the area because of its dynamic nature and keeps offshore to the south and east or uses the inshore route of Gull Stream to the west (estimated 900 vessels a year). Ferry traffic to or from Ramsgate crosses the northern end of the Goodwin Sands (UK Hydrographic Office, 2010).
- English Heritage has expressed concerns about the potential impact of an MCZ on their efforts to protect and manage the enormous number of wrecks here; the current MAINTAIN COs will mean that there should be no impact.
- The Wildlife sector believes that the COs will not achieve protection for the features to be designated and that the site will be considered to be a 'paper park'.
- The Crown Estate note that the site is within a future interest area for nearshore wave projects, tidal projects and has a number of telecom (active and inactive), wind farm and power cables. However, they accept the site.

This list represents only the major issues associated with the site. To see all stakeholder discussions, please refer to the Balanced Seas RSG and Local Group meeting reports at www.balancedseas.org.

Kentish Knock East rMCZ no 30

Marine Conservation Zone : Selection Assessment Document

Version and Issue date	Amendments made
V1.0 07.09.11	Draft final recommendations refined by the RSG in July 2011 and finalised by at the RSG's final meeting 2/3 August 2011.

1. Site name Kentish Knock East rMCZ no 30	3. Site surface area 9630 ha 96.30 km ²
2. Site centre location ETRS89 N51 39' 56.226" E1 47' 47.486" N51 39.937' E1 47.791' (N.B. WGS 84 UTM 31N coordinates are provided in the map vertices)	4. Biogeographic region Eastern English Channel

5. Features proposed for designation within Kentish Knock East ¹

Feature type	Feature name	Area ²
Broad-scale habitats	A5.1 subtidal coarse sediment	81.65 km ²
	A5.2 subtidal sand	2.82 km ²
	A5.4 Subtidal mixed sediments	11.52 km ²

6. Features within Kentish Knock East not proposed for designation

Feature type	Feature name	Comment
Geology	English Channel Outburst Flood feature	Was not identified until after final RSG. Very tip of feature. Already included as a feature for protection in several other rMCZs.

7. Site summary

This site is located outside the 6 nmi line, to the east of the Margate & Longsands SAC and overlapping with the Outer Thames Estuary SPA; it lies adjacent to the Balanced Seas/Net Gain boundary. The seabed here is predominantly subtidal coarse sediments (including sands and gravels) and small patches of subtidal sand. Grab sample data from the area show the coarse sediments contain moderate species richness in relation to others in the region. **Persistent thermal fronts** and regular summer/winter bird foraging areas highlight that the area has high pelagic biodiversity.

This site was introduced into the developing network at the end of May 2011, following an RSG request that the project team undertake some analysis to identify suitable areas to meet shortfall broad-scale habitats, particularly subtidal coarse sediment (A5.1). Given the distribution of this particular habitat, three areas were suggested in the Outer Thames Estuary, all of which were considered to have an impact on the fishing fleet, but this site was considered to be the 'least worst'. The RSG and local stakeholders subsequently adjusted the boundaries to reduce the impact on the fishing fleet and avoid the aggregate licence area. The site now extends beyond 12nm to capture the entire sediment bank and three broad-scale habitats: A5.1, A5.2 and A5.4.

The draft conservation objective of RECOVER for two of the habitats has implications for benthic trawling. However, this site is an important fishing area for both UK and non UK fleets and further assessment of the ecological and activity data is required, as well as finalisation of the conservation objectives for all three habitats; it might be possible to mitigate damage through the use of gear adaptations or restriction to light mobile gears only. An aggregate option area immediately north

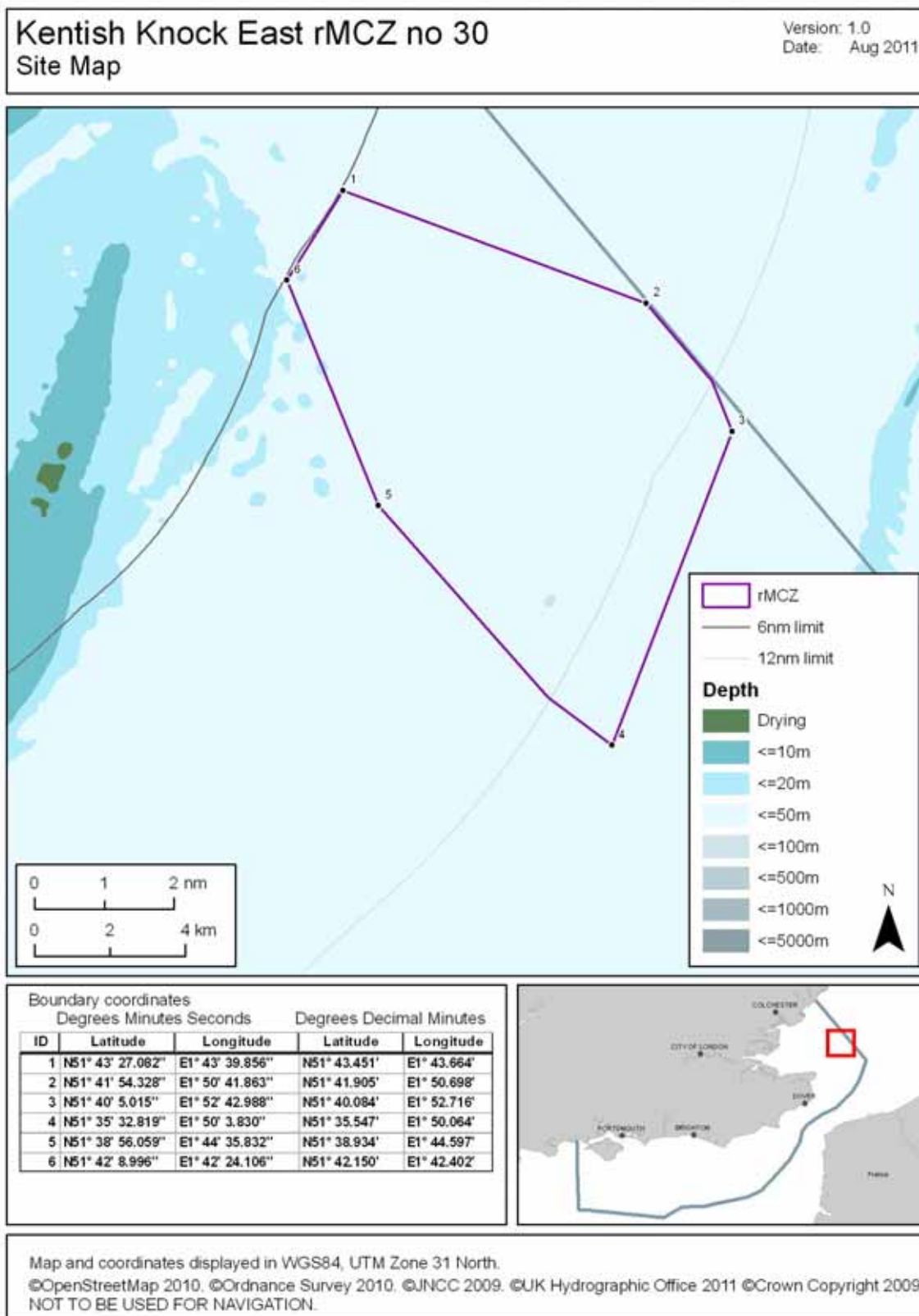
¹ Sources of information relating to these features are listed in Section 13.

² Areas have been calculated according to spatial GIS data and are indicative only.

Kentish Knock East rMCZ no 30

west of the site may result in secondary impacts on the rMCZ, which this may require a re-assessment of the vulnerability assessment.

8. Map of site (see below)



9. Detailed site description



The following is a description of the site based on extracts from literature held by the Balanced Seas Project and stakeholder correspondence. It does not constitute a complete literature review or ecological description of the site.

This site is located outside the 6 nmi line, to the east of the Margate & Longsands SAC and overlapping with the Outer Thames Estuary SPA; it lies adjacent to the Balanced Seas/Net Gain boundary. According to the UKSeaMap/MESH (v7 JNCC) data, the broad-scale habitats are shown to be subtidal coarse sediments (A5.1), sand (A5.2) and mixed sediments (A5.4), all of which have been selected for protection (See Broad-scale habitats map). The site extends beyond 12nm to capture the entire sediment bank.

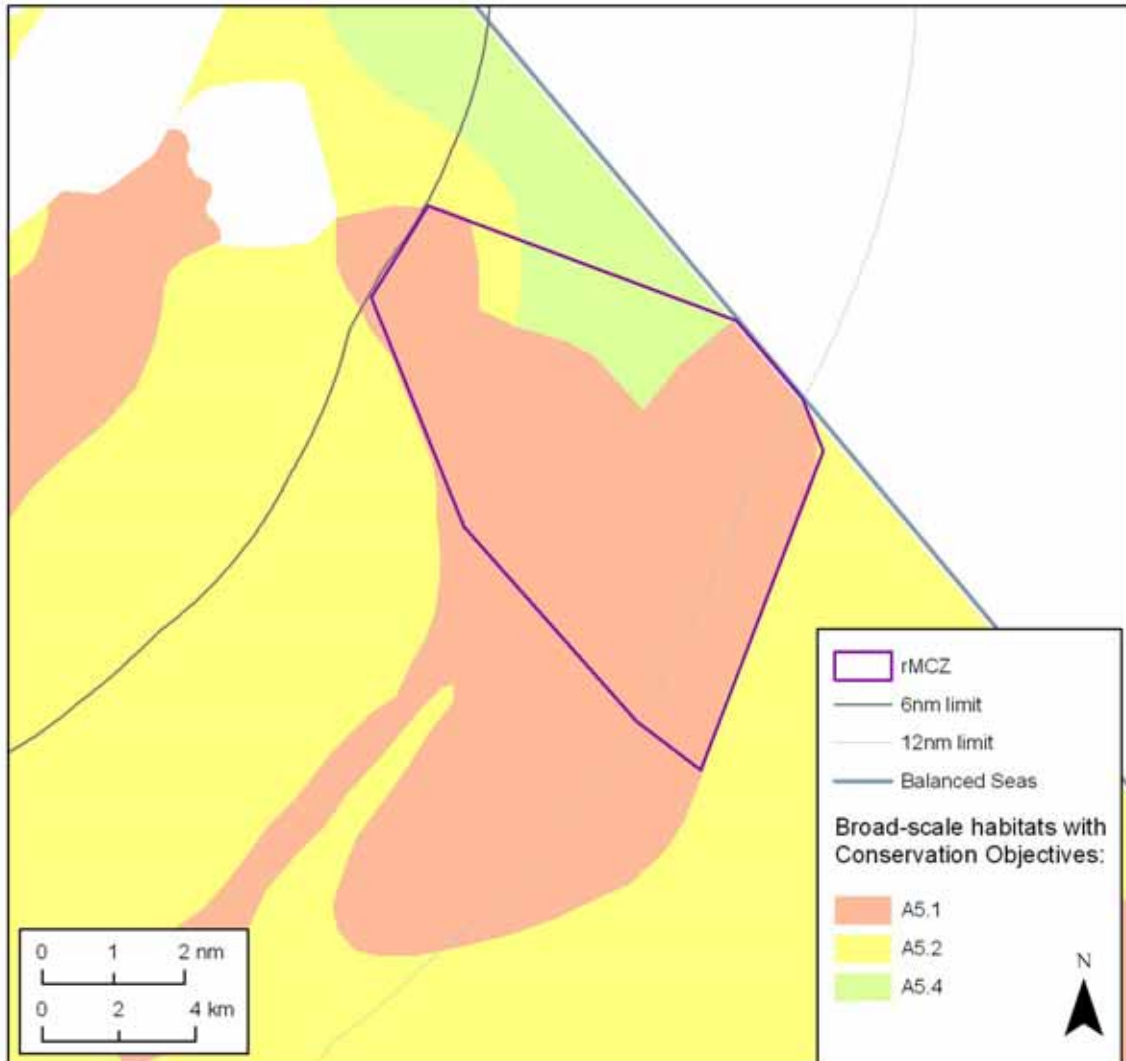
Biotope data have been collated by the Environment Agency from various grab sample surveys and these data show that the coarse sediments contain moderate species richness in relation to others in the region. **Persistent thermal fronts (national contract data)** and regular summer/winter bird foraging areas (European Seabirds at Sea data) highlight that the area has high pelagic biodiversity.

From the national contract data (Natural England, Brooks *et al.* 2009), the majority of the site's seabed shows geomorphological evidence of the Eastern English Channel Outburst Flood, which occurred some 200,000 years ago when a huge glacial lake in the North Sea burst through the Dover Straits Isthmus which contained it, thus separating England from mainland Europe. Sonar evidence of the seabed reveals deeply gouged channels where the floodwaters broke through (Gupta *et al.* 2007). However, the presence of this feature was not recognised in time to allow stakeholder discussions to select it as a feature for protection should they have wished to.

Kentish Knock East rMCZ no 30

Version: 1.0
Date: Aug 2011

Broad-scale habitats (EUNIS Level 3) with Conservation Objectives



Broad-scale habitats with Conservation Objectives:

- A5.1 Subtidal coarse sediment
- A5.2 subtidal sand
- A5.4 subtidal mixed sediments

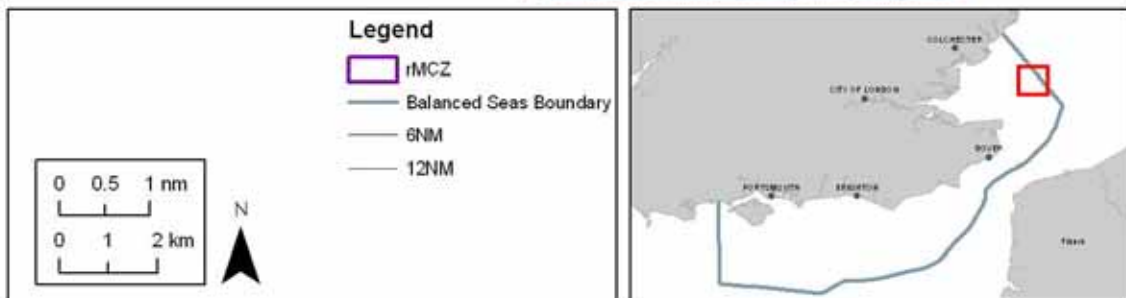
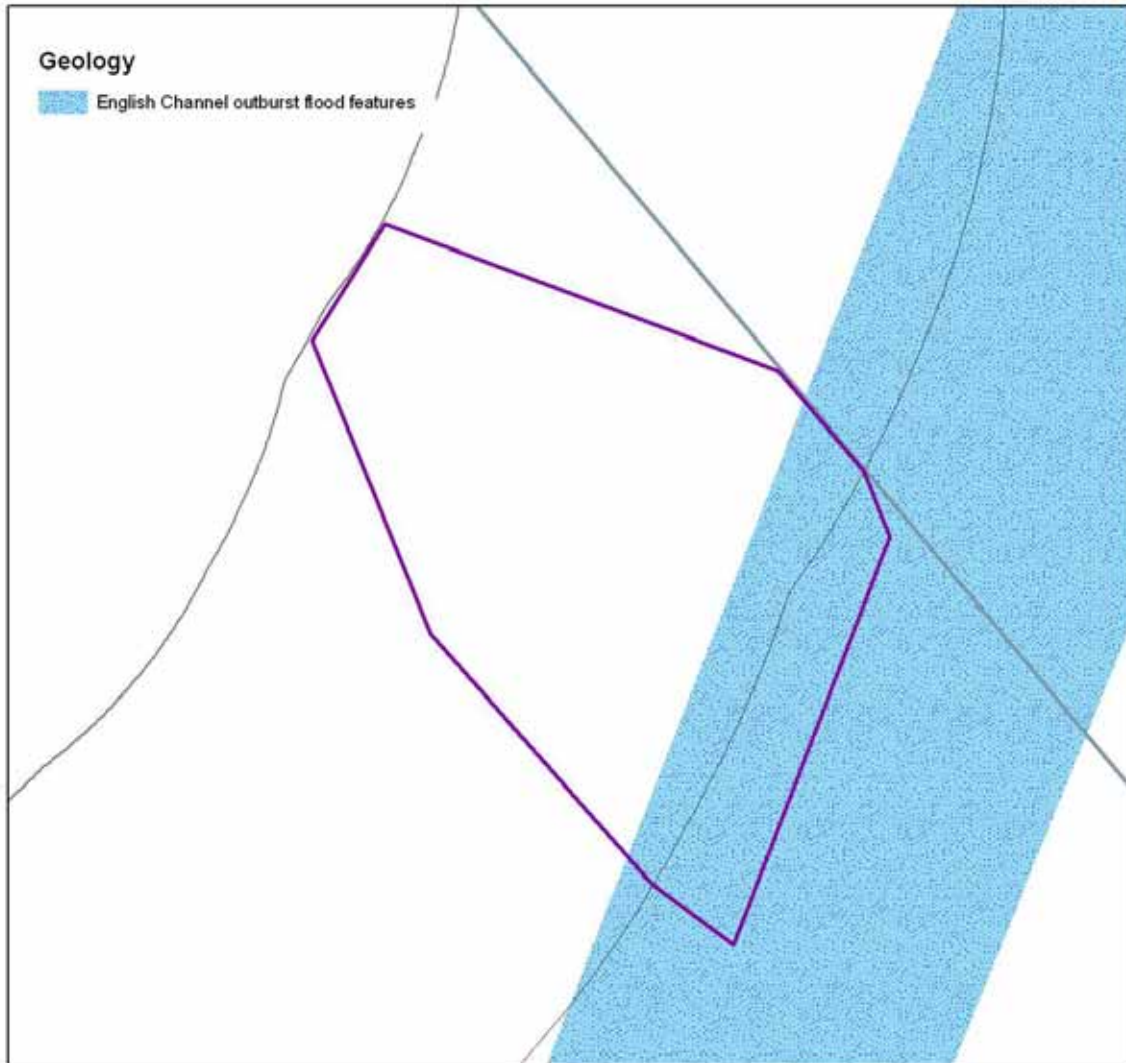
IMPORTANT: Only those broad-scale habitats with Conservation Objectives have been shown here. To see those habitats that have not been proposed for designation, please look at Section 6.



Map and coordinates displayed in WGS84, UTM Zone 31 North.

©OpenStreetMap 2010. ©Ordnance Survey 2010. ©JNCC 2009. ©Crown Copyright 2009.
NOT TO BE USED FOR NAVIGATION.

Kentish Knock East rMCZ no 30 Geology



Map and coordinates displayed in WGS84, UTM Zone 31 North.
©OpenStreetMap 2010. ©Ordnance Survey 2010. ©JNCC 2009. ©Crown Copyright 2009.
NOT TO BE USED FOR NAVIGATION.

Kentish Knock East rMCZ no 30

10. Site boundary

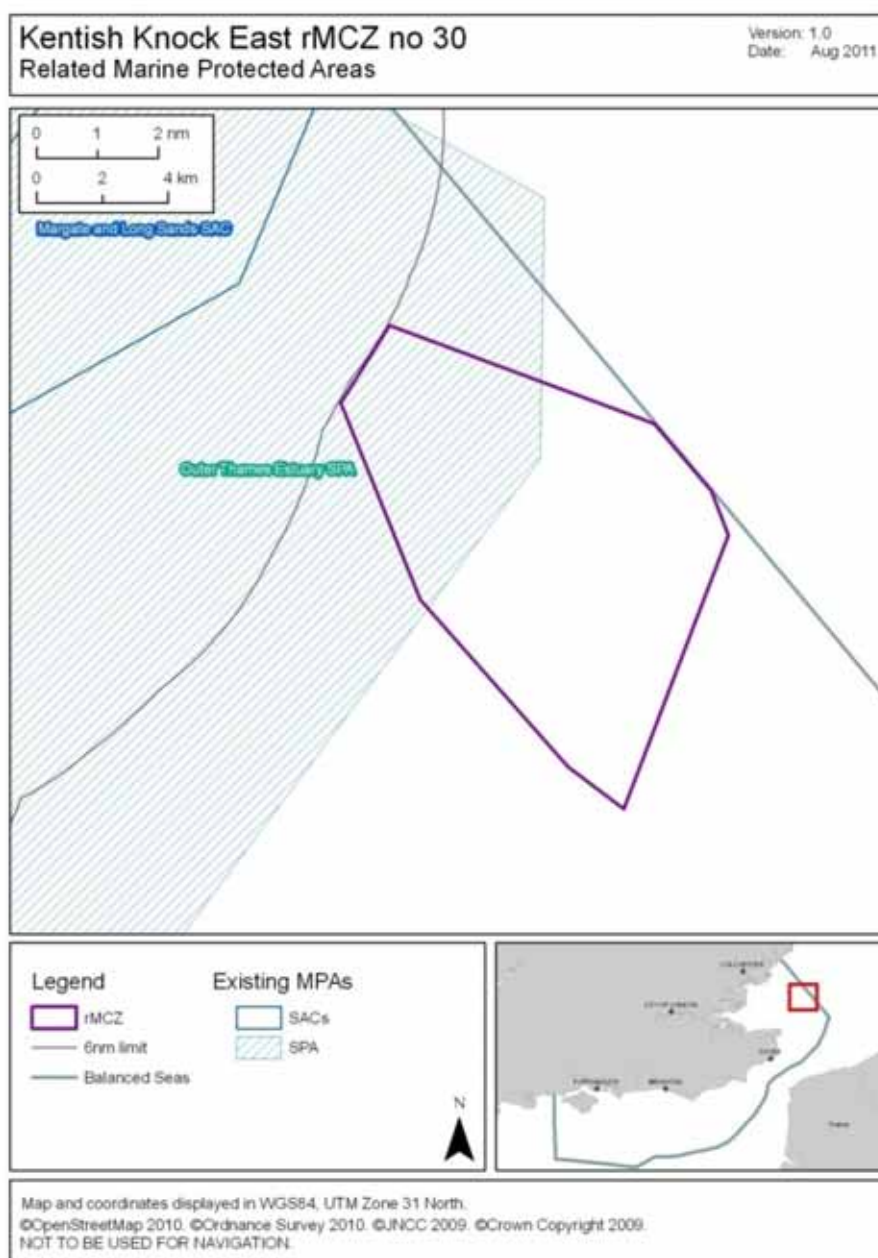
The boundary of the site has been drawn to capture as much of the subtidal coarse sediment as possible, using straight lines wherever possible. Due to the presence of an aggregate dredging license area just within the 6nm line to the northwest, the site boundaries were set at the 6nm to avoid this. The seaward side of the site extends beyond 12nm to follow the edge of the sediment bank.

11. Conservation objectives

Individual conservation objective forms for each feature can be found in Appendix 1. For a site-based summary of the conservation objectives and proposed management measures, please see Section 15.

12. Sites to which this site is related

This site is in close proximity to the Margate and Long Sands SAC and in the northwest and overlaps with the Outer Thames Estuary SPA.



Kentish Knock East rMCZ no 30

13. Supporting documentation (information relating to ENG features only)

Information	Type of information	Source	Name of survey	Date
Broad-scale habitats	Modelled and survey data	JNCC V.7 Combined UKSeaMap and MESH	Combined	June 2011
Geology	Literature search	National Contract Data. DEFRA MB102 2A	Mapping of Geological and Geomorphological Features	2009

References (additional information can be found in the Bibliography)

- BROOKS, A.J., ROBERTS, H. KENYON, N.H. & HOUGHTON, A.J. 2009. *Accessing and Developing the Required Biophysical dataset and Data Layers for Marine Protected Areas Network Planning and Wider Marine Spatial Planning Purposes. Report No 8 Task 2A: Mapping of Geological and Geomorphological Features.* DEFRA, London.
- GUPTA S, COLLIER J.S., PALMER-FELGATE, A. & POTTER G. 2007. Catastrophic flooding origin of shelf valley systems in the English Channel. *Nature*. 448 : 342-345

14. Stakeholder support for the site

The RSG as a group reached consensus that this site should be put forward in their final recommendations.

Individual sectors wishing to note their support or concerns about the site recorded the following at the final RSG meeting in August 2011; their comments have been transcribed verbatim from the form that they completed:

SECTOR	ORGANISATION	COMMENT for Kentish Knock East rMCZ 30
Yachting	RYA	Support subject to agreement on boundary.
Sea Angling		Not a major concern to RSA but the shape should be looked at.
Fisheries	Local Fisheries Representatives	CO of recovery unacceptable on such dynamic BSH. Back LG and reasons for a maintain CO.
Marine Ecology	Seasearch	Strongly support this site with a recover CO, particularly as it is seen as mobile but Sabellaria and mussel beds, which are present periodically, will have the opportunity to establish better.
Marine Wildlife	Marine Conservation Society	<u>Support</u> . Will only provide benefit if bottom trawling is restricted. Extend boundary seawards to encompass the entire sandbank.
French fishing interests	CRPMEM Nord - Pas de Calais / Picardie	Presence of the trawling fishery from Boulogne-sur-Mer, already impacted by the dMCZs 9, 14, 17, 21, 29 and 31 and Net Gain MCZs.
Dutch Fishing Interests	VisNed, Netherlands fishing industry	We strongly oppose this site, as it is hugely productive for our sole fisheries, especially using low impact [?] pulse gear.

15. Site summary of conservation objectives (COs) and proposed management measures

A conservation objective (CO) is a statement describing the desired quality of the feature. Existing MPAs in the UK use the term *Favourable Condition* to represent the desired state of their features. Some pressures caused by human activities may stop the feature attaining favourable condition if present at sufficient intensity.

MAINTAIN means that, the *stated levels of activity* currently occurring on the feature are considered acceptable, but features will be monitored and restrictions may have to be introduced if the condition declines.

RECOVER means that restrictions may be necessary on the activity causing the pressure, in order to allow the feature to recover to favourable condition. It does not necessarily mean that the activity

Kentish Knock East rMCZ no 30

will be prohibited, as other mitigation measures might be appropriate (e.g. change in gear type, reduction of intensity, seasonal restrictions, etc)

The table below documents the draft COs for ALL the features listed for protection within the site, as established by JNCC and NE through the Vulnerability Assessment (VA) process³ and then sense-checked at the national level⁴. Where a RECOVER objective is noted, the associated activity causing the pressure is indicated. In some cases, where data and information warrant it, the RSG chose to adopt the changes to COs recommended by the public authorities: Inshore Fisheries and Conservation Authorities (IFCAs), Marine Management Organisation (MMO), Environment Agency (EA) or Natural England. Changes were only accepted when recommended by these authorities and have been clearly noted. Where the VA has not yet been undertaken, or there is considerable uncertainty surrounding the accuracy of the information being used to recommend a change to the conservation objective, it has been noted as 'TO BE ASSESSED'. Local and regional stakeholders were given the opportunity to comment on the COs and potential management measures and to provide additional information that might not have been taken into account in the VA work.

For greater detail on discussions relating to the site and the network, please refer to both RSG and Local Group stakeholder meeting reports at www.balancedseas.org.

N.B. Boundaries for this site have been changed since the Vulnerability Assessment was undertaken and draft CO was set, and the COs will therefore need to be reviewed.

Feature	draft CO	Activity exerting pressure	IFCA/MMO/EA/NE Comments	Stakeholder comments on draft COs and potential management measures
A5.1 Subtidal coarse sediment & A5.2 Subtidal sand	RECOVER (to be reviewed against the final agreed boundary)	Fishing - benthic trawling (bottom)	NE said that some restriction of mobile gear types will be considered necessary (hence a CO of RECOVER) although it is understood that light mobile gears have less impact than heavy gears.	<p>LG (July 2011) felt that the CO should be changed to MAINTAIN as this is a highly dynamic area with shifting habitat and they did not feel that current activities would have an impact.</p> <p>LG commercial fishing representatives stated that French fishing vessels are thought not to operate in this area at present, although they traverse it on the way to other fishing grounds.</p> <p>At the RSG (2/3 Aug 2011), aggregate dredging sector noted the location of an aggregate option area immediately north west of the site, which might result in secondary impacts on the rMCZ and this may require a re-assessment of the VA.</p> <p>RSG members questioned the RECOVER objective for this mobile BSH in a highly dynamic area and requested further clarification from SNCBs.</p>
A5.4	To be assessed			Habitat was added too late for the vulnerability assessment

³ The process of establishing conservation objectives is outlined in the [Conservation Objectives Guidance](#) (JNCC /NE 2011)

⁴ VA results were standardised across all four regional projects but the fisheries activity data is still undergoing assessment.

16. Evolution of the site recommendations

The Outer Thames Estuary in the Balanced Seas project region was discussed at the Offshore Task Group meeting in March 2011, as part of the search for broad scale habitats A5.2 subtidal sand and A5.1 subtidal coarse sediment. At this meeting, three options were suggested, all abutting the project's boundary with Net Gain (BAI Option C, lying between 6 nm and 12 nm; BAI Option B2, lying outside 12 nm; and BAI option B, an extension northwards of the site 9 as it was then), as this general area had been identified through the Marxan work as the main distribution of these habitats and important for biodiversity. The importance of these areas for fishing by Belgian and UK fleets was noted at the time and it was felt that the Regional Stakeholder Group (RSG) should give these options more consideration.

At its meeting on 19th April 2011 (RSG 8), the RSG put forward Option C as proposed at the Offshore Working Group for further discussion, with the caveat that this area is important for UK and Belgian fishing and noting that the offshore renewable industry was concerned that it overlapped with the Thames Array windfarm site. Option B2 was dropped (for discussions about Option B, see rMCZ 9).

At RSG 9A (17th May 2011) there was still a significant short fall in the targets for the broad scale habitats A5.2 and A5.1, and the general area of Option C was reviewed again, with the results of a further Marxan analysis that continued to highlight the importance of this area for biodiversity. Option C2 was suggested as a result of this discussion, which compared this site with a number of other options in the project area (i.e. C, C2, C3, C4) (see Figure 1). Option C2 is a smaller area than Option C, placed overlapping but to the east of Option C. The RSG concluded that this site should go forward into the Draft Final Recommendations as a dMCZ. The interests of UK and Belgian fisheries were again noted. At RSG 9B, this dMCZ was confirmed (dMCZ 30 Kentish Knock East) and additional notes were added to point out that the French fishing fleet also has an interest in this area.

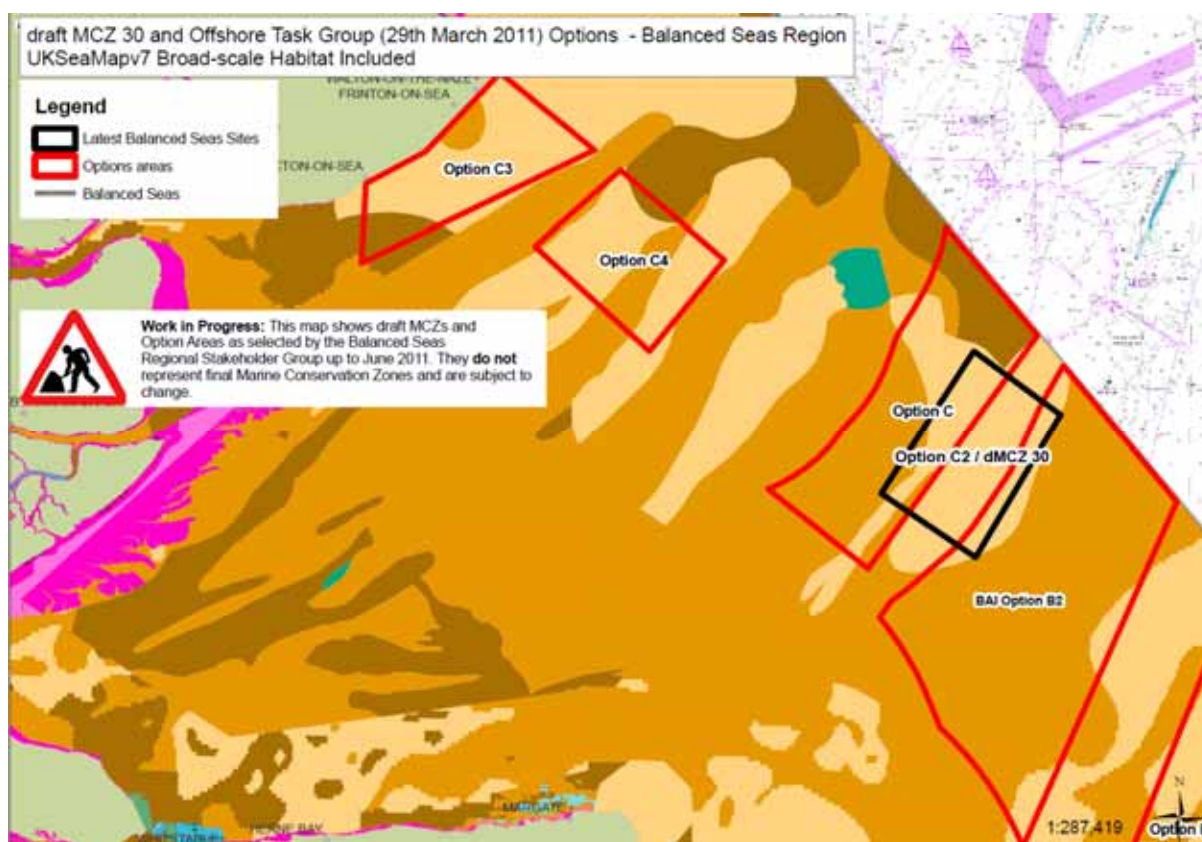


Figure 1. map of option areas discussed in the evolution of rMCZ 30.

Kentish Knock East rMCZ no 30

Subsequent to the submission of the draft final recommendations, feedback from representatives of the fishing fleets that use this area led the RSG to adjust the boundaries so that the southwestern corner of the rectangle was excluded because of fishing interests. In order to replace the habitat lost, the site was extended to the north and west to capture more A5.1 subtidal coarse sediment and northern boundaries were set to avoid the aggregate dredging license area by following the 6 nm line (RSG 10, see blue dashed boundary, Figure 2)). Participants at the meeting of the Essex and Kent Local Group in July 2011 suggested extending the seaward boundary beyond the 12 nm limit to include the full sediment bank (see red boundary, Figure 2).

At the final RSG meeting (RSG 11, August 2011), this proposed extension was debated by the RSG, and while it was noted that any part of the site extending beyond 12 nautical miles would impact the international fleets, the group decided that the boundaries should be set at the bottom of the sediment bank for ecological and navigational reasons, i.e. the boundaries proposed by the Local Group (red boundary, Figure 2).

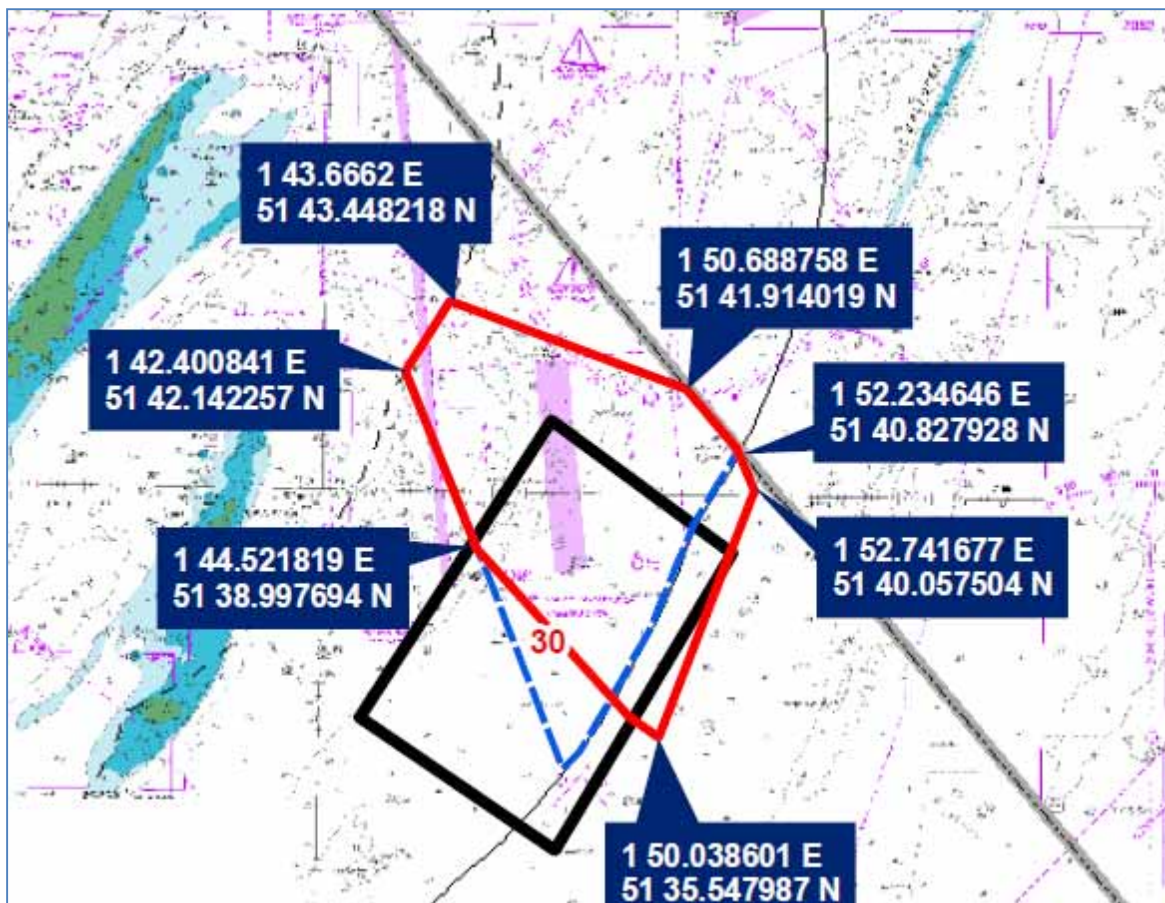


Figure 2. Evolution of rMCZ 30: Draft Final Recommendations (black line) were adjusted at RSG 10 (blue dash) and Essex and North Kent Local Group stakeholders (red line).

For greater detail on discussions relating to the site and the network, please refer to both RSG and Local Group stakeholder meeting reports at www.balancedseas.org.

17. Implications for Stakeholders

The issues associated with this site are:

- Important area for Outer Thames Estuary fishing interests, but considered to be the 'least worst' option by the Kent/Essex fishing fleet
- The Dutch fleet have expressed their opposition to the site (see Stakeholder comment section above), as they operate in the area of the site outside 12nm; however they claim to use chainless gear.
- France and Belgium have historical fishing rights in the 6-12 nm area of this site; the area is used by both under and over 10m French vessels, in particular the Boulogne fleet (see Stakeholder comment section above)
- The vulnerability assessment was undertaken on the boundaries set at the Draft Final Recommendation stage and therefore need review in case the revision alters the CO.
- The Crown Estate note that site contains an active cable and a proposed CCS pipeline, but nevertheless support the site.

This list represents only the major issues associated with the site. To see all stakeholder discussions, please refer to the Balanced Seas RSG and Local Group meeting reports at www.balancedseas.org.

II.3.32 The Manacles rMCZ

Basic site information

Site centre location (datum used: ETRS89):

Decimal Degrees		Degrees Minutes Seconds	
Lat	Long	Lat	Long
50.0467	-5.050	50° 2' 48" N	5° 3' 0" W

Site surface area: 3.5 km² (calculated in ETRS89 – LAEA)

Biogeographic region:

JNCC regional sea: Western Channel and Celtic Sea

OSPAR region: Region III: Celtic Waters (on the boundary to Region II: Greater North Sea)

Site boundary: The landward boundary of this site runs along the OS Boundary Line mean high water mark from Porthoustock Point around Manacle Point, as far as Polcries (the small bay at Dean Quarries). The seaward boundary is rectangular, with borders running east-west and north-south, extending about 2.3km to sea, to encompass the Manacles rocky reef.

Sites to which site is related: The Coverack to Porthoustock SSSI extends along the shoreline of the rMCZ. The north-western corner of the rMCZ clips the southern tip of the Fal and Helford SAC.

Maps of the site are included at the end of this site report. The main site map shows points with coordinates along the site boundary (in WGS84 UTM30N).

Features proposed for designation within the Manacles rMCZ

Table II.3.32a Draft conservation objectives for the Manacles rMCZ. M = maintain in favourable condition, R = recover to favourable condition. This is an extract of the conservation objective summary tables in section II.2.6. **The full text of the draft conservation objectives can be found in appendix 15.**

Broad-scale habitats	Subtidal coarse sediment		M
	Subtidal macrophyte-dominated sediment		M
	Subtidal mixed sediments		M
	Subtidal sand		M
	Moderate energy circalittoral rock		M
	Moderate energy infralittoral rock		M
	Intertidal coarse sediment		M
	Intertidal mixed sediments		M
	Intertidal mud		M
	Intertidal sand and muddy sand		M
	Moderate energy intertidal rock		M
Habitat FOCI	Maërl beds		M
Species FOCI	<i>Amphianthus dohrnii</i>	Sea-fan anemone	M
	<i>Eunicella verrucosa</i>	Pink sea-fan	M
	<i>Haliclystus auricula</i>	Stalked jellyfish	M
	<i>Leptopsammia pruvoti</i>	Sunset cup-coral	M
	<i>Palinurus elephas</i>	Spiny lobster	R
Mobile species not listed in ENG	<i>Cetorhinus maximus</i>	Basking sharks	M
	<i>Phocoena phocoena</i>	Harbour porpoise	M

The following tables show ENG-related statistics for this site, reported from spatial data available in Finding Sanctuary’s GIS datasets. Greyed out rows indicate features for which GIS data exists within the site boundary, but which have not been included on the list of draft conservation objectives (the reasons are stated in table footnotes).

Table II.3.32b **Subtidal broad-scale habitats** recorded in this rMCZ, based on an analysis of Finding Sanctuary's EUNIS level 3 broad-scale habitat GIS data (see appendix 8). Data sources: 1 - UKSeaMap, 2 - MESH, 3 - Environment Agency.

Habitat	Area covered within rMCZ (km ²)	% of total in study area	Source(s)
Moderate energy infralittoral rock	0.19	<0.1%	1, 2
Moderate energy circalittoral rock	0.18	<0.1%	2
Subtidal coarse sediment	0.95	<0.1%	1, 2
Subtidal sand	0.96	<0.1%	1, 2
Subtidal mixed sediments	0.08	<0.1%	2
Subtidal macrophyte-dominated sediment	1.03	5.1%	1, 2
Moderate energy infralittoral rock ¹	<0.01	<0.1%	1, 2
Subtidal sand ¹	0.01	<0.1%	1, 2
Subtidal macrophyte-dominated sediment ¹	<0.01	<0.1%	1, 2

¹ Features / areas already protected within an overlapping MPA. See appendix 11 for details.

Table II.3.32c **Intertidal broad-scale habitats** recorded in this rMCZ, based on an analysis of Finding Sanctuary's EUNIS level 3 broad-scale habitat GIS data (see appendix 8). Data sources: 2 - MESH, 3 - Environment Agency, 4 – MB102.

Habitat	Area covered within rMCZ (km ²)	% of total in study area	Source(s)
Moderate energy intertidal rock	0.04	0.7%	4
Intertidal coarse sediments	0.03	0.2%	4, 3
Intertidal sand and muddy sand	<0.01	<0.1%	4
Intertidal mud	<0.01	<0.1%	4
Intertidal mixed sediments	0.02	0.4%	4
Moderate energy intertidal rock ¹	<0.01	<0.1%	4
Intertidal coarse sediments ¹	<0.01	<0.1%	3

¹ Features / areas already protected within an overlapping MPA. See appendix 11 for details.

Table II.3.32d **FOCI habitats** recorded in this rMCZ, based on an analysis of Finding Sanctuary's amalgamated GIS FOCI datasets (see appendix 8). Data sources: 1 - MB102; 2 - JNCC/ MESH Canyons survey data; 3 - ERCCIS/Isles of Scilly Wildlife Trust; 4 - DORIS.

Habitat	Area covered (km ²)	Number of point records (total)	Number of point records (pre-1980)	Source(s)
Maerl beds	1.01			1
Maerl beds ¹	< 0.01			1
Subtidal sands and gravels ²	1.61			1

¹ Features / areas already protected within an overlapping MPA. See appendix 11 for details.

² Conservation objectives have not been included for subtidal sands and gravels as we have considered any conservation requirements met by listed broad-scale habitats.

Table II.3.32e **FOCI species** recorded in this rMCZ, based on an analysis of Finding Sanctuary's amalgamated GIS FOCI datasets (see appendix 8). Data Sources: 1 - MB102; 2 - Dorset Wildlife Trust; 3 - Cornwall Wildlife Trust; 4 - DERC; 5 - SeaSearch 2009; 6 - Steve Trehwella Survey Log 2010.

Species	Number of point records (total)	Number of point records (pre-1980)	Source(s)
<i>Amphianthus dohrnii</i>	3		1, 3
<i>Eunicella verrucosa</i>	58	3	1, 3, 5
<i>Haliclystus auricula</i>	1	1	3
<i>Leptopsammia pruvoti</i>	2		3
<i>Palinurus elephas</i>	2		1

Local Group feedback also indicates that the FOCI habitats 'fragile sponge & anthozoan communities on subtidal rocky habitats' and 'intertidal underboulder communities' are present in this site, but we do not have records of these features mapped. These features are therefore not reflected in the tables above. In the network statistics (section II.2.8), this site has not been counted as a replicate for these non-mapped FOCI.

This rMCZ also intersects with polygonal data which The Seahorse Trust provided via our interactive map, indicating the stretches of the south-west coastline along which one or both species of seahorse are found. This site intersects with 0.43 km² of seahorse area polygon (refer to appendix 8 for more information).

For additional understanding on how this site is located in relation to environmental data layers, including areas of high benthic biodiversity, offshore bird aggregation areas, or areas of seasonal sea surface temperature fronts, please refer to the interactive PDF maps presented alongside this report.

Site summary

The Manacles are a large underwater rocky reef system and a popular dive spot due to the high number of shipwrecks that surround them. The depth of the site is between 14 and 57 metres below sea level (chart datum). The primary reason for selecting this area as a rMCZ was the high-quality reefs present in the site, and the associated FOCI species (protection of broad-scale habitats was not a primary reason for the selection of this site, and the size of the area does not meet the minimum size guidelines for broad-scale habitats in the ENG). Local stakeholder and scientific feedback indicates that **there are productive tidal fronts in this area**. The area is of importance for basking sharks, and an important feeding area for small cetaceans, in particular, harbour porpoises and (seasonally) minke whales. Local Group feedback indicates that this is one of the best examples of pink sea fan communities and the pink sea fan anemone in the region.

Detailed site description

Wood (2003) found dense populations of *Eunicella verrucosa* at the Manacles in surveys carried out in 2001 / 2002, particularly on the flat open seabed below The Voices on The Manacles, and on Pencra Reef nearby. All of these sites were at least 20m below chart datum. Twenty-six of the sea fans had the sea fan anemone on them (*Amphianthus dohrnii*). The Ross coral *Pentapora foliacea* has also been recorded at the site (Davies, 1998). Southward *et al.* (2004) carried out dredging, trawling, and SCUBA diving to recover *S. Fallax*, during which active searches for *Eunicella verrucosa* were carried out. One colony was observed at 30 m on Raglan Reef on the Manacles in 2003. *E. verrucosa* has also been recorded during the 1981 South Cornwall sublittoral survey (James, 1983)

and 1980 NCC Isles of Scilly & south Cornwall sublittoral survey (Dipper, 1981). *Amphianthus dohrnii* has been reported in the area from 1980-present MarLIN UK expert sighting records (Brown, 1980) and the 2005 MCS Seasearch survey of the Manacles, Cornwall.

Palinurus elephas has been recorded both during the 2005 and 2006 MCS Seasearch of the Manacles, Cornwall. There have been a number of Short Snouted Seahorses seen around the Manacles area over the years and the area is a perfect type of site for this species (Neil Garrick-Maidment, *pers. comm.*).

The west of the Manacles has deeply gullied outcropping bedrock, with gullies opening out into an area of large boulders. Gully sides almost sheer and up to 5m high. The top of the gully sides contain sparse kelp and red foliose algae. The gully floor and sides are dominated by hydroids, including *Aglaophenia pluma* and *Halecium halecinum* (abundant). Anthozoans were also strongly represented, with *Actinothoe sphyrodeta*, occasional colonies of *Alcyonium glomeratum*, *Caryophyllia*, *Corynactis* and *Metridium senile* (James, 1983).

In the east, the seabed consisted of large boulders and rocky outcrops separated by areas of muddy shell gravel. The majority of the rock surface is covered by a hydroid/bryozoans turf in which *Polyzonias* and *Obelia dichotoma* were all common. Other conspicuous species included *Eunicella verrucosa*, *Alcyonium digitatum*, *Nemertesia antennina* and *Pentapora foliacea* (James, 1983).

At the north, an open cliff face dropping down to a large shelf of coarse sand and broken shell was reported. This in turn sloped gently away to further drop-off. The cliff face was overhung in places, with deep crevices, small caves and splits in the rock. The rock surface was carpeted with barnacles and *Corynactis*, with a small amount of hydroid/bryozoans turf. *Antedon bifida* and *Metridium senile* was also prominent (James, 1983).

Bloomfield & Solandt (2006) report on 20 years of Basking Shark sightings off the British coast, which includes several sightings off the Manacles, described as a 'hotspot' for congregations of Basking sharks when there are high densities of copepods.

Stakeholder narrative: Assumptions and Implications

As explained in part I, the stakeholder narrative is a vital underpinning of the site recommendations. Working assumptions and implications are presented here, and additional comments are presented in the following section.

The following fundamental assumption was recorded to apply to all activities in all sites: **The fundamental assumption about human activities within MCZs is that activities can continue (under current licensing regimes where applicable), as long as they do not prevent the conservation objectives from being achieved.** This assumption applies to all activities. Table II.3.32f shows more specific working assumptions and implications that were recorded for this site over the course of the planning process.

Following that, table II.3.32g shows the vulnerability assessment (VA) snapshot for this site. The VA meetings took place at the end of the project, and they did not involve the Steering Group. They started to discuss site management, but did not reach any firm conclusions. The VA snapshot table reflects the point that the VA discussions had reached at the time of the last Joint Working Group meeting in May 2011. Many Steering Group members expressed concerns about the VA process and its outcomes (see section II.2.1 for full details).

Table II.3.32f Specific assumptions and implications relating to The Manacles rMCZ. Black text reflects the working assumptions and implications recorded throughout the planning discussions. The development of the narrative recorded in black can be traced back through the Working Group and Steering Group meeting reports from 2009 to 2011. Red and green text in the first column comments on how the snapshot of the vulnerability assessment (VA) relates to each of the working assumptions that had been made as planning took place (refer to part I for a full explanation of the VA snapshot).

Activities assumed to not be allowed within the site	
Assumptions	Implications
<p>Bottom-towed fishing gear will not be allowed (includes benthic trawling and hydraulic dredging)</p> <p style="color: red;">This was discussed at the VA meeting and confirmed.</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o Loss of ground for bottom-towed gear fishermen (Steering Group feedback indicates that scallopers use the area beyond the feature of The Manacles). o Displacement of bottom-towed gear o Increased competition for fishing grounds o Reduced diversity and flexibility of fishing o Cumulative impact on bottom-towed gear fleet where protected areas are close together o No tow zones will be inundated with pots and static gear and cause difficulties for sea anglers. (This comment was recorded during one of the early planning meetings. Several stakeholder representatives have since stated that the comment is unrealistic.) o Local fishing industry wish to see the site restricted to the vicinity of the Manacles feature in order to avoid the location of their existing activities. o The SW Fishing Industry MCZ Planning Group notes significant concerns over this site given the importance of the fishing grounds in this area. o Potential safety implications derived from displacement from sheltered areas. o Potential environmental implications derived from concentrating effort in alternative grounds or due to new fishing ground searching activity.
<p>Aggregate extraction will not be allowed</p> <p style="color: green;">Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o Aggregate dredging can only occur where the mineral resources are geologically located – in highly localised and discrete areas. If aggregate operations are not allowed in MCZs (subject to appropriate monitoring, mitigation and management), and MCZs coincide with aggregate resource, then this will have significant impact on national construction aggregate supply and coast defence. <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o If aggregate operations (subject to appropriate monitoring, mitigation and management) are restricted in areas adjacent to an MCZ, then this will have significant impact on national construction aggregate supply and coast defence.

<p>Pelagic trawls will not be allowed</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o Local Group suggestions have included the seasonal exclusion of trawlers (note that no unanimously supported suggestions were made).
<p>Anchoring of large vessels will not be allowed (except in emergencies)</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o There is a general right of anchoring as a consequence of, and incidental to, the Public Right of Navigation.
<p>Dumping and disposal will not be allowed. That includes dumping of fish waste, munitions, or dumping of waste from dredging</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o

Activities assumed to possibly need restricting (limiting or mitigating) within the site or parts of the site.	
Assumptions	Implications
<p>Static fishing gear will be permitted, but there may need to be a limit on the amount of static gear used in the area.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o No tow zones will be inundated with pots and static gear and cause difficulties for sea anglers (This comment was recorded during one of the early planning meetings. Several stakeholder representatives have since stated that the comment is unrealistic.) <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o Static gear fishermen might possible additional costs for mitigation measures, should they be needed o There would be costs if monitoring is needed
<p>Tourism and recreational activities will be permitted.</p> <p>The VA meetings considered that a code of conduct may be needed for recreational divers to avoid impacts on sensitive species and habitats on the rocky seafloor. Previous WG and LG meetings considered this area of importance for cetaceans and basking sharks, and following JWG5 the Wildlife Trusts have advised a code of conduct and voluntary wildlife tour operator accreditation schemes to avoid disturbance to and collisions with these animals in this area.</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o A suggestion was made by a Local Group member to impose a speed restriction on motorised vessels to protect cetaceans and basking sharks. <p>Benefits:</p> <ul style="list-style-type: none"> o There is a substantial socio-economic benefit from recreational divers visiting this area. Also, most dive boats do not anchor. o Protection of attractive and interesting seabed habitats will help support local diving businesses
<p>The installation, operation and maintenance of renewable energy devices will be permitted</p> <p><i>Based on SAP feedback the assumption cannot apply to all sites in the network, although it can apply to any given site on its own.</i></p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o The MCZ designation may mean that additional management requirements are defined for renewable energy developments. This could result in: <ul style="list-style-type: none"> - additional costs to the renewables industry, e.g. for licensing mitigation and monitoring - delays to renewables development - delays, lost revenue and additional costs associated with cable repair activity restrictions o Attracting the funding (for development) may be harder in the first place as sites with MPA designations within them

	<p>will be less attractive to potential investors.</p> <ul style="list-style-type: none"> o Costs and delays associated with co-location of renewables in MCZs, could result in long term implications in terms of renewables deployment which could have serious implications for industry and Government in terms of loss of operational revenue and missing EU climate change targets. o Enforced co-location with MCZs would dramatically restrict deployment. <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o If co-location assumptions are not correct the impacts would/could be: site locations that can't be developed, increased costs (the implications could be re-routing of cables around a feature could cost an additional £600,000 - £1.3m/km depending on cable type, size and seabed geology), construction delays, failure to meet renewables targets, impacts on acidification, additional monitoring requirements, increased uncertainty and declining investor confidence in renewables activities. o Increased competition for sea space with other sea users.
<p>Sewerage disposal, industrial and agricultural liquid discharges will be permitted with management / mitigation</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Aquaculture of fin fish and shell fish will be permitted with mitigation / management</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o Local Group feedback has indicated that there is an area (only partially in Manacles) suitable for suspended mussel culture. The person making the comment was concerned that, if made a MCZ, this activity should be permitted. Existing farms are starting up in these bays.
<p>Crab tiling / bait digging will be permitted with mitigation / management</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o

<p>Beach replenishment will be permitted with mitigation / management</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
--	--

Activities assumed to be allowed to continue / occur within the site

Assumptions	Implications
<p>Handlining (recreational angling and commercial handlining) will be permitted. Handlining includes sea angling and trolling.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o Handliners might face possible additional costs for mitigation measures, should they be needed o There would be costs if monitoring is needed <p>Benefits:</p> <ul style="list-style-type: none"> o Potential for increased and enhanced leisure and recreational activity
<p>The installation and maintenance of cables will be permitted and will not be made prohibitively expensive within the site. This applies to power cables (including cables for renewable energy devices), and telecommunications cables.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <p>Given this assumption there are still the following concerns:</p> <ul style="list-style-type: none"> o Cable installation cost increases and delay o Cable repair cost, delays and lost revenue could increase due to activity restrictions on cable repair. o There is no definition of what ‘prohibitively expensive’ means; the cables representative would like assurance that no additional cost will result from MCZ designation (beyond costs associated with existing management and mitigation requirements). <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o For renewables/power cables, re-routing of cables around a feature or site might mean longer cable routes, at a cost of £600,000 - £1.3 million/km depending on cable type, size and seabed geology. o There may be other costs, e.g. costs associated with licensing, mitigation measures and monitoring requirements. o Increased licensing requirements and costs of cabling may have serious implications for industry and Government in terms of loss of operational revenue, missing EU climate change targets etc. o Possible cable route to renewables resources.

<p>The operation of cables (power and telecommunications) & pipelines will be permitted (i.e. any existing cables will be allowed to stay operational)</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Maintenance dredging in ports (to enable access to ports) will be permitted</p> <p><i>The project team have advised that this would mean that the dredged areas of seafloor could not be counted towards ENG targets.</i></p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Anchoring for maintenance and access for licensed visitors to heritage wrecks will be permitted</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o (no heritage wrecks currently present in the site)
<p>Anchoring of small vessels will be permitted</p> <p><i>There isn't a clear, agreed Working Group definition for what constitutes a 'small vessel'.</i></p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o No clear working group definition exists of what counts as a 'small' vessel - 24m was proposed some time ago by the RYA, but no decision was reached as to whether we would adopt that size in MCZ planning.

<p>Passage of ships will be permitted</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o A suggestion was made by a Local Group member to impose a speed restriction on motorised vessels to protect cetaceans and basking sharks.
<p>Acoustic Surveys, sonar</p> <p>The Working Groups had not made any explicit assumptions about acoustic surveys / sonar in this site, nor were any made by the project team in their 'homework' on assumptions for inshore sites. A member of the Steering Group stated at the February 2011 meeting that the assumption should be made that acoustic surveys will be allowed e.g. sub bottom profiling.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Seaweed harvesting will be permitted</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o

Table II.3.32g VA Snapshot table: This table records the point which the vulnerability assessment discussions had reached regarding site management, at the time of the final Joint Working Group meeting in May 2011. The outcome is not definitive, and the VA did not carry out an exhaustive review of all the working assumptions recorded in the longer table above. The Steering Group were not directly involved in the VA discussions, and at their final meeting, expressed considerable reservations about the VA outcome (see section II.2.1). The reason this VA snapshot table is included here is so that readers have a record of what the VA snapshot was showing at the time the final stakeholder comments were recorded for this site. For a full explanation of the VA snapshot, please refer to part I. The maps in appendix 13 show a visual representation of the information in all the VA snapshot tables in the rMCZ site reports.

Sector	Potential Management
Commercial Fishing – all mobile bottom gears	Management: - Prohibition of fishing within the rMCZ Measure: - Option 1: voluntary - Option 2: byelaw
Tourism & Leisure	Management - Education and awareness of conduct for encounters with backing sharks, cetaceans Measure - Voluntary code of conduct - Voluntary ‘Wise accreditation’
Tourism & Leisure	Management - Education and awareness of conduct for diving Measure - Voluntary code of conduct

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

The most significant uncertainty faced by the project was the lack of knowledge on management of MCZs, and this uncertainty still applies to all rMCZs in the network. There was uncertainty over what activities will be affected by MCZ designations: what activities will be permitted to continue within (or near) MCZs, what activities will not be permitted, and what activities will require mitigation or some form of restriction other than a complete ban. There was also uncertainty over what measures will be taken to ensure any activity restrictions are put in place (e.g. byelaws, voluntary measures).

Additional comments

The following is a set of additional comments made by stakeholder representatives over the course of the planning work. Some of these comments were made specifically about this site, others were more generic comments which the project team consider to be relevant to this site.

- *Mobile bottom gear*
 - Seasonal closures are an inappropriate measure for benthic conservation.

- *The Wildlife Trusts*
 - There is some concern that the reduced size of the rMCZ (compared to an original building block that extended beyond the rocky reef), and consequent lack of buffer around the reef features, limits the ecological value of designation.
 - Exclusion of netting would increase diver safety in a heavily used site.
- *Anchoring and aggregates*
 - This rMCZ was realigned to take account of anchoring and aggregate export.
- *Seabirds and cetaceans*
 - Codes of practice may be a better way to achieve management of leisure boats (if necessary) than byelaws.
 - Current levels of human activity appear to be compatible with maintaining basking shark and harbour porpoise numbers in this site. There is the potential for boat strike from pleasure craft which is a cause for concern. Monitoring of numbers and activities and impacts on these species, dissemination of codes of conduct for encounters, encouraging boat operators to become WiSE accredited and a 3 year review of baseline numbers (estimated from ERCCIS sightings data) would all help to maintain healthy populations of these mobile species. Healthy populations of harbour porpoises and basking sharks would suggest a healthy ecosystem within the site and would be an attraction for the general public and ecotourism. Mitigation measures would be required if there was a decline in species numbers due to activities within the rMCZ (e.g. disturbance from boat pleasure craft, boat strike, bycatch from fishing activity)
- *Netting and longlining*
 - A Local Group fishing representative suggested looking at static net access with the use of pingers to mitigate by-catch, and the Local Group suggested that a speed limit could be considered to protect cetaceans and basking sharks.
 - When the detailed assumptions were drafted for rMCZs in the network during the third planning iteration, all sites with 'water column protection' had an assumption that 'netting and longlining will not be allowed'. This applied to all sites considered for the protection of seabirds, cetaceans, or any of the three mobile FOCI listed in the ENG – smelt, undulate ray and European eel. Longlining does not occur in inshore sites in the region, and feedback from stakeholders was that the longlining assumption is not appropriate for any site.
 - The netting / longlining assumption and the Local Group suggestions have been superseded by the fact that the stakeholder group agreed on a different set of assumptions for mobile species (largely around the need for monitoring, and some possible voluntary codes of conduct, but no fishing restrictions).
- *General benefits of MCZs*
 - Some stakeholder representatives would like the following recorded and for these to be considered during the impact assessment:
 - Fisheries spill-over.
 - Improvements for the local economy.
 - Education opportunities.
 - Benefits to science.
 - Focus for voluntary groups.

- Potential increase in the amount and quality of recreational activities (diving, sea angling, environmental tourism, etc).
- The designation as an MCZ will be a selling point and will undoubtedly be used as an identifier to the area to highlight it as somewhere to visit.
- **Monitoring**
 - There are two main types of monitoring which will need to take place within rMCZs:
 - Monitoring the activities within a site and the various levels at which they are occurring.
 - Monitoring the ENG features for changes in condition.
- **Reaction to the vulnerability assessment process and outcomes**
 - At the sixth Joint Working Group meeting in June 2011, the results from the regional vulnerability assessment (VA) discussions were presented to the group, as shown in table II.3.32g (the VA process is described in part I). This generated concern within the JWG, for two reasons. Firstly, several members of the group had serious misgivings over the outcome of the management discussions, especially with respect to those inshore rMCZs for which no management of bottom-towed mobile fishing gear was highlighted as necessary. Secondly, the group had serious misgivings about the process itself, from which they felt disenfranchised.
 - The Steering Group made a statement at their final meeting, articulating those concerns in more detail. They recommended that there should be a process that allows them to review potential management measures for MCZs, before public consultation. The full statement made by the Steering Group is in section II.2.1.

Levels of support

The network report (section II.2) includes a project team reflection on levels of support for the network recommendations as a whole, and the site specific reflection presented here should be read within the wider network context.

This site was unanimously suggested by the Cornwall Local Group. The Local Group strongly support this rMCZ, they view it as an essential component of the network.

A fishing representative on the Steering Group commented that they would not support an rMCZ extending beyond the feature of The Manacles itself, and the boundary of the site was adjusted from a larger pre-cursor to bring it close to the reef feature in order to accommodate this concern.

The Crown Estate provided feedback on what was a much bigger building block in the area (iH12), stating that they were supportive of the area becoming a rMCZ.

Dean Quarries are concerned over impacts on their jetty & dredged channel for boat access for freighting stone, and Falmouth Harbour expressed concern over any potential impacts on their shipping lane close by.

Supporting documentation

GIS data used for reporting the quantitative habitat and species figures in the tables above includes the following sources: UKSeaMap modelled broad-scale habitat data, MESH, MB102, Environment Agency intertidal habitat data, data from Cornwall Wildlife Trust, and Seasearch 2009. Refer to appendix 8 for details, and to the tables above for data sources for specific features in this site.

Seaquest Southwest sightings, both ad hoc and effort based, land and boat based, CWT basking shark project data, and Seaquest Netsafe acoustic data are available for *Cetorhinus maximus* in the area of the rMCZ. Key Cornish datasets have been analysed recently with University of Exeter in Cornwall and papers have been written which support the raw data (See Witt *et al.* in prep; Pikesley *et al.* in press).

Further evidence underpinning the site can be found in the publications and datasets referred to in the detailed site description. There is also a lot of local knowledge about the site within the Local Group. Further information on the Natura 2000 sites to which this site is related may be found on the JNCC's [website](#)³⁹.

Seaquest Southwest sightings, both ad hoc and effort based, land and boat based, CWT basking shark project data, and Seaquest Netsafe acoustic data are available for *Cetorhinus maximus* in the area of the rMCZ. Key Cornish datasets have been analysed recently with University of Exeter in Cornwall and papers have been written which support the raw data (See Witt *et al.* in prep; Pikesley *et al.* in press).

Site map series

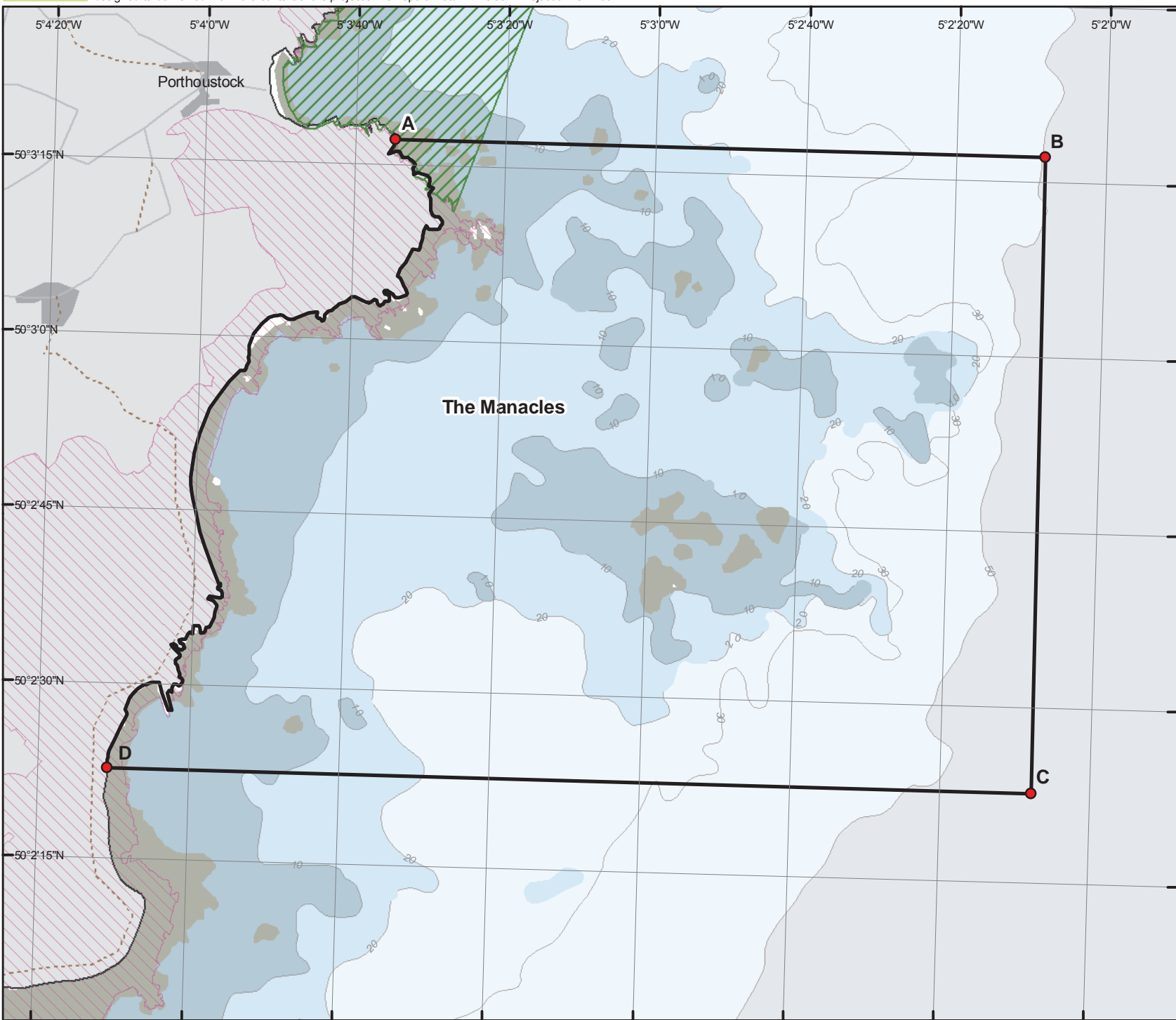
On the following pages there are four maps of this site.

- The first map (FR_044a) is the main site map showing the rMCZ boundary and includes points with coordinates (in WGS84 UTM30N). The map also shows charted depth and existing Marine Protected Areas for reference. Please note: the lat/long coordinates of the vertices in the following maps have been calculated in decimal degrees, and in degrees, minutes and seconds. For plotting on a standard Admiralty (UKHO) chart, the seconds of each coordinate need to be converted to decimal. An MS Excel table showing all coordinates in degrees, minutes and decimal seconds has been provided in the additional materials section (see Appendix 14) for plotting purposes.
- The second map (FR_044b) shows the rMCZ boundary over broad-scale habitats. The data shown on this map corresponds with the information in tables II.3.32b and II.3.32c, data sources are indicated in the tables.
- The third map (FR_044c) shows records of habitat and species FOCI. The data shown on this map corresponds with the information in tables II.3.32b to II.3.32e, data sources are indicated in the tables. In most site reports, broad-scale habitats and FOCI are shown on a single map, but for this site they have been split, because there is a large area of the FOCI habitat 'maërl beds' mapped as a polygon feature within the site, and if that polygon is layered on top of the broad-scale habitats data, it is easily confused with the broad-scale habitat 'high energy infralittoral rock', as the symbology is similar (see appendix 7).
- The fourth map (FR_044d) shows socio-economic datasets. For spatial data showing the distribution of fishing effort, please refer to the interactive PDF maps supplied with the additional materials (see appendix 14).

³⁹ <http://jncc.defra.gov.uk/page-4>

- Because of the large number of features shown on the site maps (especially inshore biophysical maps), it has not been possible to embed comprehensive legends within the site maps themselves. A comprehensive map legend is therefore provided in appendix 7, which explains the symbology used on all the maps within this final report.
- Appendix 8 describes the data sources for the information shown on the final report maps in detail.

This is one of a series of maps showing Finding Sanctuary's final MCZ recommendations, designed to be viewed within the context of the project's final report. Datum: WGS84. Projection: UTM30N.



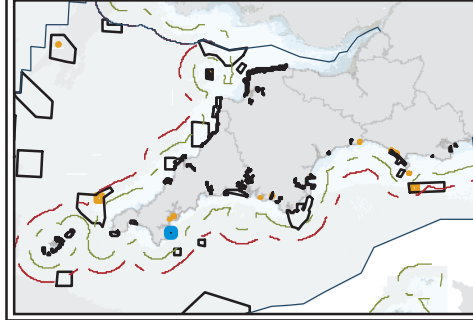
Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	50.0548	-5.0596	50° 3' 17" N	5° 3' 34" W
B	50.0548	-5.0356	50° 3' 17" N	5° 2' 8" W
C	50.0396	-5.0355	50° 2' 22" N	5° 2' 7" W
D	50.0396	-5.0696	50° 2' 22" N	5° 4' 10" W

Map Legend

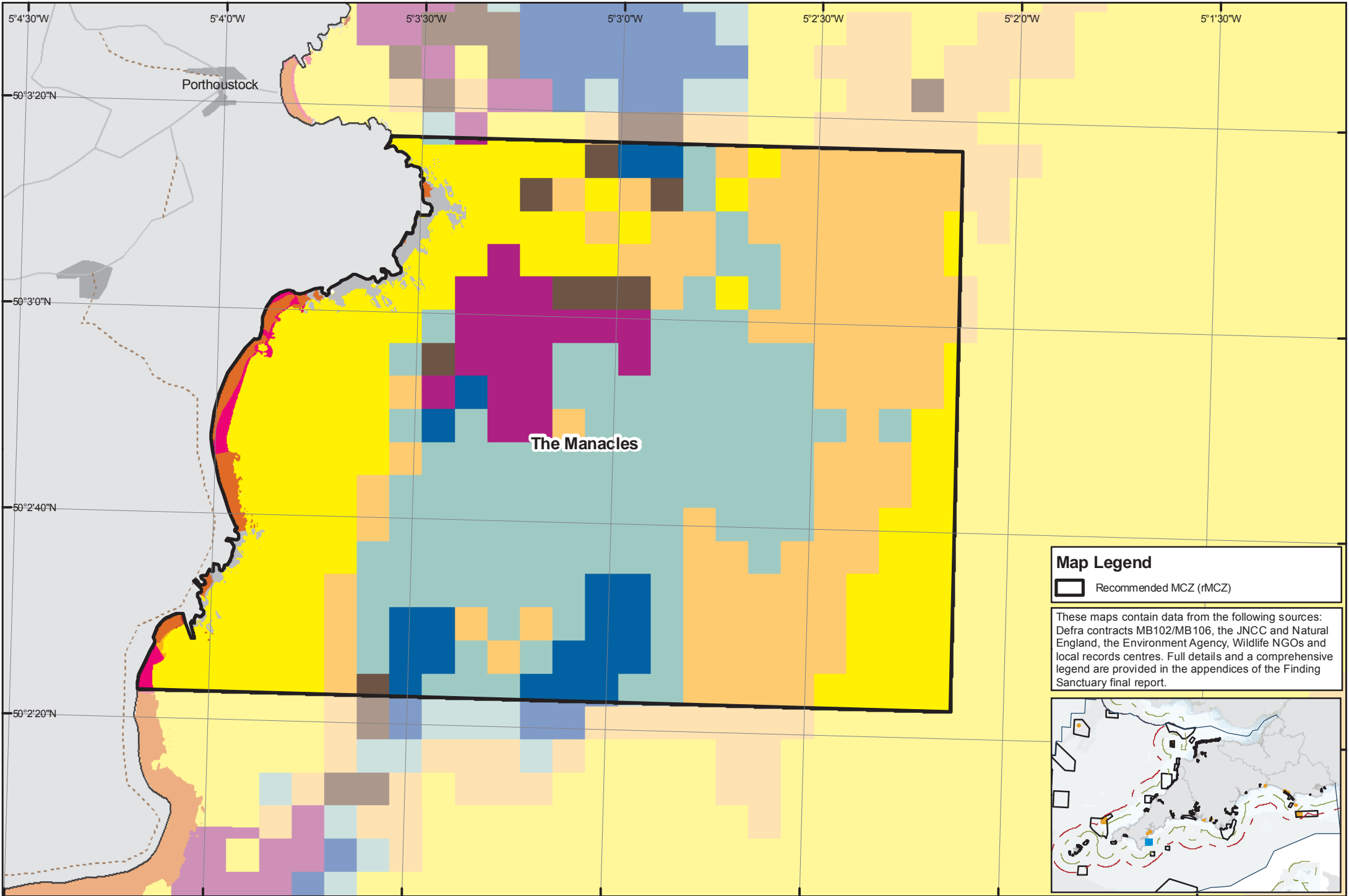
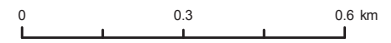
- Recommended MCZ (rMCZ)
- Existing MPAs**
- SAC
- SSSI (not part of MPA network)

A comprehensive legend is provided in the appendices of the Finding Sanctuary final report.




This is one of a series of maps showing Finding Sanctuary's final MCZ recommendations, with broad scale habitats. It is designed to be viewed within the context of the project's final report. Datum: WGS84. Projection: UTM30N.

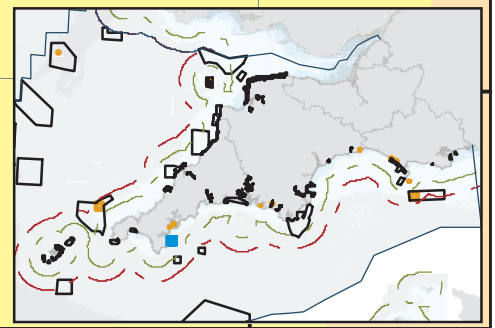
Maritime basemap © British Crown and SeaZone Solutions Limited, 2010.
All Rights Reserved. Data Licence No. 062006.004. Land basemap part
© OpenStreetMap & contributors, CC-BY-SA. Not to be used for navigation.
Contains OS data © Crown copyright 2011.



Map Legend

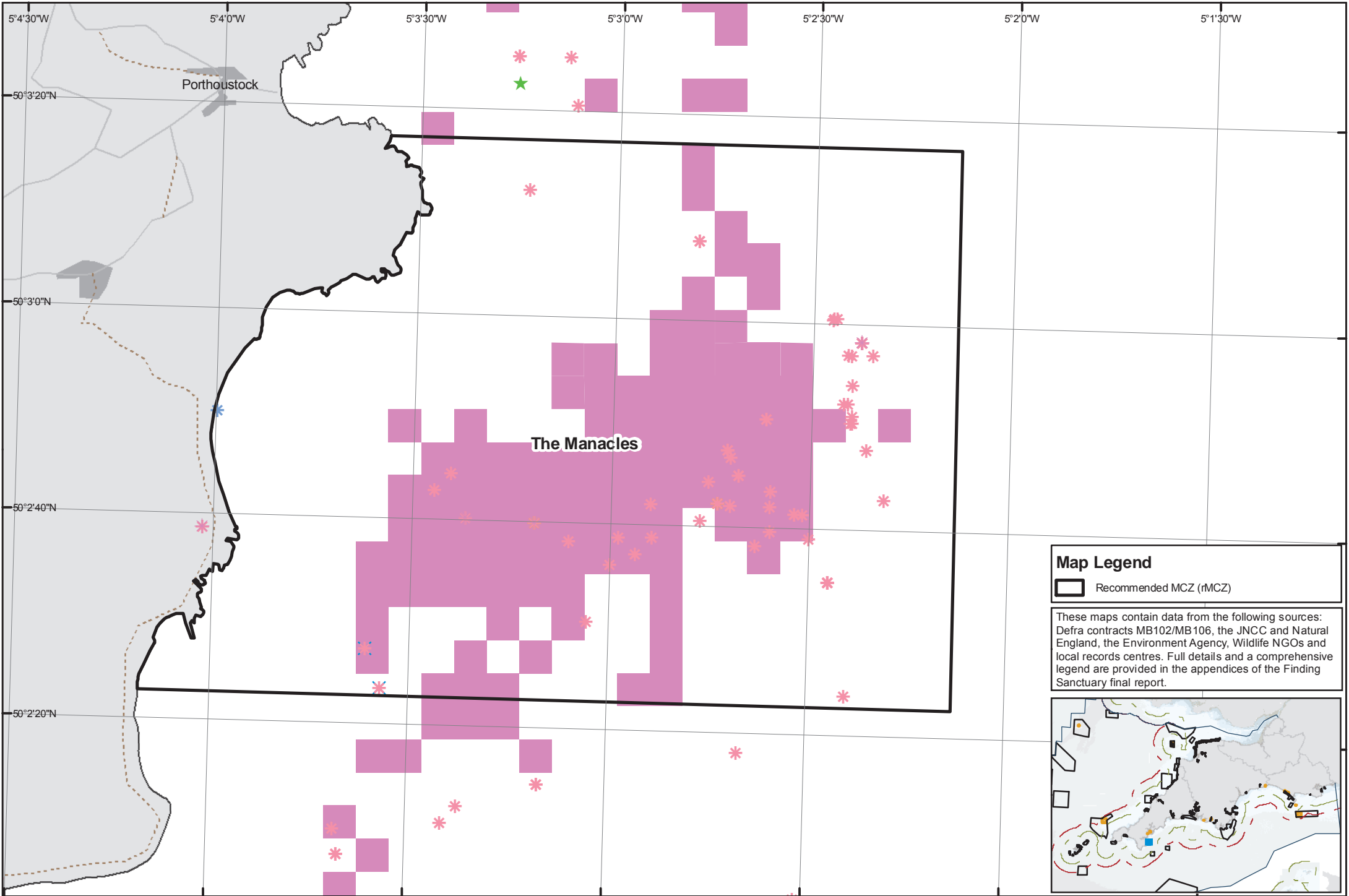
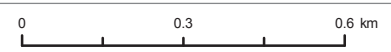
 Recommended MCZ (rMCZ)

These maps contain data from the following sources: Defra contracts MB102/MB106, the JNCC and Natural England, the Environment Agency, Wildlife NGOs and local records centres. Full details and a comprehensive legend are provided in the appendices of the Finding Sanctuary final report.



The Manacles rMCZ

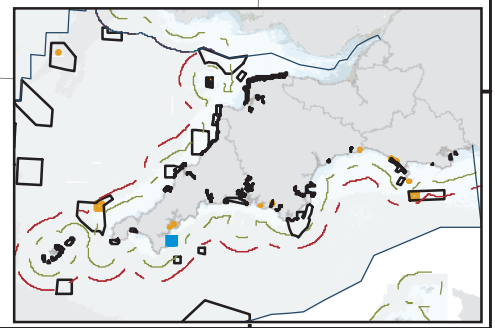
This is one of a series of maps showing Finding Sanctuary's final MCZ recommendations, with habitat and species FOCI. It is designed to be viewed within the context of the project's final report. Datum: WGS84. Projection: UTM30N.

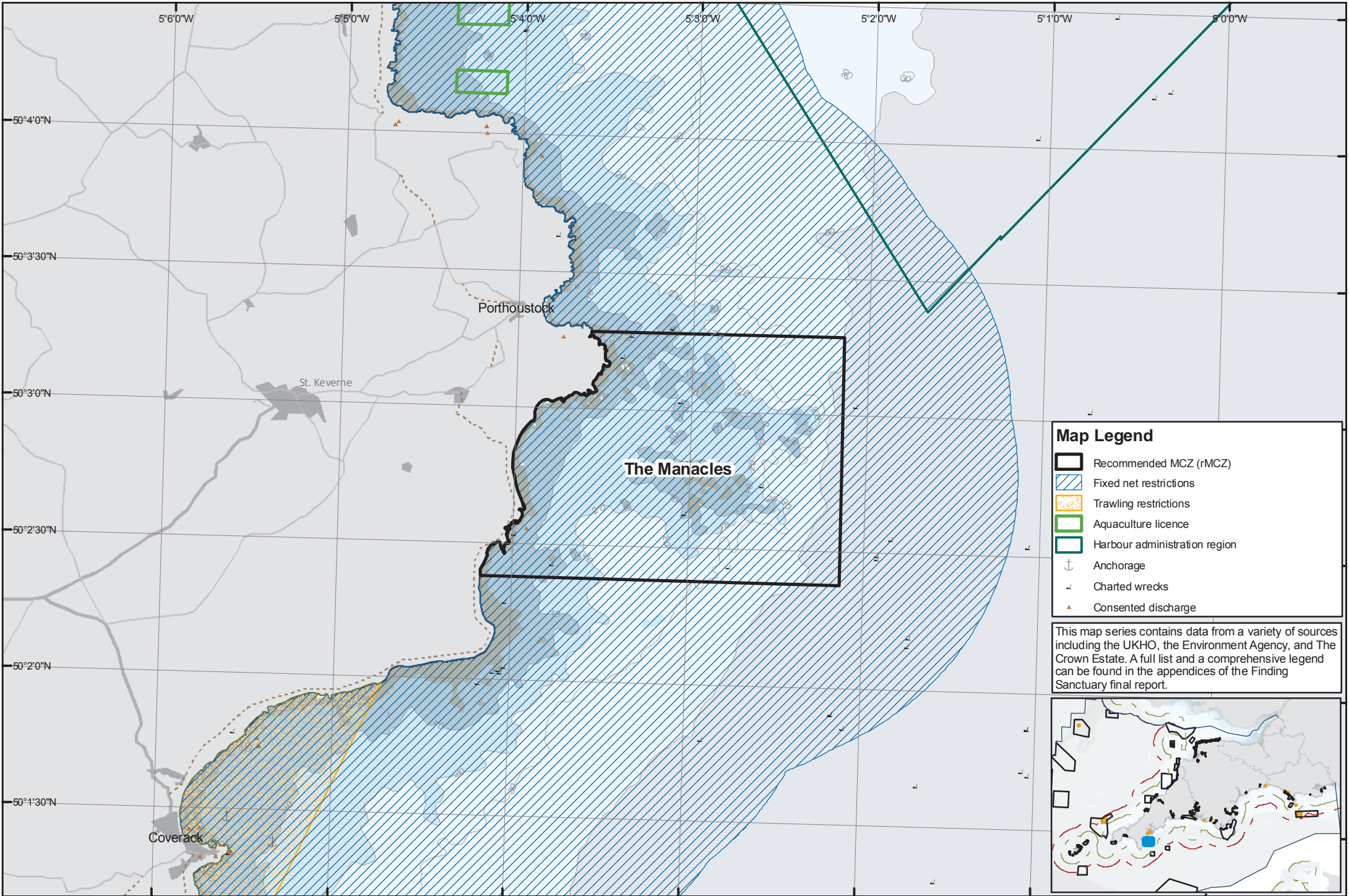


Map Legend

Recommended MCZ (rMCZ)

These maps contain data from the following sources: Defra contracts MB102/MB106, the JNCC and Natural England, the Environment Agency, Wildlife NGOs and local records centres. Full details and a comprehensive legend are provided in the appendices of the Finding Sanctuary final report.

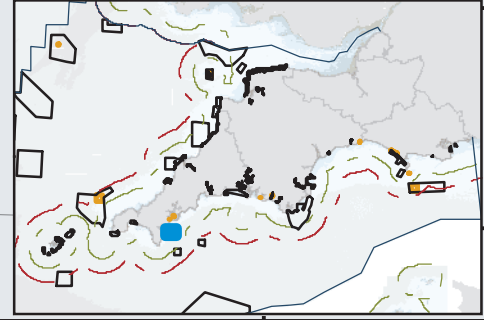




Map Legend

- Recommended MCZ (rMCZ)
- Fixed net restrictions
- Trawling restrictions
- Aquaculture licence
- Harbour administration region
- Anchorage
- Charters wrecks
- Consented discharge

This map series contains data from a variety of sources including the UKHO, the Environment Agency, and The Crown Estate. A full list and a comprehensive legend can be found in the appendices of the Finding Sanctuary final report.



II.3.10 Celtic Deep rMCZ

Basic site information

Site centre location (datum used: ETRS89):

Decimal Degrees		Degrees Minutes Seconds	
Lat	Long	Lat	Long
51.3265	-6.3507	51° 19' 35" N	6° 21' 2" W

Site surface area: 347.79 km² (calculated in ETRS89 – LAEA)

Biogeographic region:

JNCC regional sea: Western Channel and Celtic Sea

OSPAR region: Region III: Celtic Waters

Site boundary: The boundary of the Celtic Deep rMCZ has been drawn using simple, straight lines, around a portion of the Celtic Deep area containing subtidal mud and mud habitat in deep water FOCI records.

Sites to which the site is related: The Celtic Deep rMCZ contains the Celtic Deep recommended reference area. The site neighbours the South of Celtic Deep rMCZ, which lies approximately 25km to the south-west, and East of Celtic Deep rMCZ, which lies approximately 28km to the north-east.

Maps of the site are included at the end of this site report. The main site map shows points with coordinates along the site boundary (in WGS84 UTM30N).

Features proposed for designation within Celtic Deep rMCZ

Table II.3.10a Draft conservation objectives for the Celtic Deep rMCZ. 'Maintain' = maintain in favourable condition, 'recover' = recover to favourable condition. This is an extract of the conservation objective summary tables in section II.2.6. **The full text of the draft conservation objectives can be found in appendix 15.**

Feature	Conservation Objective
Subtidal mud	Recover
Mud habitats in deep water	Recover

The inclusion of conservation objectives for seabirds and common dolphins on the conservation objective feature list for this site was discussed at length at the Joint Working Group meeting in May 2011, in the full understanding of SAP feedback following progress report 3, and the JNCC's position that they would not support conservation objectives for mobile species in offshore rMCZs. The JWG could not reach a conclusion on the matter.

The following tables show ENG-related statistics for this site, reported from spatial data available in Finding Sanctuary's GIS datasets. Greyed out rows indicate features for which GIS data exists within the site boundary, but which have not been included on the list of draft conservation objectives (the reasons are stated in table footnotes).

Table II.3.10b **Subtidal broad-scale habitats** recorded in this rMCZ, based on an analysis of Finding Sanctuary's EUNIS level 3 broad-scale habitat GIS data (see appendix 8). Data sources: 1 - UKSeaMap, 2 - MESH, 3 - Environment Agency.

Habitat	Area covered within rMCZ (km ²)	% of total in study area	Source(s)
Subtidal mud	347.79	5.5%	1

Table II.3.10c **FOCI habitats** recorded in this rMCZ, based on an analysis of Finding Sanctuary's amalgamated GIS FOCI datasets (see appendix 8). Data sources: 1 - MB102; 2 - JNCC/ MESH Canyons survey data; 3 - ERCCIS/Isles of Scilly Wildlife Trust; 4 - DORIS.

Habitat	Area covered (km ²)	Number of point records (total)	Number of point records (pre-1980)	Source(s)
Mud habitats in deep water	127.25	13		1
Subtidal sands and gravels ¹	92.66			1

¹ Conservation objectives have not been included for subtidal sands and gravels as we have considered any conservation requirements met by listed broad-scale habitats.

For additional understanding on how this site is located in relation to environmental data layers, including areas of high benthic biodiversity, offshore bird aggregation areas, or areas of seasonal sea surface temperature fronts, please refer to the interactive PDF maps presented alongside this report.

Site summary

The southern tip of the site is approximately 112 km to the north-west of Trevoise Head, and the northern tip is approximately 84km from the Pembrokeshire coast in Wales. The depth is largely between 100m and 200m, constituting a depression on the seafloor which in the surrounding area is shallower than 100m. The seafloor is characterised by subtidal mud habitat, and the Celtic Deep rMCZ is the only offshore area within our study region where the 'mud habitats in deep water' FOCI has been recorded. In addition, this area is an area where **frontal systems** occur during the summer months, indicating high productivity. Offshore bird observation data indicates this as an important aggregation area for a number of seabird species year-round. The area is of importance for common dolphins.

Detailed site description

The most extensive published survey of the benthic fauna of the Celtic sea is that undertaken in 1974 and 1975 by the Field Studies Council Oil Pollution Research Unit (Hartley & Dicks 1977; Hartley 1979). The fauna at most sites was typical of a 'deep *Venus* community' as described by Mackie (1990). At the edge of the Celtic Deep, the communities were typical of a 'boreal deep mud association' and included the brittlestars *Amphiura chiajei* and *Amphiura filiformis*, the bivalves *Nucula sulcata*, *Nucula tenuis*, *Thyasira flexuosa* and *Abra nitida*, and polychaetes *Myriochele heeri*, *Lagis* (now *Pectinaria*) *koreni* and *Amphicteis gunneri* (Hiscock, 1998).

During April and May 1993, and in February and May 1994, Rees *et al.* (1999) took samples of the benthic macrofauna from the Celtic Deep. At each location, five sediment samples for macrofauna analysis were collected using a 0.1 m² day grab from the central point of a 500 m grid of 9 stations, the latter being sampled for contaminant analyses only.

Marret & Scourse (2003) took surface sediments from seven stations located in the seasonally stratified, frontal and mixed water regions in the Celtic and Irish seas. They analysed them for their dinoflagellate cyst assemblages and dinosterol content. Sediment samples were collected at six stations in the Celtic Deep and one station in Tremadog Bay (muddy hollow) during nine cruises onboard the RV Prince Madog during 1999 and 2000.

Wilson *et al.* (2001) sampled benthic biodiversity in the area, but the exact location was not specified.

Schratzberger *et al.* (2004) studied the diversity and structure of meiobenthic nematodes and macrobenthic infauna from the subtidal Celtic Deep in relation to a number of measured environmental variables. Schratzberger *et al.* (2008) surveyed four stations at the Celtic deep for nematode and polychaete assemblages in muddy sediment. Robinson *et al.* (2011) predicted the distribution of biotopes in the Irish Sea which covered the area of the Celtic Deep and East of Celtic Deep. The abundance of harpacticoid copepods was significantly lower in the Celtic Deep than off the Tyne, off the Humber and in Dundrum Bay. Diversity of harpacticoid copepod assemblages was higher in the Celtic Deep compared with most other stations (Schratzberger *et al.* 2000).

Rogers *et al.* (2008) investigated two sample sites on offshore mud sediments in the Celtic Deep and North-western Irish Sea, and two sites on sand sediments in the Bristol Channel and Outer Carmarthen Bay during July 2004 and 2005.

During the period 2000 to 2006, Ellis *et al.* (2007a) carried out approximately 150 tows with a 2m-beam trawl during groundfish surveys of the South West offshore area. Catches along the edge of the continental shelf (130–350 m deep) were characterised by large numbers of the anemone *Actinauge richardi*, with the hermit crab *Pagurus prideaux* dominating on coarse grounds in shallower waters. The study described the spatial distribution of the epibenthic fauna.

In July 2004 and 2005 respectively Rogers *et al.* (2008) took sediment samples (sand habitats), benthic fauna and demersal fish in the Celtic Deep. The deep water (78–110 m) sediments of mud habitat sites in the Celtic Deep were thought to be influenced by the relatively low levels of tidal stress.

Field sampling was undertaken during four cruises from 2004–2007 by Ellis *et al.* (2007b) with each cruise targeting specific habitat types. Sampling included the mud habitat of the Celtic Deep and the shell-gravel habitat of the western English Channel.

Between June and November 2004–2006, line-transect surveys were conducted by Sea Watch Foundation over the Celtic Deep between SE Ireland and west Wales, in order to generate absolute abundance estimates for common dolphin (Evans *et al.* 2007). From a total of 2900km of line transect effort; there were 222 encounters of common dolphins (Evans *et al.* 2007). One of the largest ever known gatherings of Fin Whales in British waters was recently observed in the Celtic Deep during a seabird and cetacean research cruise by the Research Vessel *Cefas Endeavour* in May 2011 (see weblinks [here](#)²⁰ and [here](#)²¹).

²⁰ <http://www.marine-life.org.uk/fin-whale-discovery-in-celtic-sea-%28020611%29>

²¹ <http://wildlifeneews.co.uk/2011/21-giant-fin-whales-spotted-off-coast-of-britain/>

Stakeholder narrative: Assumptions and Implications

As explained in part I, the stakeholder narrative is a vital underpinning of the site recommendations. Working assumptions and implications are presented here, and additional comments are presented in the following section.

The following fundamental assumption was recorded to apply to all activities in all sites: **The fundamental assumption about human activities within MCZs is that activities can continue (under current licensing regimes where applicable), as long as they do not prevent the conservation objectives from being achieved.** This assumption applies to all activities. Table II.3.10d shows more specific working assumptions and implications that were recorded for this site over the course of the planning process.

Following that, table II.3.10e shows the vulnerability assessment (VA) snapshot for this site. The VA meetings took place at the end of the project, and they did not involve the Steering Group. They started to discuss site management, but did not reach any firm conclusions. The VA snapshot table reflects the point that the VA discussions had reached at the time of the last Joint Working Group meeting in May 2011. Many Steering Group members expressed concerns about the VA process and its outcomes (see section II.2.1 for full details).

Table II.3.10d Specific assumptions and implications relating to Celtic Deep rMCZ. Black text reflects the working assumptions and implications recorded throughout the planning discussions. The development of the narrative recorded in black can be traced back through the Working Group and Steering Group meeting reports from 2009 to 2011. Red and green text in the first column comments on how the snapshot of the vulnerability assessment (VA) relates to each of the working assumptions that had been made as planning took place (refer to part I for a full explanation of the VA snapshot).

Activities assumed to not be allowed within the site	
Assumptions	Implications
Bottom-towed fishing gear will not be allowed. This activity was discussed during the VA meetings, and it was determined that the activity would be prohibited in the whole site.	Direct implications: <ul style="list-style-type: none"> o Loss of ground for bottom-towed gear fishermen, both UK and non-UK o Displacement of bottom-towed gear o Increased competition for fishing grounds o Reduced diversity and flexibility of fishing o Cumulative impact on bottom-towed gear fleet where protected areas are close together o No tow zones will be inundated with pots and static gear and cause difficulties for sea anglers (This comment was recorded during one of the early planning meetings. Several stakeholder representatives have since stated that the comment is unrealistic.) o Northern Irish prawn vessels and numerous European activities occur in this site. o Potential environmental implications derived from concentrating effort in alternative grounds or due to new fishing ground searching activity.

<p>Anchoring of large vessels will not be allowed (except in emergencies)</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o There is a general right of anchoring as a consequence of and incidental to the Public Right of Navigation.
<p>Aggregate extraction will not be allowed.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o Aggregate dredging can only occur where the mineral resources are geologically located – in highly localised and discrete areas. If aggregate operations are not allowed in MCZs (subject to appropriate monitoring, mitigation and management), and MCZs coincide with aggregate resource, then this will have significant impact on national construction aggregate supply and coast defence. o If aggregate operations (subject to appropriate monitoring, mitigation and management) are restricted in areas adjacent to an MCZ, then this will have significant impact on national construction aggregate supply and coast defence. <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o If aggregate operations (subject to appropriate monitoring, mitigation and management) are restricted in areas adjacent to an MCZ, then this will have significant impact on national construction aggregate supply and coast defence.
<p>Dumping and disposal will not be allowed. That includes dumping of fish waste from processing vessels and munitions.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o

<p>Activities assumed to possibly need restricting (limiting or mitigating) within the site or parts of the site.</p>	
<p>Assumptions</p>	<p>Implications</p>
<p>Static fishing gear will be permitted, but there may need to be a limit on the amount of static gear used in the area.</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o No tow zones will be inundated with pots and static gear and cause difficulties for sea anglers (This comment was recorded during one of the early planning meetings. Several stakeholder representatives have since stated that

<p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>the comment is unrealistic.) Given this assumption, there are still the following concerns: <ul style="list-style-type: none"> o Static gear fishermen might face possible additional costs for mitigation measures, should they be needed o There would be costs if monitoring is needed </p>
<p>The installation, operation and maintenance of renewable energy devices will be permitted</p> <p><i>Based on SAP feedback the assumption cannot apply to all sites in the network, although it can apply to any given site on its own.</i></p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications: <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns: <ul style="list-style-type: none"> o The MCZ designation may mean that additional management requirements are defined for renewable energy developments. This could result in: <ul style="list-style-type: none"> - additional costs to the renewables industry, e.g. for licensing mitigation and monitoring - delays to renewables development - delays, lost revenue and additional costs associated with cable repair activity restrictions o Costs and delays associated with co-location of renewables in MCZs, could result in long term implications in terms of renewables deployment which could have serious implications for industry and Government in terms of loss of operational revenue and missing EU climate change targets. o Enforced co-location with MCZs would dramatically restrict deployment. <p>If the assumption turns out to be wrong: <ul style="list-style-type: none"> o If co-location assumptions are not correct the impacts would/could be: site locations that can't be developed, increased costs (the implications could be re-routing of cables around a feature could cost an additional £600,000 - £1.3m/km depending on cable type, size and seabed geology), construction delays, failure to meet renewables targets, impacts on acidification, additional monitoring requirements, increased uncertainty and declining investor confidence in renewables activities. o Increased competition for sea space with other sea users. o Excellent wind and wave resource area but unlikely to be developed in short or medium term due to distance from shore. Aviation Danger Area likely to exclude wind development. </p> </p></p>

Activities assumed to be allowed to continue / occur within the site	
Assumptions	Implications
<p>Handlining (recreational angling and commercial handlining) will be permitted. Handlining includes sea angling and trolling.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o Handliners might face possible additional costs if mitigation measures are needed o There would be costs if monitoring is needed <p>Benefits:</p> <ul style="list-style-type: none"> o
<p>Pelagic longlining, pelagic netting and pelagic trawls will be allowed to continue (for static gear, see previous).</p> <p>Mobile species (seabirds and cetaceans) not considered as features needing protection when the vulnerability assessment was carried out with JNCC specialists.</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>The installation and maintenance of cables will be permitted and will not be made prohibitively expensive within the site. This applies to power cables (including cables for renewable energy devices), and telecommunications cables.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption there are still the following concerns:</p> <ul style="list-style-type: none"> o Cable installation cost increases and delay o Cable repair cost, delays and lost revenue could increase due to activity restrictions on cable repair. o There is no definition of what 'prohibitively expensive' means; the cables representative would like assurance that no additional cost will result from MCZ designation (beyond costs associated with existing management and mitigation requirements). <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o For renewables/power cables, re-routing of cables around a feature or site might mean longer cable routes, at a cost of £600,000 - £1.3 million/km depending on cable type, size and seabed geology. o There may be other costs, e.g. costs associated with licensing, mitigation measures and monitoring requirements. o Increased licensing requirements and costs of cabling may have serious implications for industry and Government in terms of loss of operational revenue, missing EU climate change targets etc. o One proposed power cable.

<p>The operation of cables (power and telecommunications) & pipelines will be permitted (i.e. any existing cables will be allowed to stay operational)</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o Four active and three inactive telecoms cables.
<p>Tourism and recreational activities will be permitted.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Passage of ships will be permitted</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Anchoring of small vessels will be permitted</p> <p><i>There isn't a clear, agreed Working Group definition for what constitutes a 'small vessel'.</i></p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o No clear working group definition exists of what counts as a 'small' vessel. 24m was proposed some time ago by the RYA, but no decision was reached as to whether we would adopt that size in MCZ planning.
<p>Anchoring for maintenance and access for licensed visitors to heritage wrecks will be permitted</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o (No heritage wrecks currently present in the site)

Table II.3.10e VA Snapshot table: This table records the point which the vulnerability assessment discussions had reached regarding site management, at the time of the final Joint Working Group meeting in May 2011. The outcome is not definitive, and the VA did not carry out an exhaustive review of all the working assumptions recorded in the longer table above. The Steering Group were not directly involved in the VA discussions, and at their final meeting, expressed considerable reservations about the VA outcome (see section II.2.1). The reason this VA snapshot table is included here is so that readers have a record of what the VA snapshot was showing at the time the final stakeholder comments were recorded for this site. For a full explanation of the VA snapshot, please refer to part I. The maps in appendix 13 show a visual representation of the information in all the VA snapshot tables in the rMCZ site reports.

Sector	Potential Management
Commercial Fishing – all mobile bottom gears	Management: - Prohibition of fishing in the rMCZ Measure: - Common Fisheries Policy

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

The most significant uncertainty faced by the project was the lack of knowledge on management of MCZs, and this uncertainty still applies to all rMCZs in the network. There was uncertainty over what activities will be affected by MCZ designations: what activities will be permitted to continue within (or near) MCZs, what activities will not be permitted, and what activities will require mitigation or some form of restriction other than a complete ban. There was also uncertainty over what measures will be taken to ensure any activity restrictions are put in place (e.g. byelaws, voluntary measures).

The following additional uncertainty has been highlighted for this site:

- There have been conflicting statements as to whether or not the UN Convention on the Law of the Seas (UNCLOS) allows the permanent right to lay cables in the offshore outside of 12 nautical miles or whether this activity can be managed following MCZ designation.

Additional comments

The following is a set of additional comments made by stakeholder representatives over the course of the planning work. Some of these comments were made specifically about this site; others were more generic comments which the project team consider to be relevant to this site.

- *Mobile bottom gear*
 - Seasonal closures are an inappropriate measure for benthic conservation.
- *Pelagic gear*
 - As this site had previously been considered to provide protection for pelagic and mobile species, assumptions had been made that netting and longlining would not be permitted, and pelagic trawls would be permitted, but with mitigation against bycatch for seabirds.

- *General benefits of MCZs*
 - Some stakeholder representatives would like the following recorded and for these to be considered during the impact assessment:
 - Fisheries spill-over.
 - Improvements for the local economy.
 - Education opportunities.
 - Benefits to science.
 - Focus for voluntary groups.
 - Potential increase in the amount and quality of recreational activities (diving, sea angling, environmental tourism, etc).
 - The designation as an MCZ will be a selling point and will undoubtedly be used as an identifier to the area to highlight it as somewhere to visit.
- *Monitoring*
 - There are two main types of monitoring which will need to take place within rMCZs:
 - Monitoring the activities within a site and the various levels at which they are occurring.
 - Monitoring the ENG features for changes in condition.
- *Management measures*
 - For sites beyond 6nm, stakeholder representatives repeatedly voiced concern over how the activity of non-UK fishing vessels might be managed, and stated opposition to any unilateral measures that would apply to UK vessels only. At the time of the third progress report, we had received the following statement from the SNCBs and Defra: ‘When considering the impacts of fishing restrictions on non UK vessels, it is the Government’s intention that fishing restrictions will not be imposed unilaterally on UK vessels before they can be applied to equivalent EU vessels operating within the relevant areas. In the case of those EU fishing vessels with historic fishing rights in UK waters between 6 and 12 nm, Defra will negotiate with the relevant Member States and the European Commission before introducing byelaws, or orders that are applicable to all EU vessels, or seeking Common Fisheries Policy (CFP) regulation measures. Once introduced, these would apply to all EU vessels (including UK vessels) equally and at the same time.’
- *Vulnerability Assessment*
 - Steering Group representatives voiced general concern over the process and outcome of the vulnerability assessments. This was mainly in relation to inshore sites, however, please refer to the Steering Group statement made in section II.2.1.

Levels of support

The network report (section II.2) includes a project team reflection on levels of support for the network recommendations as a whole, and the site specific reflection presented here should be read within the wider network context.

This rMCZ is located in a productive fishing area which is used by UK and non-UK vessels. The area supports a fishery for *Nephrops norvegicus*. As a result, this site is controversial with offshore fishing representatives. The reason for its inclusion in the network is the fact that it is the only location where reliable records of the FOCI habitat ‘mud habitats in deep water’ are located, and the area

was therefore recognised as unique and important for meeting the ENG. Conservation representatives have highlighted the additional ecological importance of the area, because of its high productivity and pelagic interest (there was discussion about adding draft conservation objectives for non-ENG listed mobile species). There is therefore good support for this site from conservationists. Because of the distance from shore, other sectors have voiced relatively few immediate concerns over the site, compared to other sites in the network.

Supporting documentation

GIS data used for reporting the quantitative habitat and species figures in the tables above includes the following sources: UKSeaMap modelled broad-scale habitat data and MB102. Refer to appendix 8 for details, and to the tables above for data sources for specific features in this site.

Further evidence underpinning the site can be found in the publications and datasets referred to in the detailed site description. There may be additional information relevant to this rMCZ in Brown *et al.* (2003), Farrow and Fyfe (1988), Garrard (1977), Mackie *et al.* (1997), Pollock *et al.* (1997), and Scott *et al.* (2003).

Site map series

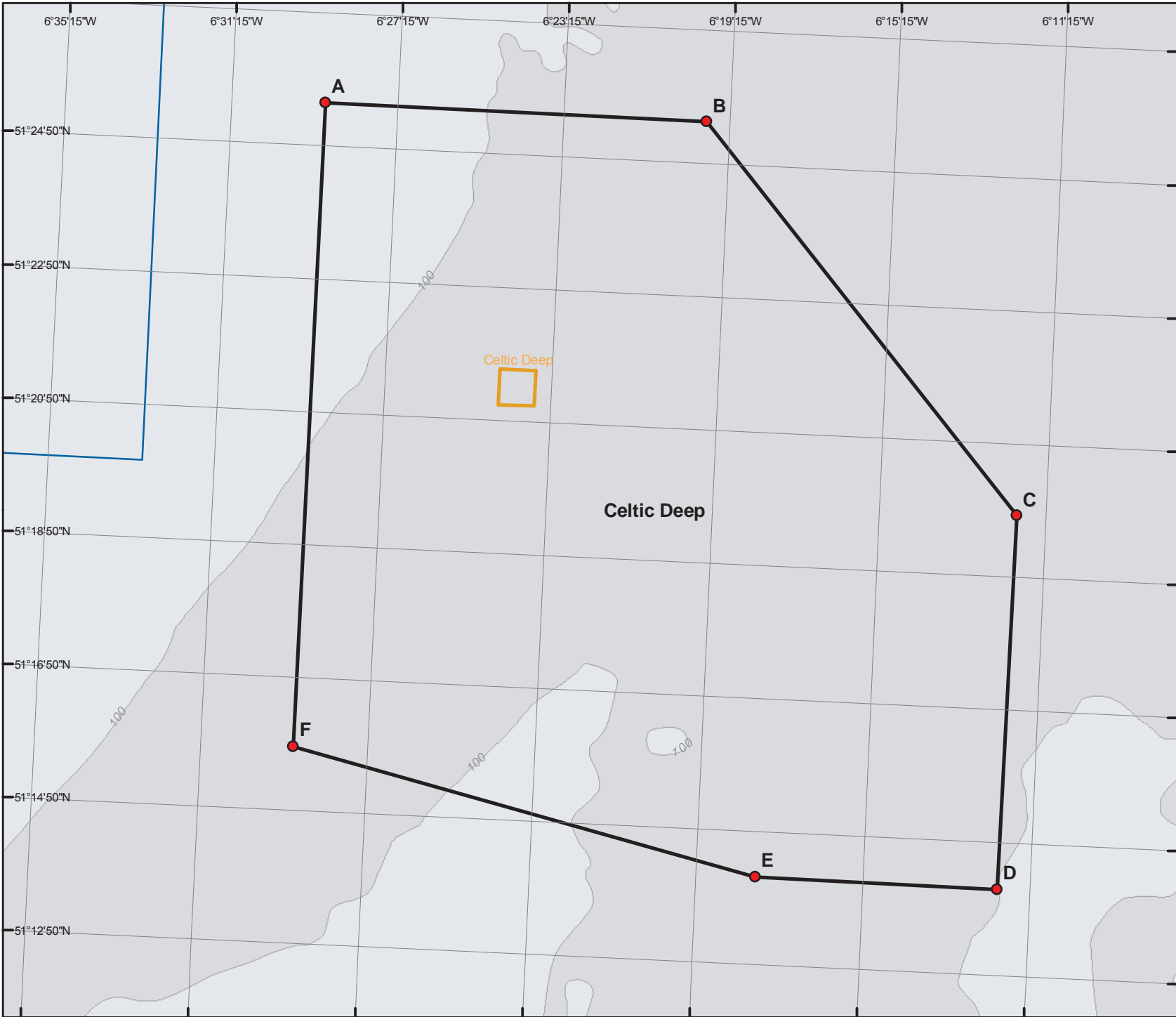
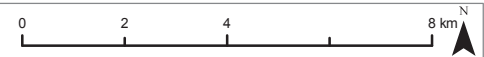
On the following pages there are three maps of this site.

- The first map (FR_018a) is the main site map showing the rMCZ boundary and includes points with coordinates (in WGS84 UTM30N). The map also shows charted depth and existing Marine Protected Areas for reference. Please note: the lat/long coordinates of the vertices in the following maps have been calculated in decimal degrees, and in degrees, minutes and seconds. For plotting on a standard Admiralty (UKHO) chart, the seconds of each coordinate need to be converted to decimal. An MS Excel table showing all coordinates in degrees, minutes and decimal seconds has been provided in the additional materials section (see Appendix 14) for plotting purposes.
- The second map (FR_018b) shows the rMCZ boundary over broad-scale habitats, and records of habitat and species FOCl. The data shown on this map corresponds with the information in tables II.3.10b and II.3.10c, data sources are indicated in the tables.
- The third map (FR_018c) shows KISCA cable routes and some other human activity information. It is zoomed out to include East of Celtic Deep rMCZ. For spatial data showing the distribution of fishing effort, please refer to the interactive PDF maps supplied with the additional materials (see appendix 14).
- Because of the large number of features shown on the site maps (especially inshore biophysical maps), it has not been possible to embed comprehensive legends within the site maps themselves. A comprehensive map legend is therefore provided in appendix 7, which explains the symbology used on all the maps within this final report.
- Appendix 8 describes the data sources for the information shown on the final report maps in detail.

Celtic Deep rMCZ

This is one of a series of maps showing Finding Sanctuary's final MCZ recommendations, designed to be viewed within the context of the project's final report. Datum: WGS84. Projection: UTM30N.

Maritime basemap © British Crown and SeaZone Solutions Limited, 2010.
All Rights Reserved. Data License No. 062006.004. Land basemap part
© OpenStreetMap & contributors, CC-BY-SA. Not to be used for navigation.
Contains OS data © Crown copyright 2011.



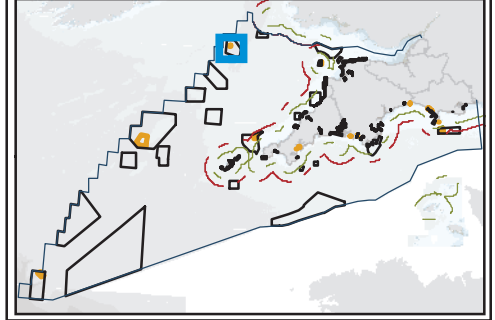
Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	51.4250	-6.4831	51° 25' 30" N	6° 28' 59" W
B	51.4246	-6.3301	51° 25' 28" N	6° 19' 48" W
C	51.3294	-6.1991	51° 19' 45" N	6° 11' 56" W
D	51.2356	-6.2004	51° 14' 8" N	6° 12' 1" W
E	51.2361	-6.2971	51° 14' 9" N	6° 17' 49" W
F	51.2634	-6.4840	51° 15' 48" N	6° 29' 2" W

Map Legend

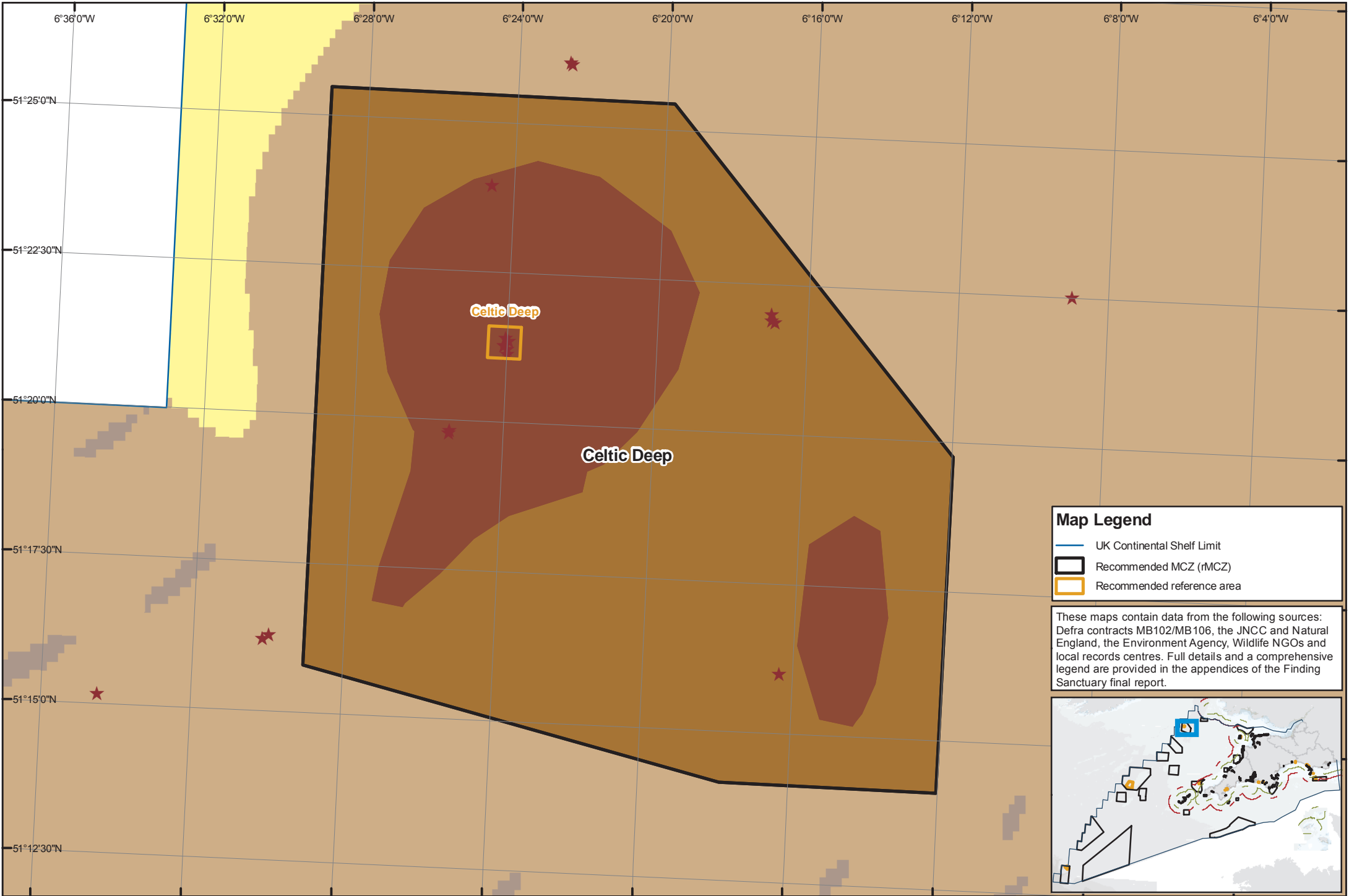
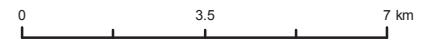
- UK Continental Shelf Limit
- Recommended MCZ (rMCZ)
- Recommended reference area

A comprehensive legend is provided in the appendices of the Finding Sanctuary final report.



This is one of a series of maps showing Finding Sanctuary's final MCZ recommendations, with biophysical information. It is designed to be viewed within the context of the project's final report. Datum: WGS84. Projection: UTM30N.

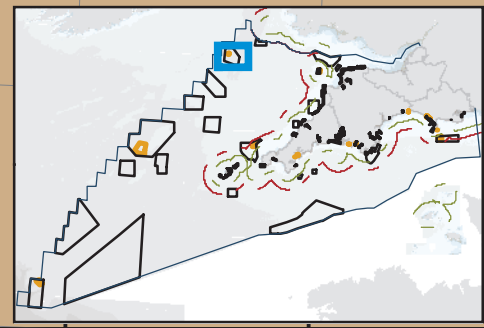
Maritime basemap © British Crown and SeaZone Solutions Limited, 2010. All Rights Reserved. Data Licence No. 062006.004. Land basemap part © OpenStreetMap & contributors, CC-BY-SA. Not to be used for navigation. Contains OS data © Crown copyright 2011.



Map Legend

- UK Continental Shelf Limit
- Recommended MCZ (rMCZ)
- Recommended reference area

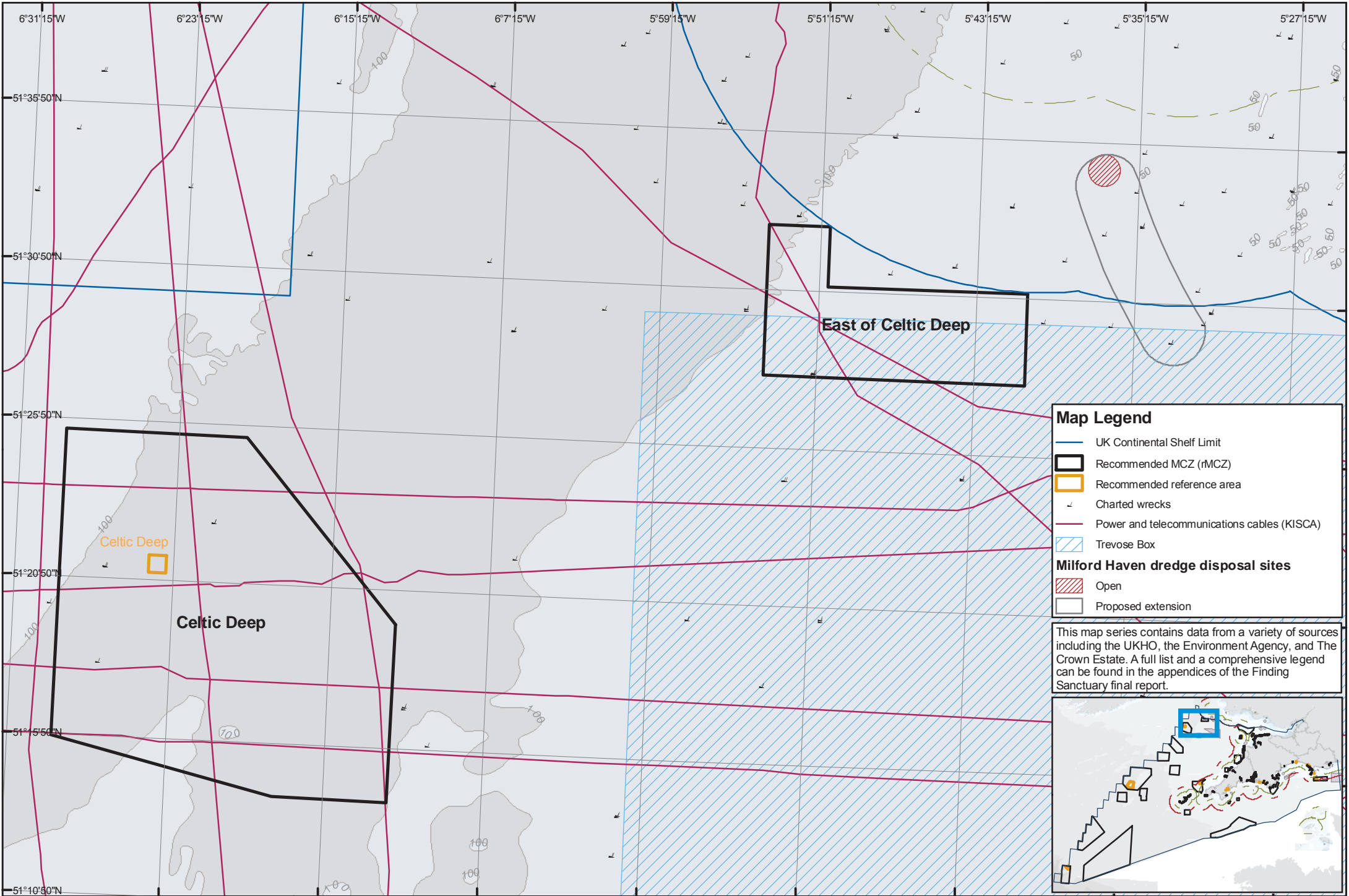
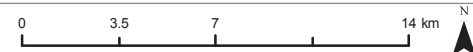
These maps contain data from the following sources: Defra contracts MB102/MB106, the JNCC and Natural England, the Environment Agency, Wildlife NGOs and local records centres. Full details and a comprehensive legend are provided in the appendices of the Finding Sanctuary final report.



Celtic Deep and East of Celtic Deep rMCZs

This is one of a series of maps showing Finding Sanctuary's final MCZ recommendations, with socio-economic information. It is designed to be viewed within the context of the project's final report. Datum: WGS84. Projection: UTM30N.

Maritime basemap © British Crown and SeaZone Solutions Limited, 2010.
All Rights Reserved. Data Licence No. 062006.004. Land basemap part
© OpenStreetMap & contributors, CC-BY-SA. Not to be used for navigation.
Contains OS data © Crown copyright 2011.



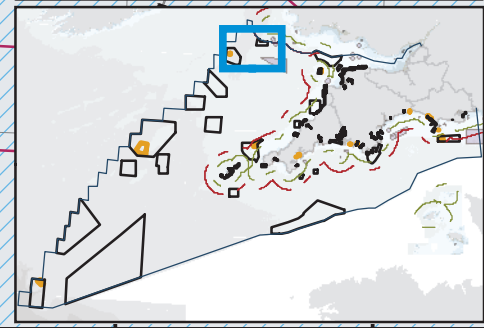
Map Legend

- UK Continental Shelf Limit
- Recommended MCZ (rMCZ)
- Recommended reference area
- Charted wrecks
- Power and telecommunications cables (KISCA)
- Trevoise Box

Milford Haven dredge disposal sites

- Open
- Proposed extension

This map series contains data from a variety of sources including the UKHO, the Environment Agency, and The Crown Estate. A full list and a comprehensive legend can be found in the appendices of the Finding Sanctuary final report.



II.3.11 East of Celtic Deep rMCZ

Basic site information

Site centre location (datum used: ETRS89):

Decimal Degrees		Degrees Minutes Seconds	
Lat	Long	Lat	Long
51.4980	-5.7990	51° 29' 52" N	5° 47' 56" W

Site surface area: 94.9 km² (calculated in ETRS89 – LAEA)

Biogeographic region:

JNCC regional sea: Western Channel and Celtic Sea

OSPAR region: Region III: Celtic Waters

Site boundary: The northern boundary of this site abuts the 12nm limit off south Wales. Rather than tracing the curved boundary of the 12nm limit, the site has been squared off with straight north-south and east-west boundary sections.

Sites to which the site is related: The East of Celtic Deep rMCZ is approx 28km to the north-east of the Celtic Deep rMCZ. The Pembrokeshire marine SAC is approx. 14km to the north.

Maps of the site are included at the end of this site report. The main site map shows points with coordinates along the site boundary (in WGS84 UTM30N).

Features proposed for designation within East of Celtic Deep rMCZ

Table II.3.11a Draft conservation objectives for the East of Celtic Deep rMCZ. 'Maintain' = maintain in favourable condition, 'recover' = recover to favourable condition. This is an extract of the conservation objective summary tables in section II.2.6. The full text of the draft conservation objectives can be found in appendix 15.

Feature	Conservation Objective
Subtidal sand	recover
Subtidal mud	recover
Subtidal coarse sediment	recover

The inclusion of conservation objectives for seabirds and cetaceans on the conservation objective feature list for this site was discussed at length at the Joint Working Group meeting in May 2011, in the full understanding of SAP feedback following progress report 3, and the JNCC's position that they would not support conservation objectives for mobile species in offshore rMCZs. The JWG could not reach a conclusion on the matter.

The following tables show ENG-related statistics for this site, reported from spatial data available in Finding Sanctuary's GIS datasets. Greyed out rows indicate features for which GIS data exists within the site boundary, but which have not been included on the list of draft conservation objectives (the reasons are stated in table footnotes).

Table II.3.11b **Subtidal broad-scale habitats** recorded in this rMCZ, based on an analysis of Finding Sanctuary's EUNIS level 3 broad-scale habitat GIS data (see appendix 8). Data sources: 1 - UKSeaMap, 2 - MESH, 3 - Environment Agency.

Habitat	Area covered within rMCZ (km ²)	% of total in study area	Source(s)
Subtidal coarse sediment	0.71	<0.1%	1
Subtidal sand	84.01	0.3%	1
Subtidal mud	10.18	0.2%	1

Table II.3.11c **FOCI habitats** recorded in this rMCZ, based on an analysis of Finding Sanctuary's amalgamated GIS FOCI datasets (see appendix 8). Data sources: 1 - MB102; 2 - JNCC/ MESH Canyons survey data; 3 - ERCCIS/Isles of Scilly Wildlife Trust; 4 - DORIS.

Habitat	Area covered (km ²)	Number of point records (total)	Number of point records (pre-1980)	Source(s)
Subtidal sands and gravels ¹	94.90			1

¹ Conservation objectives have not been included for subtidal sands and gravels as we have considered any conservation requirements met by listed broad-scale habitats.

For additional understanding on how this site is located in relation to environmental data layers, including areas of high benthic biodiversity, offshore bird aggregation areas, or areas of seasonal sea surface temperature fronts, please refer to the interactive PDF maps presented alongside this report.

Site summary

The site is approximately 40km south of the Pembrokeshire coast in Wales. The depth is within the 50m to 100m range, with the western edge dipping below the 100m depth contour. The seabed is characterised by subtidal sand, with a patch of mud. The site was included in the network because of its contribution to ENG criteria to broad-scale habitat targets, and its added ecological importance. It is in an area where **frontal** systems occur during the summer months, indicating high productivity. Offshore bird observation data indicates this as an important aggregation area for a number of seabird species year-round; and is of particular importance for wintering birds.

Detailed site description

A literature search was carried out on this site, but as for other for non-coastal sites in the network it has proved difficult to find information associated with this specific site.

Wilson *et al.* (2001) sampled benthic biodiversity in the area, but the exact location is not defined. Robinson *et al.* (2011) predicted the distribution of biotopes in the Irish Sea which covered the area of the Celtic Deep and East of Celtic Deep.

During the period 2000–2006, Ellis *et al.* (2007a) carried out approximately 150 tows with a 2m-beam trawl during groundfish surveys of the South West offshore area. Catches along the edge of the continental shelf (130–350 m deep) were characterised by large numbers of the anemone *Actinauge richardi*, with the hermit crab *Pagurus prideaux* dominating on coarse grounds in shallower waters. The study described the spatial distribution of the epibenthic fauna.

Stakeholder narrative: Assumptions and Implications

As explained in part I, the stakeholder narrative is a vital underpinning of the site recommendations. Working assumptions and implications are presented here, and additional comments are presented in the following section.

The following fundamental assumption was recorded to apply to all activities in all sites: **The fundamental assumption about human activities within MCZs is that activities can continue (under current licensing regimes where applicable), as long as they do not prevent the conservation objectives from being achieved.** This assumption applies to all activities. Table II.3.11d shows more specific working assumptions and implications that were recorded for this site over the course of the planning process. The assumptions recorded for this site changed significantly through the planning, as the pre-cursor to this site was discussed as a site where only seabirds would be protected, not the seafloor.

Following that, table II.3.11e shows the vulnerability assessment (VA) snapshot for this site. The VA meetings took place at the end of the project, and they did not involve the Steering Group. They started to discuss site management, but did not reach any firm conclusions. The VA snapshot table reflects the point that the VA discussions had reached at the time of the last Joint Working Group meeting in May 2011. Many Steering Group members expressed concerns about the VA process and its outcomes (see section II.2.1 for full details).

Table II.3.11d Specific assumptions and implications relating to East of Celtic Deep rMCZ. Black text reflects the working assumptions and implications recorded throughout the planning discussions. The development of the narrative recorded in black can be traced back through the Working Group and Steering Group meeting reports from 2009 to 2011. Red and green text in the first column comments on how the snapshot of the vulnerability assessment (VA) relates to each of the working assumptions that had been made as planning took place (refer to part I for a full explanation of the VA snapshot).

Activities assumed to not be allowed within the site	
Assumptions	Implications
<p>Bottom-towed fishing gear will not be allowed.</p> <p>This activity was discussed during the VA meetings, and it was determined that the activity would be prohibited in the whole site.</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o Loss of ground for bottom-towed gear fishermen, both UK and non-UK o Displacement of bottom-towed gear o Increased competition for fishing grounds o Reduced diversity and flexibility of fishing o Cumulative impact on bottom-towed gear fleet where protected areas are close together o No tow zones will be inundated with pots and static gear and cause difficulties for sea anglers (This comment was recorded during one of the early planning meetings. Several stakeholder representatives have since stated that the comment is unrealistic.) o Northern Irish prawn vessels and numerous european activities occur in this site. o Potential environmental implications derived from concentrating effort in alternative grounds or due to new fishing ground searching activity.

	<p>Given this assumption there are still the following concerns:</p> <ul style="list-style-type: none"> o The westward shift of the site from its previous location has implicated higher levels of fishing activity.
<p>Anchoring of large vessels will not be allowed (except in emergencies)</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o There is a general right of anchoring as a consequence of and incidental to the Public Right of Navigation
<p>Aggregate extraction will not be allowed.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o Aggregate dredging can only occur where the mineral resources are geologically located – in highly localised and discrete areas. If aggregate operations are not allowed in MCZs (subject to appropriate monitoring, mitigation and management), and MCZs coincide with aggregate resource, then this will have significant impact on national construction aggregate supply and coast defence. o If aggregate operations (subject to appropriate monitoring, mitigation and management) are restricted in areas adjacent to an MCZ, then this will have significant impact on national construction aggregate supply and coast defence. <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o If aggregate operations (subject to appropriate monitoring, mitigation and management) are restricted in areas adjacent to an MCZ, then this will have significant impact on national construction aggregate supply and coast defence.
<p>Dumping and disposal will not be allowed. That includes dumping of fish waste from processing vessels and munitions.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o

Activities assumed to possibly need restricting (limiting or mitigating) within the site or parts of the site.	
Assumptions	Implications
<p>Static fishing gear will be permitted, but there may need to be a limit on the amount of static gear used in the area.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o No tow zones will be inundated with pots and static gear and cause difficulties for sea anglers (This comment was recorded during one of the early planning meetings. Several stakeholder representatives have since stated that the comment is unrealistic.) <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o Static gear fishermen might face possible additional costs for mitigation measures, should they be needed o There would be costs if monitoring is needed
<p>The installation, operation and maintenance of renewable energy devices will be permitted</p> <p><i>Based on SAP feedback the assumption cannot apply to all sites in the network, although it can apply to any given site on its own.</i></p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o The MCZ designation may mean that additional management requirements are defined for renewable energy developments. This could result in: <ul style="list-style-type: none"> - additional costs to the renewables industry, e.g. for licensing mitigation and monitoring - delays to renewables development - delays, lost revenue and additional costs associated with cable repair activity restrictions o Costs and delays associated with co-location of renewables in MCZs, could result in long term implications in terms of renewables deployment which could have serious implications for industry and Government in terms of loss of operational revenue and missing EU climate change targets. o Enforced co-location with MCZs would dramatically restrict deployment. <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o If co-location assumptions are not correct the impacts would/could be: site locations that can't be developed, increased costs (the implications could be re-routing of cables around a feature could cost an additional £600,000 - £1.3m/km depending on cable type, size and seabed geology), construction delays, failure to meet renewables targets, impacts on acidification, additional monitoring requirements, increased uncertainty and declining investor confidence in renewables activities. o Increased competition for sea space with other sea users. o Excellent wind energy resource but unlikely to be developed in short term. o Medium wave energy resource but unlikely to be developed in short term.

Activities assumed to be allowed to continue / occur within the site	
Assumptions	Implications
<p>Handlining (recreational angling and commercial handlining) will be permitted. Handlining includes sea angling and trolling.</p> <p style="color: green;">Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p> <p>Pelagic trawls will be permitted.</p> <p style="color: green;">Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o Handliners might face possible additional costs if mitigation measures are needed o There would be costs if monitoring is needed <p>Benefits:</p> <ul style="list-style-type: none"> o <p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>The installation and maintenance of cables will be permitted and will not be made prohibitively expensive within the site. This applies to power cables (including cables for renewable energy devices), and telecommunications cables.</p> <p style="color: green;">Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption there are still the following concerns:</p> <ul style="list-style-type: none"> o Cable installation cost increases and delay o Cable repair cost, delays and lost revenue could increase due to activity restrictions on cable repair. o There is no definition of what 'prohibitively expensive' means; the cables representative would like assurance that no additional cost will result from MCZ designation (beyond costs associated with existing management and mitigation requirements). <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o For renewables/power cables, re-routing of cables around a feature or site might mean longer cable routes, at a cost of £600,000 - £1.3 million/km depending on cable type, size and seabed geology. o There may be other costs, e.g. costs associated with licensing, mitigation measures and monitoring requirements. o Increased licensing requirements and costs of cabling may have serious implications for industry and Government in terms of loss of operational revenue, missing EU climate change targets etc.

<p>The operation of cables (power and telecommunications) & pipelines will be permitted (i.e. any existing cables will be allowed to stay operational)</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o Two active telecoms cables.
<p>Tourism and recreational activities will be permitted.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Passage of ships will be permitted</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Anchoring of small vessels will be permitted</p> <p><i>There isn't a clear, agreed Working Group definition for what constitutes a 'small vessel'.</i></p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o No clear working group definition exists of what counts as a 'small' vessel. 24m was proposed some time ago by the RYA, but no decision was reached as to whether we would adopt that size in MCZ planning.
<p>Anchoring for maintenance and access for licensed visitors to heritage wrecks will be permitted</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o (No heritage wrecks currently present in the site)

Table II.3.11e VA Snapshot table: This table records the point which the vulnerability assessment discussions had reached regarding site management, at the time of the final Joint Working Group meeting in May 2011. The outcome is not definitive, and the VA did not carry out an exhaustive review of all the working assumptions recorded in the longer table above. The Steering Group were not directly involved in the VA discussions, and at their final meeting, expressed considerable reservations about the VA outcome (see section II.2.1). The reason this VA snapshot table is included here is so that readers have a record of what the VA snapshot was showing at the time the final stakeholder comments were recorded for this site. For a full explanation of the VA snapshot, please refer to part I. The maps in appendix 13 show a visual representation of the information in all the VA snapshot tables in the rMCZ site reports.

Sector	Potential Management
Commercial Fishing – all mobile bottom gears	Management: - Prohibition of fishing in the rMCZ Measure: - Common Fisheries Policy

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

The most significant uncertainty faced by the project was the lack of knowledge on management of MCZs, and this uncertainty still applies to all rMCZs in the network. There was uncertainty over what activities will be affected by MCZ designations: what activities will be permitted to continue within (or near) MCZs, what activities will not be permitted, and what activities will require mitigation or some form of restriction other than a complete ban. There was also uncertainty over what measures will be taken to ensure any activity restrictions are put in place (e.g. byelaws, voluntary measures).

The following additional uncertainty has been highlighted for this site:

- There have been conflicting statements as to whether or not the UN Convention on the Law of the Seas (UNCLOS) allows the permanent right to lay cables in the offshore outside of 12 nautical miles or whether this activity can be managed following MCZ designation.

Additional comments

The following is a set of additional comments made by stakeholder representatives over the course of the planning work. Some of these comments were made specifically about this site, others were more generic comments which the project team consider to be relevant to this site.

- *Fishing*
 - This site is located in an area of high fishing activity.
- *Mobile bottom gear*
 - Seasonal closures are an inappropriate measure for benthic conservation.
- *Pelagic gear*
 - As this site had previously been considered to provide protection for pelagic and mobile species, assumptions had been made that netting and longlining would not

be permitted, and pelagic trawls would be permitted, but with mitigation against bycatch for seabirds.

- *Disposal*
 - This site originally intersected with an area adjacent to the Milford Haven disposal site which was likely to be impacted by deposition and so it was agreed to move the site west to avoid mud habitat and the Milford Haven disposal site.
- *General benefits of MCZs*
 - Some stakeholder representatives would like the following recorded and for these to be considered during the impact assessment:
 - Fisheries spill-over.
 - Improvements for the local economy.
 - Education opportunities.
 - Benefits to science.
 - Focus for voluntary groups.
 - Potential increase in the amount and quality of recreational activities (diving, sea angling, environmental tourism, etc).
 - The designation as an MCZ will be a selling point and will undoubtedly be used as an identifier to the area to highlight it as somewhere to visit.
- *Monitoring*
 - There are two main types of monitoring which will need to take place within rMCZs:
 - Monitoring the activities within a site and the various levels at which they are occurring.
 - Monitoring the ENG features for changes in condition.
- *Management measures*
 - For sites beyond 6nm, stakeholder representatives repeatedly voiced concern over how the activity of non-UK fishing vessels might be managed, and stated opposition to any unilateral measures that would apply to UK vessels only. At the time of the third progress report, we had received the following statement from the SNCBs and Defra: ‘When considering the impacts of fishing restrictions on non UK vessels, it is the Government’s intention that fishing restrictions will not be imposed unilaterally on UK vessels before they can be applied to equivalent EU vessels operating within the relevant areas. In the case of those EU fishing vessels with historic fishing rights in UK waters between 6 and 12 nm, Defra will negotiate with the relevant Member States and the European Commission before introducing byelaws, or orders that are applicable to all EU vessels, or seeking Common Fisheries Policy (CFP) regulation measures. Once introduced, these would apply to all EU vessels (including UK vessels) equally and at the same time.’
- *Vulnerability Assessment*
 - Steering Group representatives voiced general concern over the process and outcome of the vulnerability assessments. This was mainly in relation to inshore sites, however, please refer to the Steering Group statement made in section II.2.1.

Levels of support

The network report (section II.2) includes a project team reflection on levels of support for the network recommendations as a whole, and the site specific reflection presented here should be read within the wider network context.

The site is controversial with offshore fishing interests. It was moved east from the location of its pre-cursor site, in order to avoid impacts from or conflicts with a disposal site for dredged materials from Milford Haven. There are plans to expand the disposal site. The move meant the site had better support from a cross-section of stakeholders who were concerned about the disposal site, but it moved the site into an area that is fished more heavily.

Supporting documentation

GIS data used for reporting the quantitative habitat and species figures in the tables above includes the following sources: UKSeaMap modelled broad-scale habitat data, MESH, MB102, and Environment Agency intertidal habitat data. Refer to appendix 8 for details, and to the tables above for data sources for specific features in this site.

Further evidence underpinning the site can be found in the publications and datasets referred to in the detailed site description. There may be additional information relevant to this rMCZ in Garrard (1977).

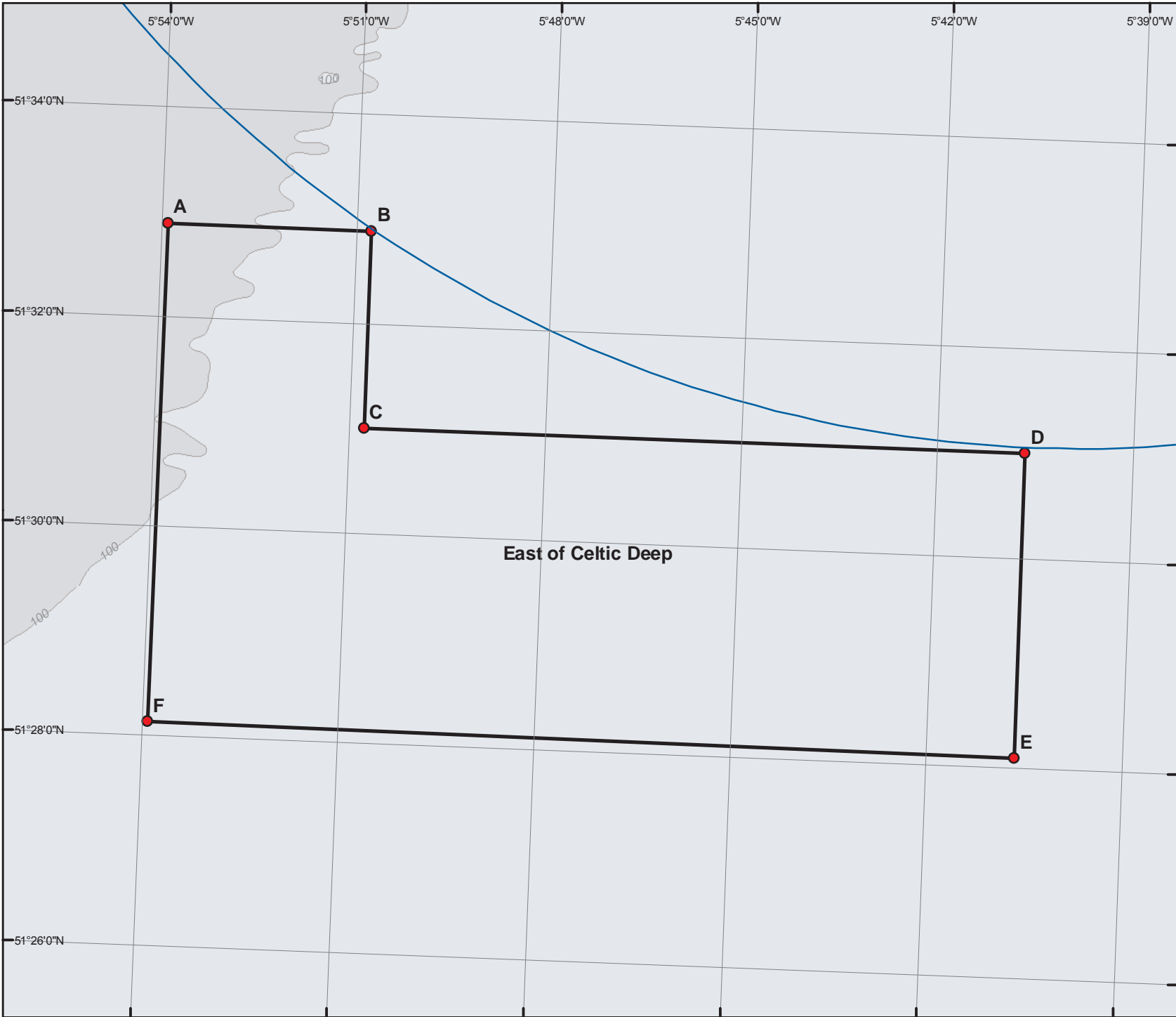
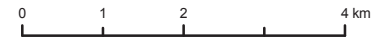
Site map series

On the following pages there are two maps of this site.

- The first map (FR_019a) is the main site map showing the rMCZ boundary and includes points with coordinates (in WGS84 UTM30N). The map also shows charted depth and existing Marine Protected Areas for reference. Please note: the lat/long coordinates of the vertices in the following maps have been calculated in decimal degrees, and in degrees, minutes and seconds. For plotting on a standard Admiralty (UKHO) chart, the seconds of each coordinate need to be converted to decimal. An MS Excel table showing all coordinates in degrees, minutes and decimal seconds has been provided in the additional materials section (see Appendix 14) for plotting purposes.
- The second map (FR_019b) shows the rMCZ boundary over broad-scale habitats, and records of habitat and species FOCI. The data shown on this map corresponds with the information in table II.3.11b, data sources are indicated in the table.
- Most rMCZ site reports contain a map showing socio-economic datasets. This one does not, as there is limited human activity mapped in the site (except for fisheries information, which is included in the interactive PDF maps supplied with the additional materials listed in appendix 14). Cables running through this site, and the current and planned Milford Haven dredge disposal site to the east of this rMCZ, are shown on map FR_018c, in the Celtic Deep rMCZ site report.
- Because of the large number of features shown on the site maps (especially inshore biophysical maps), it has not been possible to embed comprehensive legends within the site maps themselves. A comprehensive map legend is therefore provided in appendix 7, which explains the symbology used on all the maps within this final report.
- Appendix 8 describes the data sources for the information shown on the final report maps in detail.

East of Celtic Deep rMCZ

This is one of a series of maps showing Finding Sanctuary's final MCZ recommendations, designed to be viewed within the context of the project's final report. Datum: WGS84. Projection: UTM30N.



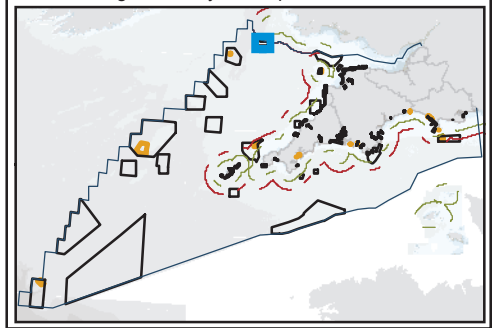
Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	51.5483	-5.8983	51° 32' 53" N	5° 53' 53" W
B	51.5482	-5.8463	51° 32' 53" N	5° 50' 46" W
C	51.5168	-5.8463	51° 31' 0" N	5° 50' 46" W
D	51.5168	-5.6776	51° 31' 0" N	5° 40' 39" W
E	51.4683	-5.6775	51° 28' 5" N	5° 40' 39" W
F	51.4689	-5.8985	51° 28' 7" N	5° 53' 54" W

Map Legend

- Project boundary
- Recommended MCZ (rMCZ)

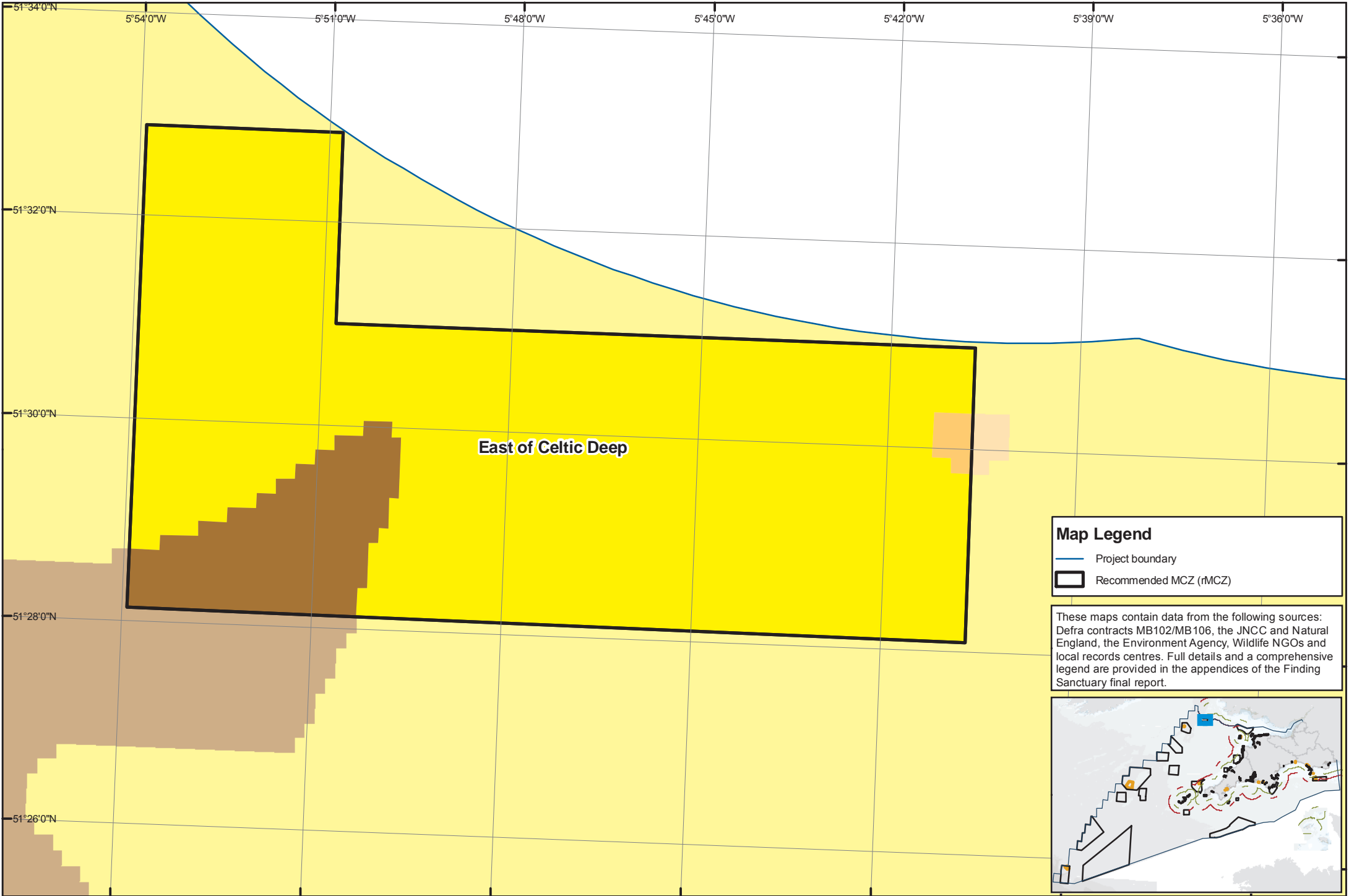
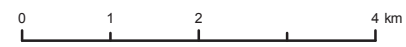
A comprehensive legend is provided in the appendices of the Finding Sanctuary final report.



East of Celtic Deep rMCZ

This is one of a series of maps showing Finding Sanctuary's final MCZ recommendations, with biophysical information. It is designed to be viewed within the context of the project's final report. Datum: WGS84. Projection: UTM30N.

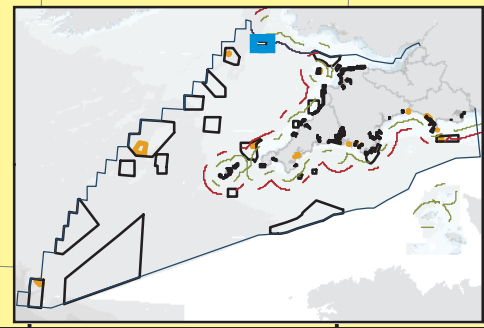
Maritime basemap © British Crown and SeaZone Solutions Limited, 2010.
All Rights Reserved. Data Licence No. 062006.004. Land basemap part
© OpenStreetMap & contributors, CC-BY-SA. Not to be used for navigation.
Contains OS data © Crown copyright 2011.



Map Legend

- Project boundary
- Recommended MCZ (rMCZ)

These maps contain data from the following sources: Defra contracts MB102/MB106, the JNCC and Natural England, the Environment Agency, Wildlife NGOs and local records centres. Full details and a comprehensive legend are provided in the appendices of the Finding Sanctuary final report.



MARINE CONSERVATION ZONE: SELECTION ASSESSMENT DOCUMENT

RMCZ 3 NORTH ST. GEORGE'S CHANNEL

Version and issue date	Amendments made
v1.0 August 2011	

1. Site name

rMCZ 3 - North St. George's Channel (this zone includes two recommended reference areas, rRA B and rRA S)

2. Site centre location

rMCZ 3:

53° 26' 27.618" N, 5° 5' 59.840" W

53.441004 Lat, -5.099955 Long. Lambert Azimuthal Equal Area projection, ETRS89 datum

rRA B:

53° 30' 59.584" N, 4° 56' 38.815" W

53.516551 Lat, -4.944115 Long. Lambert Azimuthal Equal Area projection, ETRS89 datum

rRA S:

53° 38' 3.929" N, 4° 43' 11.410" W

53.634424 Lat, -4.719836 Long. Lambert Azimuthal Equal Area projection, ETRS89 datum

3. Site surface area

1388.03 Km² (144836.9 Ha)

4. Biogeographic region

JNCC regional sea: Irish Sea.

OSPAR region III: Celtic Seas.

5. Features proposed for designation within rMCZ 3

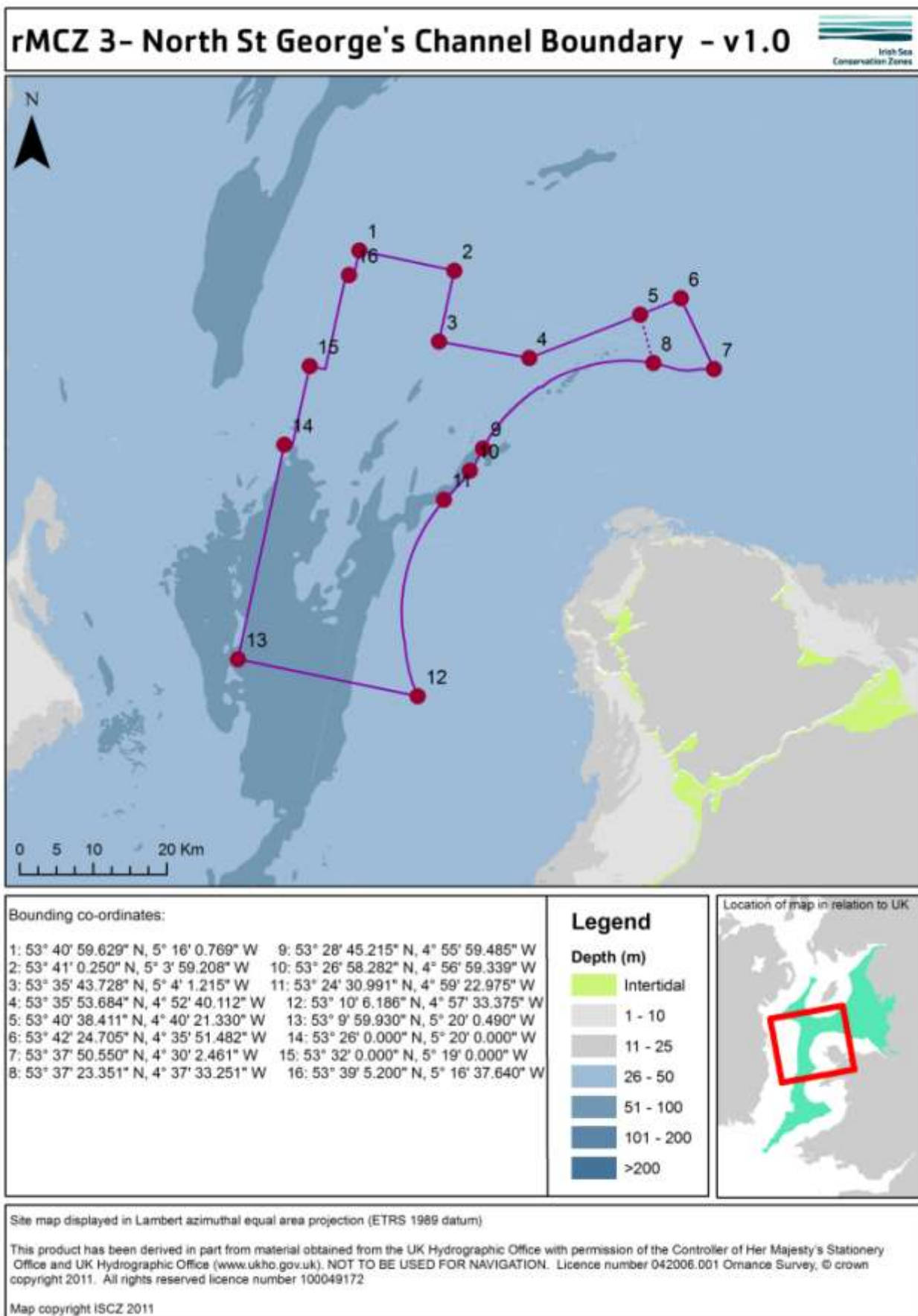
Feature type	Feature name	Area covered within site (for broad scale habitats and habitats of conservation importance)
Broad-scale habitat	A4.1 High energy circalittoral rock	9.48 Km ² (948.27 Ha)
	A4.2 Moderate energy circalittoral rock	40.07 Km ² (4007.09 Ha)
	A5.1 Subtidal coarse sediment	901.06 Km ² (90104.24 Ha)
	A5.2 Subtidal sand	336.2 Km ² (33619.22 Ha)
	A5.4 Subtidal mixed sediment	30.88 Km ² (3088.04 Ha)
	A5.6 Subtidal biogenic reefs	20.07 Km ² (2006.80 Ha)

Feature type	Feature name	Area covered within site (for broad scale habitats and habitats of conservation importance)
Habitat of conservation importance	Horse mussel (<i>Modiolus modiolus</i>) beds	20.07 Km ² (2006.80 Ha)
	Subtidal sands and gravels	1222.49 Km ² (122247.3 Ha)
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Goemorphological feature	Drumlins	n/a

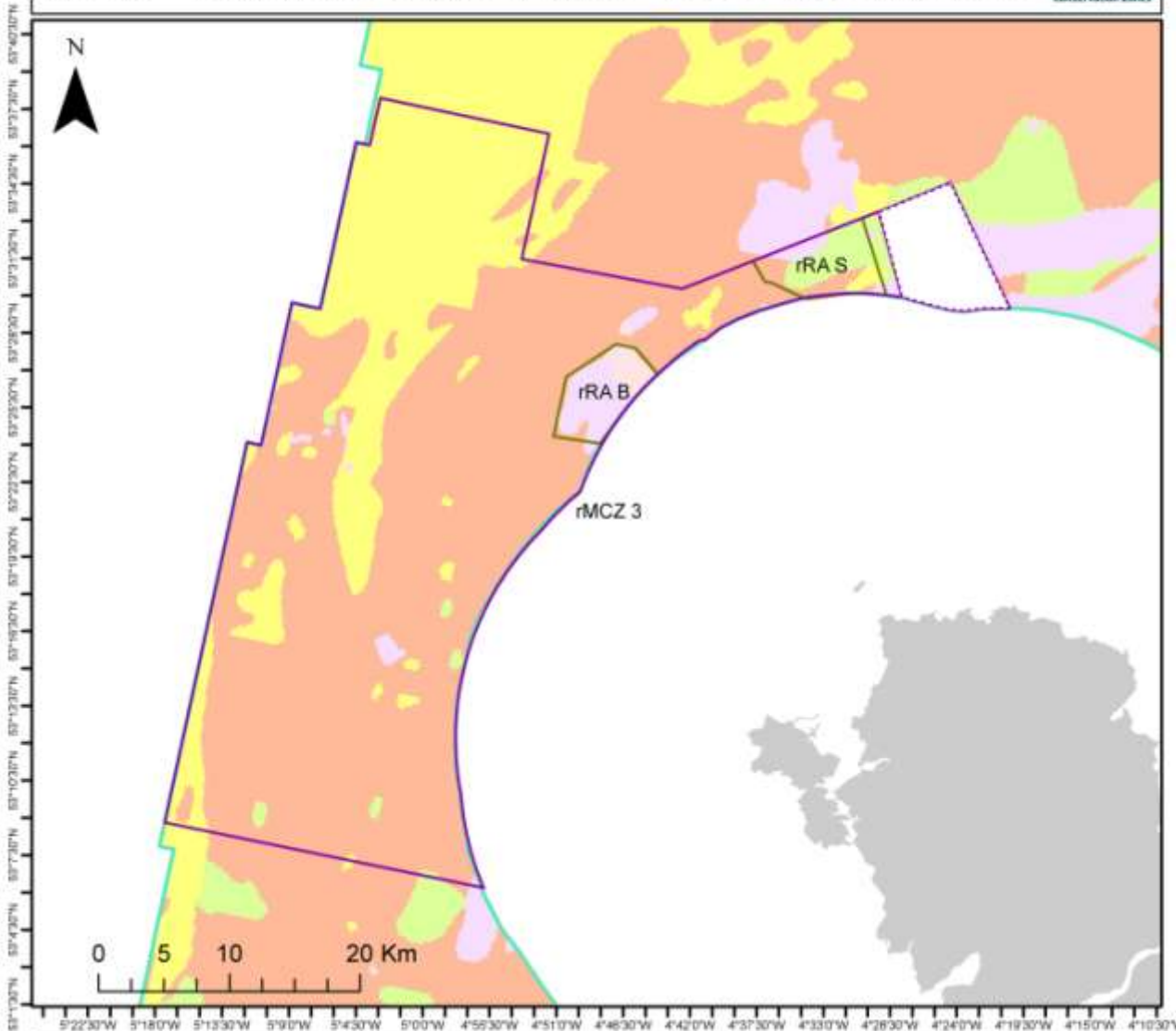
6. Features within rMCZ 3 not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad scale habitat	n/a	
Habitat of conservation importance	Ross worm (<i>Sabellaria spinulosa</i>)	Known to be present but not in high enough density to constitute a reef.
Species of conservation importance	Ocean quahog (<i>Arctica islandica</i>)	Present within rMCZ3 but greater abundance and breeding grounds further northwest. There was also low stakeholder confidence in the quality of the Quahog data relating to the site.

7. Map of site



rMCZ 3 - North St George's Channel - Broad-scale Habitats



This area is designated for the following BSHT:

- A4.1, High energy circalittoral rock
- A4.2, Moderate energy circalittoral rock
- A5.1, Subtidal coarse sediment
- A5.2, Subtidal sand
- A5.4, Subtidal mixed sediments
- A5.6, Subtidal biogenic reefs

Area: 1388.03 km²

Minimum dimension: 10.84 km

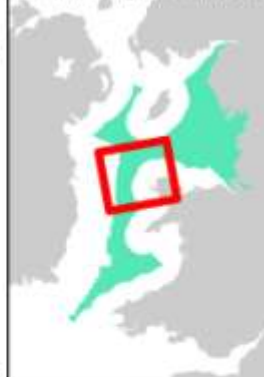
Key

- rRA
- Project Boundary
- Multipart MCZ
- rMCZ

Broad-scale Habitats

- A4.1, High energy circalittoral rock
- A5.1, Subtidal coarse sediment
- A5.2, Subtidal sand
- A5.4, Subtidal mixed sediments

Location of map in relation to UK

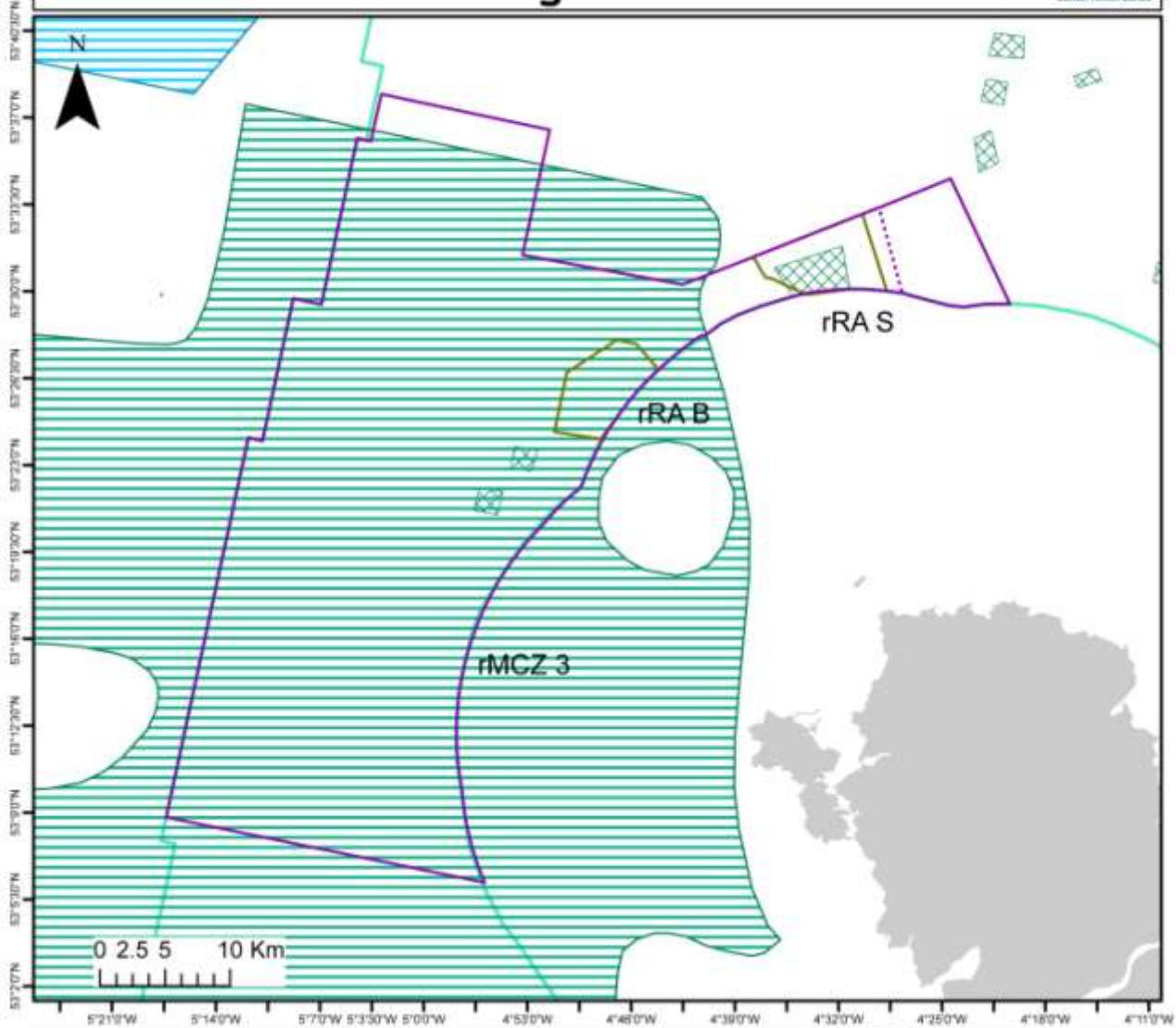


Site map displayed in Lambert azimuthal equal area projection (ETRS 1989 datum)

This product has been derived in part from material obtained from the UK Hydrographic Office with permission of the Controller of Her Majesty's Stationery Office and UK Hydrographic Office (www.ukho.gov.uk). NOT TO BE USED FOR NAVIGATION. Licence number 042006.001 Omance Survey, © crown copyright 2011. All rights reserved licence number 100049172

Map copyright ISCZ 2011

rMCZ 3 - North St George's Channel - FOCI



This area is designated for the following FOCI:

- Horse mussel beds
- Subtidal sands and gravels

Area: 1388.03 km²

Minimum dimension: 10.84 km

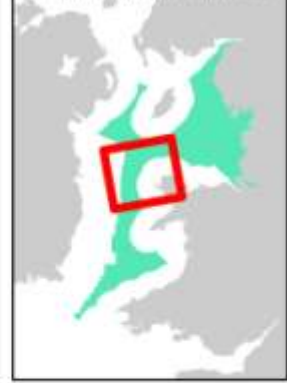
Key

- Multipart MCZ
- rMCZ
- rRA
- Project Boundary

FOCI

- Horse mussel beds
- Mud habitats in deep water
- Subtidal sands and gravels

Location of map in relation to UK



Site map displayed in Lambert azimuthal equal area projection (ETRS 1989 datum)

This product has been derived in part from material obtained from the UK Hydrographic Office with permission of the Controller of Her Majesty's Stationery Office and UK Hydrographic Office (www.ukho.gov.uk). NOT TO BE USED FOR NAVIGATION. Licence number 042006.001 Omance Survey, © crown copyright 2011. All rights reserved licence number 100049172

Map copyright ISCZ 2011

8. Site summary

rMCZ 3 is a large zone in the mid-Irish Sea with biological, geological and geomorphological features of interest. The depth of the area ranges from 40 m to 170 m and it is located approximately 23 km / 12 nm northwest from the coast of Anglesey in north Wales.

Horse mussels *Modiolus modiolus* have been found in dense enough aggregations ($\geq 50\%$ coverage) to constitute beds, an Annex 1 Reef habitat according to the EU Habitats and Species Directive. The horse mussel *Modiolus modiolus* beds in this area support a range of filter feeding animals, for example acorn barnacle *Balanus balanus*, hydroids and soft corals (Rees 2005). One such reef has been captured within rRA S. Tube dwelling ross worms *Sabellaria spinulosa* have also been recorded in two surveyed areas, over horse mussel shells (Rees 2005) and over the Croker Carbonate Slabs (JNCC, 2011). However, it has been confirmed by JNCC that there is insufficient evidence to confirm whether these localised occurrences of *Sabellaria spinulosa* are in dense enough aggregations to constitute a biogenic reef. Therefore, the species *Sabellaria spinulosa* has been noted as present but not designated as a *Sabellaria spinulosa* reef.

The Croker Carbonate Slabs is an area within rMCZ3 that has been recommended to Defra as a Special Area of Conservation (SAC), based on the presence of an Annex 1 habitat, submarine structures made by leaking gases. These methane-derived carbonate structures provide a unique seabed habitat for a range of soft corals, filter feeders, sponges, tube worms and anemones (Whomersley et al. 2010, JNCC, 2011).

The majority of the seabed in this area is composed of a mixture of sediments, categorised as the FOCI habitat subtidal sands and gravels. This is a very common substrate type in the Irish Sea and throughout UK waters. Sands and gravels in the Irish Sea tend to host a range of invertebrates.

9. Detailed site description

rMCZ3 is the largest recommended MCZ in the Irish Sea, and this extensive area covers a range of biological, geological and geomorphological features of interest.

The seabed in rMCZ3 has been mapped using a combination of physical and biological data (UK Seemap, the Mapping European Seabed Habitat projects (MESH), and the HABMAP project). The predominant broad-scale habitat types present in the area are the three (subtidal coarse sediment, subtidal sand subtidal mixed sediment) which constitute the FOCI habitat subtidal sands and gravels. In this region, sands and gravels tend to support an abundance of bivalves and polychaete worms. Bolam et al. (2010) identified molluscs and annelid worms which live within the sediment as the main secondary producers in this part of the Irish Sea. These invertebrates are a key part of the food chain; they recycle organic matter from within the sediment, linking primary production from the plankton to predatory fish (Bolam et al. 2010).

There are two additional broad-scale habitat types present in rMCZ3, high and moderate energy circalittoral rock, or bedrock on the seafloor which is subject to a high to moderate level of wave and tidal energy (MESH, 2008). The majority of these broad-scale habitat types have been captured within reference area B, which is situated in the central north-eastern part of rMCZ3. Parts of these areas of bedrock have been surveyed to verify the presence of specific Annex 1 reef habitat, listed on the EU Habitats and Species directive.

Biological and acoustic survey data have indicated that boulders and cobbles present in rMCZ3 (specifically the northwest corner) are home to animal species such as the tube worm *Pomatoceros triquete* and the

soft coral, dead man's fingers *Alcyonium digitatum* along with hydroids, such as *Abietinaria abietin* (Blyth-Skyrme et al. 2008).

During a JNCC commissioned CEFAS survey on the Croker carbonate slabs (JNCC 2011), a high abundance of ross worm *Sabellaria spinulosa* were recorded in rMCZ3. *Sabellaria spinulosa* is a tubeworm which ingests particles from the surrounding water and from this excretes a cement like substance to form the tube in which they live. Collectively these worms can form dense aggregations, or reefs, which stabilise the substrate and provide an important habitat for a host of other species (Maddock 2010). The survey of the Croker carbonate slabs revealed that the ross worms present were associated with byzoans, hydroids and sponges (Whomersley et al. 2010). It is important to note that the OSPAR definition of ross worm *Sabellaria spinulosa* reefs on rocky habitat are areas with a minimum of 50% *Sabellaria* coverage. Unfortunately, there has been no assessment as to whether there are occurrences of *Sabellaria spinulosa* reef at this location, which is the habitat FOCI listed in the ENG. As such, *Sabellaria spinulosa* is not proposed for designation in rMCZ3.

Large parts of the Irish Sea were surveyed as part of the Strategic Environment Assessment (SEA, 2005) for offshore energy licensing. This information, which became publically available in 2005, confirmed the presence of another biogenic reef type in rMCZ3, horse mussel *Modiolus modiolus* beds (Rees, 2005). This is an important addition to the IS CZ network, as this is a habitat FOCI that is not present with any confidence in any other rMCZ.

Horse mussel beds support a range of other suspension feeders, providing a link in the food chain by connecting primary production in the plankton to the benthos (sea bed organisms), termed 'benthic-pelagic coupling' (Tyler-Walts 2007). Bivalves also perform a number of essential roles for optimum ecosystem functioning. They play a key role in unlocking the energy of primary producers, which in the sea are the phytoplankton (microscopic algae), making it available to be used as food by other creatures. As such, primary producers are the very basis of the food chain that provides the fish that humans consume. It is the bivalves and other suspension feeders that make that energy readily available and useable to the next organism in the food chain. They filter suspended particles from the water column (via a siphon which extends up into the water) and discharge nutrient rich particulates onto the seabed (Dame, 1996). Such deposits promote the growth of deposit feeding and herbivorous benthic (seabed) invertebrates, which serve as prey for crabs and demersal fish (those that live on or near the seabed). Horse mussel beds may also be an important feeding and nursery ground for demersal fish (Hinz et al. 2010).

Basking sharks *Cetorhinus maximus* are now marked as endangered on the International Union for Conservation of Nature red list of threatened species. Satellite tracking of these important species revealed that St. George's Channel was part of their migratory route utilising the nutrient rich waters, formed by tidal mixing currents (Stephan et al. 2011). As such, whilst they are not features proposed for designation, they may benefit indirect protection as a result of designation of rMCZ 3.

rMCZ 3 includes one of two areas in the Irish Sea where Annex 1 habitat feature 'submarine structures made by leaking gases' has been recorded. The Croker Carbonate Slabs are located 30 km west of Anglesey and are composed of areas of methane derived authigenic carbonate structures which provide a habitat type that hosts species that are not found in the surrounding areas, where the majority of the substrate is made of coarse sediment. From a JNCC commissioned CEFAS survey, a diverse and varied benthic community was recorded, including hydroids, polymastid sponges, soft corals, such as the ross coral as well as large areas covered by the tubeworm *Sabellaria spinulosa* (JNCC 2011).

The RSG agreed, in the final (June 13th and 14th 2011) meeting, to further extend the north eastern boundary of rMCZ3 to include part of an extensive and regionally important drumlin field. These palaeo-ice flow parallel bedforms are, on average, 100–400 m long and 1–20 m high. Most of the lee sides are steeper than 10°, with values up to 24°. In this area the glacial features are aligned in a similar direction to the current, resulting in the current running along-slope (Van Landeghem *et al.*, 2008). Blyth-Skyrme *et al.* (2008) found patches of boulder reef that were associated with the drumlin landforms. These areas complied with the definition of reef according to the EU Habitats Directive (CEC 2007) in that they were comprised of cobbles and boulders, were topographically distinct from the surrounding area, and supported a typical reef fauna, comprised of hydroids, soft corals and bryozoans.

Recent mapping efforts for the British and Irish Isles have collated information on the very large datasets of drumlins that exist in these islands. They have been observed and mapped, using high resolution digital elevation models (DEMs) and satellite images for the land area (ca 311,000 km²) of the British and Irish Isles (Great Britain, Northern Ireland and the Republic of Ireland) (Clark *et al.*, 2009). This terrestrial database includes 58,983 drumlins in total: comprising 37,043 in Great Britain and 21,940 in Ireland. Increasingly the offshore sectors of the former British and Irish Ice Sheet has been mapped and have identified further drumlin fields on the sea floor (e.g. van Landeghem *et al.*, 2009; Dunlop *et al.*, 2010). The drumlins on the sea floor between Anglesey and the Isle of Man are a small subset of these subglacial landforms associated with the last Irish Sea Ice Stream (ISIS). The ISIS advanced out of source areas in Scotland and other mountain regions after 34 kyrs ago, reaching maximum extent at the Scillies c. 24 kyrs and declined to evacuate the northern Irish Sea basin ~19 kyrs, with a re-advance in the northern sector ~ 17 kyrs.

The setting of this area in the context of the ISIS has some importance; it is in the centre of the Irish Sea Basin rather than the margins and in a zone of converging ice flow, moving to the west and turning south into the deeper central Irish Sea Basin. The morphological features (e.g. the drumlins proposed for designation in rMCZ3) relate a history of grounded ice flow during deglaciation 21-19 kyrs ago during the passage of the ice margin northwards. Iceberg scour marks on the subglacial terrain show that retreat of the grounded ice margin northwards terminated into a water-mass with a carving margin producing icebergs. Examination of the sea floor imagery used by van Landeghem *et al.* (2009) to map the area between Anglesey and the Isle of Man shows some little evidence for remobilisation and erosion of the subglacial terrain with marine processes keeping the terrain clear of postglacial sediments. The seascape is a well preserved relict subglacial land surface, with little potential for natural change over the coming centuries.

Site identification work was supported by knowledge and data for several important seabird species. rMCZ 3 is an important area for seabirds in the Irish Sea providing a foraging ground to a wide range of species. These include: guillemots (*Uria aalge*), gannets (*Morus bassanus*), Manx shearwaters (*Puffinus puffinus*) and puffins (*Fratercula arctica*). These birds can have significant foraging radii (the gannet can travel up to 300 km) and will originate from Welsh and Irish colonies, in particular the rocky cliffs on the Anglesey coast where there are a number of SACs and SPAs that offer protection to bird species (such as the Skerries) (Gouldstone *pers comm.* 2011).

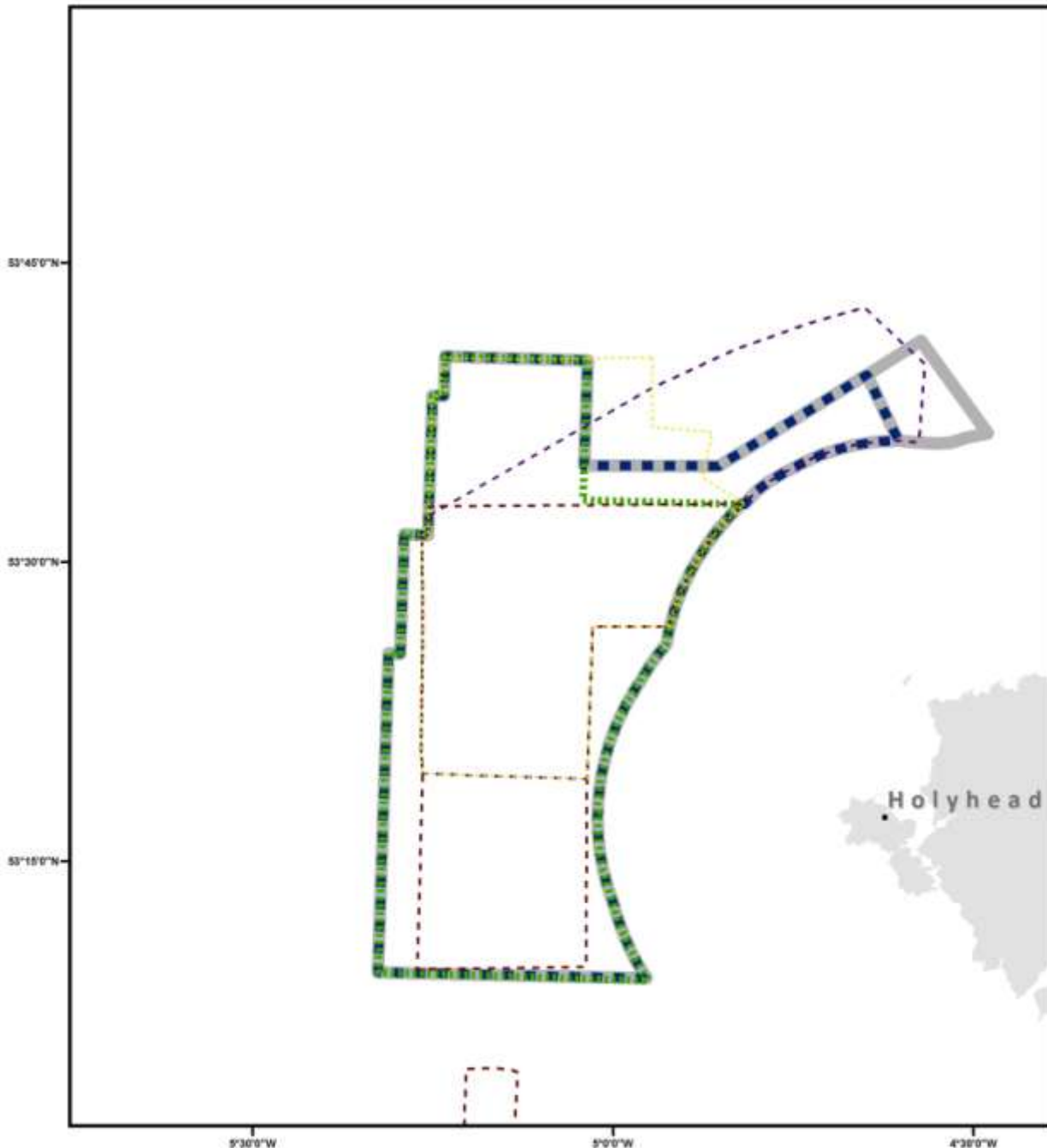
The European seabirds at sea data (JNCC 2011) show that the northern section of the site, which contains an important pelagic front, is heavily used by a number of species. These species utilise the site and, in particular, the sand habitats within it to feed. Locally, guillemots (*Uria aalge*) feed on sandeel, herring and sprat; puffins (*Fratercula arctica*) feed on sandeel and capelin; gannets (*Morus bassanus*) feed on mackerel,

herring and sandeel; Manx shearwaters (*Puffinus puffinus*) feed on herring, sprat, whitebait and pilchards (Gouldstone pers comm. 2011).

10. Site boundary

This site was identified as early as the 1st iteration as it [then] contained the only example of High Energy Circalittoral Rock in the project area. Its exact boundary has changed throughout the process, with subsequent additions to the north and south for ecological (e.g. horse mussel data, thermal front data) and geomorphological reasons (e.g. drumlins), but it has largely remained in a similar location throughout. The site now abuts onto Welsh territorial waters and Republic of Ireland waters; this is largely to facilitate the join up of any future potential marine protected areas, if this is deemed appropriate. The development of the site through time can be seen on the below map.

rMCZ 3- Iteration 1- Final Recommendations



0 5 10 20 Km

- Final Recommendations
- Draft Final Recommendations
- Iteration 3
- Iteration 2 Option A
- Iteration 2 Option B
- Iteration 1

Map in Relation to UK

This product has been derived in part from material obtained from the UK Hydrographic Office with permission of the Controller of Her Majesty's Stationery Office and UK Hydrographic Office (www.ukho.gov.uk). NOT TO BE USED FOR NAVIGATION. Licence number 042006.001 Ordnance Survey, © crown copyright 2011. All rights reserved licence number 00049172 Map Copyright IS CZ 2011

11. Conservation objectives

Conservation Objective	
1 Maintain/ recover	Subject to natural change, recover the Subtidal Sand to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of Subtidal Sand in the biogeographic region are all recovered, such that the feature makes its contribution to the network.</p>
Advice on operations	
3 Pressures	<p>Subtidal Sand is sensitive to the pressures: (feature is not currently exposed to pressures in <i>Italics</i>)</p> <ul style="list-style-type: none"> • Removal of non-target species (lethal) • Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm • Surface abrasion: damage to seabed surface features • <i>Structural abrasion/penetration: Structural damage to seabed >25mm</i> • <i>Siltation rate changes (high)</i> • <i>Siltation rate changes (low)</i> • <i>Physical change (to another seabed type)</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Siltation rate changes (high)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Siltation rate changes (low)</i> • <i>Temperature changes - regional/national</i> • <i>Salinity changes - local</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i>
4 Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.

Conservation Objective	
1 Maintain/ recover	Subject to natural change, recover the Subtidal Sands and Gravels to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of Subtidal Sands and Gravels in the biogeographic region are all recovered, such that the feature makes its contribution to the network.</p>
Advice on operations	
3 Pressures	<p>Subtidal sands and gravels are sensitive to the pressures: (feature is not currently exposed to pressures in <i>Italics</i>)</p> <ul style="list-style-type: none"> • Removal of non-target species (lethal) • Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm • Surface abrasion: damage to seabed surface features • <i>Structural abrasion/penetration: Structural damage to seabed >25mm</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Physical change (to another seabed type)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i> • <i>Removal of target species (lethal)</i> • <i>Siltation rate changes (high)</i> • <i>Siltation rate changes (low)</i>
4 Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.

Conservation Objective	
1 Maintain/ recover	Subject to natural change, maintain the Subtidal Coarse Sediment , such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of Subtidal Coarse Sediment in the biogeographic region are all maintained, such that the feature makes its contribution to the network.</p>
Advice on operations	
3 Pressures	<p>Subtidal Coarse Sediment is sensitive to the pressures: (feature is not currently exposed to pressures in <i>Italics</i>)</p> <ul style="list-style-type: none"> • <i>Removal of non-target species (lethal)</i> • <i>Structural abrasion/penetration: Structural damage to seabed >25mm</i> • <i>Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm</i> • <i>Surface abrasion: damage to seabed surface features</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Physical change (to another seabed type)</i> • <i>Salinity changes - local</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i> • <i>Siltation rate changes (high)</i> • <i>Siltation rate changes (low)</i>
4 Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.

Conservation Objective	
1 Maintain/ recover	Subject to natural change, maintain the Subtidal Mixed Sediment , such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of Subtidal Mixed Sediment in the biogeographic region are all maintained, such that the feature makes its contribution to the network.</p>
Advice on operations	
3 Pressures	<p>Subtidal Mixed Sediment is sensitive to the pressures: (feature is not currently exposed to pressures in <i>Italics</i>)</p> <ul style="list-style-type: none"> • <i>Surface abrasion: damage to seabed surface features</i> • <i>Removal of non-target species (lethal)</i> • <i>Structural abrasion/penetration: Structural damage to seabed >25mm</i> • <i>Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm</i> • <i>Physical change (to another seabed type)</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Introduction of microbial pathogens (disease)</i> • <i>Salinity changes - local</i> • <i>Siltation rate changes (high)</i> • <i>Temperature changes - local</i> • <i>Temperature changes - regional/national</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i> • <i>Water clarity changes</i>
4 Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.

Conservation Objective	
1 Maintain/ recover	Subject to natural change, maintain the High Energy Circalittoral Rock such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of High Energy Circalittoral Rock in the biogeographic region are all maintained, such that the feature makes its contribution to the network.</p>
Advice on operations	
3 Pressures	<p>High Energy Circalittoral Rock is sensitive to the pressures: (feature is not currently exposed to pressures in <i>Italics</i>)</p> <ul style="list-style-type: none"> • <i>Structural abrasion/penetration: Structural damage to seabed >25mm</i> • <i>Removal of target species (lethal)</i> • <i>Removal of non-target species (lethal)</i> • <i>Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Salinity changes – local</i> • <i>Physical change (to another seabed type)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Siltation rate changes (high)</i> • <i>Siltation rate changes (low)</i> • <i>Surface abrasion: damage to seabed surface features</i> • <i>Temperature changes - local</i> • <i>Water clarity changes</i> • <i>Temperature changes - regional/national</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i>
4 Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.

Conservation Objective	
1 Maintain/ recover	Subject to natural change, maintain the Moderate Energy Circalittoral Rock , such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of Moderate Energy Circalittoral Rock in the biogeographic region are all maintained, such that the feature makes its contribution to the network.</p>
Advice on operations	
3 Pressures	<p>Moderate Energy Circalittoral Rock is sensitive to the pressures : (Feature is not currently exposed to pressures in <i>Italics</i>)</p> <ul style="list-style-type: none"> • <i>Structural abrasion/penetration: Structural damage to seabed >25mm</i> • <i>Removal of non-target species (lethal)</i> • <i>Removal of target species (lethal)</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Physical change (to another seabed type)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm</i> • <i>Siltation rate changes (high)</i> • <i>Salinity changes - local</i> • <i>Surface abrasion: damage to seabed surface features</i> • <i>Siltation rate changes (low)</i> • <i>Temperature changes - local</i> • <i>Water clarity changes</i> • <i>Temperature changes - regional/national</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i> • <i>Wave exposure changes - local</i> • <i>Wave exposure changes - regional/national</i>
4 Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.

Conservation Objective	
1 Maintain/ recover	Subject to natural change, recover the <i>Modiolus modiolus</i> (Horse Mussel) Beds to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of <i>Modiolus modiolus</i> (Horse Mussel) Beds in the biogeographic region are all recovered, such that the feature makes its contribution to the network.</p>
Advice on operations	
3 Pressures	<p><i>Modiolus modiolus</i> (Horse Mussel) Beds is sensitive to the pressures: (feature is not currently exposed to pressures in <i>Italics</i>)</p> <ul style="list-style-type: none"> • Surface abrasion: damage to seabed surface features • <i>Removal of target species (lethal)</i> • <i>Removal of non-target species (lethal)</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i> • <i>Physical change (to another seabed type)</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm</i> • <i>Siltation rate changes (high)</i> • <i>Structural abrasion/penetration: Structural damage to seabed >25mm</i> • <i>Temperature changes - local</i> • <i>Siltation rate changes (low)</i> • <i>Temperature changes - regional/national</i> • <i>Water flow (tidal & ocean current) changes - regional/national</i> • <i>Water flow (tidal current) changes - local</i> • <i>Wave exposure changes - local</i> • <i>Wave exposure changes - regional/national</i> • <i>Salinity changes – local</i>
4 Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.

Conservation Objective	
1 Maintain/ recover	Subject to natural change, maintain the Drumlins , such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • component features, • spatial distribution, • integrity • natural environmental quality*, and • natural environmental processes* <p>Representative of drumlins in the biogeographic region are all maintained, such that the feature makes its contribution to the network.</p>
Advice on operations	
3 Pressures	
4 Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.

Conservation Objective	
1 Maintain/ recover	Subject to natural change, recover the Subtidal Biogenic Reefs to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of Subtidal Biogenic Reefs in the biogeographic region are all recovered, such that the feature makes its contribution to the network.</p>
Advice on operations	
3 Pressures	<p>Subtidal Biogenic Reefs is sensitive to the pressures: (feature is not currently exposed to pressures in <i>Italics</i>)</p> <ul style="list-style-type: none"> • Surface abrasion: damage to seabed surface features • <i>Removal of target species (lethal)</i> • <i>Removal of non-target species (lethal)</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i> • <i>Physical change (to another seabed type)</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm</i> • <i>Siltation rate changes (high)</i> • <i>Structural abrasion/penetration: Structural damage to seabed >25mm</i> • <i>Temperature changes - local</i> • <i>Siltation rate changes (low)</i> • <i>Temperature changes - regional/national</i> • <i>Water flow (tidal & ocean current) changes - regional/national</i> • <i>Water flow (tidal current) changes - local</i> • <i>Wave exposure changes - local</i> • <i>Wave exposure changes - regional/national</i> • <i>Salinity changes – local</i>
4 Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.

12. Sites to which this site is related

rMCZ3 is located in the mid-Irish sea, 88 km (47 nm) to the north of another recommended MCZ (rMCZ4). It is located 80 km (43 nm) from the Lleyn Peninsula and Sarnau (Welsh inshore SACs) with marine components, which include horse mussel beds and ross worm *Sabellaria spinulosa* reefs. It is located 35 km (19 nm) from the Menai Strait and Conwy Bay Welsh inshore SACs which also designate marine components.

13. Supporting documentation

Information	Type of information	Source
Location of high energy circalittoral rock	Combined physical and biological surveying with habitat modelling	Robinson et al. (2007), MESH, Blyth-Skyrme et al. 2008
Location of moderate energy circalittoral rock	Combined physical and biological surveying with habitat modelling	Robinson et al. (2007), MESH, Blyth-Skyrme et al. 2008
Subtidal coarse sediment	Combined physical and biological surveying with habitat modelling	Robinson et al. (2007), MESH.
Subtidal sand	Combined physical and biological surveying with habitat modelling	Robinson et al. (2007), MESH.
Subtidal mixed sediment	Combined physical and biological surveying with habitat modelling	Robinson et al. (2007), MESH.
Subtidal sands and gravels	Combined physical and biological surveying with habitat modelling	Robinson et al. (2007), MESH.
Horse mussel <i>Modiolus modiolus</i> beds	Physical and Biological survey	Rees (2005) SEA survey
Ross worm <i>Sabellaria spinulosa</i> reefs	Biological survey	Whomersley et al. 2010
Ocean quahog <i>Arctica islandica</i>	Biological survey	CEFAS surveyors 1998
Croker carbonate slabs (submarine structure made by leaking gases)	Biological survey	JNCC 2011

14. Stakeholder considerations

Caveats:

- Cable work (installation, maintenance and decommissioning) would be allowed to continue in line with current legislation. This caveat applies to existing and future cables (e.g. those associated with adjacent Round 3 offshore windfarms).
- The part of rMCZ3 that proposes designation of drumlins (to the far north-east of the site) was agreed on the basis that the underlying broad-scale habitats and FOCI would not be proposed for designation.
- Scallop dredging and other commercial fishing would be allowed to continue in the area of rMCZ3 that is proposed for designation of drumlins only.
- The offshore wind developers reluctantly accepted the group decision to propose designation of drumlins, but pointed out that the industry could/might face additional costs as a result.

Implications:

Stakeholder implications are explored further, on a site-by-site basis, in the management implications tables in Annex 3. The socio-economic implications of designation of this site will be costed in the Impact Assessment.

Stakeholder support:

Most stakeholders accepted the inclusion of rMCZ3 in the final network in order to satisfy the ENG targets. Conservation stakeholders in particular expressed strong support for inclusion of this site. Most concerns were related to future development in the adjacent Centrica Round 3 offshore wind area of search, and the potential implications associated with designating this rMCZ. There are several important fishing grounds in rMCZ3 and concerns were raised over the ability to maintain use of these grounds if/when the site is designated.

For a fuller context on the RSG discussions associated with this site, readers of this report are encouraged to consult meeting reports from the IS CZ RSG workshops - especially those from the May and July 2011 workshops (IS CZ, 2011b,d).

References

BLYTH-SKYRME, V. LINDENBAUM, C., VERLING, E., VAN LANDEGHEM, K., ROBINSON, K., MACKIE A., & DARBYSHIRE T. (2008). *Broad-scale biotope mapping of potential reefs in the Irish Sea (north-west of Anglesey)* JNCC Report No. 423.

BOLAM, S.G., BARRIO-FROJAN, C.R.S. & EGGLETON, J.D. (2010). *Macrofaunal production along the UK continental shelf*. *Journal of Sea Research* **64**: 166-179.

BUTLER, P. (2009) *Establishing the *Arctica islandica* archive: Development of the definitive shell-based proxy for the North Atlantic shelf seas*. PhD thesis, Bangor University.

- CLARKE, C.D. et al. (2009). Size and shape characteristics of drumlins, derived from a large sample, and associated scaling laws. *Quaternary Glaciodynamics*. 28 (7-8), 677-692.
- DAME, RF. (1996) *Ecology of Marine Bivalves: An Ecosystem Approach*. Boca Raton (FL):CRC Press.
- DUNLOP, P., SHANNON, R., McCABE, M., QUINN, R, and DOYLE, E. (2010) Marine geophysical evidence for ice sheet extension and recession on the Malin Shelf: New evidence for the western limits of the British Irish Ice Sheet . *Marine Geology*, 276 (1-4). pp. 86-99.
- JNCC (2011) *Croker carbonate slabs SAC selection assessment*. Version 2.0 (18/03/2011).
- HINZ, H. et al. (2010) Seabed habitats around the Isle of Man. Fisheries and Conservation report No. 12, Bangor University. pp 29.
- ISCZ (2011b). Meeting report from the 6th Irish Sea Conservation Zones Stakeholder Group meeting. RK Partnership Ltd.
- ISCZ (2011d). Meeting report from the 8th Irish Sea Conservation Zones Stakeholder Group meeting. RK Partnership Ltd.
- MADDOCK, A. (2010) *UK Biodiversity Action Plan; Priority Habitat Descriptions*. BRIG (ed. Ant <http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsRevised20100730.pdf>)
- REES, I. (2005) *Assessment of the status of horse mussel (Modiolus modiolus) beds in the Irish Sea off NW Anglesey*. DTI-SEA 6 Sub-contract report.
- ROBINSON, K., RAMSAY, K., WILSON, J., MACKIE A., WHEELER, A., O'BEIRN F., LINDENBAUM, C., VAN LANDEGHAM, K., MCBREEN, F., MITCHELL, N. 2007. *HABMAP:Habitat Mapping for conservation and management of the southern Irish Sea*. Report to the Welsh European Funding Office. CCW Science Report Number 810. Countryside Council for Wales, Bangor. 233 pp plus appendices.
- SEELEY, B., LEAR, D., HIGGS, S., NEILLY, M., BILEWITCH, J., EVANS, J., WILKES, P. & ADAMS, L. 2010. *Assessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes*. Report No 16: Task 2C. Mapping of Protected Habitats. DEFRA Project Code: MB0102 Marine Biodiversity R&D Program.
- STEPHAN, E., GADENNE, H & JUNG, A. 2011. *Satellite tracking of basking sharks in the north-east Atlantic ocean*. NGO for study of conservation of Elasmobranchs. Available from: <http://www.assc-apecs.org/programme-de-marquage-satellite.html>
- TYLER-WALTERS, 2007. *Modiolus modiolus*. Horse mussel. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 21/03/2011]. Available from: <http://www.marlin.ac.uk/speciesimportance.php?speciesID=3817>

VAN LANDEGHAM, K., WHEELER, A.J., MITCHELL, N.C. (2009) Seafloor evidence for palaeo-ice streaming and calving of the grounded Irish Sea Ice Stream: Implications for the interpretation of its final deglaciation phase. *Boreas* 38: 119-131

WHOMERSLEY, P., WILSON, C., CLEMENTS, A., BROWN, C., LONG, D., LESLIE, A. & LIMPENNY, D. 2010. *Understanding the marine environment – seabed habitat investigations of submarine structures in the mid Irish Sea and Solan Bank Area of Search (AoS)*. JNCC Report No. 430.

MARINE CONSERVATION ZONE: SELECTION ASSESSMENT DOCUMENT

RMCZ 4 MID ST. GEORGE'S CHANNEL

Version and issue date	Amendments made
v1.0 August 2011	

1. Site name

rMCZ4 – Mid st. Georges Channel (zone includes recommended reference area rRA C)

2. Site centre location

rMCZ 4:

52° 39' 31.843" N, 5° 16' 6.465" W

52.658845 Lat, -5.268462 Long. Lambert Azimuthal Equal Area projection, ETRS89 datum

rRA C:

52° 37' 32.293" N, 5° 22' 54.816" W

52.625636 Lat, -5.381893 Long. Lambert Azimuthal Equal Area projection, ETRS89 datum

3. Site surface area

760.86 Km² (76084.72 Ha)

4. Biogeographic region

JNCC regional sea: Irish Sea.

OSPAR region III: Celtic Seas.

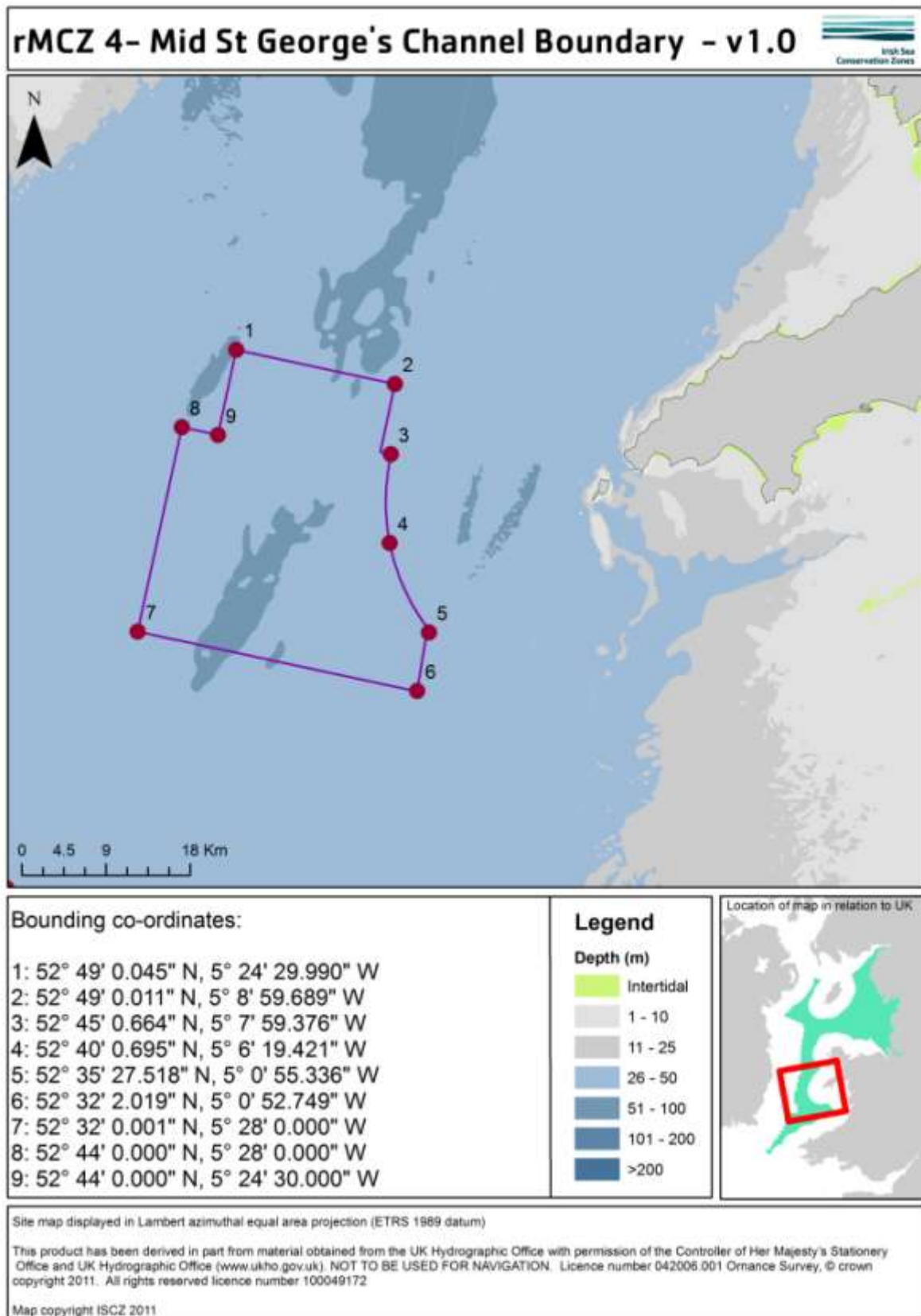
5. Features proposed for designation within rMCZ4

Feature type	Feature name	Area covered within site (for broad scale habitats and habitats of conservation importance)
Broad scale habitat	A4.2 Moderate energy circalittoral rock	26.67 Km ² (2667.05 Ha)
	A5.1 Subtidal coarse sediment	368.24 Km ² (36823.04 Ha)
	A5.2 Subtidal sand	114.42 Km ² (11441.68 Ha)
	A5.4 Subtidal mixed sediments	246.31 km ² (24630.38 Ha)
Habitat of conservation importance	Subtidal sands and gravels	760.86 Km ² (76085.04 Ha)
Species of conservation importance	n/a	
Geological feature	n/a	
Other feature	n/a	

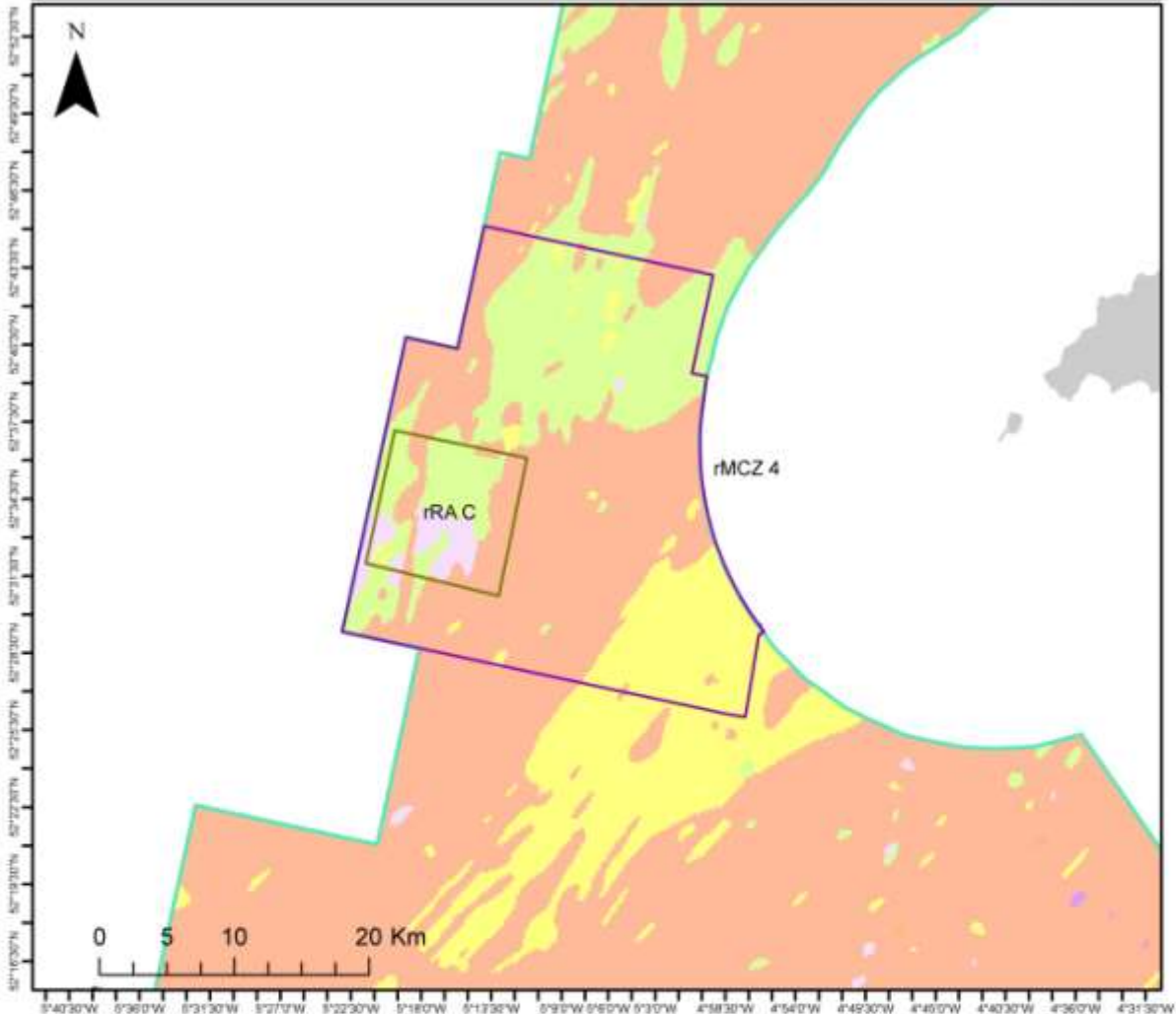
6. Features within rMCZ4 not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad scale habitat	n/a	
Habitat of conservation importance	n/a	
Species of conservation importance	n/a	

7. Map of site



rMCZ 4 - Mid St George's Channel - Broad-scale Habitats



This area is designated for the following BSHT:

- A4.2, Moderate energy circalittoral rock
- A5.1, Subtidal coarse sediment
- A5.2, Subtidal sand
- A5.4, Subtidal mixed sediments

Area: 760.86 km²

Minimum dimension: 6.39 km

Key

- rRA
- Project Boundary
- rMCZ

Broad-scale Habitats

- A4.1, High energy circalittoral rock
- A5.1, Subtidal coarse sediment
- A5.2, Subtidal sand
- A5.4, Subtidal mixed sediments

Location of map in relation to UK

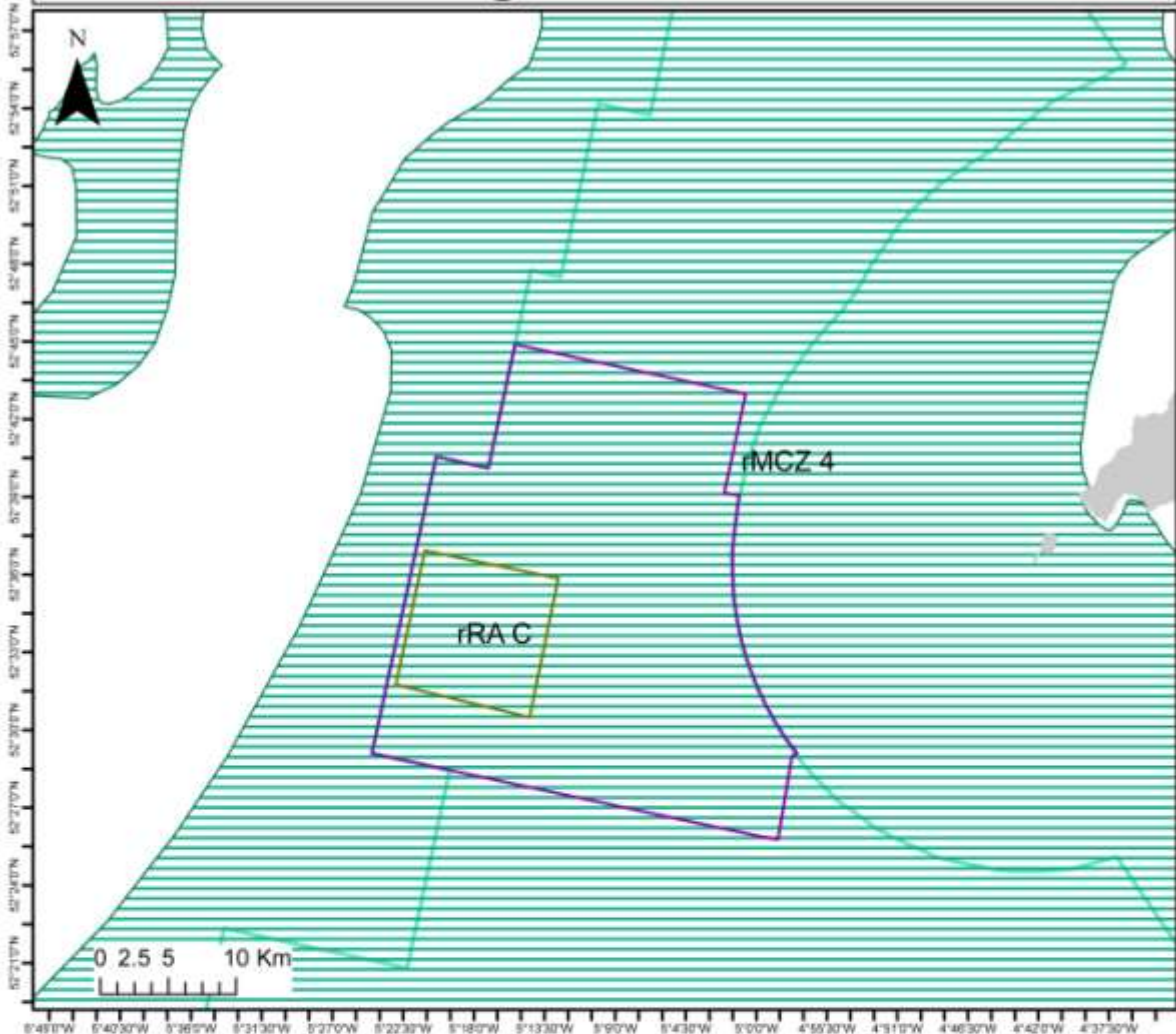


Site map displayed in Lambert azimuthal equal area projection (ETRS 1989 datum)

This product has been derived in part from material obtained from the UK Hydrographic Office with permission of the Controller of Her Majesty's Stationery Office and UK Hydrographic Office (www.ukho.gov.uk). NOT TO BE USED FOR NAVIGATION. Licence number 042006.001 Ormance Survey, © crown copyright 2011. All rights reserved licence number 100049172

Map copyright ISCZ 2011

rMCZ 4 - Mid St George's Channel - FOCI



This area is designated for the following FOCI:

- Subtidal sands and gravels

Area: 760.86 km²

Minimum dimension: 6.39 km

Key

- rMCZ
- rRA
- Project Boundary

FOCI

- Subtidal sand gravels



Site map displayed in Lambert azimuthal equal area projection (ETRS 1989 datum)

This product has been derived in part from material obtained from the UK Hydrographic Office with permission of the Controller of Her Majesty's Stationary Office and UK Hydrographic Office (www.ukho.gov.uk). NOT TO BE USED FOR NAVIGATION. Licence number 042006.001 Ormance Survey, © crown copyright 2011. All rights reserved licence number 100049172

Map copyright ISCZ 2011

8. Site summary

rMCZ4 is located in the offshore waters of the Irish Sea, c.23 km (12.3 nm) from the coast of Wales. It is situated between Irish offshore waters to the west and Welsh territorial waters to the east. The depth of the site ranges from 60 – 125 m. The seabed type is predominantly subtidal coarse sediment, but there are also areas of subtidal mixed sediments, sand and bedrock, which is potentially reef habitat (Dalkin 2008). Due to the thermal fronts that form in the summer months, this is thought to be an area of relatively high biological productivity (Miller et al. 2010). This highlights the importance of this site for general ecosystem processes, as an increase in primary production attracts herbivorous species and, in turn, larger marine predators to the area. Within the subtidal sands and gravel habitat in this area, annelid worms, bivalves and crustaceans are the main secondary producers. These invertebrates provide an essential link in energy flow within the ecosystem, recycling organic matter in the sediment, linking primary production to predatory fish (Bolam et al. 2010).

9. Detailed site description

A combination of physical and biological surveys have been used to identify the seabed habitat types within the area (UKSeaMap: Connor et al. 2006, the Mapping European Seabed Habitat projects (MESH), and HABMAP: Robinson et al. 2007). The predominant marine habitat type in rMCZ 4 is subtidal coarse sediment, amongst which are smaller areas of sand, mixed sediment and bedrock. A JNCC commissioned survey collected data from around this region to verify the presence of potential reef habitat amongst the areas of rocky habitat (Dalkin 2008). From the JNCC survey, technical issues precluded video and still photographs from being collected of the seabed and therefore the presence of reef habitat within site rMCZ4 has not been verified through biological sampling. However, inferences on the biological community in rMCZ 4 can be drawn from the shared broad-scale habitat type (moderate energy circalittoral rock, or subtidal bedrock) that was successfully surveyed to the north of the site.

The subtidal bedrock, namely cobbles and boulders was the reef habitat surveyed to the north of the site. This habitat is of ecological importance because it supports a diverse animal community. Barnacles and worms, including *Pomatoceros triqueter* were found within the offshore circalittoral coarse sediment, whilst the subtidal mixed sediments contained pebbles, cobbles and boulders that were home to a diverse range of fauna, including barnacles, hydroids, anemones and sponges, for example, dead man's fingers (Dalkin et al. 2008; Figure 1).

Sand and gravel sediments are the most common habitat types found in the site and these are host a range of different invertebrate species. Within and around rMCZ4 annelids, worms and crustacean species are the main secondary producers in the food web (Bolam et al. 2010). These species, which live within or on the seabed, play a key role in recycling organic matter within the sediment, and linking the primary production (in the plankton) with predatory fish.

In addition, this site covers an area of high primary productivity, due to the thermal fronts which commonly form in this location (Miller et al. 2010). An increase in solar energy during spring causes the relatively warm, less dense, water to sit on top of colder, denser, deep water. This increase in

temperature triggers an increase in biological productivity, similar to the increase in productivity later on in the year when water cooling allows for nutrient rich deeper waters coming in from the Atlantic to mix with the surface waters (Brown et al. 2010).



Figure 1. Cobbles and boulders with gravel and sand surveyed to the north of rMCZ4. These habitat types are home to barnacles, hydroids, anemones and dead man's fingers (Image taken from Dalkin 2008).

Basking sharks *Cetorhinus maximus* are now marked as endangered on the International Union for Conservation of Nature red list of threatened species. Satellite tracking of these important species revealed that St. George's Channel was part of their migratory route utilising the nutrient rich waters, formed by tidal mixing currents (Stephan *et al.* 2011). As such, whilst they are not features proposed for designation, they may benefit indirect protection as a result of designation of rMCZ 4.

Site identification work was supported by knowledge and data for several important seabird species. rMCZ 4 is an important area for seabirds in the Irish Sea providing a foraging ground to a wide range of species, these include: guillemots (*Uria aalge*), gannets (*Morus bassanus*), Manx shearwaters (*Puffinus puffinus*) and puffins (*Fratercula arctica*). These birds can have significant foraging radii (the gannet can travel up to 300 km) and will originate from Welsh and Irish colonies, in particular Cardigan Bay and rocky cliffs on the east coast of Ireland (Gouldstone pers comm. 2011).

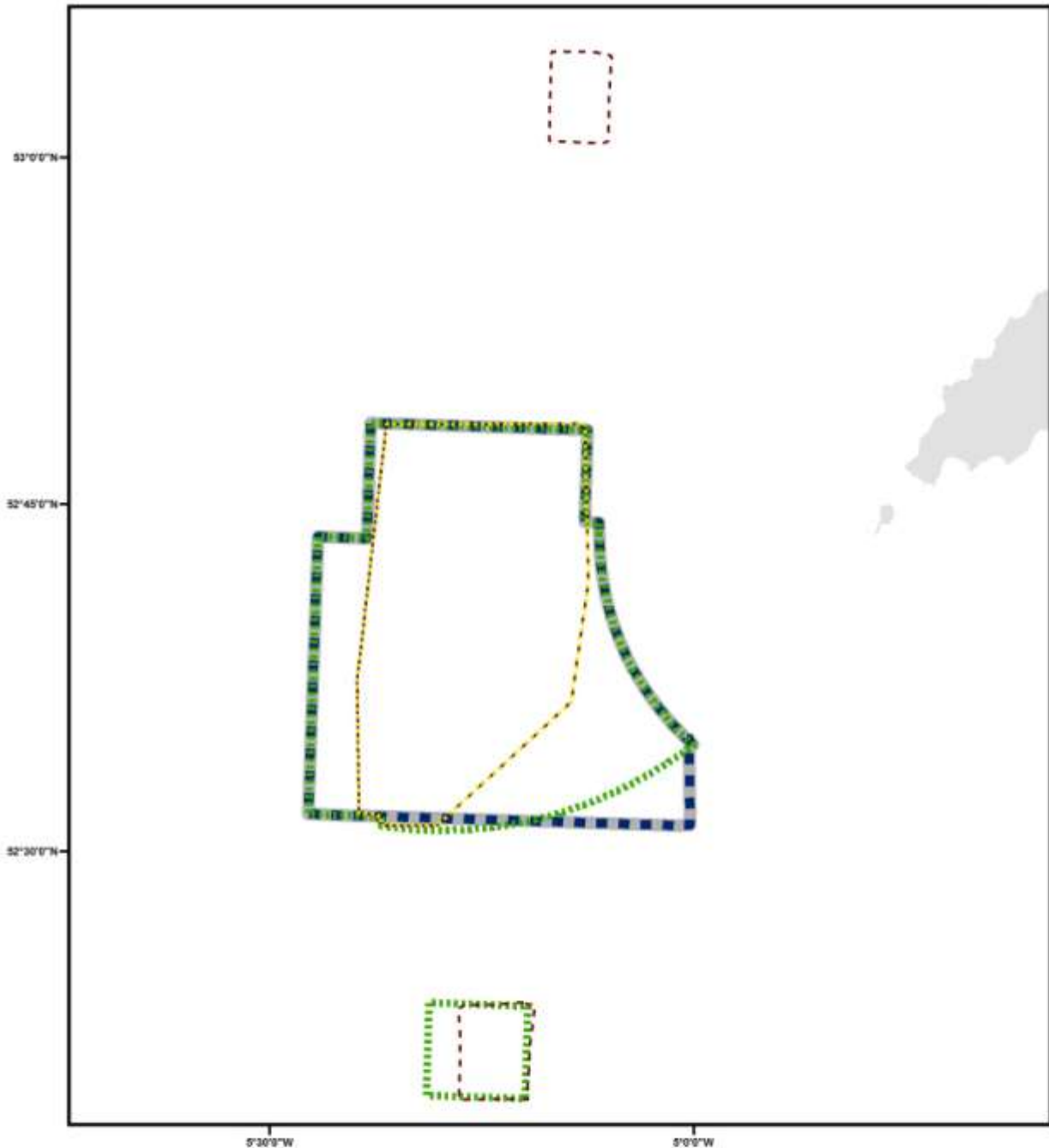
RSPB data incorporated in the Areas of Additional Ecological Importance GIS layer shows that the north eastern section of the site, which contains a productive pelagic front, is heavily used by a number of species. These species utilise the rMCZ and, in particular, the sandy and mixed habitats within it to feed. Locally, guillemots (*Uria aalge*) feed on sandeel, herring and sprat; puffins (*Fratercula arctica*) feed on sandeel and capelin; gannets (*Morus bassanus*) feed on mackerel,

herring and sandeel; Manx shearwaters (*Puffinus puffinus*) feed on herring, sprat, whitebait and pilchards (Gouldstone pers comm. 2011).

10. Site boundary

This site was identified as early as the first iteration to capture in the network the large amount of subtidal mixed sediments in the project area. Its boundary has changed relatively little since the first iteration but, for the draft final recommendations, the southern boundary was altered (moved further north) slightly to reduce overlap with Belgian commercial fishing activity. Earlier iterations (2nd and 3rd) included small satellite boxes to the north and the south of the main site itself. These were removed for the draft final (and final) recommendations, as it emerged that they had been included based on relatively questionable ecological data. The development of the site through time can be seen on the below map.

rMCZ 4- Iteration 1- Final Recommendations



0 4.5 9 18 Km

- Final Recommendations
- Draft Final Recommendations
- Iteration 3
- Iteration 2 Option A
- Iteration 2 Option B
- Iteration 1

Map in Relation to UK

This product has been derived in part from material obtained from the UK Hydrographic Office with permission of the Controller of Her Majesty's Stationery Office and UK Hydrographic Office (www.ukho.gov.uk). NOT TO BE USED FOR NAVIGATION. Licence number 042006.001 Ordnance Survey, © crown copyright 2011. All rights reserved licence number 00049172 Map Copyright ISCSZ 2011

11. Conservation objectives

Conservation Objective	
1 Maintain/ recover	Subject to natural change, recover the Subtidal Sand to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of Subtidal Sand in the biogeographic region are all recovered, such that the feature makes it contribution to the network.</p>
Advice on operations	
3 Pressures	<p>Subtidal Sand is sensitive to the pressures: (the feature is not currently exposed to pressures in <i>Italics</i>)</p> <ul style="list-style-type: none"> • Removal of non-target species (lethal) • Structural abrasion/penetration: Structural damage to seabed >25mm • Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm • <i>Surface abrasion: damage to seabed surface features</i> • <i>Siltation rate changes (high)</i> • <i>Siltation rate changes (low)</i> • <i>Physical change (to another seabed type)</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Siltation rate changes (high)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Siltation rate changes (low)</i> • <i>Temperature changes - regional/national</i> • <i>Salinity changes - local</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i>
4 Human activities	<p>Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas. Based on a current assessment of activities taking place in the site, the human activities that require additional management are benthic trawling. Those activities that are known to take place in the site that will be managed through the current regulatory framework are military activity. Those activities that are deemed not to require management but are known to take place in the site are shipping, transit of vessels and other fisheries.</p>

Conservation Objective	
1 Maintain/ recover	Subject to natural change, recover the Subtidal Mixed Sediment to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* <p>Representative of Subtidal Mixed Sediment in the biogeographic region are all recovered, such that the feature makes its contribution to the network</p>
Advice on operations	
3 • Pressures	<p>Subtidal Mixed Sediment is sensitive to the pressures: (the feature is not currently exposed to pressures in <i>Italics</i>)</p> <ul style="list-style-type: none"> • Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm • Removal of non-target species (lethal) • Surface abrasion: damage to seabed surface features • Removal of Target species • <i>Structural abrasion/penetration: Structural damage to seabed >25mm</i> • <i>Physical change (to another seabed type)</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Introduction of microbial pathogens (disease)</i> • <i>Salinity changes - local</i> • <i>Siltation rate changes (high)</i> • <i>Temperature changes - local</i> • <i>Temperature changes - regional/national</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i> • <i>Water clarity changes</i>
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas. Based on a current assessment of activities taking place in the site, the human activities that require additional management are benthic trawling. Those activities that are known to take place in the site that will be managed through the current regulatory framework are military activity. Those activities that are deemed not to require management but are known to take place in the site are shipping, transit of vessels and other fisheries.

Conservation Objective	
1 Maintain/ recover	Subject to natural change, recover the Subtidal Sands and Gravels to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of Subtidal Sands and Gravels in the biogeographic region are all recovered, such that the feature makes it contribution to the network</p>
Advice on operations	
3 Pressures	<p>Subtidal Sands and Gravels is sensitive to the pressures: (the feature is not currently exposed to pressures in <i>Italics</i>)</p> <ul style="list-style-type: none"> • Removal of non-target species (lethal) • Surface abrasion: damage to seabed surface features • Removal of target species (lethal) • Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm • <i>Structural abrasion/penetration: Structural damage to seabed >25mm</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Physical change (to another seabed type)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i> • <i>Siltation rate changes (high)</i> • <i>Siltation rate changes (low)</i>
4 Human activities	<p>Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas. Based on a current assessment of activities taking place in the site, the human activities that require additional management are benthic trawling. Those activities that are known to take place in the site that will be managed through the current regulatory framework are military activity. Those activities that are deemed not to require management but are known to take place in the site are shipping, transit of vessels and other fisheries.</p>

Conservation Objective	
1 Maintain/ recover	Subject to natural change, recover the Subtidal Coarse Sediment to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of Subtidal Coarse Sediment in the biogeographic region are all or recovered, such that the feature makes it contribution to the network</p>
Advice on operations	
3 Pressures	<p>Subtidal Coarse Sediment is sensitive to the pressures: (the feature is not currently exposed to pressures in <i>Italics</i>)</p> <ul style="list-style-type: none"> • Removal of non-target species (lethal) • Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm • Surface abrasion: damage to seabed surface features • <i>Structural abrasion/penetration: Structural damage to seabed >25mm</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Physical change (to another seabed type)</i> • <i>Salinity changes - local</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i> • <i>Siltation rate changes (high)</i> • <i>Siltation rate changes (low)</i>
4 Human activities	<p>Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas. Based on a current assessment of activities taking place in the site, the human activities that require additional management are benthic trawling. Those activities that are known to take place in the site that will be managed through the current regulatory framework are military activity. Those activities that are deemed not to require management but are known to take place in the site are shipping, transit of vessels and other fisheries.</p>

Conservation Objective	
1 Maintain/ recover	Subject to natural change, maintain the Moderate Energy Circalittoral Rock to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of Moderate Energy Circalittoral Rock in the biogeographic region are all recovered, such that the feature makes it contribution to the network</p>
Advice on operations	
3 Pressures	<p>Moderate Energy Circalittoral Rock is sensitive to the pressures: (feature is not currently exposed to pressures in <i>Italics</i>)</p> <ul style="list-style-type: none"> • <i>Structural abrasion/penetration: Structural damage to seabed >25mm</i> • <i>Removal of non-target species (lethal)</i> • <i>Removal of target species (lethal)</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Physical change (to another seabed type)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm</i> • <i>Siltation rate changes (high)</i> • <i>Salinity changes - local</i> • <i>Surface abrasion: damage to seabed surface features</i> • <i>Siltation rate changes (low)</i> • <i>Temperature changes - local</i> • <i>Water clarity changes</i> • <i>Temperature changes - regional/national</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i> • <i>Wave exposure changes - local</i> • <i>Wave exposure changes - regional/national</i>
4 Human activities	<p>Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas. Based on a current assessment of activities taking place in the site, the human activities that require additional management are benthic trawling. Those activities that are known to take place in the site that will be managed through the current regulatory framework are military activity. Those activities that are deemed not to require management but are known to take place in the site are shipping, transit of vessels and other fisheries.</p>

12. Sites to which this site is related

rMCZ 4 is placed between two other recommended MCZs in the Irish Sea Conservation Zone region, rMCZ 5 which is located 75 km (40 nm) to the south and rMCZ 3 which is located 88 km (47 nm) to the north. All three of these sites are offshore and have been recommended to protect the EUNIS level 2 habitat types, sublittoral sediment and circalittoral rock.

There are two Welsh marine Special Areas of Conservation (SACs) in the vicinity of rMCZ4 (vicinity being defined as less than 80 km). Llyn Peninsula and the Sarnau, a marine SAC is within 50 km (27 nm) while the SAC in Cardigan Bay is 65 km (35 nm) away.

13. Supporting documentation

Information	Type of information	Source
Location of moderate energy circalittoral rock	Combined biological and physical data were used to generate predictive habitat maps of the seabed	Connor et al. 2006, MESH project, Robinson et al. 2007
Location of subtidal coarse sediment	Combined biological and physical data were used to generate predictive habitat maps of the seabed	Connor et al. 2006, MESH project, Robinson et al. 2007
Location of subtidal sand	Combined biological and physical data were used to generate predictive habitat maps of the seabed	Connor et al. 2006, MESH project, Robinson et al. 2007
Location of subtidal mixed sediments	Combined biological and physical data were used to generate predictive habitat maps of the seabed	Connor et al. 2006, MESH project, Robinson et al. 2007
Location of subtidal sands and gravels	Combined biological and physical data were used to generate predictive habitat maps of the seabed	Connor et al. 2006, MESH project, Robinson et al. 2007

14. Stakeholder considerations

Caveats:

15. The MOD inert firing range within the site is assumed to be compatible with the benthic features for which the site is proposed for designation.

Implications:

Stakeholder implications are explored further, on a site-by-site basis, in the management implications tables in Annex 3.. The socio-economic implications of designation of this site will be costed in the Impact Assessment.

Stakeholder support:

Most stakeholders accepted the inclusion of rMCZ4 in the final network in order to satisfy the ENG targets. Conservation stakeholders in particular expressed strong support for inclusion of this site. Strong concerns were raised by the Belgian fishing interests on the understanding that they may lose fishing grounds in the far south of the site if it is designated.

For a fuller context on the RSG discussions associated with this site, readers of this report are encouraged to consult meeting reports from the ISCZ RSG workshops - especially those from the May and July 2011 workshops (ISCZ, 2011b,d).

References

- BOLAM, S.G., BARRIO-FROJAN, C.R.S. & EGGLETON, J.D. 2010. *Macrofaunal production along the UK continental shelf*. Journal of Sea Research **64**: 166-179.
- BROWN, J., CARILLO, L., FERNAND, L., HORSBURGH, K.J., HILL, A.E., YOUNG, E.F. & MEDLER, K.J. 2003. *Observations on the physical structure and the seasonal jet-like circulation of the Celtic Sea and St George's Channel of the Irish Sea*. Continental Shelf Research **23**: 533-561.
- CONNOR, D.W., GILLILAND, P.M., GOLDING, N., ROBINSON, P., TODD, D., & VERLING, E. 2006. *UKSeaMap: themapping of seabed and water column features of UK seas*. Joint Nature Conservation Committee.
- DALKIN, M. 2008. *Mid Irish Sea reefs habitat mapping report*, JNCC Report 411, ISSN 0963 8901
- ISCZ (2011b). Meeting report from the 6th Irish Sea Conservation Zones Stakeholder Group meeting. RK Partnership Ltd.
- ISCZ (2011d). Meeting report from the 8th Irish Sea Conservation Zones Stakeholder Group meeting. RK Partnership Ltd.
- MESH Mapping European Seabed Habitats. Available at <http://www.searchMESH.net> [Accessed on 16th May 2011]

MILLER, P.I., CHRISTODOULOU, S. & SAUX-PICART, S. 2010. *Oceanic thermal fronts from Earth observation data – a potential surrogate for pelagic diversity*. Report to the Department of Environment, Food and

Rural Affairs. Defra Contract No. MB102. Plymouth Marine Laboratory, subcontracted by ABPmer, Task 2F, pp. 24.

ROBINSON, K., RAMSAY, K., WILSON, J., MACKIE A., WHEELER, A., O'BEIRN F., LINDENBAUM, C., VAN LANDEGHAM, K., MCBREEN, F., MITCHELL, N. 2007. *HABMAP: Habitat Mapping for conservation and management of the southern Irish Sea*. Report to the Welsh European Funding Office. CCW Science Report Number 810. Countryside Council for Wales, Bangor. 233 pp plus appendices.

STEPHAN, E., GADENNE, H & JUNG, A. 2011. *Satellite tracking of basking sharks in the north-east Atlantic ocean*. NGO for study of conservation of Elasmobranchs. Available from: <http://www.assc-apecs.org/programme-de-marquage-satellite.html>

MARINE CONSERVATION ZONE: SELECTION ASSESSMENT DOCUMENT

RMCZ 5 NORTH OF CELTIC DEEP

Version and issue date	Amendments made
v1.0 August 2011	

1. Site name

rMCZ 5 - North of Celtic Deep

2. Site centre location

52° 5' 27.139" N, 5° 38' 48.496" W

52.090871 Lat, -5.646804 Long. Lambert Azimuthal Equal Area projection, ETRS89 datum

3. Site surface area

655.69 km² (65567.33 ha)

4. Biogeographic region

JNCC regional sea: Irish Sea.

OSPAR region III: Celtic Seas.

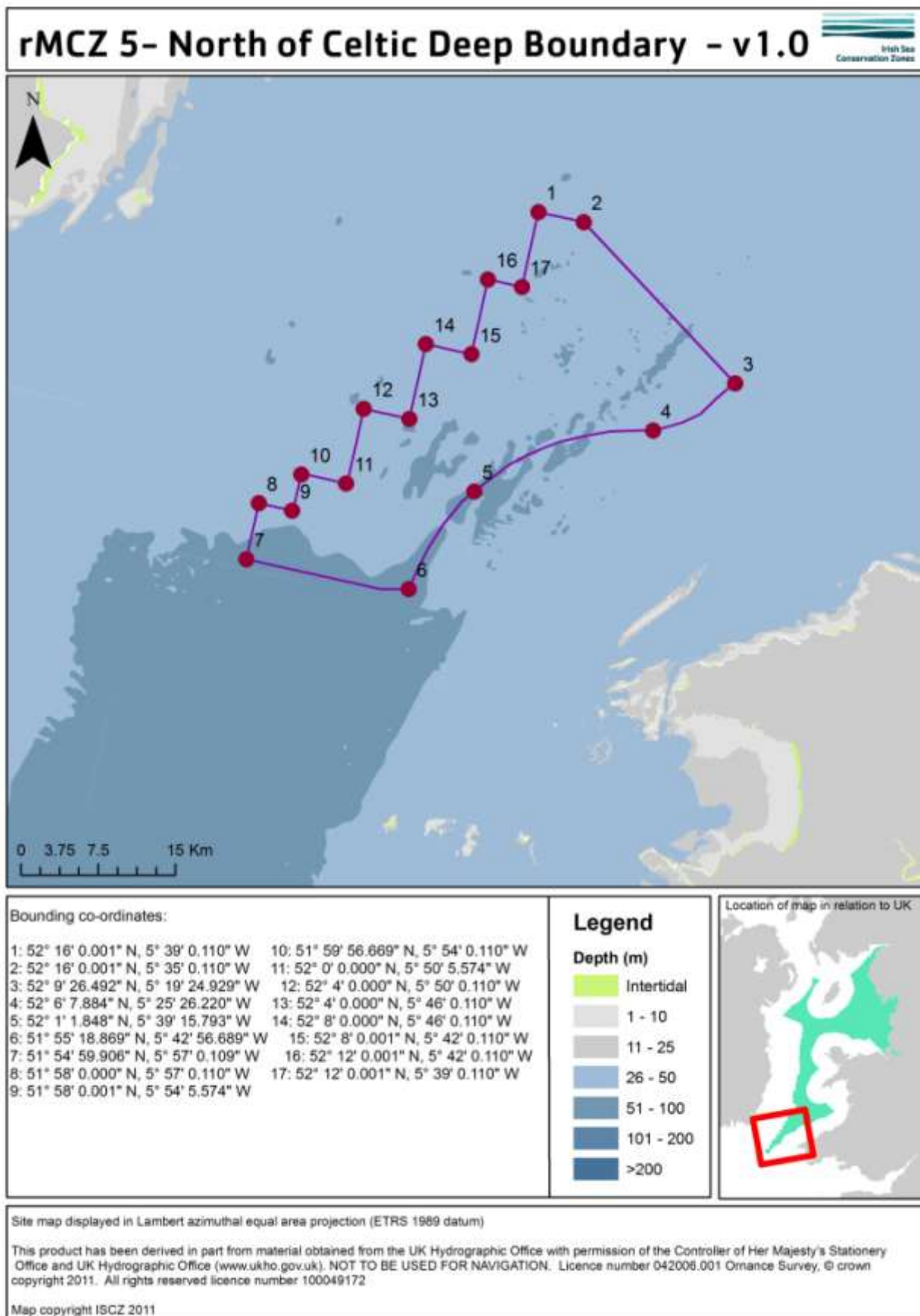
5. Features proposed for designation within rMCZ 5

Feature type	Feature name	Area covered within site (for broad scale habitats and habitats of conservation importance)
Broad scale habitat	A5.1 Subtidal coarse sediment A5.2 Subtidal sand A4.2 Moderate energy circalittoral rock	616.88km ² (61687.14 ha) 32.62km ² (3261.82 ha) 2.33 km ² (233.18 ha)
Habitat of conservation importance	Subtidal sands and gravels	599.9 km ² (59988.78 ha)
Species of conservation importance	n/a	
Geological feature	n/a	
Other features	n/a	

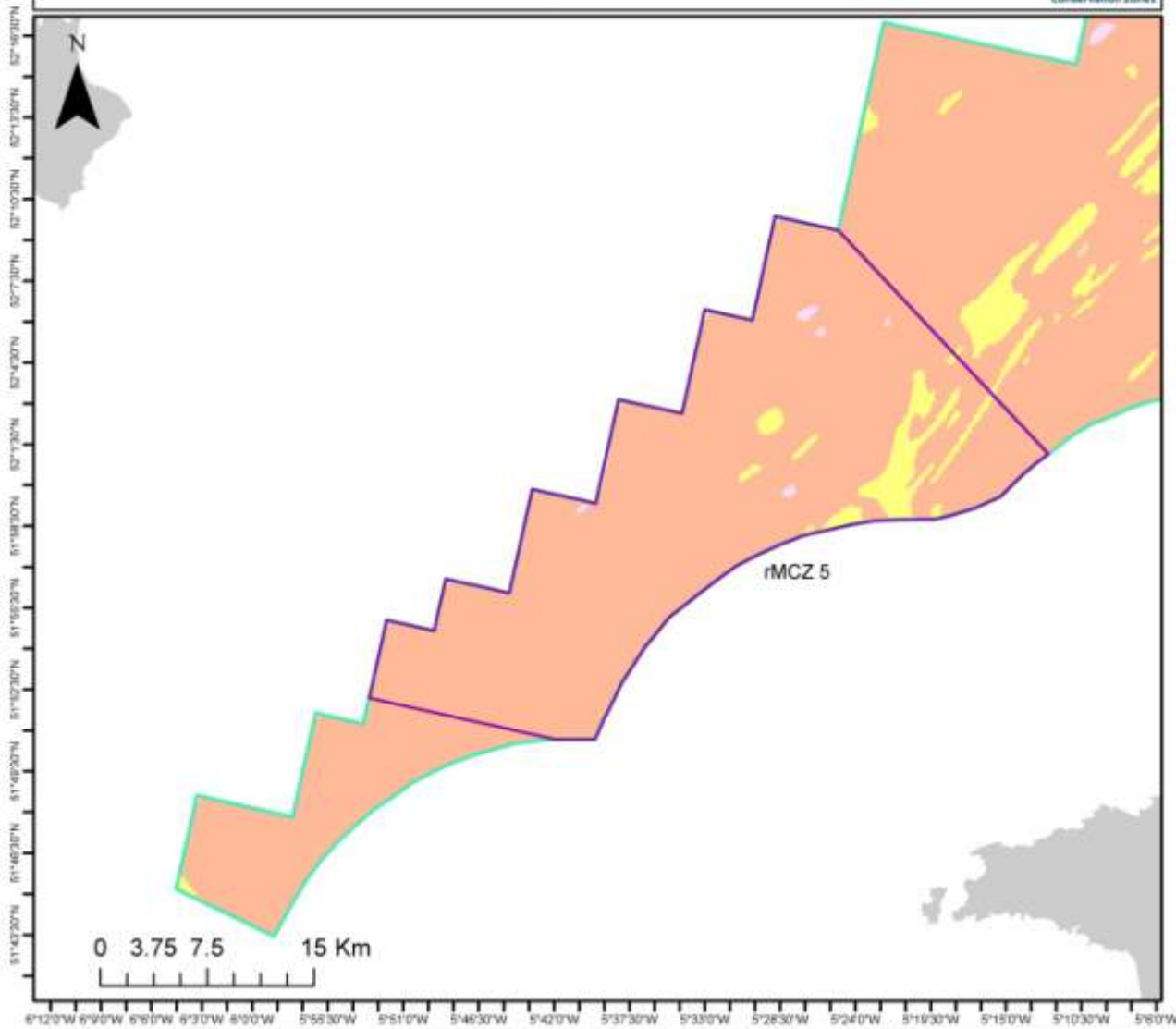
6. Features within rMCZ 5 not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad scale habitat	n/a	
Habitat of conservation importance	Horse mussel (<i>Modiolus modiolus</i>) beds	Insufficient confidence that the records of horse mussel represent horse mussel <i>beds</i> .
Species of conservation importance	Ocean quahog (<i>Arctica islandica</i>)	Insufficient confidence in the records. Known to breed in North Western region of the Irish Sea, therefore designated in rMCZ6. There was also low stakeholder confidence in the quality of the Quahog data relating to the site.

7. Map of site



rMCZ 5 - North of Celtic Deep - Broad-scale Habitats



This area is designated for the following BSHT:

- A4.2, Moderate energy circalittoral rock
- A5.1, Subtidal coarse sediment
- A5.2, Subtidal sand

Area: 655.69 km²

Minimum dimension: 3.68 km

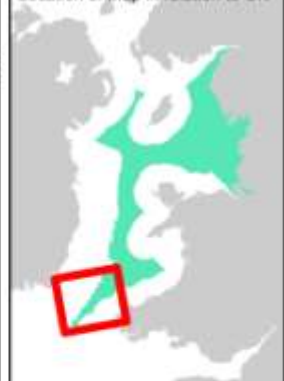
Key

Project Boundary rMCZ

Broad-scale Habitats

- A4.2, Moderate energy circalittoral rock
- A5.1, Subtidal coarse sediment
- A5.2, Subtidal sand
- A5.4, Subtidal mixed sediments

Location of map in relation to UK

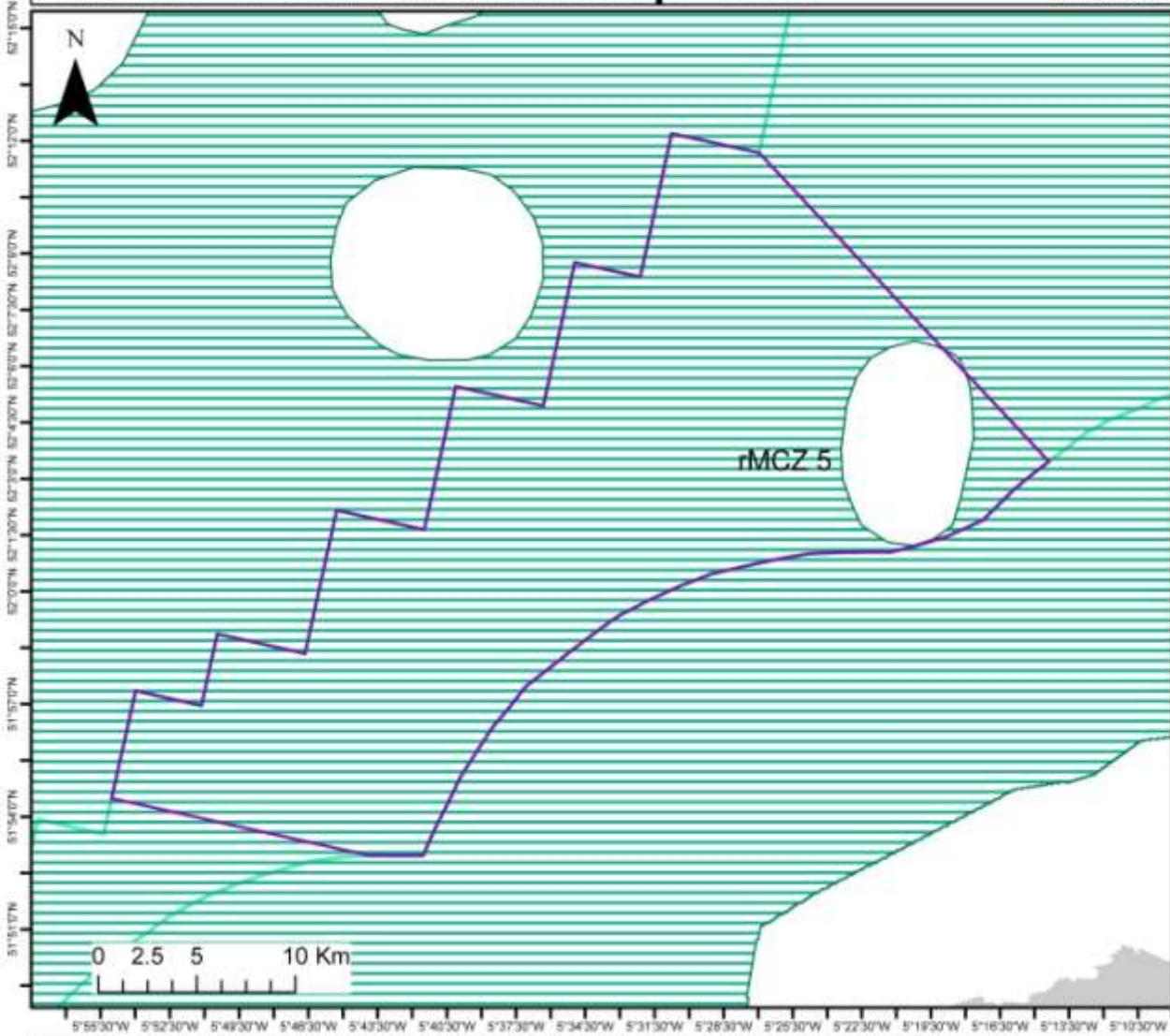


Site map displayed in Lambert azimuthal equal area projection (ETRS 1989 datum)

This product has been derived in part from material obtained from the UK Hydrographic Office with permission of the Controller of Her Majesty's Stationery Office and UK Hydrographic Office (www.ukho.gov.uk). NOT TO BE USED FOR NAVIGATION. Licence number 042006.001 Omance Survey, © crown copyright 2011. All rights reserved licence number 100049172

Map copyright ISCZ 2011

rMCZ 5 - North of Celtic Deep - FOCI






This area is designated for the following FOCI:

- Subtidal sands and gravels

Area: 655.69 km²

Minimum dimension: 3.68 km

Key

-  rMCZ
-  Project Boundary
- FOCI**
-  Subtidal sands and gravels

Location of map in relation to UK



Site map displayed in Lambert azimuthal equal area projection (ETRS 1989 datum)

This product has been derived in part from material obtained from the UK Hydrographic Office with permission of the Controller of Her Majesty's Stationery Office and UK Hydrographic Office (www.ukho.gov.uk). NOT TO BE USED FOR NAVIGATION. Licence number 042006.001 Omance Survey, © crown copyright 2011. All rights reserved licence number 100049172

Map copyright ISZ 2011

8. Site summary

rMCZ5 is a large offshore site located between Welsh territorial waters and Republic of Ireland offshore waters. It is the most southerly site in the IS CZ project area, located 23 km (12 nm) from the Welsh coast. Extensive areas of subtidal coarse sediment are present throughout the site, in addition to moderate energy circalittoral rock and subtidal sand. rMCZ 5 includes part of St George's Channel, which is a deep (approximately 112 m) area that connects the Irish Sea to the Celtic Sea, through which water travels in from the Atlantic Ocean. The area is associated with high benthic diversity (Bolam et al. 2010) and high pelagic biological productivity due to **thermal fronts that form in the summer months (Miller et al. 2010)**. The associated increase in abundance of pelagic food attracts top predators; the area is critical to the common dolphin *Delphinus delphis* (Clark et al. 2010) and is an important seabird foraging area (Smith et al. 2011).

9. Detailed site description

rMCZ5 is proposed for designation as an MCZ based on the presence of three broad-scale habitat types subtidal coarse sediment, subtidal sand and moderate energy circalittoral rock in an area of high productivity and benthic biodiversity.

A combination of physical and biological data has been used to identify the seabed habitat types within the site (UK Seemap, the Mapping European Seabed Habitat projects (MESH), and the HABMAP project). Aside from patches of bedrock and subtidal sand, the predominant marine habitat type is subtidal coarse sediment. Subtidal coarse sediment is a very common marine habitat type throughout the IS CZ project area, but there are three principle reasons why this site was prioritised for inclusion in the network.

First, the coarse sediment and subtidal sand found in the St. George's channel which is, in parts, greater than in 100 m depth, is rich in benthic diversity (Seeley et al. 2010). It is also an area of high abundance and biomass of marine invertebrate species (Bolam et al. 2010). Molluscs and annelids (for example, bivalves and worms) along with crustaceans are the main secondary producers around the area of rMCZ 5 (Bolam et al. 2010), which means these marine invertebrates are important for recycling organic matter from within the sediment and are key in linking energy between primary production in the plankton with predatory fish (Bolam et al. 2010).

Second, the area is of high biological productivity due to **seasonal tidal mixing fronts (Miller et al. 2010)**. This is due to increased solar energy during spring which causes the warm, less dense water to sit on top of colder, denser deep water and their location depends on the water depth and the tidal mixing currents. The enhanced productivity results from mixing **processes at fronts**, which transfer additional nutrients from the mixed side into the surface layer of the stratified side (**Miller pers. comm. 13th July 2011**). This increase in temperature triggers an increase in biological productivity, similar to later on in the year when water cooling allows for nutrient rich deeper waters coming in from the Atlantic to mix with the surface waters (Brown et al. 2010). High biological productivity attracts top predators, including whales and dolphins which are protected under the Annex 1 of the EU Habitats directive. St George's Channel is a critical habitat for the short beaked common dolphin *Delphinus delphis*, where they congregate in large numbers (between May to November) for feeding and calving (Clark et al. 2010). Basking sharks *Cetorhinus maximus* are now marked as endangered on the International Union for conservation of Nature red list of

threatened species. Satellite tracking of these important species revealed that St. George's Channel was part of their migratory route (Stephan *et al.* 2011). These marine mammals and seabirds, for which this area provides important foraging grounds, provide evidence of the high biological productivity of the site.

Third, at the time of writing, the Irish national plans for marine protected areas are not yet in motion, and it seems likely that the Welsh MCZs will be placed within existing marine protected areas and therefore be restricted to inshore waters within 6 nm from the coast (Lindenbaum K. pers. comm. 24th March 2011). Therefore, rMCZ5, along with the more northerly sites rMCZ4 and 3 may offer the only offshore protection for these habitat types in the UK territorial waters of the Irish Sea.

The ocean quahog *Arctica islandica* has been recorded within rMCZ5 (Mackie 1995). The only known breeding population of quahogs in the Irish Sea is located much further north (in rMCZ 6), as the warmer seawater temperatures in recent years may not favour larval survival in the southern Irish Sea (P Butler, pers comm. 17th March 2011). However, given the longevity of the species and its importance as a scientific reference tool, the ocean quahog is noted as being present but not designated in this southerly site, rMCZ5.

There are records for horse mussels *Modiolus modiolus* a feature which has not proposed for designation in this site. There are numerous records of horse mussel from this site, but data are insufficient to suggest that these individual records support the presence of horse mussel beds. Rees (2009) indicated that the records of horse mussels south of the confirmed beds near the Llyn Peninsula, are unlikely to represent beds. The records within rMCZ5 are more likely to be scattered populations of adults, records of juveniles, or another modiolus species (Rees 2009). On this basis, horse mussel beds have not been proposed for designation within rMCZ 5.

Site identification work was supported by knowledge and data for several important seabird species. rMCZ 5 is an important area for seabirds in the Irish Sea providing a foraging ground to a wide range of species, these include: gannets (*Morus bassanus*), Manx shearwaters (*Puffinus puffinus*) and puffins (*Fratercula arctica*). These birds can have significant foraging radii (the gannet can travel up to 300 km) and will originate from Welsh and Irish colonies, in particular Cardigan Bay and rocky cliffs on the east coast of Ireland (Gouldstone pers comm. 2011).

RSPB data incorporated in the Areas of Additional Ecological Importance GIS layer shows that the whole site, with its rich sandy sediments and high energy environment, is heavily used by a number of species. Locally puffins (*Fratercula arctica*) feed on sandeel and capelin; gannets (*Morus bassanus*) feed on mackerel, herring and sandeel; Manx shearwaters (*Puffinus puffinus*) feed on herring, sprat, whitebait and pilchards (Gouldstone pers comm. 2011).

10. Site boundary

This site has changed relatively little, in terms of position, throughout the process. The east and west boundaries of rMCZ5 abut onto the adjacent Welsh territorial limits and the median line between UK and the Republic of Ireland offshore waters. This will allow potential linkage to any future marine protected areas in adjacent waters, if this is deemed suitable. The site was located in this position to avoid the key (largely UK) fishing grounds in the Irish Sea and to ensure some connectivity between the ISCZ and the Finding Sanctuary MCZ networks. The southern boundary line originally (1st, 2nd and 3rd iteration) extended

further south in the project area but this was moved further north in the draft final recommendations, to the 51°55'N line, to allow fishery access. This reduction in size (and the location of the northern boundary limit (between 51°54'N, 5°35'W and 52° 9'26"N, 5°19' 24"W) is particularly important for Belgian beam trawlers, who work in this area before travelling further north in Irish Sea to access fishing grounds around Liverpool Bay and to the southwest of the Isle of Man. The development of the site boundary through time is shown on the below map.

11. Conservation objectives

Conservation Objective	
1 Maintain/ recover	Subject to natural change, recover the Subtidal Sand to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of Subtidal Sand in the biogeographic region are all recovered, such that the feature makes its contribution to the network.</p>
Advice on operations	
3 Pressures	<p>Subtidal Sand is sensitive to the pressures: (feature is not currently exposed to pressure in <i>Italics</i>)</p> <ul style="list-style-type: none"> • Removal of non-target species (lethal) • Surface abrasion: damage to seabed surface features • Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm • <i>Structural abrasion/penetration: Structural damage to seabed >25mm</i> • <i>Siltation rate changes (high)</i> • <i>Siltation rate changes (low)</i> • <i>Physical change (to another seabed type)</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Siltation rate changes (high)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Siltation rate changes (low)</i> • <i>Temperature changes - regional/national</i> • <i>Salinity changes - local</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i>
4 Human activities	<p>Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas. Based on a current assessment of activities taking place in the site, the human activities that require additional management are benthic trawling. Those activities that are known to take place in the site that will be managed through the current regulatory framework are telecom and power cables. Those activities that are deemed not to require management but are known to take place in the site are shipping, recreation, transit of vessels and other fisheries.</p>

Conservation Objective	
1 Maintain/ recover	Subject to natural change, recover the Subtidal Sands and Gravels to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	the <ul style="list-style-type: none"> • extent, • diversity • community structure • natural environmental quality*, and natural environmental processes* Representative of Subtidal Sands and Gravels in the biogeographic region are all recovered, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal Sands and Gravels is sensitive to the pressures:(The feature is not currently exposed to pressure in <i>Italics</i>) <ul style="list-style-type: none"> • Removal of non-target species (lethal) • Surface abrasion: damage to seabed surface features • Removal of target species (lethal) • Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm • <i>Structural abrasion/penetration: Structural damage to seabed >25mm</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Physical change (to another seabed type)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i> • <i>Siltation rate changes (high)</i> • <i>Siltation rate changes (low)</i>
4 Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas. Based on a current assessment of activities taking place in the site, the human activities that require additional management are benthic trawling. Those activities that are known to take place in the site that will be managed through the current regulatory framework are telecom and power cables. Those activities that are deemed not to require management but are known to take place in the site are shipping, recreation, transit of vessels and other fisheries.

Conservation Objective	
1 Maintain/ recover	Subject to natural change, recover the Subtidal Coarse Sediment to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of Subtidal Coarse Sediment in the biogeographic region are all recovered, such that the feature makes its contribution to the network, such that the feature makes its contribution to the network.</p>
Advice on operations	
3 Pressures	<p>Subtidal Coarse Sediment is sensitive to the pressures: (feature is not currently exposed to pressure in <i>Italics</i>)</p> <ul style="list-style-type: none"> • Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm • Surface abrasion: damage to seabed surface features • <i>Removal of non-target species (lethal)</i> • <i>Structural abrasion/penetration: Structural damage to seabed >25mm</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Physical change (to another seabed type)</i> • <i>Salinity changes - local</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i> • <i>Siltation rate changes (high)</i> • <i>Siltation rate changes (low)</i>
4 Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas. Based on a current assessment of activities taking place in the site, the human activities that require additional management are benthic trawling. Those activities that are known to take place in the site that will be managed through the current regulatory framework are telecom and power cables. Those activities that are deemed not to require management but are known to take place in the site are shipping, recreation, transit of vessels and other fisheries.

Conservation Objective	
1 Maintain/ recover	Subject to natural change, maintain the Moderate Energy Circalittoral Rock to favourable condition by 2020 and maintain thereafter, such that:
2 Attributes and parameters	<p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and natural environmental processes* <p>Representative of Moderate Energy Circalittoral Rock in the biogeographic region are or recovered, such that the feature makes its contribution to the network.</p>
Advice on operations	
3 Pressures	<p>Moderate Energy Circalittoral Rock is sensitive to the pressures: (feature is not currently exposed to pressure in <i>Italics</i>)</p> <ul style="list-style-type: none"> • <i>Structural abrasion/penetration: Structural damage to seabed >25mm</i> • <i>Removal of non-target species (lethal)</i> • <i>Removal of target species (lethal)</i> • <i>Physical loss (to land or freshwater habitat)</i> • <i>Physical change (to another seabed type)</i> • <i>Physical removal (extraction of substratum)</i> • <i>Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm</i> • <i>Siltation rate changes (high)</i> • <i>Salinity changes - local</i> • <i>Surface abrasion: damage to seabed surface features</i> • <i>Siltation rate changes (low)</i> • <i>Temperature changes - local</i> • <i>Water clarity changes</i> • <i>Temperature changes - regional/national</i> • <i>Introduction or spread of non-indigenous species & translocations (competition)</i> • <i>Wave exposure changes - local</i> • <i>Wave exposure changes - regional/national</i>
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas. Based on a current assessment of activities taking place in the site, the human activities that require additional management are benthic trawling. Those activities that are known to take place in the site that will be managed through the current regulatory framework are telecom and power cables. Those activities that are deemed not to require management but are known to take place in the site are shipping, recreation, transit of vessels and other fisheries.

12. Sites to which this site is related

rMCZ 5 is located 75 km (40 nm) from rMCZ 4, another recommended MCZ within the ISCZ project area which has also been suggested for designation of the same EUNIS level 2 habitat type, subtidal sediment. As this zone is in the southern part of the project area, the nearest neighbouring site is the Celtic Deep rMCZ in the Finding Sanctuary project area. Celtic Deep is located 66 km (36 nm) from rMCZ 5, while East of Celtic Deep is 46 km (25 nm) away. These two sites which are both recommended for designation as MCZs, contain the same EUNIS level 2 habitat type, A5 subtidal sediment.

There are various Welsh and Irish marine Special Areas of Conservation (SACs) in the vicinity of rMCZ5 (vicinity being defined here as less than 80 km (43 nm)). Carnsore Point (designated for Annex 1 reef habitat) and Long Bank are within 40 km (21 nm) of the western edge of rMCZ5. Within 40 km of the Welsh side of the site is the Pembrokeshire marine SAC, Cardigan Bay marine SAC, St Davids (an island and cliff designated SAC, which is an important area for seabirds and breeding grey seals) and Skokholm and Skower Special Area of Protection (SPA).

13. Supporting documentation

Information	Type of information	Source
Location of moderate energy circa-littoral rock	Combined physical and biological surveying with habitat modelling	Robinson et al. (2007)
Location of subtidal coarse sediment	Combined physical and biological surveying with habitat modelling	Robinson et al. (2007)
Location of subtidal sand	Combined physical and biological surveying with habitat modelling	Robinson et al. (2007)

14. Stakeholder considerations

Caveats:

There are no specific caveats associated with this site.

Implications:

Stakeholder implications are explored further, on a site-by-site basis, in the management implications tables in Annex 3. The socio-economic implications of designation of this site will be costed in the Impact Assessment.

Stakeholder support:

Most stakeholders accepted the inclusion of rMCZ5 in the final network in order to satisfy the ENG targets. Conservation stakeholders expressed strong support for inclusion of this site. Strong concerns were raised

on behalf of the French fishing interests, on the understanding that they may lose fishing grounds if the site is designated.

For a fuller context on the RSG discussions associated with this site, readers of this report are encouraged to consult meeting reports from the IS CZ RSG workshops - especially those from the May and July 2011 workshops (IS CZ, 2011b,d).

References

BOLAM, S.G., BARRIO-FROJAN, C.R.S. & EGGLETON, J.D. 2010. *Macrofaunal production along the UK continental shelf*. *Journal of Sea Research* **64**: 166-179.

BROWN, J., CARILLO, L., FERNAND, L., HORSBURGH, K.J., HILL, A.E., YOUNG, E.F. & MEDLER, K.J. 2003. *Observations on the physical structure and the seasonal jet-like circulation of the Celtic Sea and St George's Channel of the Irish Sea*. *Continental Shelf Research* **23**: 533-561.

BUTLER, P. 2009 Establishing the *Arctica islandica* archive: Development of the definitive shell-based proxy for the North Atlantic shelf seas. PhD thesis, Bangor University.

CLARKE, J., DOLMAN, S & HOYT, E. 2010 Towards marine protected areas for cetaceans in Scotland, England and Wales. WDCS.

IS CZ (2011b). Meeting report from the 6th Irish Sea Conservation Zones Stakeholder Group meeting. RK Partnership Ltd.

IS CZ (2011d). Meeting report from the 8th Irish Sea Conservation Zones Stakeholder Group meeting. RK Partnership Ltd.

MACKIE, A., Oliver, P.G., Rees, E.I.S. (1995). BIOMÔR 1 Benthic biodiversity in the Southern Irish Sea. *Studies in Marine Biodiversity and Systematics from the National Museum of Wales. BIOMÔR Reports*, 1. Galleries of Wales/National Museums: Cardiff. ISBN 0-7200-0427-6.

MILLER, P.I., CHRISTODOULOU, S. & SAUX-PICART, S. 2010. *Oceanic thermal fronts from Earth observation data – a potential surrogate for pelagic diversity*. Report to the Department of Environment, Food and Rural Affairs. Defra Contract No. MB102. Plymouth Marine Laboratory, subcontracted by ABPmer, Task 2F, pp. 24.

SEELEY, B., LEAR, D., HIGGS, S., NEILLY, M., BILEWITCH, J., EVANS, J., WILKES, P. & ADAMS, L. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes*. Report No 16: Task 2C. Mapping of Protected Habitats. DEFRA Project Code: MB0102 Marine Biodiversity R&D Program.

SMITH, K., BRIGGS, J., HAMER, J. & WALKER, P. 2011. Natural heritage evidence to support strategic planning for marine renewable energy. CCW Policy Research Report.

STEPHAN, E., GADENNE, H & JUNG, A. 2011. *Satellite tracking of basking sharks in the north-east Atlantic ocean*. NGO for study of conservation of Elasmobranchs. Available from: <http://www.assc-apecs.org/programme-de-marquage-satellite.html>

ROBINSON, K., RAMSAY, K., WILSON, J., MACKIE A., WHEELER, A., O'BEIRN F., LINDENBAUM, C., VAN LANDEGHAM, K., MCBREEN, F., MITCHELL, N. 2007. *HABMAP: Habitat Mapping for conservation and management of the southern Irish Sea*. Report to the Welsh European Funding Office. CCW Science Report Number 810. Countryside Council for Wales, Bangor. 233 pp plus appendices.

WILSON, J.G., MACKIE, A.S.Y., O'CONNOR, B.D.S., REES, E.I.S. & DARBYSHIRE, T. 2001. *Benthic biodiversity in the southern Irish Sea 2: The South-West Irish Sea Survey*. Studies in marine Biodiversity and Systematics from the National Museum of Wales. BIOMÔR Rep 2(1).

7.12 Marine Conservation Zone: NG 12, Compass Rose

Version and issue date	Amendments made
V1.0 31 st August, 2011	Original release
V1.1 6 th September, 2011	Minor corrections and edits
V1.2 2 nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

NG 12, Compass Rose (site also contains RA10, Compass Rose rRA)

Site centre location

54° 29' 31"N, 0° 15' 22"E

54.492005°, 0.256335°

Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

551.56km² / 55,156.40ha

Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

JNCC Regional Sea: Northern North Sea

OSPAR Region II: Greater North Sea

Table 7.90 Features proposed for designation within NG 12, Compass Rose

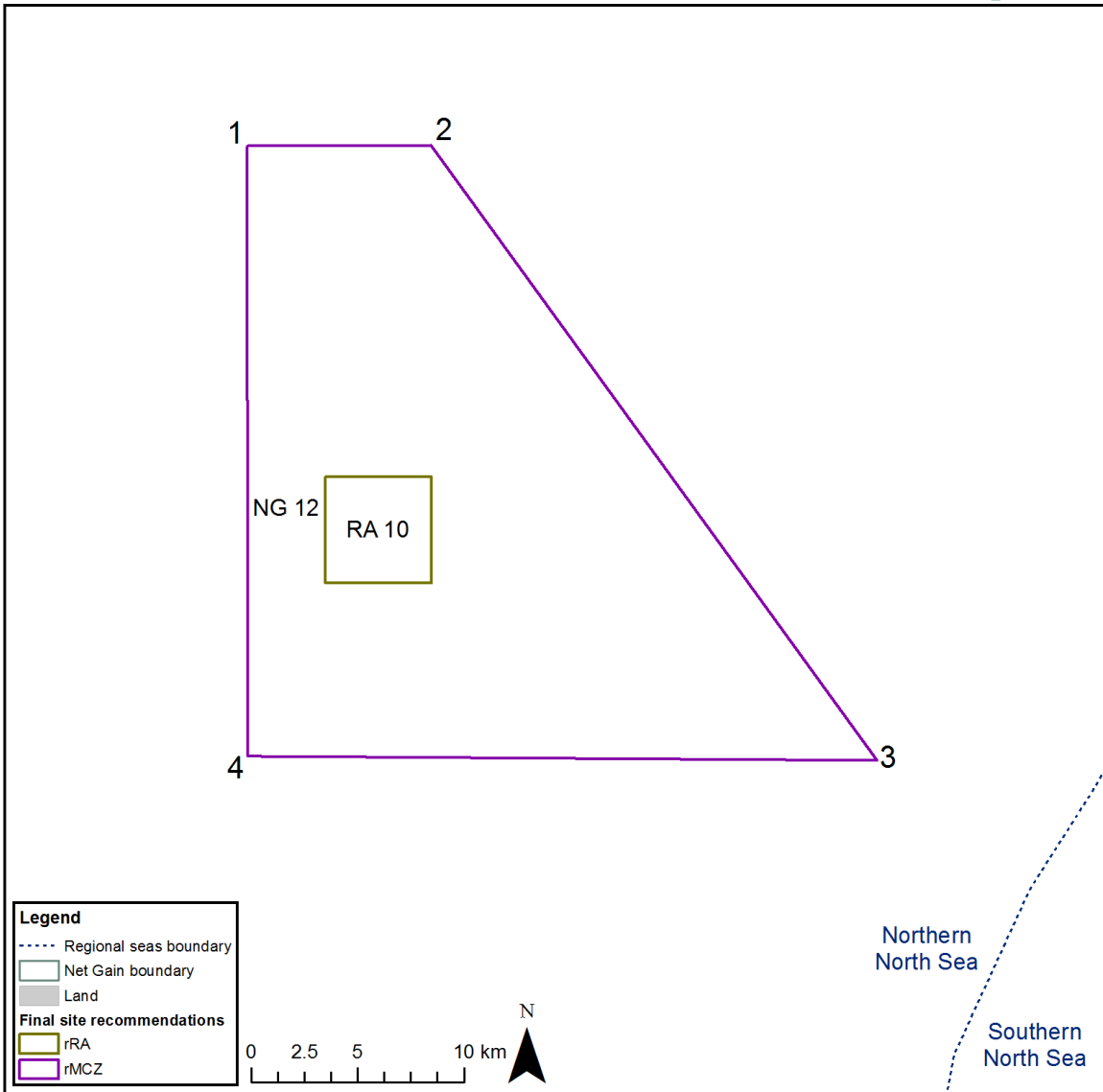
Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A4.2: Moderate energy circalittoral rock	244.88km ²
Habitat of conservation importance	n/a	n/a
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Table 7.91 Features within NG 12, Compass Rose not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	A5.1: Subtidal coarse sediment	Habitat was not put forward for designation because the adequacy had been well exceeded in other sites ²⁸
Broad-scale habitat	A5.2: Subtidal sand	Habitat was not put forward for designation because the adequacy had been well exceeded in other sites ²⁸
Habitat of conservation importance	Subtidal sands and gravels (modelled)	Habitat was not put forward for designation because the adequacy had been well exceeded in other sites ²⁸
Species of conservation importance	n/a	n/a

²⁸ Discussions held during the July, 2011 LGM suggested that these features could be considered for designation in subsequent stages of the MCZ consultation process on the basis that their inclusion would not materially alter the management requirements for the site. For the purposes of Net Gain's final recommendations these features have not been put forward for designation and have not been the subject of a vulnerability assessment.

Compass Rose (NG 12)

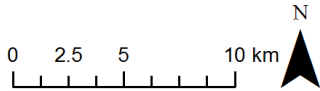


Legend

- Regional seas boundary
- Net Gain boundary
- Land

Final site recommendations

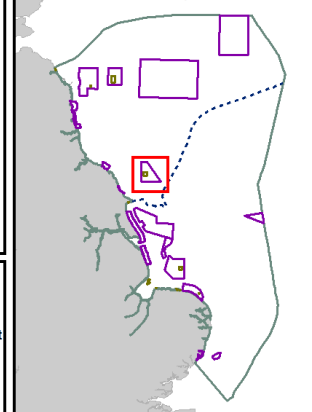
- rRA
- rMCZ



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	54° 38' 28.75" N	0° 04' 59.30" E	54.641326	0.083144
2	54° 38' 40.74" N	0° 13' 00.34" E	54.644651	0.216760
3	54° 23' 29.90" N	0° 33' 28.30" E	54.391646	0.557865
4	54° 22' 59.70" N	0° 06' 06.48" E	54.383253	0.101802

Location of main map within Net Gain



Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright, All rights reserved. Regional seas: © JNCC (2009). All rights reserved.

Figure 7.98 Location and extent of site NG12 (Compass Rose)

Site summary

The location of NG 12 is approximately 30km offshore from the North Yorkshire coast in the North East of England. The depth range of the site is 50m (Figure 7.102), and the seabed is composed of moderate energy circalittoral rock and subtidal coarse sediment/sand. Within the site there is a fishing area known as Heartbreak ridge which is known to be hard ground, and local knowledge indicates that the seabed may also be covered in large boulders and possibly rocky scars (Rowe, 2011 pers. comm.). The site captures a small portion of the Flamborough Frontal System which is most prevalent during spring/summer/autumn and is defined by temperature gradients of the northern and southern North Sea waters (Jones, *et al.* 2004a). Fish species are known to use the area for spawning and seabirds for foraging.

Detailed site description

NG12 (Compass Rose) is being recommended for designation due to the presence of the broad scale habitat, moderate energy circalittoral rock. The site covers a total surface area of 551.53 km² of which 244.88 km² represents moderate energy circalittoral rock.

Moderate energy circalittoral rock is defined as 'deeper water rock, with some shelter from waves and currents (JNCC, 2011). This habitat supports primarily algal species in shallow waters whilst deeper waters with insufficient sunlight for algal growth support high densities of animal communities. Such communities can include cup coral, sea-fans, anemones, sponges, mussels, worms, starfish, brittle stars and sea urchins (Natural England, 2011).

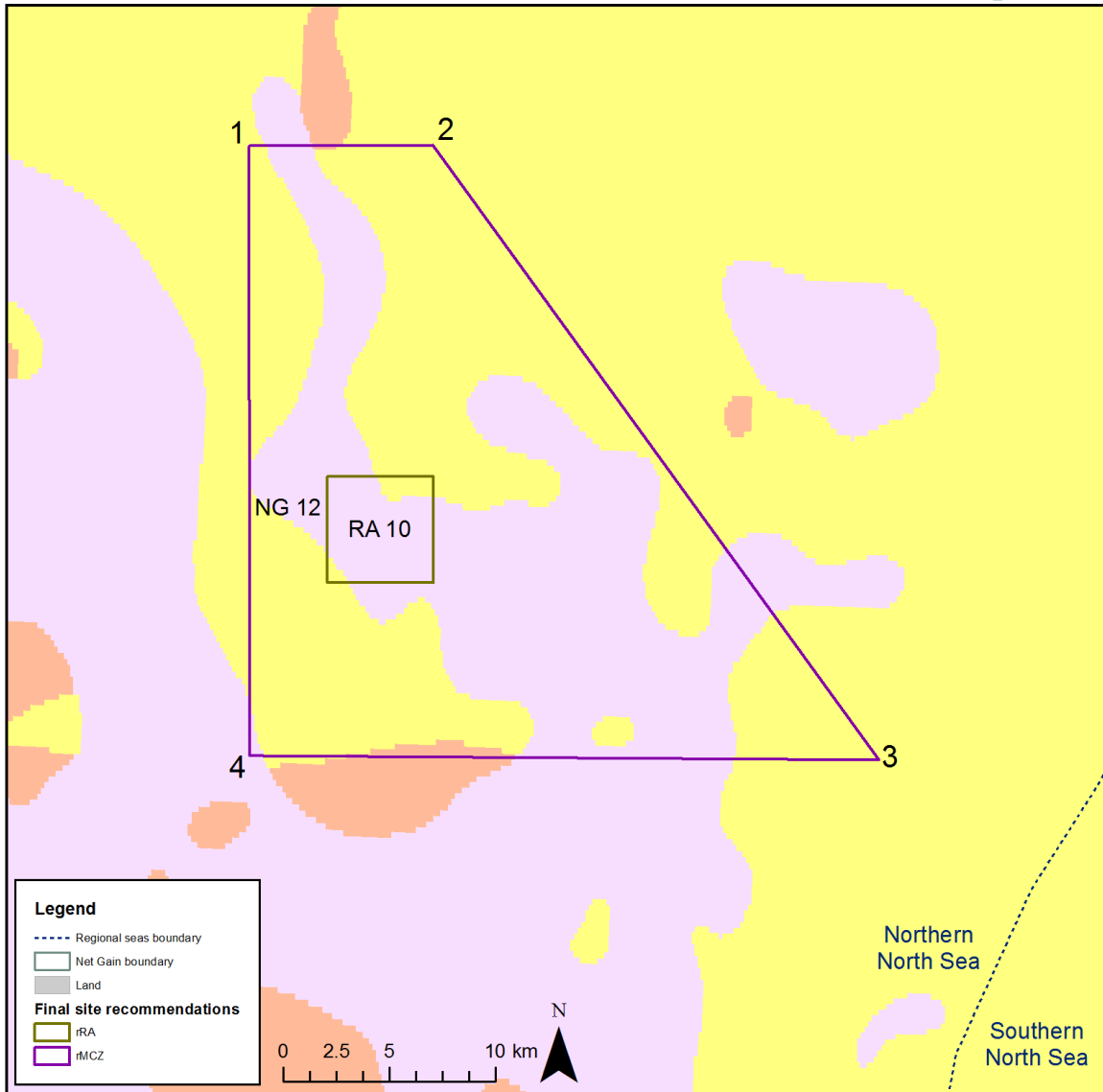
Within the boundary of NG12 is an area referred to by the local commercial fishermen as Heartbreak ridge which is approximately 2.5 square miles. It is named this due to it being an area which is very hard ground to trawl over as the sea bed is thought to be covered in large boulders and rocky scars (Rowe, 2011 pers. comm.). During the last four to five years, some of the static fishing vessels from Scarborough, Bridlington and Whitby have potted it quite successfully for crab and lobster as the rocky habitat is ideal for these species (Rowe, 2011 pers. comm.).

This site captures a small portion of the Flamborough Frontal System at different times of the year (Figure 7.103; Figure 7.104; Figure 7.105; Figure 7.106). The Flamborough frontal system is defined by the distinct temperature gradient between the waters to the north and south of Flamborough Head (Jones, *et al.*, 2004). This boundary represents the mixing of the warmer waters of the southern North Sea and the cooler waters of the northern North Sea. The upwelling in locations such as this allows nutrients to be transported to the surface from deeper colder waters which in turn creates a site of increased primary biomass production (Hill, *et al.*, 1993) Tidal flows in this region flood southwards and ebb northwards (Jones *et al.* 2004b).

The site contains spawning grounds for plaice during December to March, for herring from August to October, for lemon sole from April to September, for sandeels (*A. marinus*) from November to February, and for sprat from May to August (Fisheries Agency, 1998) (Figure 7.110; Figure 7.111). As well as being a spawning ground this site is also a nursery ground for cod, whiting, lemon sole, sandeel and sprat (Fisheries Agency, 1998)

The European Seabirds at Sea database (ESAS) which surveys the foraging behaviours of seabirds, reports that NG12 is of average importance to seabirds (Figure 7.107; Figure 7.108; Figure 7.109), and species including Atlantic puffin, black-legged kittiwake, common guillemot, northern fulmar, northern gannet and razorbill can be found within the site (RSPB, 2010). Species such as the kittiwake for instance have been shown to have a maximum foraging range of approximately 80km (Daunt, *et al.* 2002) which would mean that foraging behaviour would take place in NG12.

Compass Rose (NG 12)



Legend

- Regional seas boundary
- Net Gain boundary
- Land

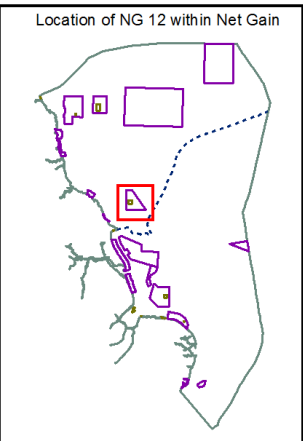
Final site recommendations

- rRA
- rMCZ

Legend

Broad scale habitat

- A4.2: Moderate energy circalittoral rock
- A5.1: Subtidal coarse sediment
- A5.2: Subtidal sand



Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Broad scale habitats (UKSeaMap2010; Intertidal habitats; MESH, Humber REC): JNCC, 2010; ABPmer, 2010; MESH, 2010, MALSf, 2011 respectively.

Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark); © Crown copyright. All rights reserved. Regional seas: © JNCC (2009). All rights reserved.

Figure 7.99 Broad-scale habitat present within NG 12

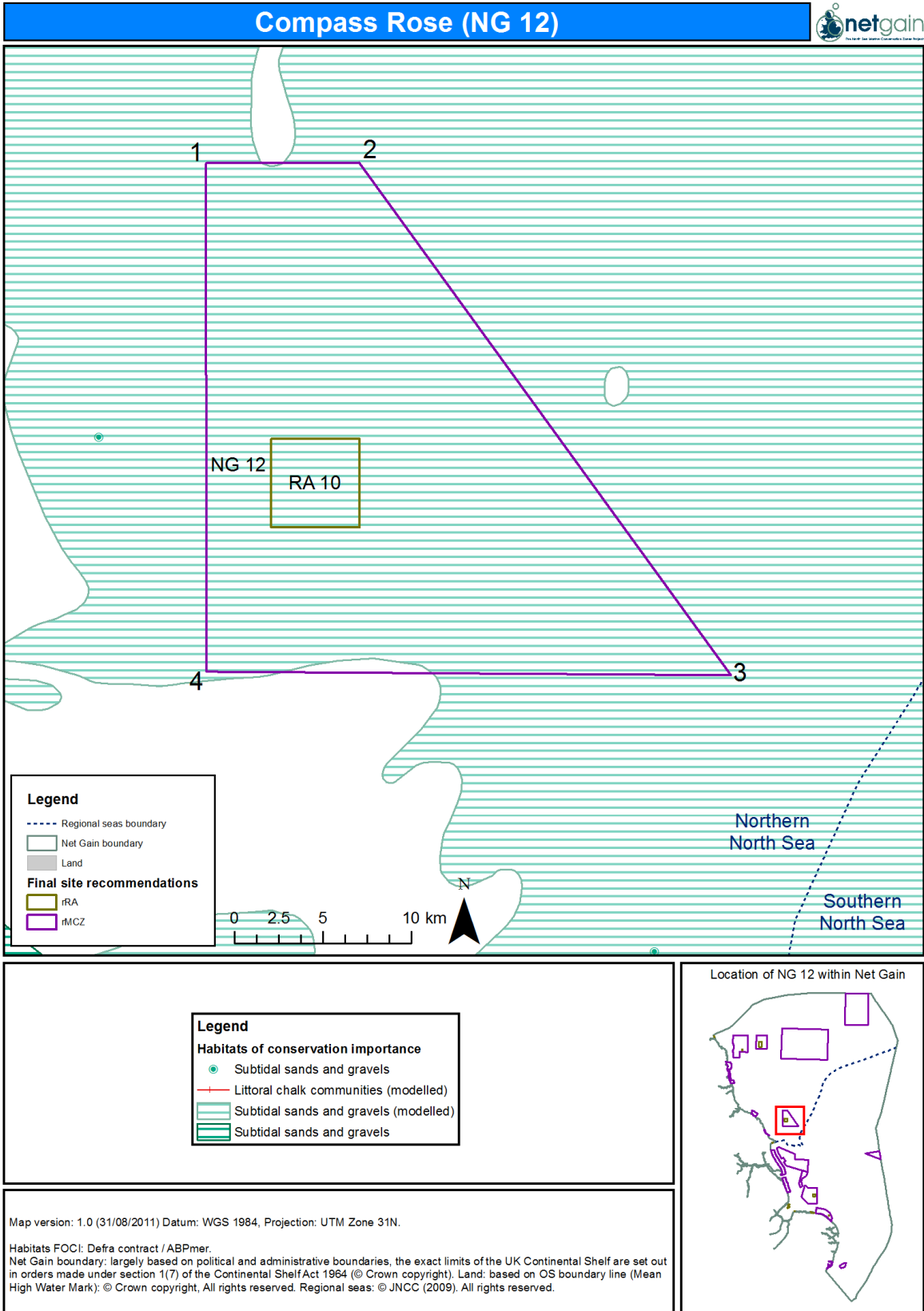
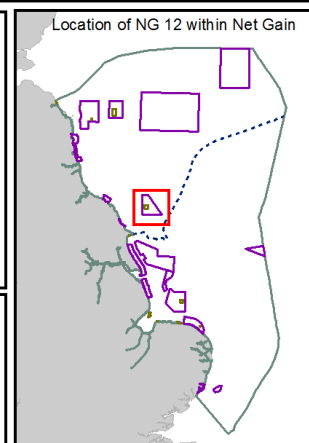
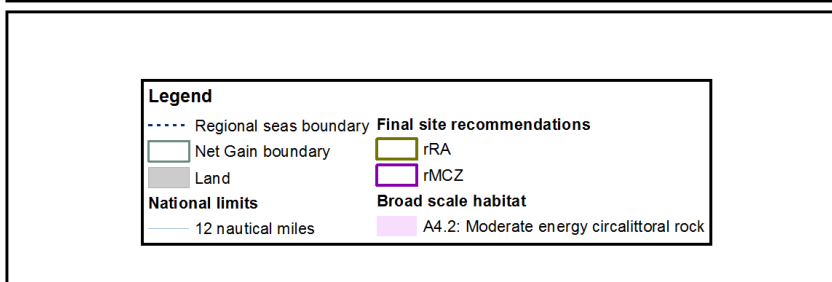
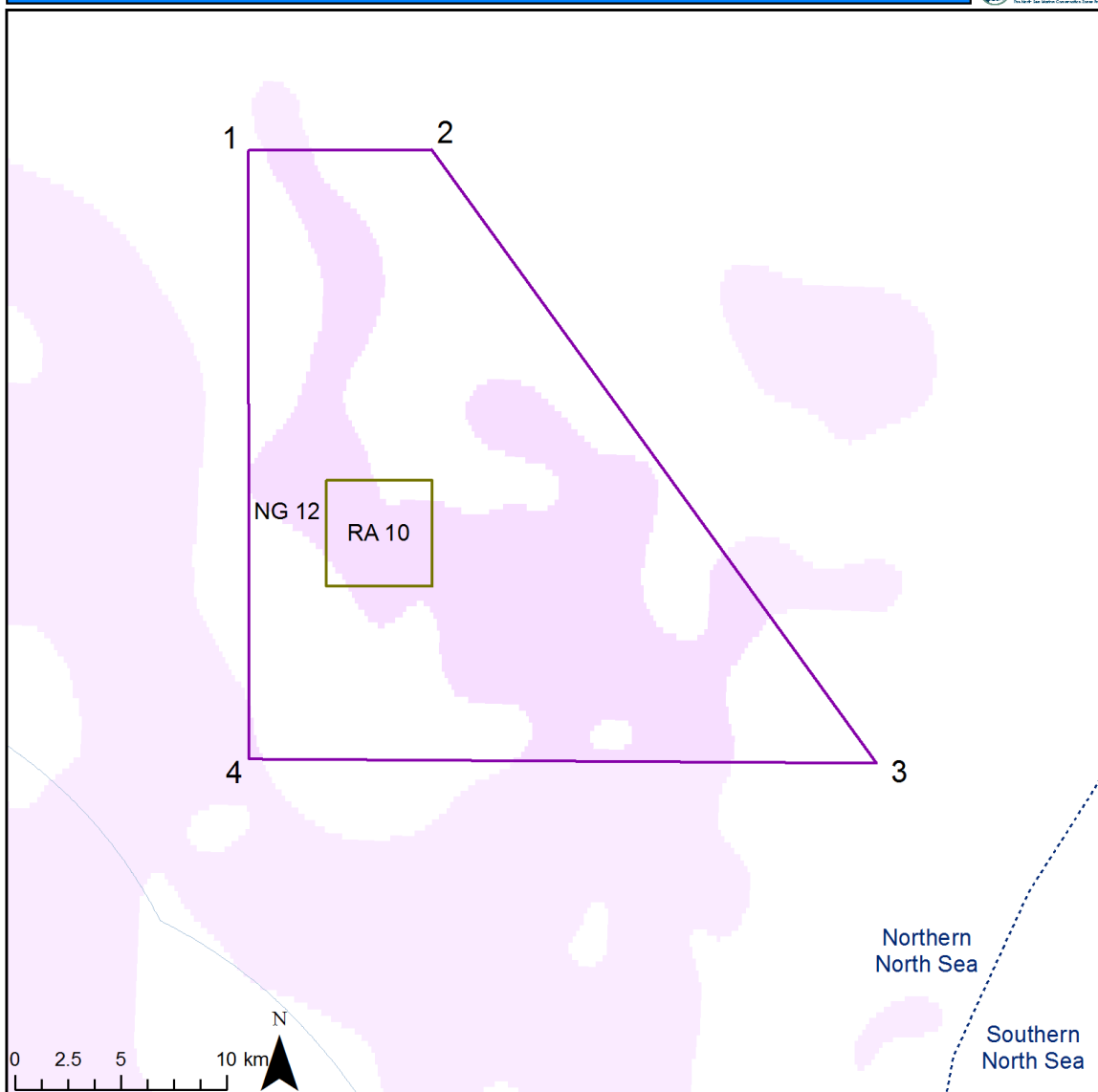


Figure 7.100 FOCI habitat present within NG 12

Compass Rose (NG 12)



Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

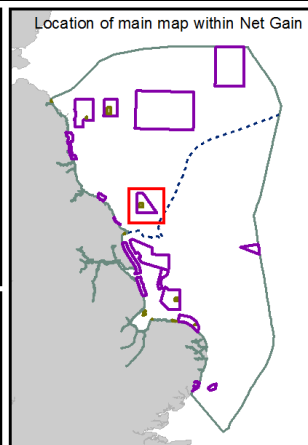
Broad scale habitats (UKSeaMap2010): JNCC, 2010. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright, All rights reserved. Regional seas: © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right.

Figure 7.101 Features put forward for recommendation in NG 12

Compass Rose (NG 12)



Legend	
-----	Regional seas boundary
□	Net Gain boundary
□	rRA
□	rMCZ
Depth class based on LMW Mark (m)	
■	<= -5
■	<= 0
■	<= 5
■	<= 10
■	<= 15
■	<= 20
■	<= 30
■	<= 40
■	<= 50
■	<= 75
■	<= 100
■	<= 150
■	<= 200



Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.
 Contains data from the Ordnance Survey © Crown Copyright and database right 2011. Ordnance Survey 100022021. Contains data from the UK Hydrographic Office © Crown Copyright and/or database rights. Reproduced by permission of the Controller of Her Majesty's Stationery Office and the UK Hydrographic Office (www.ukho.gov.uk). Admiralty Charts © Crown Copyright, 2011. All rights reserved. License No. EK001-GOV001. NOT TO BE USED FOR NAVIGATION. Contains UKHO Law of the Sea data © Crown copyright and database right. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark); © Crown copyright, All rights reserved. Regional seas: © JNCC (2009). National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right.

Figure 7.102 Bathymetry of NG 12

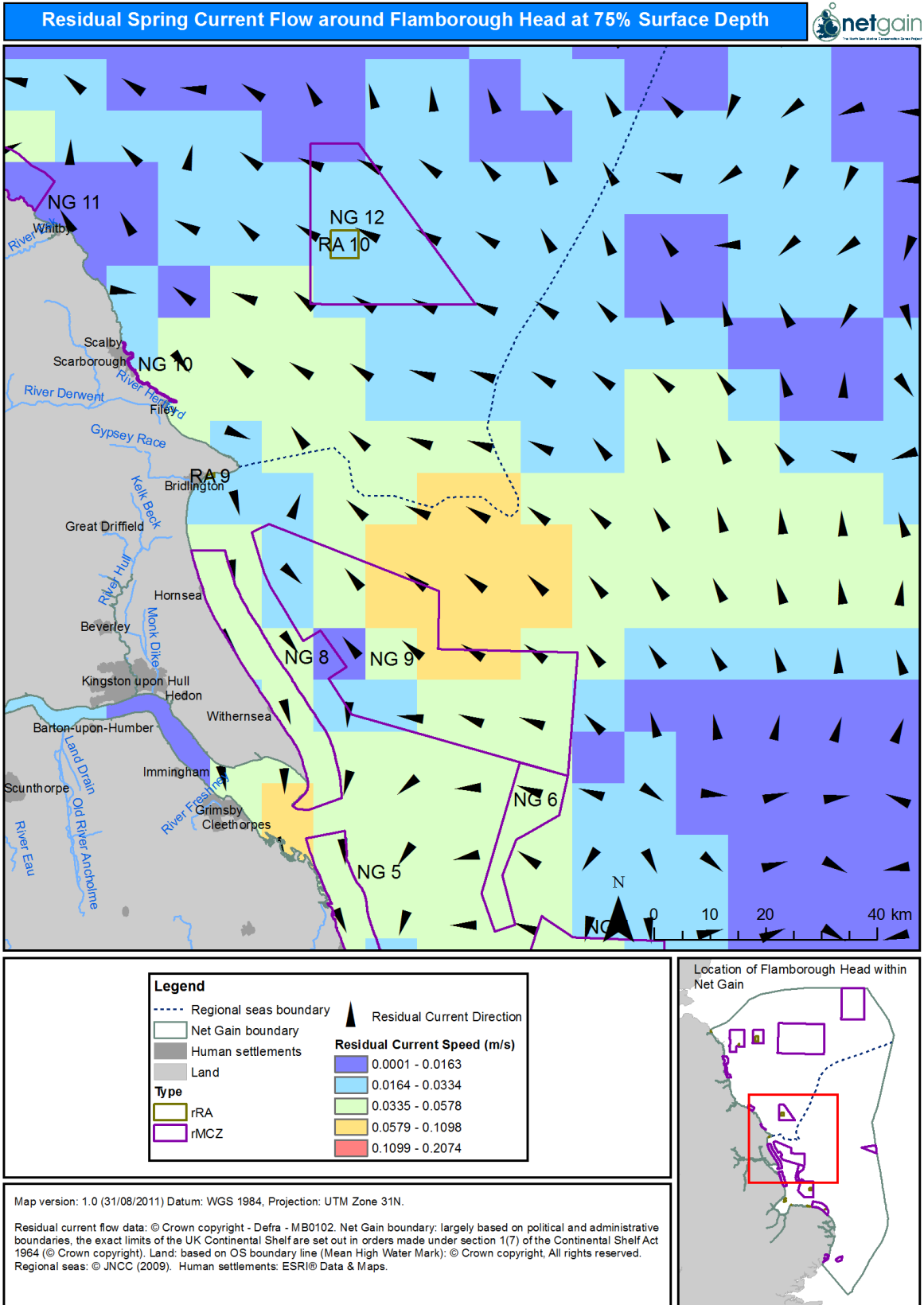


Figure 7.103 Residual spring current flow around Flamborough Head at 75% surface depth

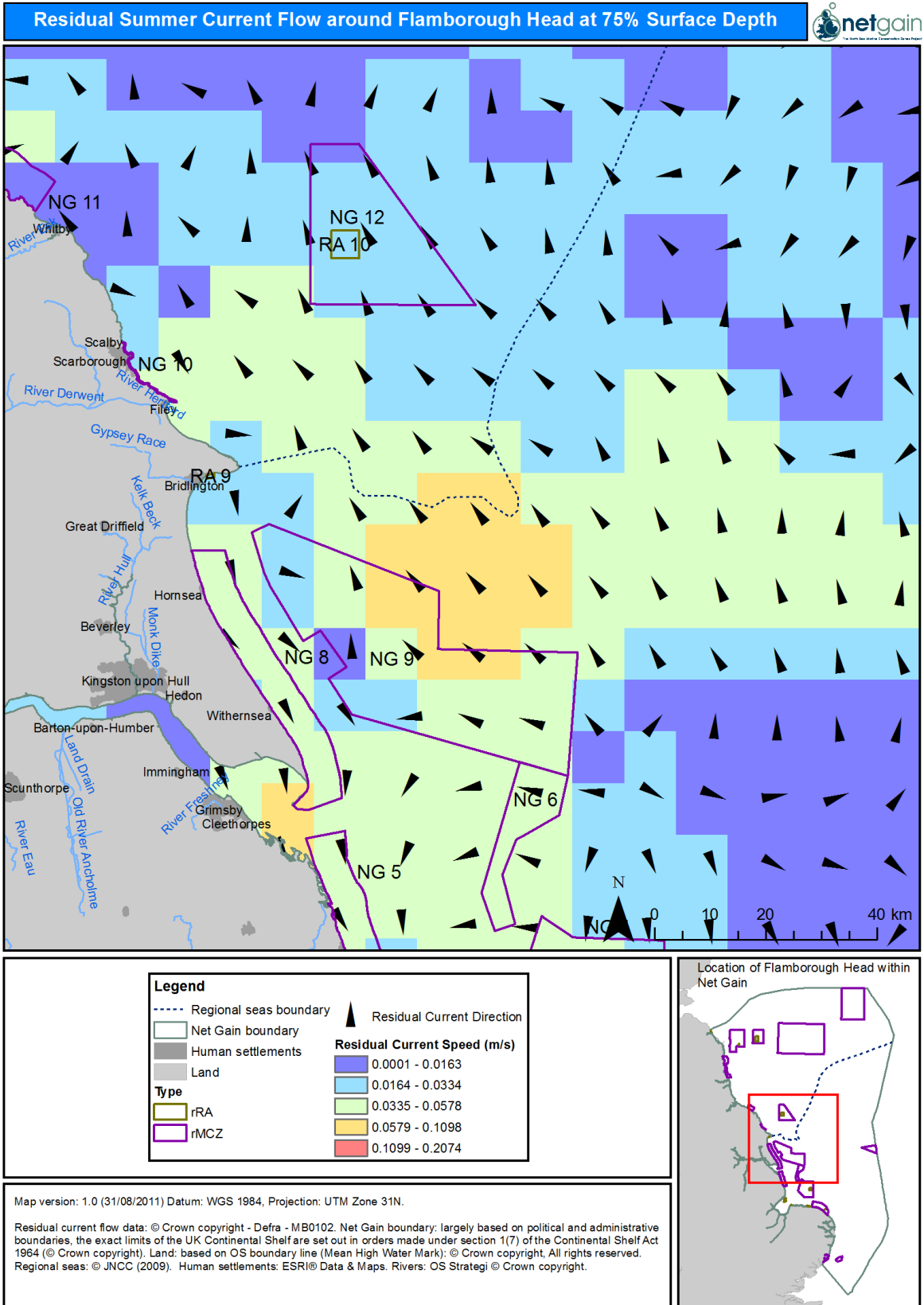


Figure 7.104 Residual summer current flow around Flamborough Head at 75% surface depth

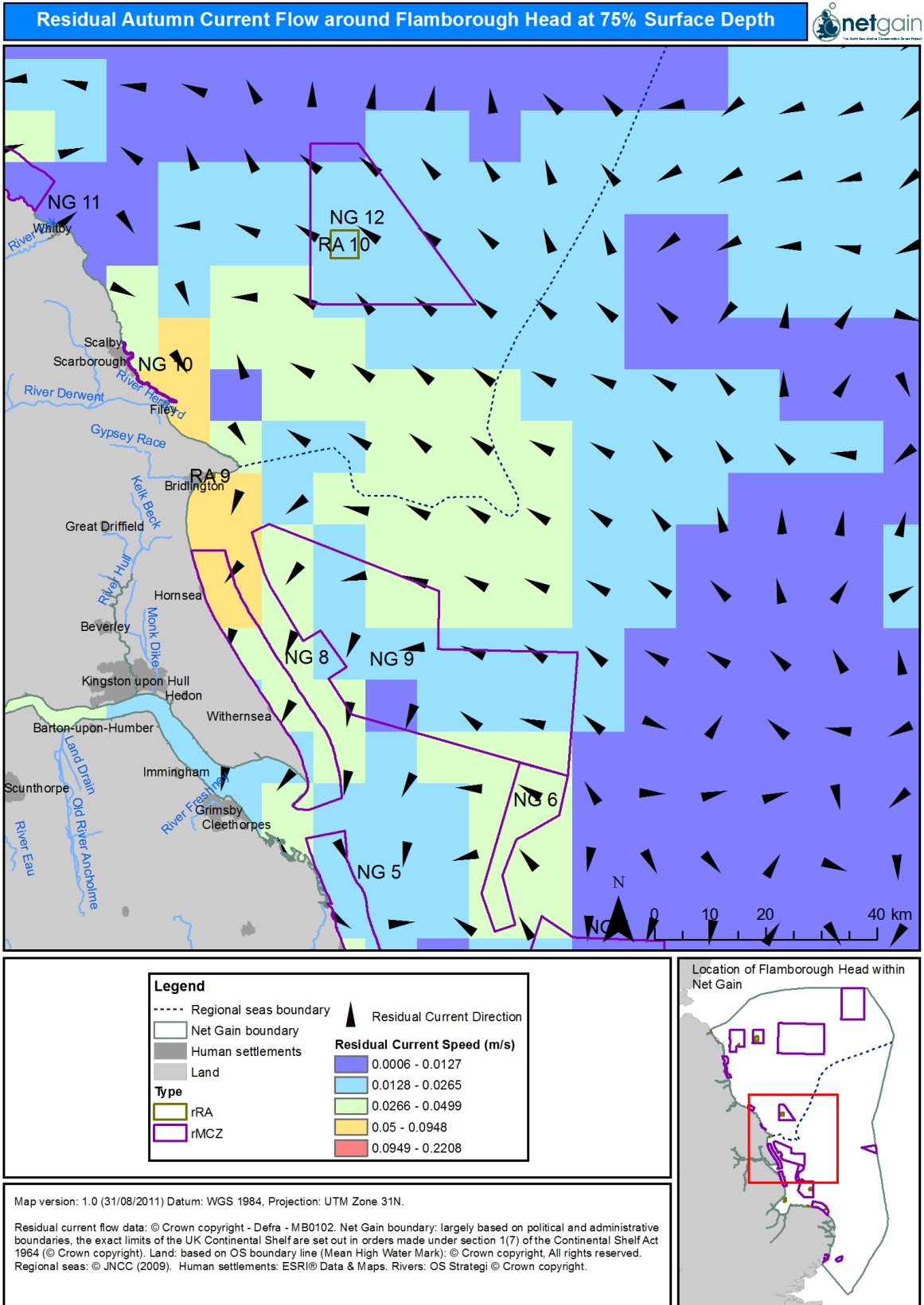


Figure 7.105 Residual autumn current flow around Flamborough Head at 75% surface depth

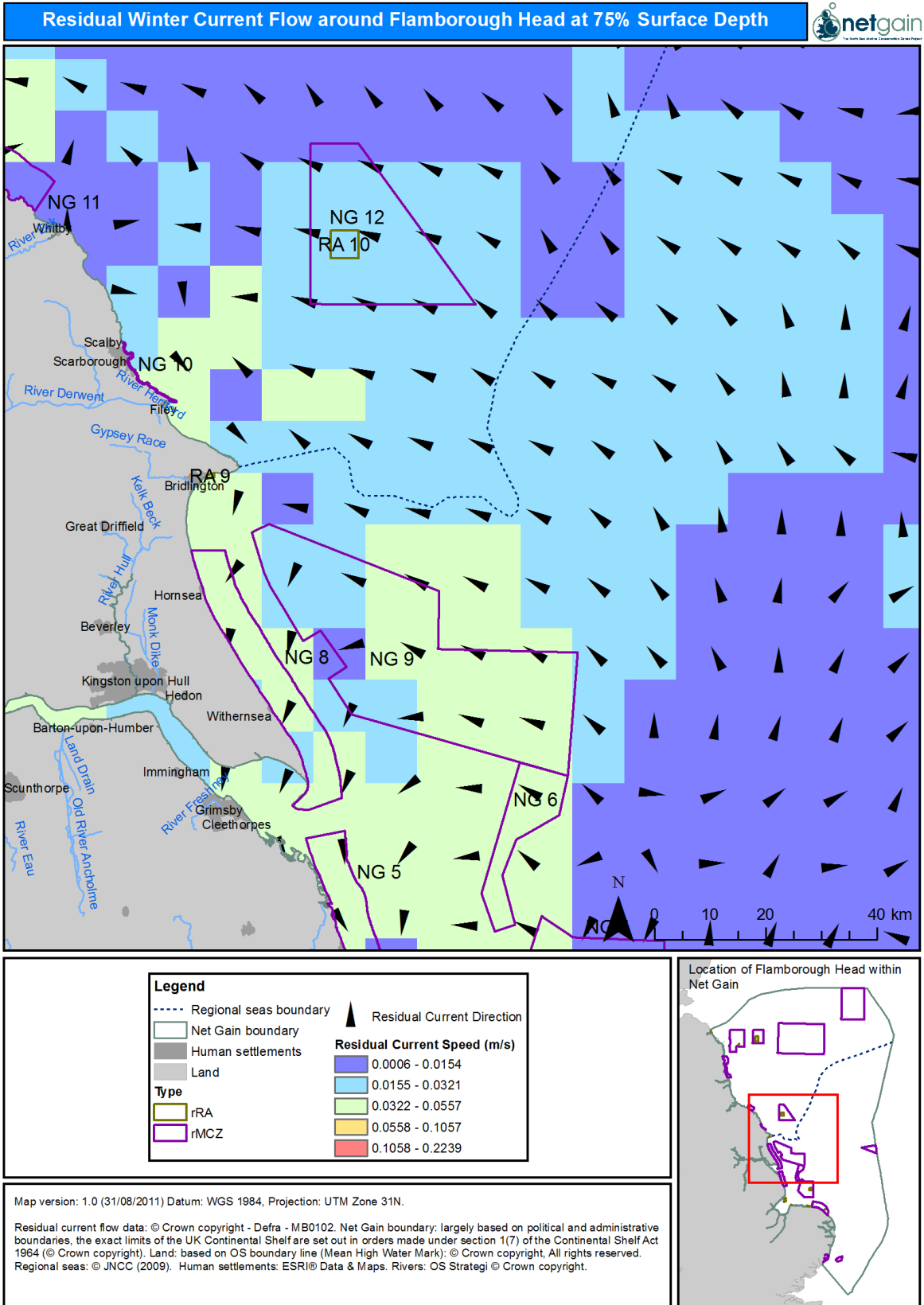
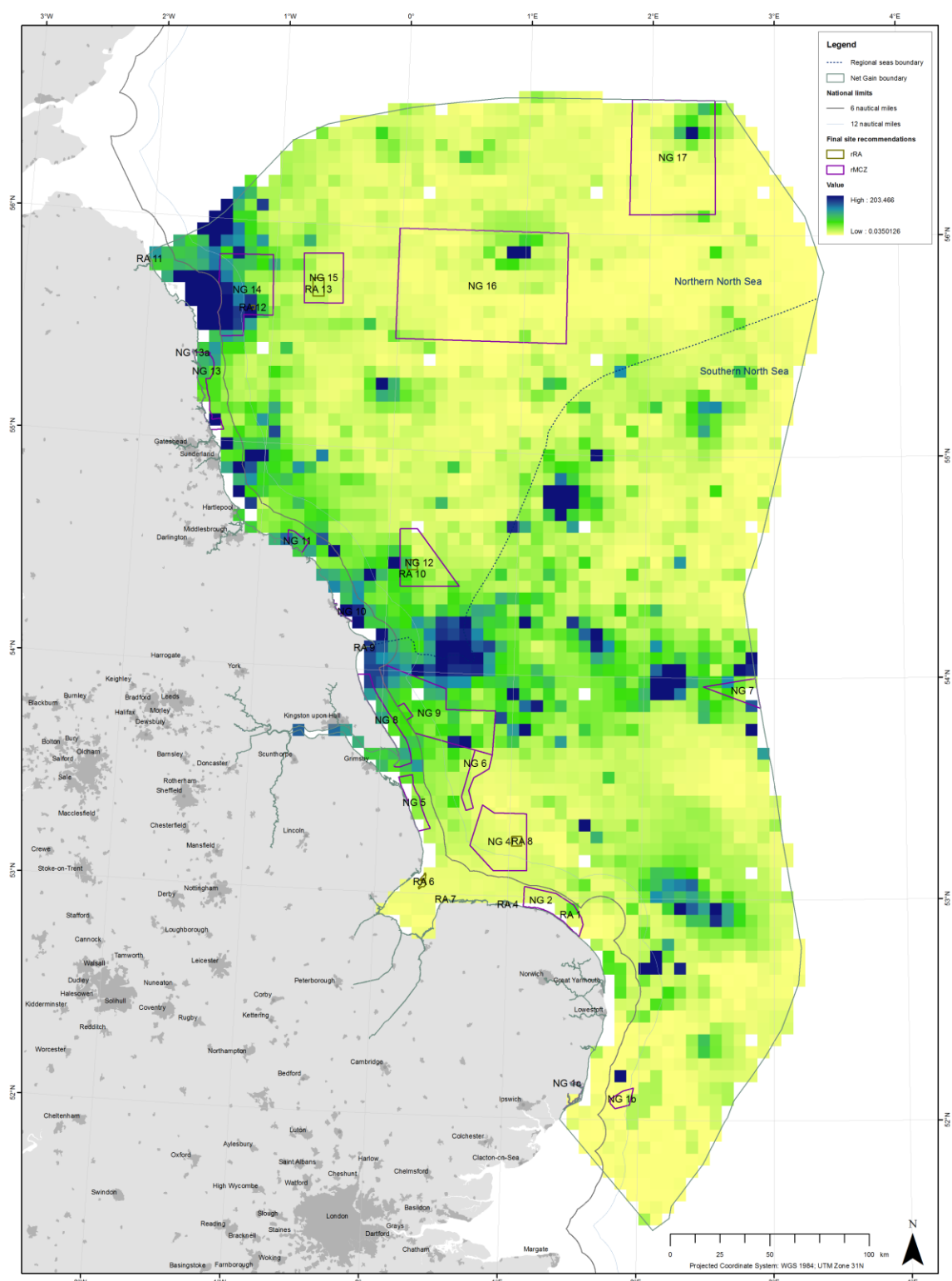


Figure 7.106 Residual winter current flow around Flamborough Heat at 75% surface depth

Seabird density: Breeding seasons



Seabird density data: JNCC. Net Gain boundary, largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark); © Crown copyright. All rights reserved. Regional seas: © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.107 ESAS Seabird density: breeding seasons

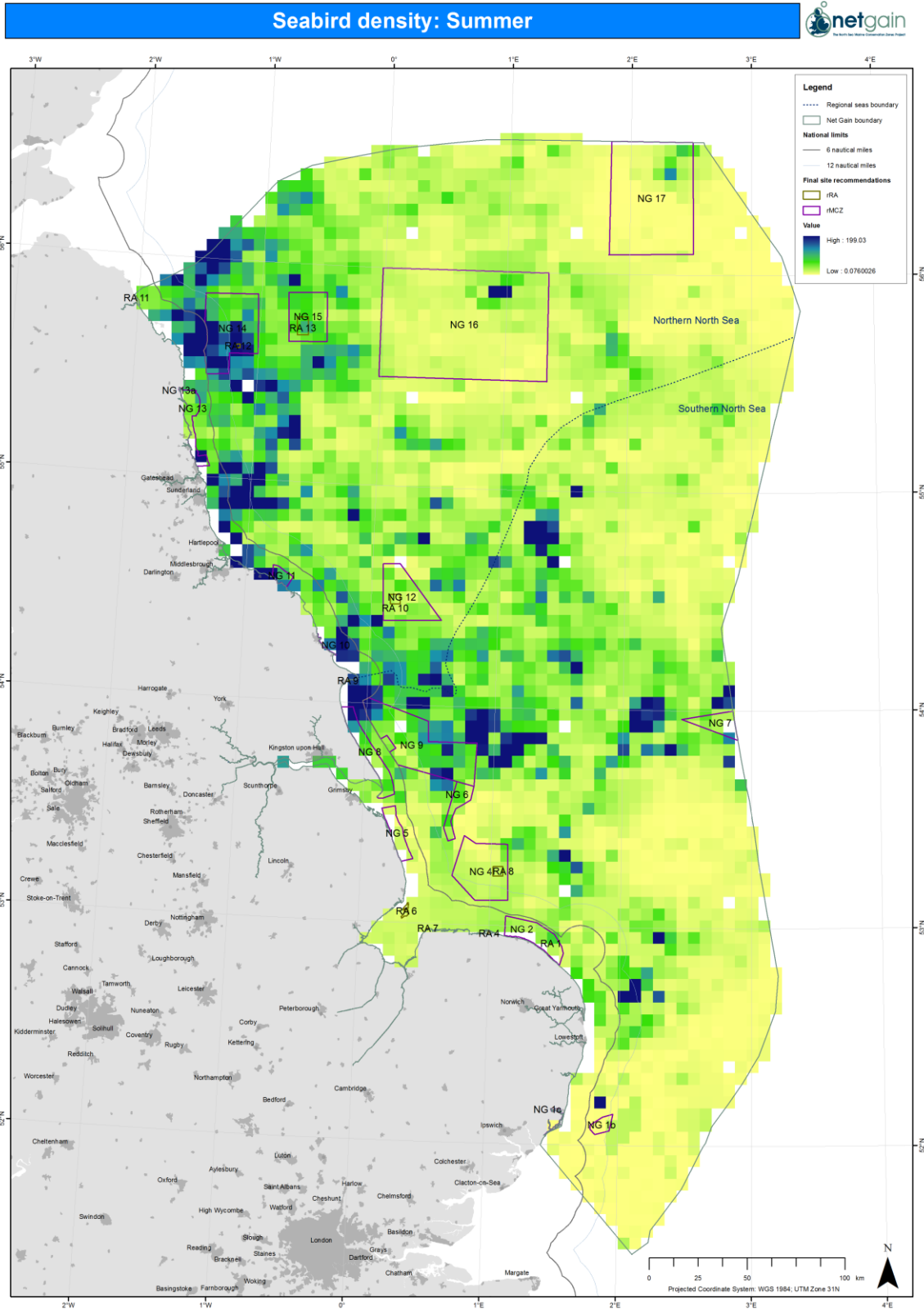


Figure 7.108 ESAS Seabird density: summer

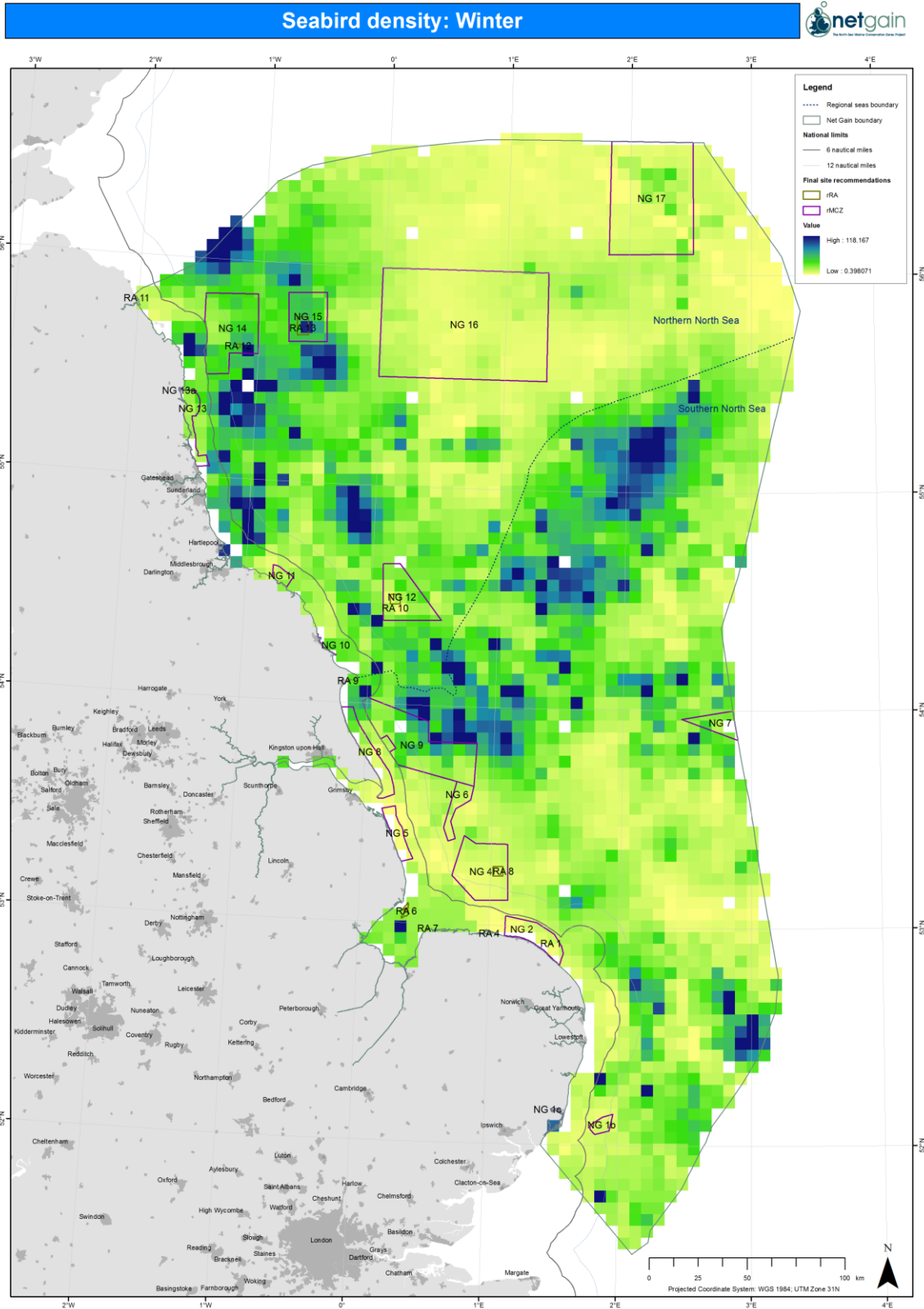
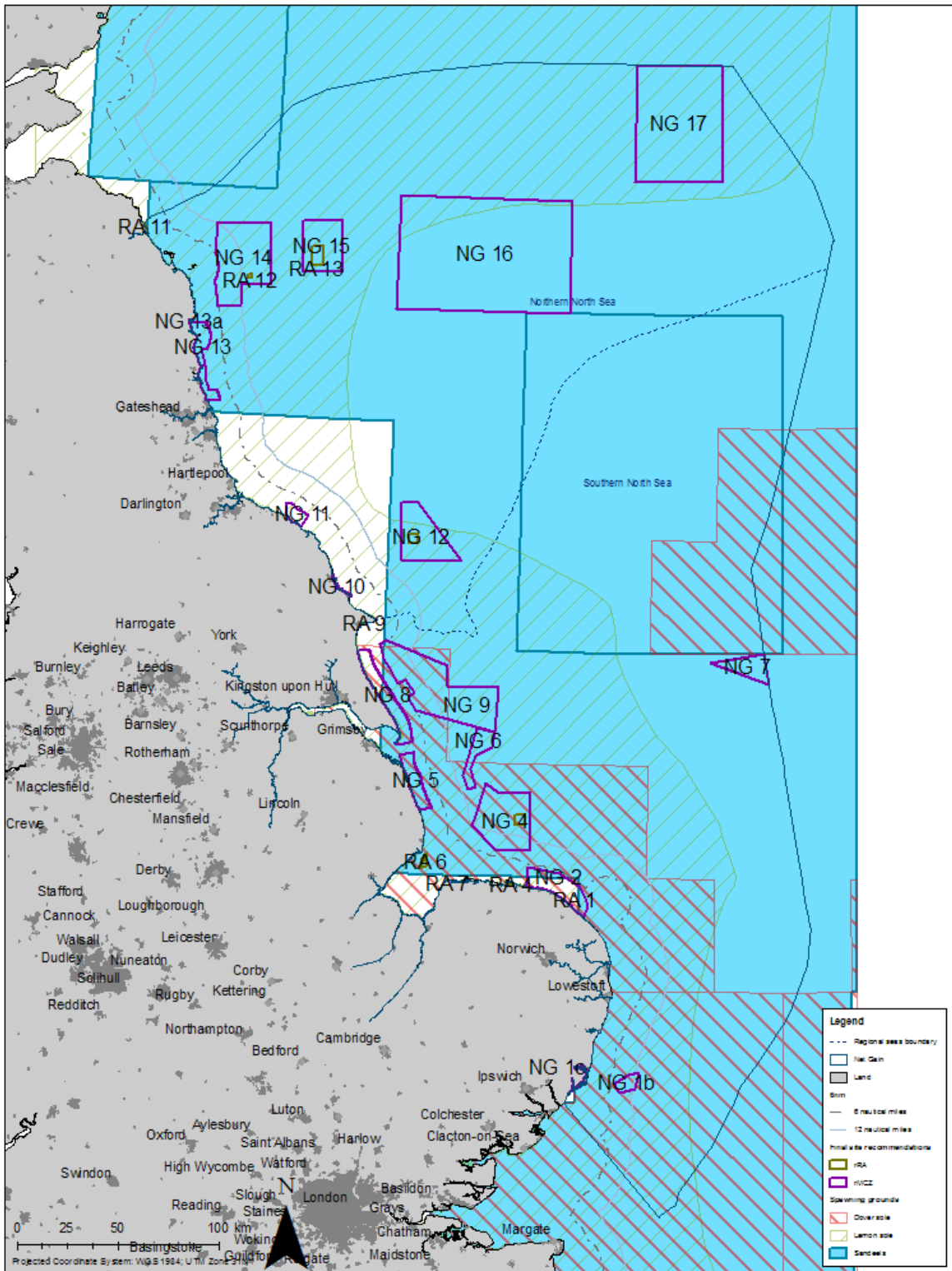


Figure 7.109 ESAS Seabird density: winter

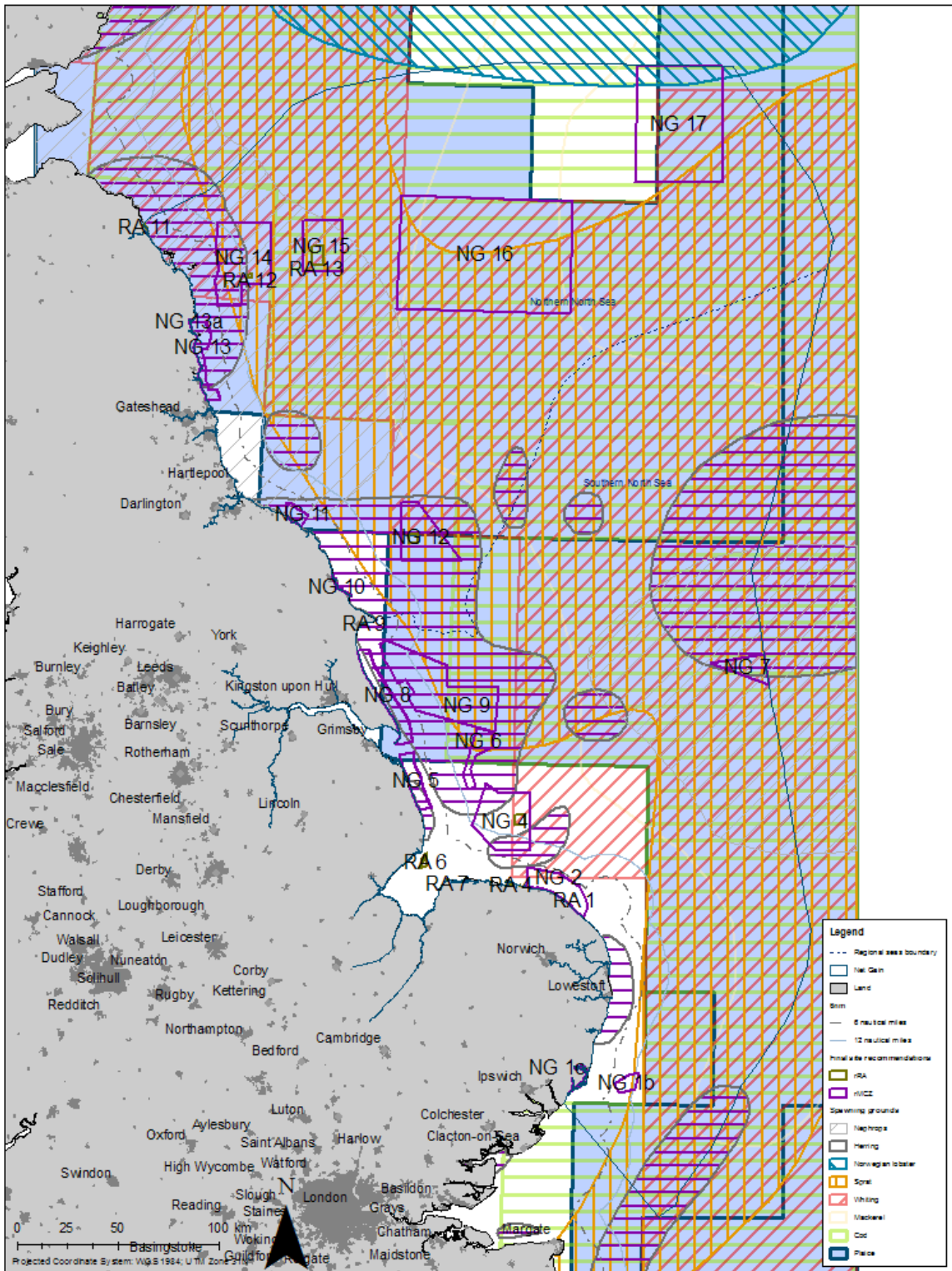
Species spawning grounds (Map 1)



Spawning data: Data collected in BE301. Net Gain boundaries largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land based on OS boundary line (Mean High Water Mark) © Crown copyright. All rights reserved. Regional seas: © JNCC (2009). Regional seas: © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: EBR8 Data & Maps.

Figure 7.110 Spawning grounds (Map 1)

Species spawning grounds (Map 2)



Spawning data: Data collected in BE301. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark) (© Crown copyright). All rights reserved. Regional seas: © JNCC (2009). Regional seas: © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRB Data & Maps.

Figure 7.111 Spawning grounds (Map 2)

Site boundary

The offshore site was developed from the original site NG 2.16 from the 2nd iteration. At the time of the 3rd iteration the Regional Hub members suggested altering the western boundary to remove a section as adequacy targets had been met. During March/April Regional Hub meetings the north eastern boundary was altered to remove areas of high fishing intensity, as again adequacy targets were met. The boundary of the site now encompasses the moderate energy circalittoral rock with a buffer around it to allow for uncertainty of the exact extent of the feature.

Conservation objectives

Table 7.92 Conservation objectives for site NG 12, A4.2: Moderate energy circalittoral rock

Conservation Objective												
1 Maintain/ recover	Moderate energy circalittoral rock on exposed rocky headlands and coastlines mainly on the south west and west coasts of Britain and Ireland and northeast England. Subject to natural change, recover the Moderate energy circalittoral rock to favourable condition by 2020, and maintain thereafter, such that the:											
2 Attributes and parameters (indicated by *) of feature	<p style="text-align: center;"><u>Habitat</u></p> <p>the</p> <ul style="list-style-type: none"> • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* <p>representative of Moderate energy circalittoral rock in the biogeographic region are recovered, such that the feature makes its contribution to the network.</p>											
Advice on operations												
3 Pressures	<p>Moderate energy circalittoral rock is sensitive to the pressures:</p> <table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">Pressure</th> <th style="text-align: left;">Sensitivity</th> <th style="text-align: left;">Confidence</th> </tr> </thead> <tbody> <tr> <td>Physical loss (to land or freshwater habitat)</td> <td>H</td> <td>L</td> </tr> <tr> <td>Physical change (to another seabed type)</td> <td>M-H</td> <td>L</td> </tr> </tbody> </table>	Pressure	Sensitivity	Confidence	Physical loss (to land or freshwater habitat)	H	L	Physical change (to another seabed type)	M-H	L		
Pressure	Sensitivity	Confidence										
Physical loss (to land or freshwater habitat)	H	L										
Physical change (to another seabed type)	M-H	L										

	Physical removal (extraction of substratum)	M-H	L
	Removal of non-target species (lethal)	M-H	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M-H	L
	Siltation rate changes (high)	M-H	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M-H	L
	Salinity changes - local	L-H	L
	Surface abrasion: damage to seabed surface features	L-H	L
	Siltation rate changes (low)	NS-H	L
	Temperature changes - local	NS-H	L
	Water clarity changes	NS-H	L
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	L
	Removal of target species (lethal)	NS-M	H
	Wave exposure changes - local	NS-M	L
	Wave exposure changes - regional/national	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

This site does not overlap with any present MPAs. rRA 10, recommended for the protection of moderate energy circalittoral rock, lies within the site boundaries.

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The site received good support from the two groups that reviewed it at the Large Group meeting (both groups scoring it as '3'), reflecting the consensus achieved at previous Regional Hubs. Within the groups there was a balance of views. Whilst, for example, the French fishing representative was strongly against the site - because the French fleet trawl there - it was recognised that other options for sites for the same (moderate energy circalittoral rock) feature would be likely to be more contentious.

Views on confidence in the underlying data were more polarised with one group scoring it 'L' and the other 'H'. One group commented that they had low confidence in the data, and were not sure if the moderate energy circalittoral rock is where it is said to be. The renewables sector may be undertaking some survey work in the area (in relation to a possible cable route) which may provide additional information. This would be of particular value in supporting the designation of the Reference Area within the site (rRA10).

The expected level of contention was felt to be moderate to high, but would be dependent on the management measures that are ultimately introduced. The NFFO pointed out that any management restrictions at the site would be likely to affect the fishing activities of the international fleets – and particularly highlighted negative implications of the associated recommended Reference Area 10.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- French commercial fishing sector:- Strongly against
- RSPB:- Not against the site but only low level of support
- The Crown Estate:- Accept – assumption that there will be no additional EIA requirements on renewables projects due to rMCZ designation
- The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement

The location of this site has undergone much debate during Regional Hubs with respect to adjusting boundaries to include the Flamborough-Helgoland frontal feature. The discussions are summarised below, and are also available in full within previous iteration reports and the Draft Final Recommendations.

Some of the Regional Hub members expressed concern in making late changes to site boundaries, particularly given that consensus had been reached on the current location. It was noted that the current recommended site location included good biodiversity and the available GIS data shows that the Flamborough-Helgoland Front is, in part, included in this area, although the feature moves beyond suggested site boundaries. The NFFO also noted that the Dogger Bank (pSAC) area also captures some of the frontal system, as do sites NG 7 and NG9.

If the site were to be moved further south to accommodate more of the front, there would likely be a higher socio-economic impact, as there is higher fishing activity in the area to the south of NG 12 correlating with the frontal systems. South of the proposed location, there is also less of the moderate energy circalittoral rock habitat present; the very feature for which this site was proposed, and therefore it would be less likely that the adequacy target would be met. It was also noted that stakeholders had less confidence in the available data further south.

Net Gain suggested that there was no consensus within the room to support the site being moved. It was noted that the NGOs requested the site be moved to cover the Flamborough Front area but the balance of the stakeholders present did not support it being shifted southwards. The discussions were concluded with an agreed consensus not to shift the site southwards.

Subsequently The Wildlife Trusts and MCS representatives asked for the following comments to be recorded:

1. The representatives were incredibly unhappy regarding discussions around NG 12:
 - They had repeatedly asked the group to consider the Flamborough Front feature to the south of this site;
 - Having received SAP advice the group had insufficient opportunity to use it due to lack of wider stakeholder support; and
 - This demonstrates the difficulties experienced in incorporating science into this process.
2. All seabed features should have 'recovery' as a conservation objective or no ecological improvement will be noted in condition of the BSH.
3. All seabed features are vulnerable to mobile fishing gear that targets seabed species.

Table 7.93 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
European seabirds at sea (ESAS)	Modelled data	Kober, et al. 2010
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010
Residual current flow	Modelled data	Lambkin, et al. 2009
Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

DAUNT, F., BENVENUTI, S., HARRIS, M.P., DALL'ANTONIA, L., ELSTON, D.A. & WANLESS, S. (2002). *Foraging strategies of the black-legged kittiwake Rissa tridactyla at a North Sea colony: evidence for a maximum foraging range. Marine Ecology Progress Series. 245: 239-247.*

FISHERIES AGENCY, (1998). *Fisheries Sensitivity Maps in British Waters. Edition 1.*

HILL, A.E., JAMES, I.D., LINDEN, P.F., MATTHEWS, J.P., PRANDLE, D., SIMPSON, J.H., GMITROWICZ, E.M., SMEED, D.A., LWZA, K.M.M., DURAZO, R., FOX, A.D. & BOWERS, D.G. (1993). *Dynamics of tidal mixing fronts in the North Sea. Philosophical Transactions: Physical Sciences and Engineering. 343(1669): 431-446.*

JONES, L.A., COYLE, M.D., EVANS, D., GILLILAND and, P.M. & MURRAY, A.R. 2004a. *Southern North Sea Marine Natural Area Profile: A contribution to regional planning and management of the seas around England. Peterborough: English Nature.*

JONES, L.A., DAVIES, H., COYLE, M.D., EVANS, D, GILLIAND, P.M., IRVING, R. & MURRAY, A.R. 2004b. *Mid North Sea Marine Natural Area Profile : A contribution to regional planning and management of the seas around England. Peterborough: English Nature.*

KOBER, K., WEBB, A., WIN, I., LEWIS, M., O'BRIEN, S., WILSON, L.J., REID, J.B. 2010. *An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs. JNCC report No. 431.*

LAMBKIN, D.O., WAKELIN, S., HOLT, J., BELL, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Report No 9 task 2G. Residual current flow datalayer: Description of approach (Draft). ABP Marine Environmental Research Ltd.*

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5). JNCC.*

RSPB, 2010. *Species foraging ranges, mean, mean maximum and maximum, received from Martin Kerby 2010*

NATURAL ENGLAND, (2011). *Broad Habitats: Moderate energy circalittoral rock.* < <http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/mcz/features/broadhabitats/moderateenergycircalittoralrock.aspx> > Accessed 15/08/2011.

THE WILDLIFE TRUSTS. 2010. *Areas of additional pelagic ecological importance (APEI) data layer.*

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method.* ABP Marine Environmental Research Ltd.

East Meridian rMCZ no 29

Marine Conservation Zone : Selection Assessment Document

Version and Issue date	Amendments made
V1.0 07.09.11	Draft final recommendations refined by the RSG in July 2011 and finalised by the RSG 2/3 August 2011.

1. Site name East Meridian rMCZ no 29	3. Site surface area 40767 ha 407.67 km ²
2. Site centre location ETRS89 N50 33' 0.996" E0 16' 20.053" N50 33.017' E0 16.334' N.B. WGS 84 UTM 31N coordinates are provided in the map vertices)	4. Biogeographic region Eastern English Channel

5. Features proposed for designation within East Meridian¹

Feature type	Feature name	REC Broad-scale Habitats (L4/L3)	Area ²
REC Broad-scale habitat	A5.2 Subtidal sand	A4D.92 ME deep circalittoral rock and thin sands	128.37 km ²
		A5.27 deep circalittoral sand	
	A5.4 Subtidal mixed sediments	A5.45 deep circalittoral mixed sediments	279.36 km ²
		A4D.94 ME deep circalittoral rock and thin mixed sediments	
Habitat FOCI	Rossworm (<i>Sabellaria spinulosa</i>) reef		313.04 m ²
	Subtidal sands and gravels		253.64 km ²

6. Features within East Meridian not proposed for designation

Feature type	Feature name	Comment
Geology	English Channel Outburst Flood feature	Was not identified until after final RSG. As this makes up the majority of the site area, it would be a good site to protect the feature

¹ Sources of information relating to these features are listed in Section 13.

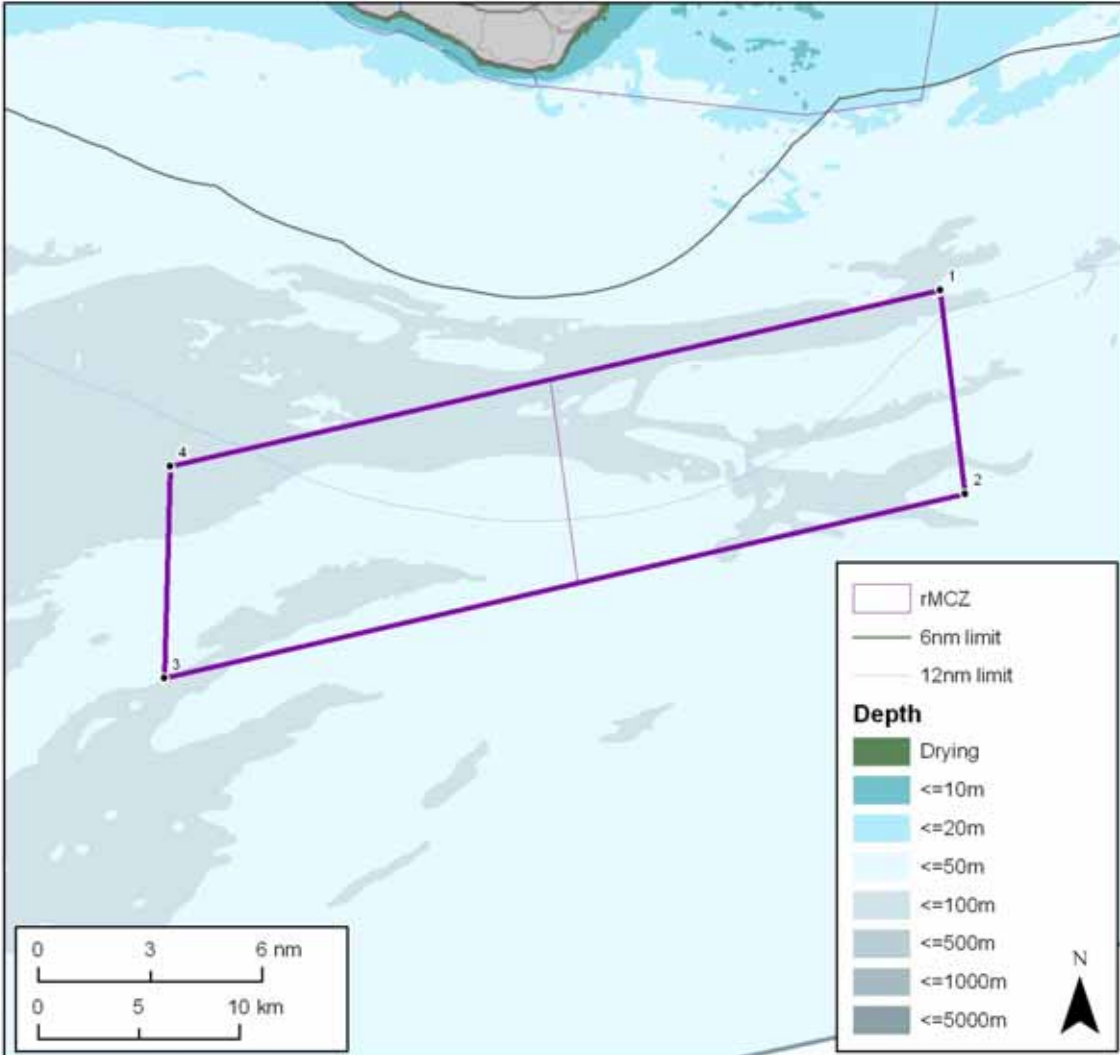
² Areas have been calculated according to spatial GIS data and are indicative only.

East Meridian rMCZ no 29

7. Map of site

East Meridian rMCZ no 29 Site Map

Version: 1.0
Date: Aug 2011



Boundary coordinates

ID	Degrees Minutes Seconds		Degrees Decimal Minutes	
	Latitude	Longitude	Latitude	Longitude
1	N50° 38' 33.533"	E0° 32' 1.871"	N50° 38.559'	E0° 32.031'
2	N50° 33' 7.052"	E0° 33' 22.702"	N50° 33.118'	E0° 33.378'
3	N50° 27' 23.332"	E0° 0' 3.193"	N50° 27.389'	E0° 0.053'
4	N50° 33' 5.163"	W0° 0' 3.142"	N50° 33.086'	W0° 0.052'



Map and coordinates displayed in WGS84, UTM Zone 31 North.

©OpenStreetMap 2010, ©Ordnance Survey 2010, ©JNCC 2009, ©UK Hydrographic Office 2011 ©Crown Copyright 2009.
NOT TO BE USED FOR NAVIGATION.

8. Site summary

This site lies within the inner English Channel shipping lane, just to the east of the Greenwich Meridian line of longitude, and directly south of Beachy Head. Lying over the Northern Palaeovalley and Palaeovalley Banks, which are the geological remnants of the deeper ancient river system, the seabed within the site is comprised of deep circalittoral rock overlain with a thin veneer of either sands or mixed sediments or areas of thicker sands and mixed sediments (See Broad-scale habitats and Geology maps, below.) The area is high in benthic species richness and benthic Chao 2 species richness, with pelagic data showing the north of the site is higher in biodiversity. Locating the site within the shipping channel has the advantage of reducing (relatively speaking) the amount of human activity that will be associated with the seabed, which, it is hoped, will increase the ecological recovery potential of the site for various marine communities. Two FOCI: Rossworm reef and subtidal sands and gravels are also proposed for protection (see FOCI map, below).

A site slightly to the northwest was proposed by the South East England Biodiversity Forum, in order to capture additional sediment targets, fine-scale habitat complexity and areas of high biodiversity. Following additional analysis by the project team on behalf of the RSG, this site was also suggested as the most biodiverse option for shortfall broad-scale habitat targets. Discussions with the RSG resulted in realignment of the site to capture the same amount of habitat but follow the shipping channel, in order to reduce the safety hazards that might be presented by a site straddling the traffic separation zones.

The site is the larger of two options in the same area, the options having been proposed as there is no support from UK and non-UK fishing sectors for this larger area, but some limited support for the smaller east half (rMCZ 29.2 East Meridian (Eastern Side)). The draft conservation objectives of the larger site have implications for benthic trawling which would need to be reduced and this is opposed; the issues will need to be addressed in the next stage, if this site goes, through as CFP processes will be involved because of the large amount of non-UK fishing in the site and further information is needed on activities, particularly scallop dredging. Subtidal sands and gravels were added as a feature at the last RSG meeting and await the vulnerability assessment. The geological feature was not identified in the site until after the RSG final meeting but is likely not to have additional implications for management if it were incorporated into the list of features for protection.

9. Detailed site description



The following is a description of the site based on extracts from literature held by the Balanced Seas Project and stakeholder correspondence. It does not constitute a complete literature review or ecological description of the site.

A proposal for a site in this approximate location was made in April 2011 by the South East England Biodiversity Forum (SEEBF) in order to meet shortfall subtidal broad-scale habitats, incorporate the finer-scale REC habitats of the Eastern English Channel Synthesis Study, include areas of high biodiversity, increase the average viability of sites in the region and improve the level of connectivity between them (SEEBF MCZ Proposal 18.04.2011).

During the RSG discussion (RSG Meeting 9A, May 2011), the location and shape of the site were adjusted in an attempt to meet similar levels of habitat complexity, biodiversity and connectivity, whilst minimising the overlap with some of the most heavily fished areas in the region. The site was thus reshaped to lie within the inner shipping channel (see Figure 1), as this was thought to naturally reduce the number of additional activities occurring in the vicinity. Furthermore, the Science Advisory Panel had encouraged the RSG to investigate placing MCZs in shipping channels, given that ecological benefits to fish stocks had resulted from other MPAs placed in similar locations.

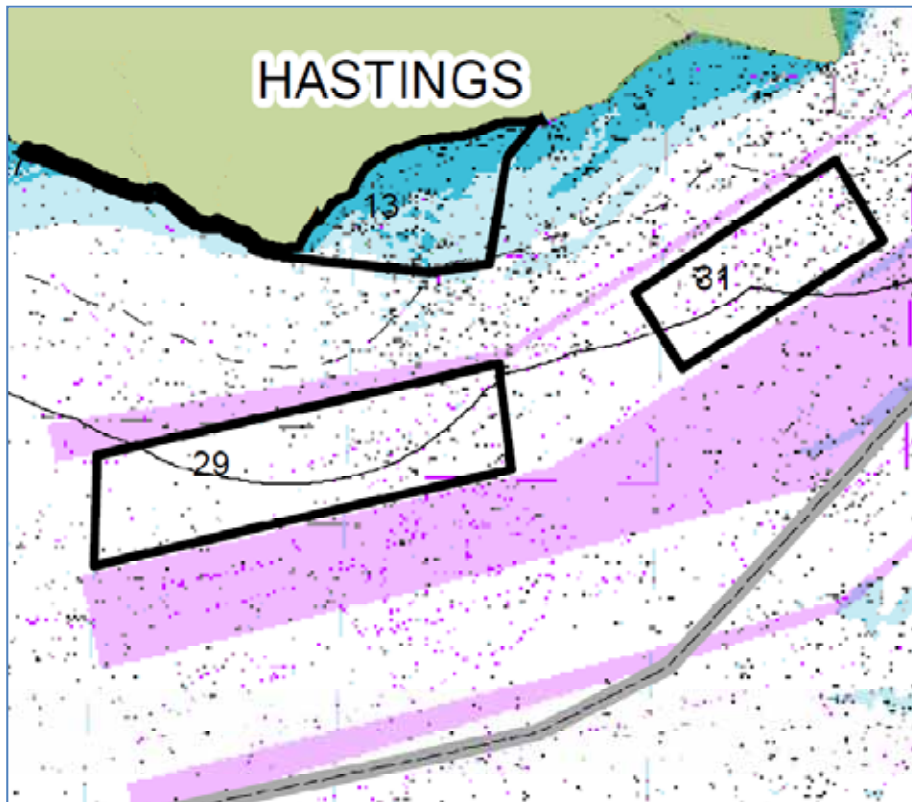


Figure 1. Positioning of rMCZ 29, 29.2 (separate boundary not shown) and rMCZ 31 in relation to the shipping channels and traffic separation marks (pink areas)

In its current location, using the UKSeaMap/MESH (v7 JNCC) EUNIS Level 3 habitat map, this rMCZ is made up of subtidal sand and subtidal mixed sediments (see Broad-scale habitats map). This EUNIS Level 3 habitat definition is the result of ‘back translating’ the reclassified finer-scale habitats from the MALSF-funded seabed surveys (REC data: James *et al.* 2010, 2011) into the broader ENG habitat classifications, which generally gives a coarser definition of the seabed³.

Data from the MALSF English Channel Synthesis Regional Environmental Characterisation data (REC, James *et al.* 2011), shows that the site consists of four finer-scale EUNIS Level 4 habitats, including both thick sediment depositions (where the site overlaps the palaeovalley) and areas of moderate energy circalittoral rock that is covered with a thin veneer of sands or mixed sediments (see REC EUNIS Level 4 map). National contract data (Seeley *et al.* 2010 DEFRA MB102 2C) show there is a record of Rossworm reef on the eastern boundary of the site and that subtidal sands and gravels occur across the southern half of the site. (see FOCI map). National contract biodiversity layers indicate that the southeastern quarter of the site overlaps an area recorded as supporting the region’s top 10% of Chao 2 species richness and while the southern half contains the top 25% of benthic species richness. The Environment Agency collated and analysed biotope data from grab sample and core sample records from various sediment surveys in the region, but samples from the site did not highlight particular richness. The site lies just outside the belt of highest pelagic richness just to the north of the site, where **thermal fronts are persistent** throughout the year) as shown in the national contract data for pelagic biodiversity. From the national contract data (Natural England, Brooks *et al.* 2009), the majority of the site’s seabed shows geomorphological evidence of the Eastern English Channel Outburst Flood, which occurred some 200,000 years ago when a huge glacial lake in the North Sea burst through the Dover Straits Isthmus which contained it, thus separating England from mainland Europe. Sonar evidence of the seabed reveals deeply gouged channels where the floodwaters broke through (Gupta *et al.* 2007).

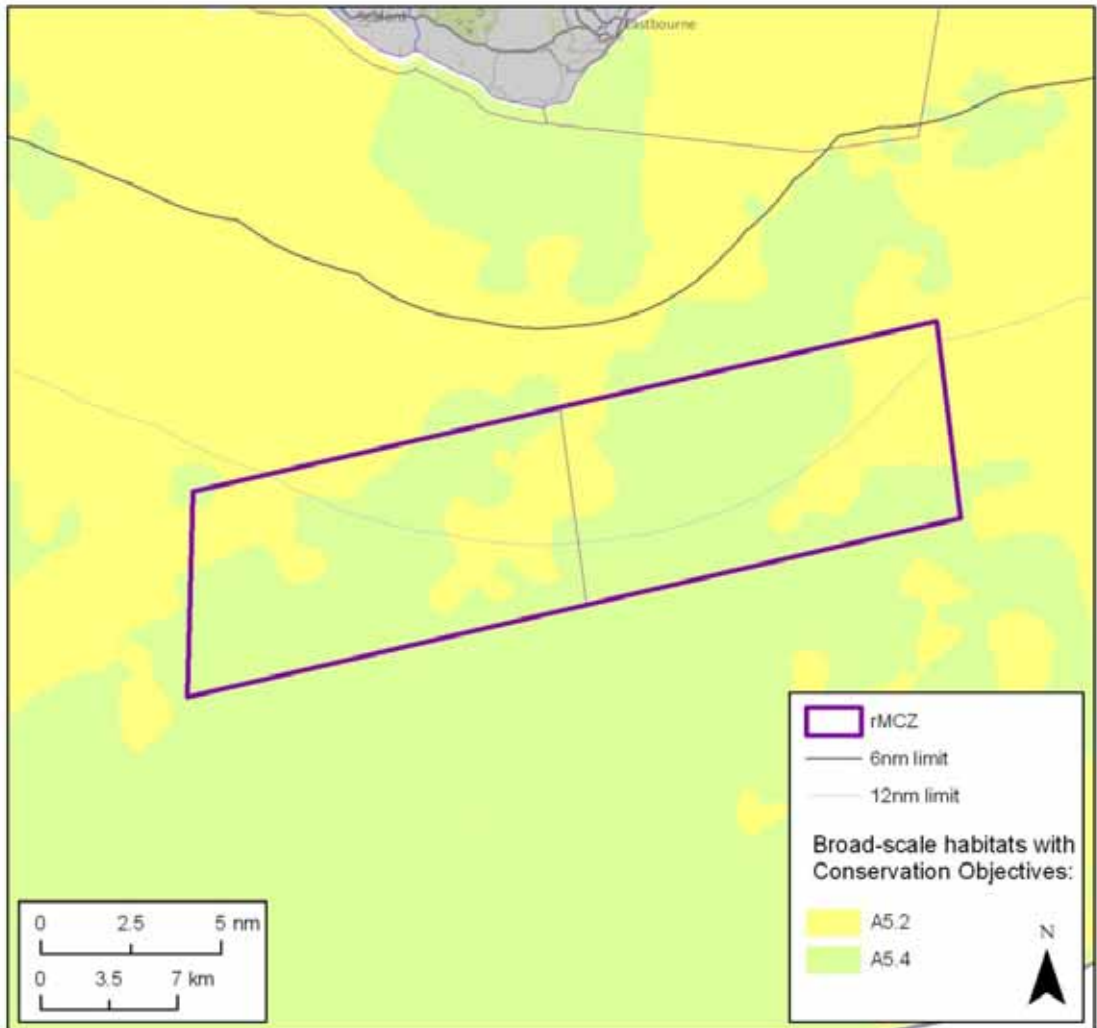
³ Please see the Final Recommendations report for a more detailed explanation of how these datasets have been used.

East Meridian rMCZ no 29

The presence of this feature was not recognised in time to allow stakeholder discussions to select it as a feature for protection should they have wished to. Since this is perhaps the site which captures the greatest extent of the feature in the Balanced Seas region, and the RSG have selected the feature in several other sites without adverse effects to any particular stakeholder sector, this feature could be considered for protection if the site goes forward.

East Meridian rMCZ no 29
Broad-scale habitats (EUNIS Level 3) with Conservation Objectives

Version: 1.0
Date: Aug 2011



Broad-scale habitats with Conservation Objectives:
- A5.2 subtidal sand
- A5.4 subtidal mixed sediments

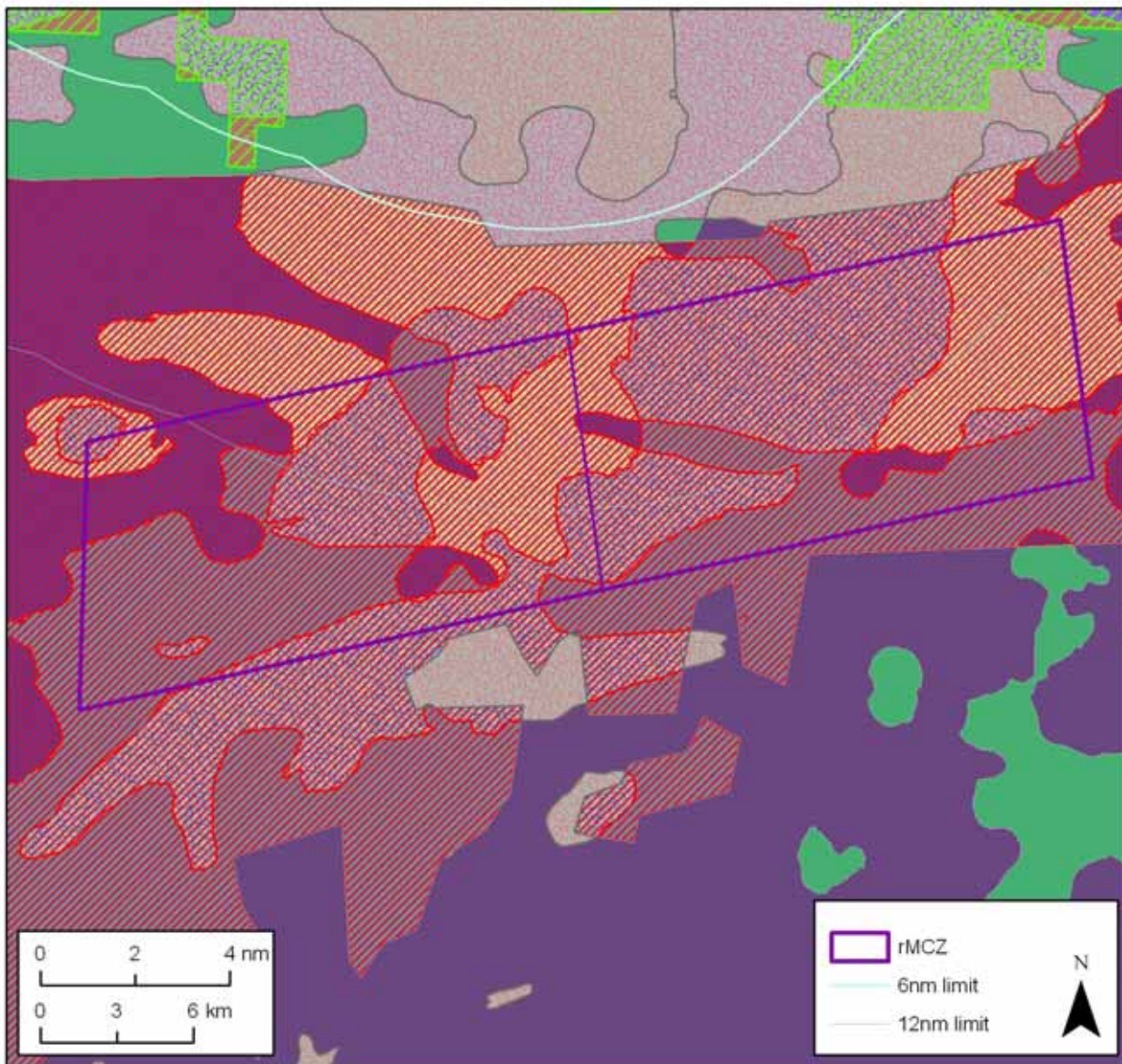


Map and coordinates displayed in WGS84, UTM Zone 31 North.
©OpenStreetMap 2010. ©Ordnance Survey 2010. ©JNCC 2009. ©Crown Copyright 2009.
NOT TO BE USED FOR NAVIGATION.





East Meridian rMCZ no 29

Version: 1.0
Date: Aug 2011

Broad-scale habitat (reclassified EUNIS Level 4 from REC data)



Broad-scale habitat (reclassified EUNIS Level 4 from REC data)

-  A4D 92 : Moderate energy deep circalittoral rock and thin sands
-  A4D 94 : Moderate energy deep circalittoral rock and thin mixed sediments
-  A5 27 : Deep Circalittoral sand
-  A5 45 : Deep circalittoral mixed sediments

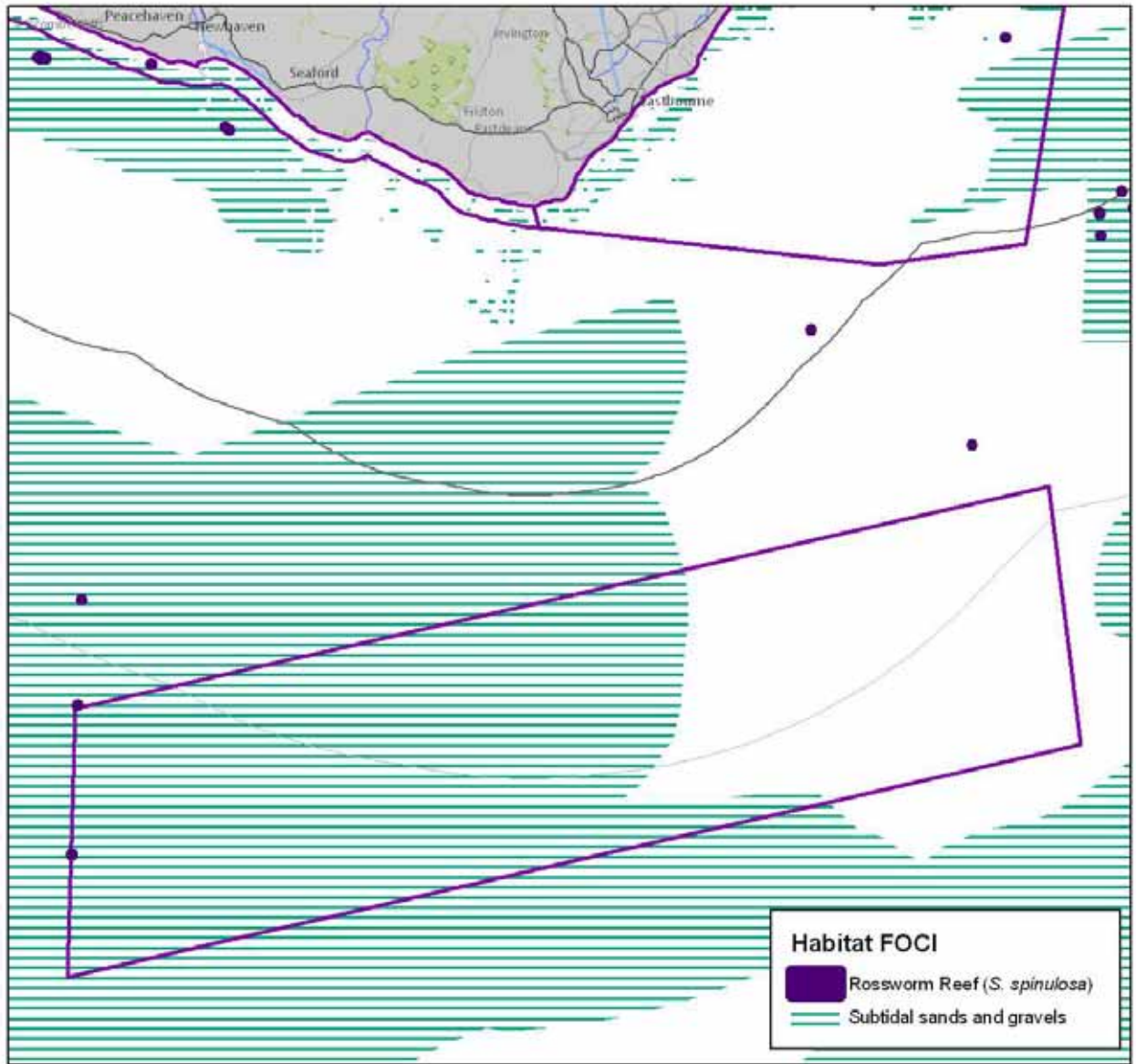


Map and coordinates displayed in WGS84, UTM Zone 31 North.
©OpenStreetMap 2010. ©Ordnance Survey 2010. ©JNCC 2009. ©Crown Copyright 2009.
NOT TO BE USED FOR NAVIGATION.

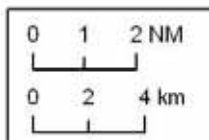
East Meridian rMCZ no 29

Version: 1.0
Date: Aug 2011

Habitat and Species FOCI with Conservation Objectives



IMPORTANT: Only those FOCI with conservation Objectives have been shown here. To see those FOCI that have not been proposed for designation, please look at Section 6.



Legend



Map and coordinates displayed in WGS84, UTM Zone 31 North.

©OpenStreetMap 2010. ©Ordnance Survey 2010. ©JNCC 2009. ©Crown Copyright 2009.
NOT TO BE USED FOR NAVIGATION.

East Meridian rMCZ no 29
Geology

Version: 1.0
Date: Aug 2011



Legend:

- rMCZ
- 6nm limit
- 12nm limit

Scale bars:

- 0 2 4 nm
- 0 3 6 km

North arrow (N)



Map and coordinates displayed in WGS84, UTM Zone 31 North.
©OpenStreetMap 2010. ©Ordnance Survey 2010. ©JNCC 2009. ©Crown Copyright 2009.
NOT TO BE USED FOR NAVIGATION.

East Meridian rMCZ no 29

10. Site boundary

The site boundary has been drawn to align with the shipping lane. The western boundary aligns with the Greenwich meridian line and the eastern boundary was drawn such that the site attained approximately the same area as the original SEEBF site had aimed to capture. It has been extended to the point at which the shipping lane alters course. The site lies partly within 6 naut mi and partly within the area 6-12 naut mi which has implications for management.

11. Conservation objectives

Individual conservation objective forms for each feature can be found in Appendix 1. For a site-based summary of the conservation objectives and proposed management measures, please see Section 15.

12. Sites to which this site is related

This site is not associated with any existing designation.

13. Supporting documentation (information relating to ENG features only)

Information	Type of information	Source	Name of survey	Date
Broad-scale Habitats	Modelled and survey data	JNCC V.7 Combined UKSeaMap and MESH	Multiple	June 2011
Broad-scale Habitats	Modelled data	MALSF REC	Synthesis study of Central & Eastern English Channel	2011
Subtidal sands and gravels	Survey	National contract data, DEFRA MB102 2C		Jan-Sept 2008
Rossworm (<i>Sabellaria spinulosa</i>) reef	Survey	Data sourced from Environment Agency database	Wide scale survey by CEFAS of English channel	2005
Rossworm (<i>Sabellaria spinulosa</i>) reef	Survey	Data sourced from Environment Agency database	South Coast REC	Jan 2006 – Jan 2008
Geology	Literature search	National Contract Data. DEFRA MB102 2A	Mapping of Geological and Geomorphological Features	2009

References (additional information can be found in the bibliography)

- BROOKS, A.J., ROBERTS, H. KENYON, N.H. & HOUGHTON, A.J. 2009. *Accessing and Developing the Required Biophysical dataset and Data Layers for Marine Protected Areas Network Planning and Wider Marine Spatial Planning Purposes. Report No 8 Task 2A: Mapping of Geological and Geomorphological Features*. DEFRA, London.
- GUPTA S, COLLIER J.S., PALMER-FELGATE, A. & POTTER G. 2007. Catastrophic flooding origin of shelf valley systems in the English Channel. *Nature*. 448 : 342-345
- JAMES, J W C, PEARCE, B, COGGAN, R A, LEIVERS, M. CLARK, R W E, PLIM, J F, HILL, J M, ARNOTT, S H L, BATESON, L, DE-BURGH THOMAS, A AND, BAGGALEY, P A. 2011. The MALSF synthesis study in the central and eastern English Channel. British Geological Survey Open Report OR/11/01. 158pp. Published by MALSF.
- JAMES, J W C, PEARCE, B, COGGAN, R A, ARNOTT, S H L, CLARK, R W E, PLIM, J F, PINNION, J, BARRIO FRÓJAN, C, GARDINER, J P, MORANDO, A, BAGGALEY, P A, SCOTT, G, BIGOURDAN, N. 2010. The South Coast Regional Environmental Characterisation. British Geological Survey Open Report OR/09/51. 249pp. Published by MALSF.
- SEEBF MCZ proposal 18.04.2011. SEEBF Recommendation for an additional MCZ off the coast of Sussex
- SEELEY, B., HIGGS, S., LEAR, D., EVANS, J., NEILLY, M., CAMPBELL, M., WILKES, P., ADAMS, L., 2010. *Accessing and Developing the Required Biophysical Dataset and Data Layers for Marine Protected Areas Network Planning and Wider Marine Spatial Planning Purposes. Report No 16: Mapping of Protected Habitats (MB102 Task 2C)*. DEFRA, London.

East Meridian rMCZ no 29

14. Stakeholder support for the site

The RSG as a group reached consensus that this site should be put forward in their final recommendations.

Individual sectors wishing to note their support or concerns about the site recorded the following at the final RSG meeting in August 2011. Note that these comments must be read in association with the description of the option for this area: rMCZ 29.2 East Meridian (eastern side). Their comments have been transcribed verbatim from the form that they completed:

SECTOR	ORGANISATION	COMMENT for East Meridian rMCZ 29
Yachting	RYA	Stronger support for 29.2 only.
Kite Surfing	British Kite Surfing Association	Confidence higher for 29.2 than 29, however as 29.2 is less contentious there would be a higher chance of designation if this was the only site available. 29 as a whole will more than likely be rejected for high opposition.
Sea Angling		29.2 East Meridian has more support from the offshore fleet, not a lot of interest to RSA.
Fisheries	Local Representatives	29 No support. 29.2 Least worst option. Low support.
Fishing - FPO, beam trawling	South West Fisheries Producer Organisation	29 No support for any of this site, extremely contentious, for UK and foreign interests. 29.1 No support. 29.2 Some support for this area by UK and French, if SW corner of this area is taken out.
Birds	RSPB	East Meridian - support larger site rather than 29.2 because larger site captures more biodiversity and smaller site doesn't get full support from all sectors.
Wildlife Trusts	Hampshire Wildlife Trust	I support the full 29 above the reduced 29.2, with the recovery CO. This site has already been moved for socioeconomics.
Marine Wildlife	Marine Conservation Society	<u>Support site</u> . Recover CO for all broadscale habitats to recover from bottom towed fishing.
French Fishing industry	CRPMEM Nord - Pas de Calais / Picardie	We are strongly against this site, very important for the French fleet (trawling and dredging activity from Boulogne-sur-Mer and Dunkirk (40-45 vessels) and from Haute Normandie). Option 29.2 is clearly better but still impacting the fleet from Boulogne-sur-Mer. In the Conservation Aims paper (version 1 August 2011), you have to add "the Dutch, Belgian, UK and French fishing fleets strongly oppose this site". My sector can support the 29.2's area option but cannot absolutely support the 29.1. A lot of scallops dredgers (about 40) used to fish between February to May in this area
Dutch fishing industry	VisNed	1. Strongly opposed. 2. See 9.

15. Site summary of conservation objectives (COs) and proposed management measures

A conservation objective (CO) is a statement describing the desired quality of the feature. Existing MPAs in the UK use the term *Favourable Condition* to represent the desired state of their features. Some pressures caused by human activities may stop the feature attaining favourable condition if present at sufficient intensity.

MAINTAIN means that, the *stated levels of activity* currently occurring on the feature are considered acceptable, but features will be monitored and restrictions may have to be introduced if the condition declines.

RECOVER means that restrictions may be necessary on the activity causing the pressure, in order to allow the feature to recover to favourable condition. It does not necessarily mean that the activity will be prohibited,

East Meridian rMCZ no 29

as other mitigation measures might be appropriate (e.g. change in gear type, reduction of intensity, seasonal restrictions, etc)

The table below documents the draft COs for ALL the features listed for protection within the site, as established by JNCC and NE through the Vulnerability Assessment (VA) process⁴ and then sense-checked at the national level⁵. Where a RECOVER objective is noted, the associated activity causing the pressure is indicated. In some cases, where information and data warrant it) the RSG chose to adopt the changes to COs recommended by the public authorities: Inshore Fisheries and Conservation Authorities (IFCAs), Marine Management Organisation (MMO), Environment Agency (EA) or Natural England. Changes were only accepted when recommended by these authorities and have been clearly noted. Where the VA has not yet been undertaken, or there is considerable uncertainty surrounding the accuracy of the information being used to recommend a change to the conservation objective, it has been noted as 'TO BE ASSESSED'. Local and regional stakeholders were given the opportunity to comment on the COs and potential management measures and to provide additional information that might not have been taken into account in the VA work.

NB: Due to the structure of information used in the Vulnerability Assessment for offshore sites, in this site the RECOVER CO for *benthic trawling is likely to include shellfish harvesting in the form of scallop dredging*. The demersal fishing activity layer did not differentiate between bottom trawls and dredges and so RECOVER should be applied to both activities. Further analysis will be conducted on the breakdown of activity to inform the Impact Assessment.

Feature	Draft CO	Activity Exerting Pressure	MMO Comments	Stakeholder comments
A5.2 Subtidal Sand	RECOVER	Fishing - benthic trawling (bottom gear)	From 6-12 nm, would be Prohibition Order and CFP agreement Beyond 12nm would be CFP alone	
A5.4 Subtidal mixed sediments	RECOVER	Fishing - benthic trawling (bottom gear)	From 6-12 nm, would be Prohibition Order and CFP agreement Beyond 12nm would be CFP alone	
Rossworm (<i>Sabellaria spinulosa</i>) reef	RECOVER	Fishing - benthic trawling (bottom gear)	From 6-12 nm, would be Prohibition Order and CFP agreement Beyond 12nm would be CFP alone	
Subtidal sands and gravels	Not assessed	This feature was not discussed in the time available, but was noted as a question mark in the list of features for protection. Given that it represents a very similar habitat type to the existing broad-scale habitats for protection, it has been included in this list by default, but no vulnerability assessment has been undertaken. However, discussions with NE suggest that the conservation objectives are likely to be the same as above.		
English Channel Outburst Flood Feature	Not assessed	This feature was not discussed by the RSG. Further stakeholder discussion would be necessary to include this feature if it presented socio-economic implications		

16. Evolution of the site

In April 2011 the South East England Biodiversity Forum (SEEBF) proposed a site in this general area in order to meet shortfall subtidal broad-scale habitats, incorporate the finer-scale REC habitats of the Eastern

⁴ The process of establishing conservation objectives is outlined in the [Conservation Objectives Guidance](#) (JNCC /NE 2011)

⁵ VA results were standardised across all four regional projects but the fisheries activity data is still undergoing assessment.

East Meridian rMCZ no 29

English Channel Synthesis Study, include areas of high biodiversity, increase the average viability of sites in the region and improve the level of connectivity between them (SEEBF MCZ Proposal).

During stakeholder discussions in RSG 9A (May 2011), the location and shape of the site were adjusted in an attempt to meet similar levels of habitat complexity, biodiversity and connectivity, whilst minimising the overlap with some of the most heavily fished areas in the region. The site was thus reshaped to lie within the inner shipping channel, as this was thought to naturally reduce the number of additional activities occurring in the vicinity, and because the Science Advisory Panel had encouraged the RSG to investigate placing MCZs in shipping channels, given the ecological benefits to fish stocks that had resulted from other MPAs placed in similar locations.

The SAP's feedback on the Draft Final Recommendations said that it would be acceptable to decrease the amount of some of the subtidal broad-scale habitats included provided the minimum targets were still met (they suggested 2% over the minimum target would be acceptable) where improved seabed habitat data (i.e. REC data) had been used and if by doing this, it would improve key stakeholder support for individual sites and the network as a whole. Using this rationale, the RSG discussed reducing the area of this site at its meeting in July 2011. However, different fishing sectors were impacted by different areas of the site, and the group could not agree on a single option that suited all sectors. The RSG thus proposed three options – the full site; the western half; and the eastern half– with the suggestion that the Impact Assessment should demonstrate the different socio-economic impact of each option. At their final meeting (2/3 Aug 2011), the RSG determined that only two options were necessary for the final recommendations as there was no support for the third. The two options are: the full extent (rMCZ 29) and the smaller eastern half (rMCZ 29.2, see the separate site sheet).

17. Implications for stakeholders

The issues associated with this site are:

- The location of this site is very close to the Rampion wind farm which increases the area of seabed that will be effectively off limits to the trawling sector
- Despite the fact that the Fisheries Minister has gone on record to say that any fisheries restrictions will apply to both UK and international fleets equally, the UK fishing fleet have stated that they will not support offshore sites located between 6-12 nautical miles because there is a possibility that UK vessels will be unfairly disadvantaged if sites are designated through UK legislation prior to being agreed through the Common Fisheries Policy.
- UK fishing fleet use this area intensely, particularly the western half, and feel that their support would increase if 29 were dropped and replaced by 29.2. Scallop dredging is important in the site, as well as trawling.
- The French and Belgian fleets also use this area intensely but seasonally, and the French Normandy fleet have stated that they would prefer this site to be replaced with 29.2.
- The Crown Estate accepts the site but has noted that it overlaps with a high value aggregates region and is within 1km of two marine aggregate prospecting areas (though these have been confirmed as relinquished by the BMAPA representative, RSG 9A July 2011). The site also contains active and inactive telecoms cables.

This list represents only the major issues associated with the site. To see all stakeholder discussions, please refer to the Balanced Seas RSG and Local Group meeting reports at www.balancedseas.org.

II.3.30 South-East of Falmouth rMCZ

Basic site information

Site centre location (datum used: ETRS89):

Decimal Degrees		Degrees Minutes Seconds	
Lat	Long	Lat	Long
49.9830	-4.7143	49° 58' 58" N	4° 42' 51" W

Site surface area: 25 km² (calculated in ETRS89 – LAEA)

Biogeographic region:

JNCC regional sea: Western Channel and Celtic Sea

OSPAR region: Region II: Greater North Sea

Site boundary: The site is a simple square, with borders running north-south and east-west, measuring 5km on each side in line with ENG guidelines. The north-west corner of the rMCZ intersects with the 12nm limit, the remainder of the site lies beyond 12nm.

Sites to which the site is related: The site lies approximately 22km south-west of the Fal and Helford SAC.

Maps of the site are included at the end of this site report. The main site map shows points with coordinates along the site boundary (in WGS84 UTM30N).

Features proposed for designation within South-East of Falmouth

Table II.3.30a Draft conservation objectives for South-East of Falmouth rMCZ. M = maintain in favourable condition, R = recover to favourable condition. This is an extract of the conservation objective summary tables in section II.2.6. **The full text of the draft conservation objectives can be found in appendix 15.**

Broad-scale habitats	Subtidal coarse sediment		R
	Subtidal sand		R

The following tables show ENG-related statistics for this site, reported from spatial data available in Finding Sanctuary’s GIS datasets. Greyed out rows indicate features for which GIS data exists within the site boundary, but which have not been included on the list of draft conservation objectives (the reasons are stated in table footnotes).

Table II.3.30b **Subtidal broad-scale habitats** recorded in this rMCZ, based on an analysis of Finding Sanctuary’s EUNIS level 3 broad-scale habitat GIS data (see appendix 8). Data sources: 1 - UKSeaMap, 2 - MESH, 3 - Environment Agency.

Habitat	Area covered within rMCZ (km ²)	% of total in study area	Source(s)
Subtidal coarse sediment	24.35	<0.1%	1
Subtidal sand	0.69	<0.1%	1

Table II.3.30c **FOCI habitats** recorded in this rMCZ, based on an analysis of Finding Sanctuary’s amalgamated GIS FOCI datasets (see appendix 8). Data sources: 1 - MB102; 2 - JNCC/ MESH Canyons survey data; 3 - ERCCIS/Isles of Scilly Wildlife Trust; 4 - DORIS.

Habitat	Area covered (km ²)	Number of point records (total)	Number of point records (pre-1980)	Source(s)
Subtidal sands and gravels ¹	21.01			1

¹ Conservation objectives have not been included for subtidal sands and gravels as we have considered any conservation requirements met by listed broad-scale habitats.

For additional understanding on how this site is located in relation to environmental data layers, including areas of high benthic biodiversity, offshore bird aggregation areas, or areas of seasonal sea surface temperature fronts, please refer to the interactive PDF maps presented alongside this report.

Site summary

The site is located in an area of **seasonal frontal systems**, which means the area has high productivity and scores highly as an area of additional ecological (pelagic) importance (see AAEI map, FR_081). The area is heavily used by fishermen, in particular, mobile benthic and pelagic gear fishermen. The site’s seabed is approximately 70 metres below chart datum.

Detailed site description

A literature search was carried out on this site, but as for other for non-coastal sites in the network it has proved difficult to find information associated with this specific site.

Poulton *et al.* (2002) In Jones *et al.* (2004) describe the offshore sediments around the coast of Britain which included the English Channel. The consequences of a changing climate have been relatively well documented in the English Channel for fish, plankton and intertidal benthos (see, for example, Genner *et al.* 2004; Hawkins *et al.* 2008). During the 1950s, Norman Holme sampled benthic infaunal and epifaunal communities on a large geographical scale spanning the entire English Channel (Holme, 1961, 1966). Part of Holme’s benthic survey was revisited in 2006, covering a large extent of the Channel coast (Hinz *et al.* 2011). The main aims of this resurvey were to describe the current status of benthic communities and compare the data to the historic survey to investigate potential changes in the communities. Comparison of the 1950s and 2006 surveys showed benthic species distributions remained similar, in general, with little or no obvious trends consistent with warming sea temperatures.

Benthic biodiversity and seabed sediments derived from cluster analysis of presence/absence data was carried out by Rees *et al.* (1999) in the general area around South-East of Falmouth. It may be that this work overlapped the rMCZ, but further checks need to be made.

Site narrative: Assumptions and Implications

As explained in part I, the stakeholder narrative is a vital underpinning of the site recommendations. Working assumptions and implications are presented here, and additional comments are presented in the following section.

The following fundamental assumption was recorded to apply to all activities in all sites: **The fundamental assumption about human activities within MCZs is that activities can continue (under current licensing regimes where applicable), as long as they do not prevent the conservation objectives from being achieved.** This assumption applies to all activities.

Table II.3.30d shows more specific working assumptions and implications that were recorded for this site over the course of the planning process. This site was a relatively late addition to the network (it was added after the third progress report). Most of the detailed work on recording assumptions and implications for the sites within the developing network configuration had already taken place before this site was added. Therefore, some of the content of table II.3.30d is based on what had previously been recorded for a previous, larger site that had been included in the developing network configuration in the area, and which was replaced by two smaller sites, South-East of Falmouth rMCZ and South of Falmouth rMCZ, following Local Group and fisheries sector feedback. The previously stated assumptions were implicit in the discussions over whether the site should be added to the network or not. Many of the assumptions and implications highlighted for this site are generic, and will apply to other rMCZs in the network as well. Site-specific comments from the later planning meetings (when the site was within the network) have also been added to the table.

Following that, table II.3.30e shows the vulnerability assessment (VA) snapshot for this site. The VA meetings took place at the end of the project, and they did not involve the Steering Group. They started to discuss site management, but did not reach any firm conclusions. The VA snapshot table reflects the point that the VA discussions had reached at the time of the last Joint Working Group meeting in May 2011. Many Steering Group members expressed concerns about the VA process and its outcomes (see section II.2.1 for full details).

Table II.3.30d Specific assumptions and implications relating to South-East of Falmouth rMCZ. Black text reflects the working assumptions and implications recorded throughout the planning discussions. The development of the narrative recorded in black can be traced back through the Working Group and Steering Group meeting reports from 2009 to 2011. Red and green text in the first column comments on how the snapshot of the vulnerability assessment (VA) relates to each of the working assumptions that had been made as planning took place (refer to part I for a full explanation of the VA snapshot). This site has been recently added to the network (after the third progress report). No detailed assumptions were drawn up by the working groups & project team for this site specifically.

Activities assumed to not be allowed within the site	
Assumptions	Implications
Bottom-towed fishing gear will not be allowed (includes benthic trawling and hydraulic dredging) This activity was discussed in the VA meetings, and the assumption was confirmed.	Direct implications: <ul style="list-style-type: none"> o Loss of ground for bottom-towed gear fishermen, both UK and non-UK (Mobile benthic fishing does occur in the area, which is deemed important for scalloping and beam trawling. However, this rMCZ was selected by the Working Groups out of several building blocks in the area, as it was deemed the least contentious to the fishing industry and it was recognised that a protected area is required in this area in order to meet the Ecological Network Guidance). o Displacement of bottom-towed gear o Increased competition for fishing grounds o Reduced diversity and flexibility of fishing o Cumulative impact on bottom-towed gear fleet where protected areas are close together o No tow zones will be inundated with pots and static gear

	<p>and cause difficulties for sea anglers. (This comment was recorded during one of the early planning meetings. Several stakeholder representatives have since stated that the comment is unrealistic.)</p> <ul style="list-style-type: none"> o The SW Fishing Industry MCZ Planning Group notes significant concerns over this site given the importance of the fishing grounds in this area. o Potential environmental implications derived from concentrating effort in alternative grounds or due to new fishing ground searching activity. <p>Benefits:</p> <ul style="list-style-type: none"> o Protection of areas of high pelagic interest will increase ecological value of network
<p>Aggregate extraction will not be allowed</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o Aggregate dredging can only occur where the mineral resources are geologically located – in highly localised and discrete areas. If aggregate operations are not allowed in MCZs (subject to appropriate monitoring, mitigation and management), and MCZs coincide with aggregate resource, then this will have significant impact on national construction aggregate supply and coast defence. <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o If aggregate operations (subject to appropriate monitoring, mitigation and management) are restricted in areas adjacent to an MCZ, then this will have significant impact on national construction aggregate supply and coast defence.
<p>Anchoring of large vessels will not be allowed (except in emergencies)</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o There is a general right of anchoring as a consequence of, and incidental to, the Public Right of Navigation.
<p>Dumping and disposal will not be allowed. That includes dumping of fish waste, munitions, or dumping of waste from dredging</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o

Activities assumed to possibly need restricting (limiting or mitigating) within the site or parts of the site.	
Assumptions	Implications
<p>Static fishing gear will be permitted, but there may need to be a limit on the amount of static gear used in the area.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o No tow zones will be inundated with pots and static gear and cause difficulties for sea anglers (This comment was recorded during one of the early planning meetings. Several stakeholder representatives have since stated that the comment is unrealistic.) <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o Local Group feedback indicated that some Local group members thought that mitigation measures should be put in place to prevent bycatch in static nets, including regulation of when and how nets are set. Other Local Group members indicated that bycatch of birds was not a problem in set nets in this area. The protection of birds is not currently included in the developing conservation objectives for this site. o Static gear fishermen might face possible additional costs for mitigation measures, should they be needed o There would be costs if monitoring is needed
<p>Sewerage disposal, industrial and agricultural liquid discharges will be permitted with management / mitigation</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Aquaculture of fin fish and shell fish will be permitted with mitigation / management</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o

<p>Crab tiling / bait digging will be permitted with mitigation / management</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Beach replenishment will be permitted with mitigation / management</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>The installation, operation and maintenance of renewable energy devices will be permitted</p> <p><i>Based on SAP feedback the assumption cannot apply to all sites in the network, although it can apply to any given site on its own.</i></p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o The MCZ designation may mean that additional management requirements are defined for renewable energy developments. This could result in: <ul style="list-style-type: none"> - additional costs to the renewables industry, e.g. for licensing mitigation and monitoring - delays to renewables development - delays, lost revenue and additional costs associated with cable repair activity restrictions o Attracting the funding (for development) may be harder in the first place as sites with MPA designations within them will be less attractive to potential investors o Costs and delays associated with co-location of renewables in MCZs, could result in long term implications in terms of renewables deployment which could have serious implications for industry and Government in terms of loss of operational revenue and missing EU climate change targets. o Enforced co-location with MCZs would dramatically restrict deployment. <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o If co-location assumptions are not correct the impacts would/could be: site locations that can't be developed, increased costs (the implications could be re-routing of cables around a feature could cost an additional £600,000 -

	<p>£1.3m/km depending on cable type, size and seabed geology), construction delays, failure to meet renewables targets, impacts on acidification, additional monitoring requirements, increased uncertainty and declining investor confidence in renewables activities.</p> <ul style="list-style-type: none"> o Increased competition for sea space with other sea users. o Potential longer term wave resource area, but navigational constraints significant.
--	--

Activities assumed to be allowed to continue / occur within the site	
Assumptions	Implications
<p>Handlining (recreational angling and commercial handlining) will be permitted. Handlining includes sea angling and trolling.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o Handliners might face possible additional costs for mitigation measures, should they be needed o There would be costs if monitoring is needed <p>Benefits:</p> <ul style="list-style-type: none"> o Potential for increased and enhanced leisure and recreational activity
<p>The installation and maintenance of cables will be permitted and will not be made prohibitively expensive within the site. This applies to power cables (including cables for renewable energy devices), and telecommunications cables.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <p>Given this assumption there are still the following concerns:</p> <ul style="list-style-type: none"> o Cable installation cost increases and delay o Cable repair cost, delays and lost revenue could increase due to activity restrictions on cable repair. o There is no definition of what ‘prohibitively expensive’ means; the cables representative would like assurance that no additional cost will result from MCZ designation (beyond costs associated with existing management and mitigation requirements). <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o For renewables/power cables, re-routing of cables around a feature or site might mean longer cable routes, at a cost of £600,000 - £1.3 million/km depending on cable type, size and seabed geology. o There may be other costs, e.g. costs associated with licensing, mitigation measures and monitoring requirements. o Increased licensing requirements and costs of cabling may have serious implications for industry and Government in terms of loss of operational revenue, missing EU climate

	<p>change targets etc.</p> <ul style="list-style-type: none"> o Possible cable route to renewables resources.
<p>The operation of cables (power and telecommunications) and pipelines will be permitted (i.e. any existing cables will be allowed to stay operational)</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Tourism and recreational activities will be permitted.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Maintenance dredging in ports (to enable access to ports) will be permitted</p> <p><i>The project team have advised that this would mean that the dredged areas of seafloor could not be counted towards ENG targets.</i></p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Anchoring for maintenance and access for licensed visitors to heritage wrecks will be permitted</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o (No heritage wrecks currently present in the site)
<p>Anchoring of small vessels will be permitted</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o

<p>There isn't a clear, agreed Working Group definition for what constitutes a 'small vessel'.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o No clear working group definition exists of what counts as a 'small' vessel - 24m was proposed some time ago by the RYA, but no decision was reached as to whether we would adopt that size in MCZ planning.
<p>Passage of ships will be permitted</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Seaweed harvesting will be permitted</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o

Table II.3.30e VA Snapshot table: This table records the point which the vulnerability assessment discussions had reached regarding site management, at the time of the final Joint Working Group meeting in May 2011. The outcome is not definitive, and the VA did not carry out an exhaustive review of all the working assumptions recorded in the longer table above. The Steering Group were not directly involved in the VA discussions, and at their final meeting, expressed considerable reservations about the VA outcome (see section II.2.1). The reason this VA snapshot table is included here is so that readers have a record of what the VA snapshot was showing at the time the final stakeholder comments were recorded for this site. For a full explanation of the VA snapshot, please refer to part I. The maps in appendix 13 show a visual representation of the information in all the VA snapshot tables in the rMCZ site reports.

Sector	Potential Management
<p>Commercial Fishing – all mobile bottom gears</p>	<p>Management:</p> <ul style="list-style-type: none"> - Prohibition of fishing within the rMCZ <p>Measure:</p> <ul style="list-style-type: none"> - Common Fisheries Policy

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

The most significant uncertainty faced by the project was the lack of knowledge on management of MCZs, and this uncertainty still applies to all rMCZs in the network. There was uncertainty over what activities will be affected by MCZ designations: what activities will be permitted to continue within

(or near) MCZs, what activities will not be permitted, and what activities will require mitigation or some form of restriction other than a complete ban. There was also uncertainty over what measures will be taken to ensure any activity restrictions are put in place (e.g. byelaws, voluntary measures).

Additional comments

The following is a set of additional comments made by stakeholder representatives over the course of the planning work. Some of these comments were made specifically about this site, others were more generic comments which the project team consider to be relevant to this site.

- *Mobile bottom gear*
 - Seasonal closures are an inappropriate measure for benthic conservation.

- *General benefits of MCZs*
 - Some stakeholder representatives would like the following recorded and for these to be considered during the impact assessment:
 - Fisheries spill-over.
 - Improvements for the local economy.
 - Education opportunities.
 - Benefits to science.
 - Focus for voluntary groups.
 - Potential increase in the amount and quality of recreational activities (diving, sea angling, environmental tourism, etc).
 - The designation as an MCZ will be a selling point and will undoubtedly be used as an identifier to the area to highlight it as somewhere to visit.

- *Monitoring*
 - There are two main types of monitoring which will need to take place within rMCZs:
 - Monitoring the activities within a site and the various levels at which they are occurring.
 - Monitoring the ENG features for changes in condition.

- *Management measures*
 - Most of this rMCZ lies beyond the 12nm limit. For sites beyond 6nm, stakeholder representatives repeatedly voiced concern over how the activity of non-UK fishing vessels might be managed, and stated opposition to any unilateral measures that would apply to UK vessels only. At the time of the third progress report, we had received the following statement from the SNCBs and Defra: 'When considering the impacts of fishing restrictions on non UK vessels, it is the Government's intention that fishing restrictions will not be imposed unilaterally on UK vessels before they can be applied to equivalent EU vessels operating within the relevant areas. In the case of those EU fishing vessels with historic fishing rights in UK waters between 6 and 12 nm, Defra will negotiate with the relevant Member States and the European Commission before introducing byelaws, or orders that are applicable to all EU vessels, or seeking Common Fisheries Policy (CFP) regulation measures. Once introduced, these would apply to all EU vessels (including UK vessels) equally and at the same time.'

- **Reaction to the vulnerability assessment process and outcomes**
 - At the sixth Joint Working Group meeting in June 2011, the results from the regional vulnerability assessment (VA) discussions were presented to the group, as shown in table II.3.30e (the VA process is described in part I). This generated concern within the JWG, for two reasons. Firstly, several members of the group had serious misgivings over the outcome of the management discussions, especially with respect to those inshore rMCZs for which no management of bottom-towed mobile fishing gear was highlighted as necessary. Secondly, the group had serious misgivings about the process itself, from which they felt disenfranchised.
 - The Steering Group made a statement at their final meeting, articulating those concerns in more detail. They recommended that there should be a process that allows them to review potential management measures for MCZs, before public consultation. The full statement made by the Steering Group is in section II.2.1.

Levels of support

The network report (section II.2) includes a project team reflection on levels of support for the network recommendations as a whole, and the site specific reflection presented here should be read within the wider network context.

This rMCZ is located within a region that has high pelagic productivity, and which is heavily fished by static and mobile gear fishermen, both UK and non-UK. There is strong gear conflict. Fishing representatives are not supportive of this site, but find this rMCZ less bad than a larger area that was included in this region previously (see third progress report). The rMCZ is strongly supported by conservationists, as it lies within an area of additional ecological importance because of its high productivity and **seasonal frontal systems**. The current rMCZ (together with the South of Falmouth rMCZ) represents the outcome of a genuine negotiation between conservation and fishing interests, where both sides have gained and lost – fishermen would have preferred no rMCZs at all in this area, and conservationists would have preferred the larger area previously included in the developing recommendations.

The Crown Estate provided feedback to state that they were supportive of this rMCZ. Early Local Group feedback indicated that this area was preferred to other alternatives containing the same broad scale habitats, and it was considered the ‘least bad’ option in that area.

Supporting documentation

GIS data used for reporting the quantitative habitat and species figures in the tables above includes the following sources: UKSeaMap modelled broad-scale habitat data, and **MB102**. Refer to appendix 8 for details, and to the tables above for data sources for specific features in this site.

Further evidence underpinning the site can be found in the publications and datasets referred to in the detailed site description.

Site map series

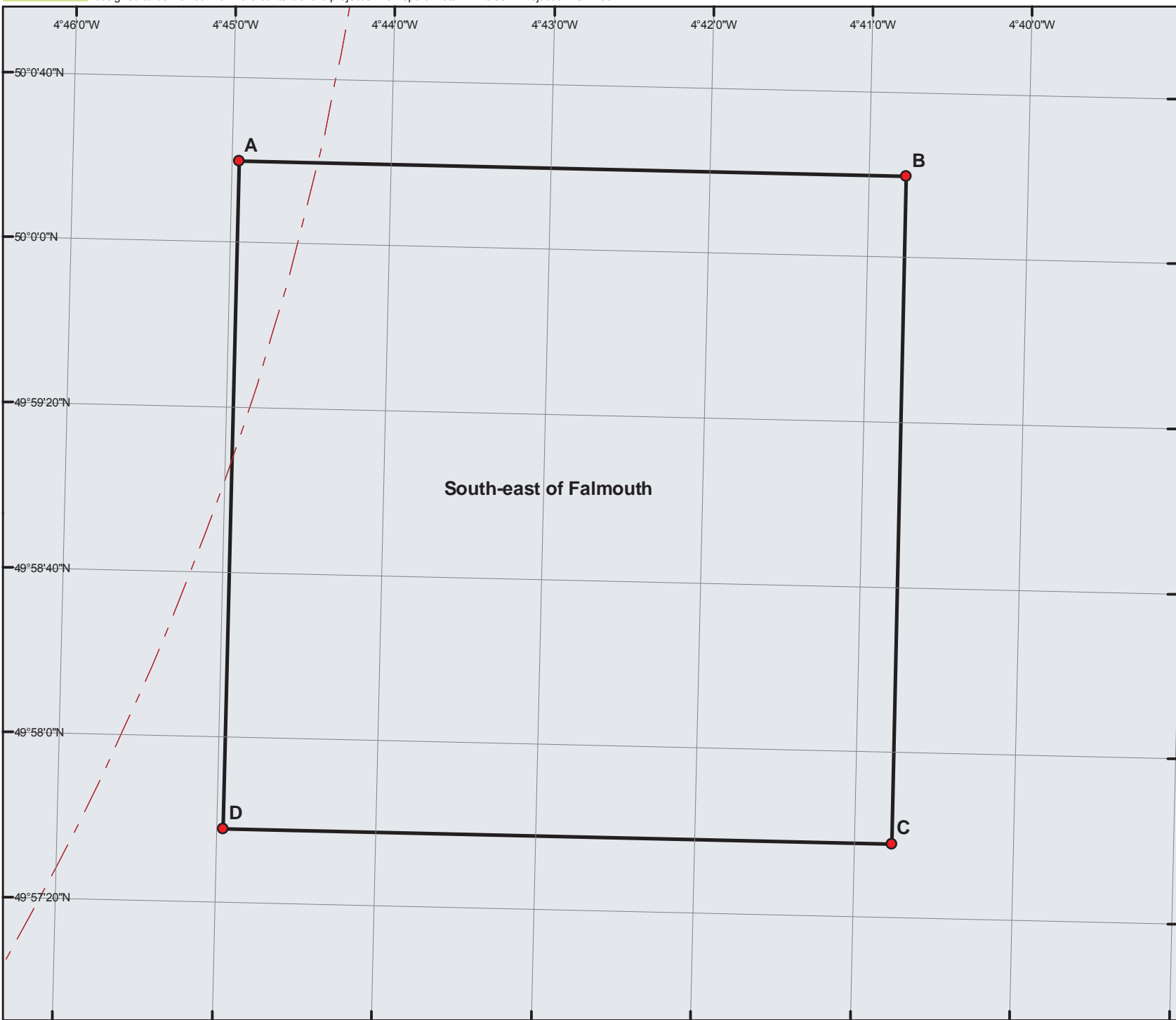
On the following pages there are two maps of this site.

- The first map (FR_042a) is the main site map showing the rMCZ boundary and includes points with coordinates (in WGS84 UTM30N). The map also shows charted depth and

existing Marine Protected Areas for reference. Please note: the lat/long coordinates of the vertices in the following maps have been calculated in decimal degrees, and in degrees, minutes and seconds. For plotting on a standard Admiralty (UKHO) chart, the seconds of each coordinate need to be converted to decimal. An MS Excel table showing all coordinates in degrees, minutes and decimal seconds has been provided in the additional materials section (see Appendix 14) for plotting purposes.

- The second map (FR_042b) shows the rMCZ boundary over broad-scale habitats, and records of habitat and species FOCI. The data shown on this map corresponds with the information in table II.3.30b, data sources are indicated in the table.
- Because of the large number of features shown on the site maps (especially inshore biophysical maps), it has not been possible to embed comprehensive legends within the site maps themselves. A comprehensive map legend is therefore provided in appendix 7, which explains the symbology used on all the maps within this final report.
- Appendix 8 describes the data sources for the information shown on the final report maps in detail.

This is one of a series of maps showing Finding Sanctuary's final MCZ recommendations, designed to be viewed within the context of the project's final report. Datum: WGS84. Projection: UTM30N.



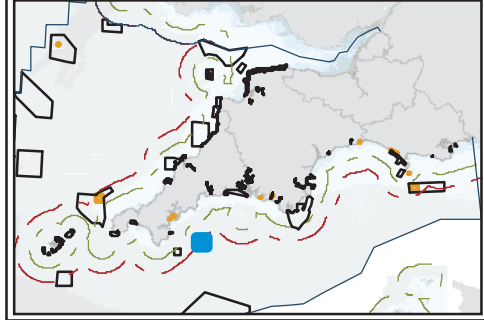
Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	50.0055	-4.7492	50° 0' 19" N	4° 44' 57" W
B	50.0055	-4.6794	50° 0' 19" N	4° 40' 46" W
C	49.9605	-4.6794	49° 57' 37" N	4° 40' 45" W
D	49.9605	-4.7492	49° 57' 37" N	4° 44' 57" W

Map Legend

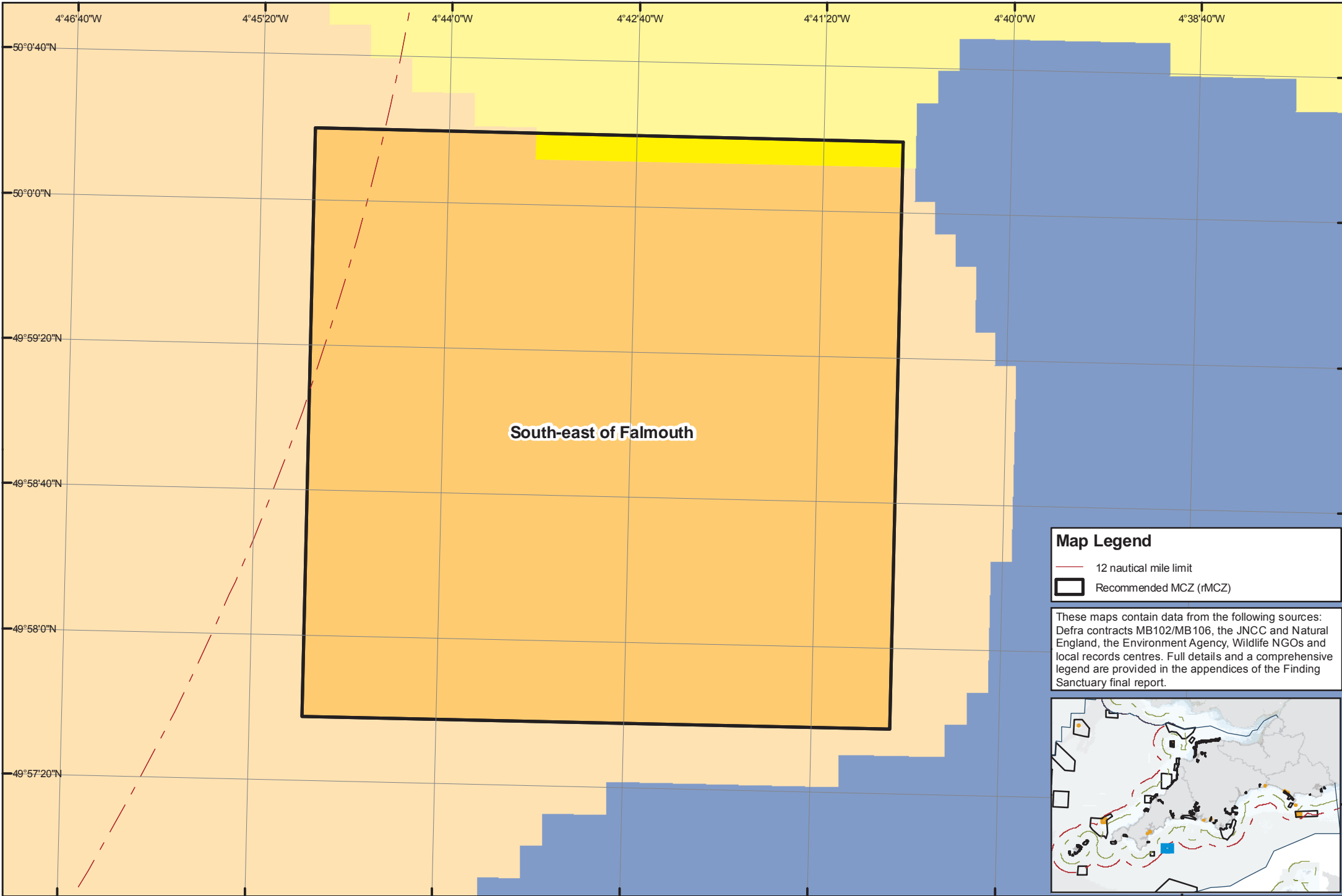
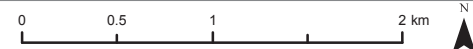
- 12 nautical mile limit
- Recommended MCZ (rMCZ)

A comprehensive legend is provided in the appendices of the Finding Sanctuary final report.





This is one of a series of maps showing Finding Sanctuary's final MCZ recommendations, with biophysical information. It is designed to be viewed within the context of the project's final report. Datum: WGS84. Projection: UTM30N.

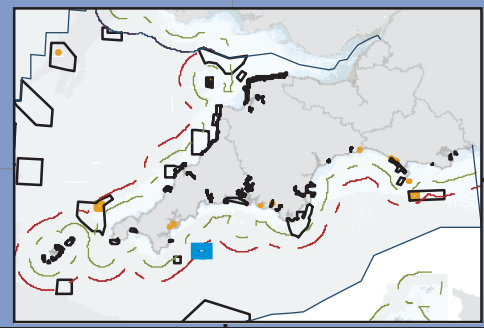
Maritime basemap © British Crown and SeaZone Solutions Limited, 2010. All Rights Reserved. Data Licence No. 062006.004. Land basemap part © OpenStreetMap & contributors, CC-BY-SA. Not to be used for navigation. Contains OS data © Crown copyright 2011.



Map Legend

-  12 nautical mile limit
-  Recommended MCZ (rMCZ)

These maps contain data from the following sources: Defra contracts MB102/MB106, the JNCC and Natural England, the Environment Agency, Wildlife NGOs and local records centres. Full details and a comprehensive legend are provided in the appendices of the Finding Sanctuary final report.



II.3.31 South of Falmouth rMCZ

Basic site information

Site centre location (datum used: ETRS89):

Decimal Degrees		Degrees Minutes Seconds	
Lat	Long	Lat	Long
49.9077	-4.9760	49° 54' 27" N	4° 58' 33" W

Site surface area: 25 km² (calculated in ETRS89 – LAEA)

Biogeographic region:

JNCC regional sea: Western Channel and Celtic Sea

OSPAR region: Region II: Greater North Sea (on the boundary to Region III: Celtic Waters)

Site boundary: The site is a simple square, with borders running north-south and east-west, measuring 5km on each side in line with ENG guidelines. The north-west corner of the site intersects with the 6nm limit, the remainder of the site lies beyond 6nm.

Sites to which the site is related: The site lies approximately 9 km east of the Lizard Point candidate SAC.

Maps of the site are included at the end of this site report. The main site map shows points with coordinates along the site boundary (in WGS84 UTM30N).

Features proposed for designation within South of Falmouth rMCZ

Table II.3.31a Draft conservation objectives for the South of Falmouth rMCZ. M = maintain in favourable condition, R = recover to favourable condition. This is an extract of the conservation objective summary tables in section II.2.6. **The full text of the draft conservation objectives can be found in appendix 15.**

Broad-scale habitats	Moderate energy circalittoral rock		R
	Subtidal coarse sediment		R

The following tables show ENG-related statistics for this site, reported from spatial data available in Finding Sanctuary's GIS datasets. Greyed out rows indicate features for which GIS data exists within the site boundary, but which have not been included on the list of draft conservation objectives (the reasons are stated in table footnotes).

Table II.3.31b **Subtidal broad-scale habitats** recorded in this rMCZ, based on an analysis of Finding Sanctuary's EUNIS level 3 broad-scale habitat GIS data (see appendix 8). Data sources: 1 - UKSeaMap, 2 - MESH, 3 - Environment Agency.

Habitat	Area covered within rMCZ (km ²)	% of total in study area	Source(s)
Moderate energy circalittoral rock	2.69	<0.1%	1
Subtidal coarse sediment	22.29	<0.1%	1

Table II.3.31c **FOCI habitats** recorded in this rMCZ, based on an analysis of Finding Sanctuary's amalgamated GIS FOCI datasets (see appendix 8). Data sources: 1 - MB102; 2 - JNCC/ MESH Canyons survey data; 3 - ERCCIS/Isles of Scilly Wildlife Trust; 4 - DORIS.

Habitat	Area covered (km ²)	Number of point records (total)	Number of point records (pre-1980)	Source(s)
Subtidal sands and gravels ¹	22.86			1

¹ Conservation objectives have not been included for subtidal sands and gravels as we have considered any conservation requirements met by listed broad-scale habitats.

For additional understanding on how this site is located in relation to environmental data layers, including areas of high benthic biodiversity, offshore bird aggregation areas, or areas of seasonal sea surface temperature fronts, please refer to the interactive PDF maps presented alongside this report.

Site summary

The site is located in an area of **seasonal frontal systems**, which means the area has high productivity and scores highly as an area of additional ecological (pelagic) importance (see AAEI map, FR_081). The area is heavily used by fishermen, in particular, mobile benthic and pelagic gear fishermen. The depth of the site ranges from 77 to 83 metres.

Detailed site description

A literature search was carried out on this site, but as for other for non-coastal sites in the network it has proved difficult to find information associated with this specific site.

Poulton *et al.* (2002) In Jones *et al.* (2004) describe the offshore sediments around the coast of Britain which included the English Channel. The consequences of a changing climate have been relatively well documented in the English Channel for fish, plankton and intertidal benthos (see, for example, Genner *et al.* 2004; Hawkins *et al.* 2008). During the 1950s, Norman Holme sampled benthic infaunal and epifaunal communities on a large geographical scale spanning the entire English Channel (Holme, 1961; 1966). Part of Holme's benthic survey was revisited in 2006, covering a large extent of the Channel coast (Hinz *et al.* 2011). The main aims of this resurvey were to describe the current status of benthic communities and compare the data to the historic survey to investigate potential changes in the communities. Comparison of the 1950s and 2006 surveys showed benthic species distributions remained similar, in general, with little or no obvious trends consistent with warming sea temperatures.

Stakeholder narrative: Assumptions and Implications

As explained in part I, the stakeholder narrative is a vital underpinning of the site recommendations. Working assumptions and implications are presented here, and additional comments are presented in the following section.

The following fundamental assumption was recorded to apply to all activities in all sites: **The fundamental assumption about human activities within MCZs is that activities can continue (under current licensing regimes where applicable), as long as they do not prevent the conservation objectives from being achieved.** This assumption applies to all activities.

Table II.3.31d shows more specific working assumptions and implications that were recorded for this site over the course of the planning process. This site was a relatively late addition to the network (it was added after the third progress report). Most of the detailed work on recording assumptions and implications for the sites within the developing network configuration had already taken place before this site was added. Therefore, some of the content of table II.3.31d is based on what had previously been recorded for a previous, larger site that had been included in the developing network configuration in the area, and which was replaced by two smaller sites, South-East of Falmouth rMCZ and South of Falmouth rMCZ, following Local Group and fisheries sector feedback. The previously stated assumptions were implicit in the discussions over whether the site should be added to the network or not. Many of the assumptions and implications highlighted for this site are generic, and will apply to other rMCZs in the network as well. Site-specific comments from the later planning meetings (when the site was within the network) have also been added to the table.

Following that, table II.3.31e shows the vulnerability assessment (VA) snapshot for this site. The VA meetings took place at the end of the project, and they did not involve the Steering Group. They started to discuss site management, but did not reach any firm conclusions. The VA snapshot table reflects the point that the VA discussions had reached at the time of the last Joint Working Group meeting in May 2011. Many Steering Group members expressed concerns about the VA process and its outcomes (see section II.2.1 for full details).

Table II.3.31d Specific assumptions and implications relating to South of Falmouth rMCZ. Black text reflects the working assumptions and implications recorded throughout the planning discussions. The development of the narrative recorded in black can be traced back through the Working Group and Steering Group meeting reports from 2009 to 2011. Red and green text in the first column comments on how the snapshot of the vulnerability assessment (VA) relates to each of the working assumptions that had been made as planning took place (refer to part I for a full explanation of the VA snapshot). This site has been recently added to the network (after the third progress report). No detailed assumptions were drawn up by the working groups & project team for this site specifically.

Activities assumed to not be allowed within the site	
Assumptions	Implications
Bottom-towed fishing gear will not be allowed (includes benthic trawling and hydraulic dredging) This activity was discussed in the VA meetings, and the assumption was confirmed.	Direct implications: <ul style="list-style-type: none"> o Loss of ground for bottom-towed gear fishermen, both UK and non-UK (Mobile benthic fishing does occur in the area, which is deemed important for scalloping and beam trawling. However, this rMCZ was selected by the Working Groups out of several building blocks in the area, as it was deemed the least contentious to the fishing industry and it was recognised that a protected area is required in this area in order to meet the Ecological Network Guidance). o Displacement of bottom-towed gear o Increased competition for fishing grounds o Reduced diversity and flexibility of fishing o Cumulative impact on bottom-towed gear fleet where protected areas are close together o No tow zones will be inundated with pots and static gear and cause difficulties for sea anglers. (This comment was recorded during one of the early planning meetings. Several stakeholder representatives have since stated that the comment is unrealistic.) o The SW Fishing Industry MCZ Planning Group notes

	<p>significant concerns over this site given the importance of the fishing grounds in this area.</p> <ul style="list-style-type: none"> o Potential environmental implications derived from concentrating effort in alternative grounds or due to new fishing ground searching activity. <p>Benefits:</p> <ul style="list-style-type: none"> o Protection of areas of high pelagic interest will increase ecological value of network
<p>Aggregate extraction will not be allowed</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o Aggregate dredging can only occur where the mineral resources are geologically located – in highly localised and discrete areas. If aggregate operations are not allowed in MCZs (subject to appropriate monitoring, mitigation and management), and MCZs coincide with aggregate resource, then this will have significant impact on national construction aggregate supply and coast defence. <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o If aggregate operations (subject to appropriate monitoring, mitigation and management) are restricted in areas adjacent to an MCZ, then this will have significant impact on national construction aggregate supply and coast defence.
<p>Anchoring of large vessels will not be allowed (except in emergencies)</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o There is a general right of anchoring as a consequence of, and incidental to, the Public Right of Navigation.
<p>Dumping and disposal will not be allowed. That includes dumping of fish waste, munitions, or dumping of waste from dredging</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o

Activities assumed to possibly need restricting (limiting or mitigating) within the site or parts of the site.	
Assumptions	Implications
<p>Static fishing gear will be permitted, but there may need to be a limit on the amount of static gear used in the area.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o No tow zones will be inundated with pots and static gear and cause difficulties for sea anglers (This comment was recorded during one of the early planning meetings. Several stakeholder representatives have since stated that the comment is unrealistic.) <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o Local Group feedback indicated that some Local group members thought that mitigation measures should be put in place to prevent bycatch in static nets, including regulation of when and how nets are set. Other Local Group members indicated that bycatch of birds was not a problem in set nets in this area. The protection of birds is not currently included in the developing conservation objectives for this site. o Static gear fishermen might face possible additional costs for mitigation measures, should they be needed o There would be costs if monitoring is needed.
<p>Sewerage disposal, industrial and agricultural liquid discharges will be permitted with management / mitigation</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Aquaculture of fin fish and shell fish will be permitted with mitigation / management</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Crab tiling / bait digging will be permitted with mitigation / management</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o

<p>Beach replenishment will be permitted with mitigation / management</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>The installation, operation and maintenance of renewable energy devices will be permitted</p> <p><i>Based on SAP feedback the assumption cannot apply to all sites in the network, although it can apply to any given site on its own.</i></p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o The MCZ designation may mean that additional management requirements are defined for renewable energy developments. This could result in: <ul style="list-style-type: none"> - additional costs to the renewables industry, e.g. for licensing mitigation and monitoring - delays to renewables development - delays, lost revenue and additional costs associated with cable repair activity restrictions o Attracting the funding (for development) may be harder in the first place as sites with MPA designations within them will be less attractive to potential investors. o Costs and delays associated with co-location of renewables in MCZs, could result in long term implications in terms of renewables deployment which could have serious implications for industry and Government in terms of loss of operational revenue and missing EU climate change targets. o Enforced co-location with MCZs would dramatically restrict deployment. <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o If co-location assumptions are not correct the impacts would/could be: site locations that can't be developed, increased costs (the implications could be re-routing of cables around a feature could cost an additional £600,000 - £1.3m/km depending on cable type, size and seabed geology), construction delays, failure to meet renewables targets, impacts on acidification, additional monitoring requirements, increased uncertainty and declining investor confidence in renewables activities. o Increased competition for sea space with other sea users. o There is some overlap with accessible wind resource area. o Possible medium term wave resource area, but navigational constraints significant.

Activities assumed to be allowed to continue / occur within the site	
Assumptions	Implications
<p>Handlining (recreational angling and commercial handlining) will be permitted. Handlining includes sea angling and trolling.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o Handliners might face possible additional costs for mitigation measures, should they be needed o There would be costs if monitoring is needed <p>Benefits:</p> <ul style="list-style-type: none"> o Potential for increased and enhanced leisure and recreational activity
<p>The installation and maintenance of cables will be permitted and will not be made prohibitively expensive within the site. This applies to power cables (including cables for renewable energy devices), and telecommunications cables.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <p>Given this assumption there are still the following concerns:</p> <ul style="list-style-type: none"> o Cable installation cost increases and delay o Cable repair cost, delays and lost revenue could increase due to activity restrictions on cable repair. o There is no definition of what ‘prohibitively expensive’ means; the cables representative would like assurance that no additional cost will result from MCZ designation (beyond costs associated with existing management and mitigation requirements). <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o For renewables/power cables, re-routing of cables around a feature or site might mean longer cable routes, at a cost of £600,000 - £1.3 million/km depending on cable type, size and seabed geology. o There may be other costs, e.g. costs associated with licensing, mitigation measures and monitoring requirements. o Increased licensing requirements and costs of cabling may have serious implications for industry and Government in terms of loss of operational revenue, missing EU climate change targets etc. o Possible cable route to renewables resources, further offshore.
<p>The operation of cables (power and telecommunications) & pipelines will be permitted (i.e. any existing cables will be allowed to stay operational)</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>If the assumption turns out to be wrong:</p> <ul style="list-style-type: none"> o Two active telecoms cables.

<p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	
<p>Tourism and recreational activities will be permitted.</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Maintenance dredging in ports (to enable access to ports) will be permitted</p> <p><i>The project team have advised that this would mean that the dredged areas of seafloor could not be counted towards ENG targets.</i></p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Anchoring for maintenance and access for licensed visitors to heritage wrecks will be permitted</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o (no heritage wrecks currently present in the site)
<p>Anchoring of small vessels will be permitted</p> <p><i>There isn't a clear, agreed Working Group definition for what constitutes a 'small vessel'.</i></p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o <p>Given this assumption, there are still the following concerns:</p> <ul style="list-style-type: none"> o No clear working group definition exists of what counts as a 'small' vessel - 24m was proposed some time ago by the RYA, but no decision was reached as to whether we would adopt that size in MCZ planning.

<p>Passage of ships will be permitted</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o
<p>Seaweed harvesting will be permitted</p> <p>Activity not taking place / not taking place at high enough levels to cause a problem in this site, so this was not considered during the VA meetings</p>	<p>Direct implications:</p> <ul style="list-style-type: none"> o

Table II.3.31e VA Snapshot table: This table records the point which the vulnerability assessment discussions had reached regarding site management, at the time of the final Joint Working Group meeting in May 2011. The outcome is not definitive, and the VA did not carry out an exhaustive review of all the working assumptions recorded in the longer table above. The Steering Group were not directly involved in the VA discussions, and at their final meeting, expressed considerable reservations about the VA outcome (see section II.2.1). The reason this VA snapshot table is included here is so that readers have a record of what the VA snapshot was showing at the time the final stakeholder comments were recorded for this site. For a full explanation of the VA snapshot, please refer to part I. The maps in appendix 13 show a visual representation of the information in all the VA snapshot tables in the rMCZ site reports.

Sector	Potential Management
Commercial Fishing – all mobile bottom gears	<p>Management:</p> <ul style="list-style-type: none"> - Prohibition of fishing within the rMCZ <p>Measure:</p> <ul style="list-style-type: none"> - Common Fisheries Policy

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

The most significant uncertainty faced by the project was the lack of knowledge on management of MCZs, and this uncertainty still applies to all rMCZs in the network. There was uncertainty over what activities will be affected by MCZ designations: what activities will be permitted to continue within (or near) MCZs, what activities will not be permitted, and what activities will require mitigation or some form of restriction other than a complete ban. There was also uncertainty over what measures will be taken to ensure any activity restrictions are put in place (e.g. byelaws, voluntary measures).

Additional comments

The following is a set of additional comments made by stakeholder representatives over the course of the planning work. Some of these comments were made specifically about this site, others were more generic comments which the project team consider to be relevant to this site.

- *Mobile bottom gear*
 - Seasonal closures are an inappropriate measure for benthic conservation.
- *General benefits of MCZs*
 - Some stakeholder representatives would like the following recorded and for these to be considered during the impact assessment:
 - Fisheries spill-over.
 - Improvements for the local economy.
 - Education opportunities.
 - Benefits to science.
 - Focus for voluntary groups.
 - Potential increase in the amount and quality of recreational activities (diving, sea angling, environmental tourism, etc).
 - The designation as an MCZ will be a selling point and will undoubtedly be used as an identifier to the area to highlight it as somewhere to visit.
- *Monitoring*
 - There are two main types of monitoring which will need to take place within rMCZs:
 - Monitoring the activities within a site and the various levels at which they are occurring.
 - Monitoring the ENG features for changes in condition.
- *Management measures*
 - Most of this rMCZ lies beyond the 6nm limit. There may be non-UK vessels with historical rights that fish within the area. For sites beyond 6nm, stakeholder representatives repeatedly voiced concern over how the activity of non-UK fishing vessels might be managed, and stated opposition to any unilateral measures that would apply to UK vessels only. At the time of the third progress report, we had received the following statement from the SNCBs and Defra: 'When considering the impacts of fishing restrictions on non UK vessels, it is the Government's intention that fishing restrictions will not be imposed unilaterally on UK vessels before they can be applied to equivalent EU vessels operating within the relevant areas. In the case of those EU fishing vessels with historic fishing rights in UK waters between 6 and 12 nm, Defra will negotiate with the relevant Member States and the European Commission before introducing byelaws, or orders that are applicable to all EU vessels, or seeking Common Fisheries Policy (CFP) regulation measures. Once introduced, these would apply to all EU vessels (including UK vessels) equally and at the same time.'
- *Reaction to the vulnerability assessment process and outcomes*
 - At the sixth Joint Working Group meeting in June 2011, the results from the regional vulnerability assessment (VA) discussions were presented to the group, as shown in table II.3.31e (the VA process is described in part I). This generated concern within the JWG, for two reasons. Firstly, several members of the group had serious misgivings over the outcome of the management discussions, especially with respect to those inshore rMCZs (including this one) for which no management of bottom-towed mobile fishing gear was highlighted as necessary. Secondly, the group had serious misgivings about the process itself, from which they felt disenfranchised.
 - The Steering Group made a statement at their final meeting, articulating those concerns in more detail. They recommended that there should be a process that

allows them to review potential management measures for MCZs, before public consultation. The full statement made by the Steering Group is in section II.2.1.

Levels of support

The network report (section II.2) includes a project team reflection on levels of support for the network recommendations as a whole, and the site specific reflection presented here should be read within the wider network context.

This rMCZ is located within a region that has high pelagic productivity, and which is heavily fished by static and mobile gear fishermen, both UK and non-UK. There is strong gear conflict. Fishing representatives are not supportive of this site, but find this rMCZ less bad than a larger area that was included in this region previously (see third progress report). The rMCZ is strongly supported by conservationists, as it lies within an area of additional ecological importance because of its high productivity and **seasonal frontal systems**. The current rMCZ (together with the South-east of Falmouth rMCZ) represents the outcome of a genuine negotiation between conservation and fishing interests, where both sides have gained and lost – fishermen would have preferred no rMCZs at all in this area, and conservationists would have preferred the larger area previously included in the developing recommendations.

The Crown Estate provided feedback to state that they were supportive of this rMCZ. Early Local Group feedback indicated that this area was preferred to other alternatives containing the same broad scale habitats, and it was considered the ‘least bad’ option in that area.

Supporting documentation

GIS data used for reporting the quantitative habitat and species figures in the tables above includes the following sources: UKSeaMap modelled broad-scale habitat data, and **MB102**. Refer to appendix 8 for details, and to the tables above for data sources for specific features in this site.

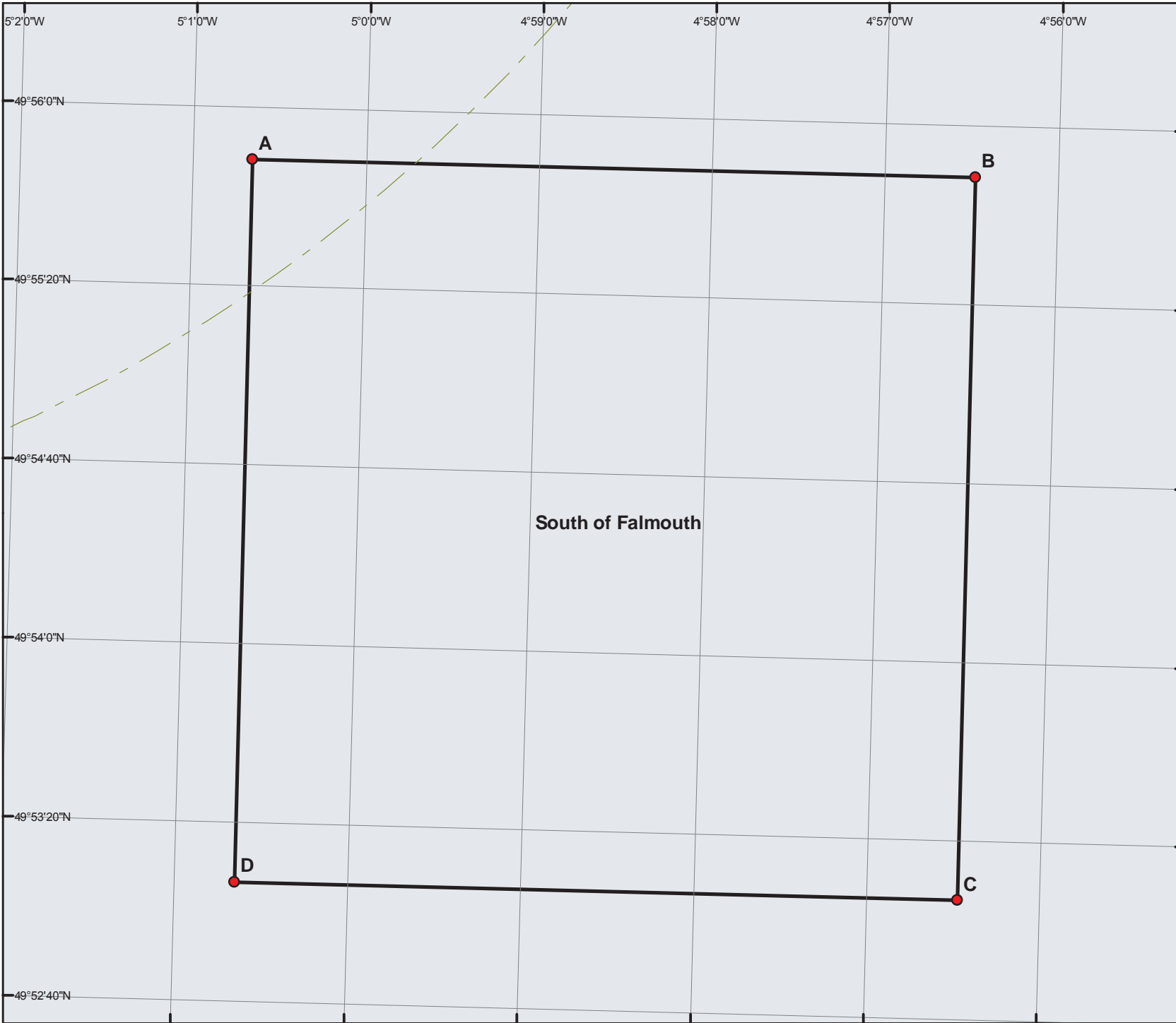
Further evidence underpinning the site can be found in the publications and datasets referred to in the detailed site description.

Site map series

On the following pages there are three maps of this site.

- The first map (FR_043a) is the main site map showing the rMCZ boundary and includes points with coordinates (in WGS84 UTM30N). The map also shows charted depth and existing Marine Protected Areas for reference. Please note: the lat/long coordinates of the vertices in the following maps have been calculated in decimal degrees, and in degrees, minutes and seconds. For plotting on a standard Admiralty (UKHO) chart, the seconds of each coordinate need to be converted to decimal. An MS Excel table showing all coordinates in degrees, minutes and decimal seconds has been provided in the additional materials section (see Appendix 14) for plotting purposes.
- The second map (FR_043b) shows the rMCZ boundary over broad-scale habitats, and records of habitat and species FOCI. The data shown on this map corresponds with the information in table II.3.31b, data sources are indicated in the table.
- The third map (FR_043c) shows socio-economic datasets. For spatial data showing the distribution of fishing effort, please refer to the interactive PDF maps supplied with the additional materials (see appendix 14).

- Because of the large number of features shown on the site maps (especially inshore biophysical maps), it has not been possible to embed comprehensive legends within the site maps themselves. A comprehensive map legend is therefore provided in appendix 7, which explains the symbology used on all the maps within this final report.
- Appendix 8 describes the data sources for the information shown on the final report maps in detail.



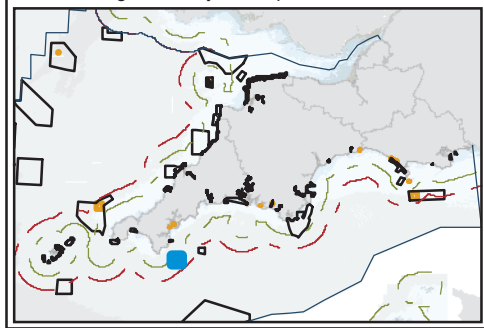
Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	49.9301	-5.0108	49° 55' 48" N	5° 0' 39" W
B	49.9302	-4.9413	49° 55' 48" N	4° 56' 28" W
C	49.8852	-4.9412	49° 53' 6" N	4° 56' 28" W
D	49.8852	-5.0108	49° 53' 6" N	5° 0' 38" W

Map Legend

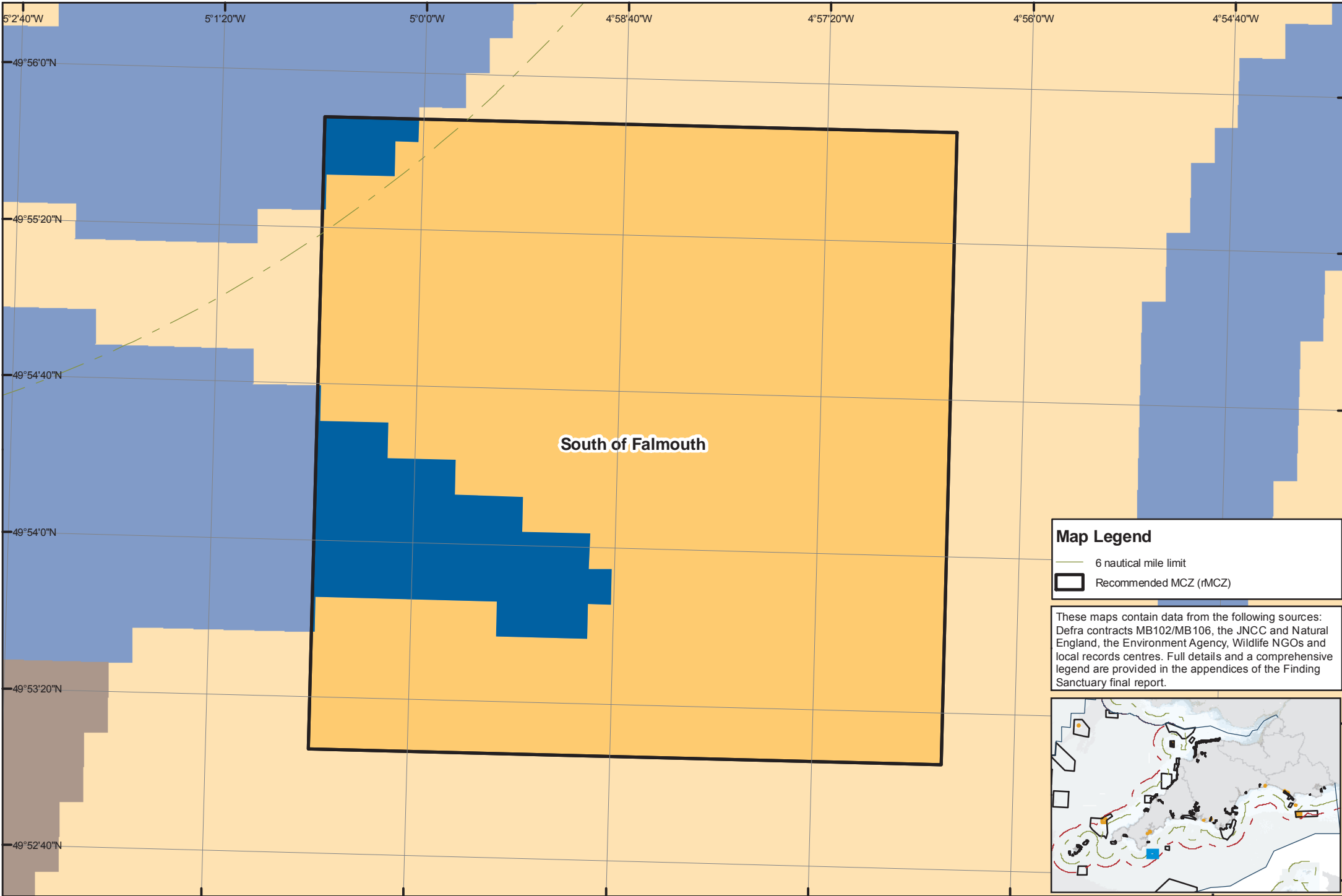
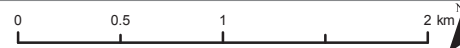
- 6 nautical mile limit
- Recommended MCZ (rMCZ)

A comprehensive legend is provided in the appendices of the Finding Sanctuary final report.



This is one of a series of maps showing Finding Sanctuary's final MCZ recommendations, with biophysical information. It is designed to be viewed within the context of the project's final report. Datum: WGS84. Projection: UTM30N.

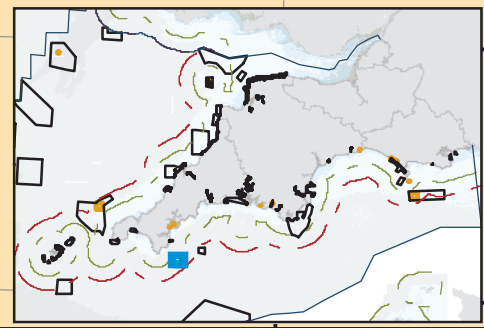
Maritime basemap © British Crown and SeaZone Solutions Limited, 2010.
All Rights Reserved. Data Licence No. 062006.004. Land basemap part
© OpenStreetMap & contributors, CC-BY-SA. Not to be used for navigation.
Contains OS data © Crown copyright 2011.

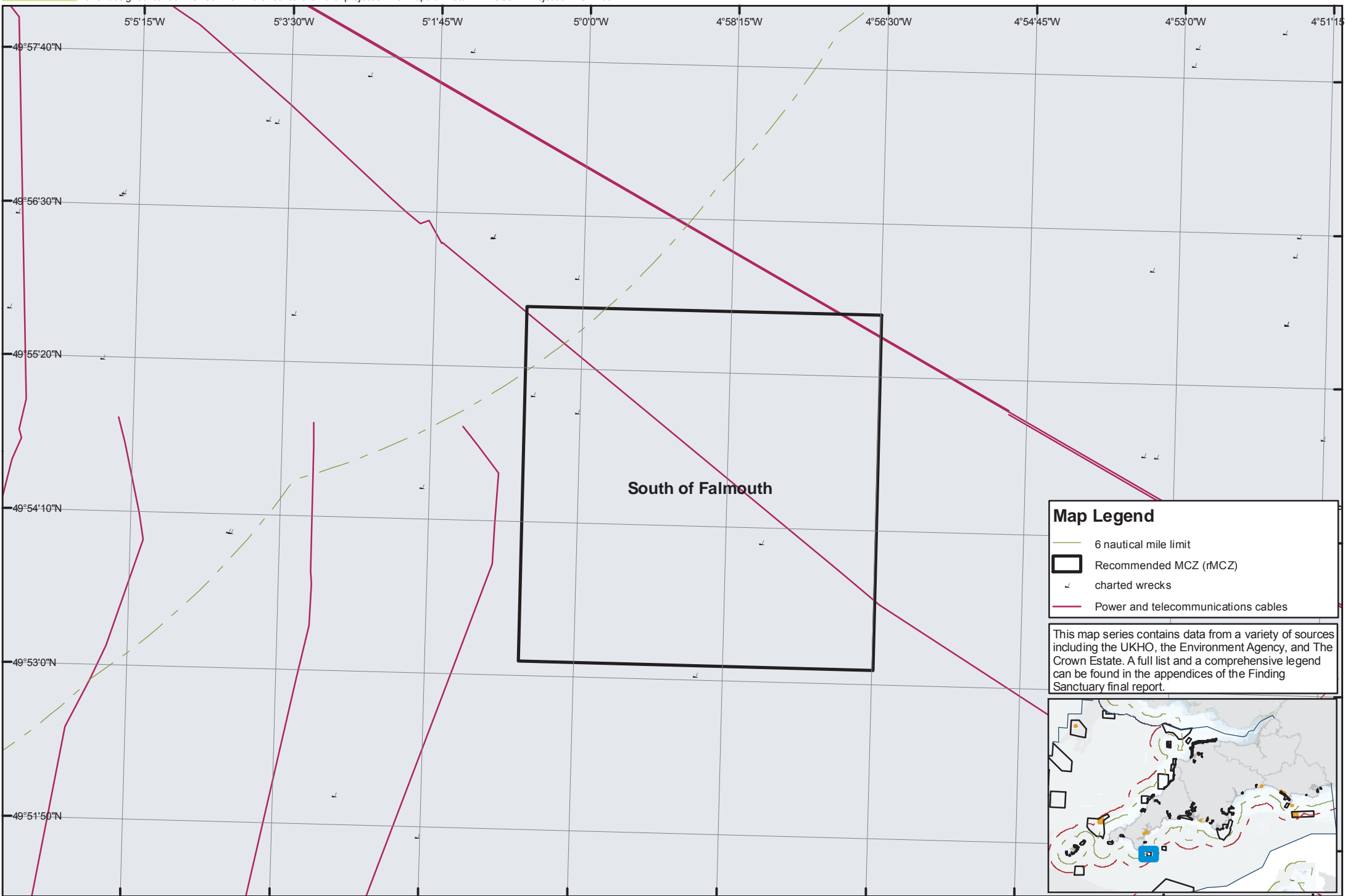


Map Legend

- 6 nautical mile limit
- Recommended MCZ (rMCZ)

These maps contain data from the following sources: Defra contracts MB102/MB106, the JNCC and Natural England, the Environment Agency, Wildlife NGOs and local records centres. Full details and a comprehensive legend are provided in the appendices of the Finding Sanctuary final report.

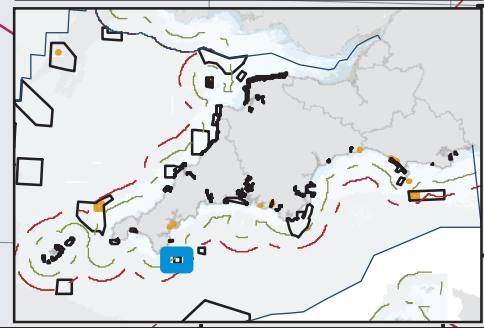




Map Legend

- 6 nautical mile limit
- Recommended MCZ (rMCZ)
- charted wrecks
- Power and telecommunications cables

This map series contains data from a variety of sources including the UKHO, the Environment Agency, and The Crown Estate. A full list and a comprehensive legend can be found in the appendices of the Finding Sanctuary final report.





Scottish Natural Heritage
Dualchas Nàdair na h-Alba

All of nature for all of Scotland
Nàdar air fad airson Alba air fad

Scottish MPA Project
Data Confidence Assessment

CLYDE SEA SILL NATURE CONSERVATION MPA

SEPTEMBER 2014

Further information on Nature Conservation MPAs, the wider network and protected areas management is available at -

www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork

For the full range of MPA site documents and more on the fascinating range of marine life to be found in Scotland's seas, please visit -

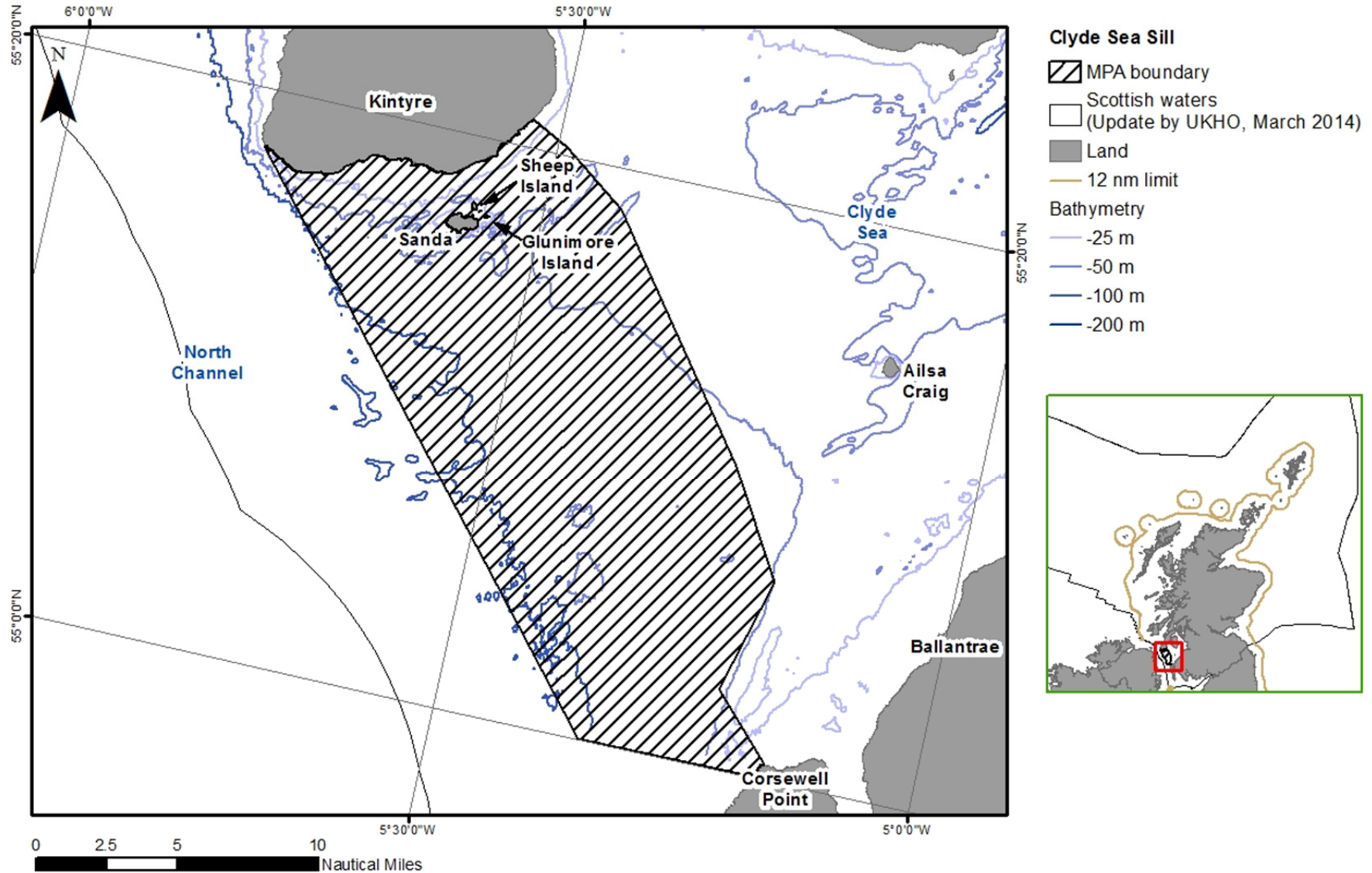
www.snh.gov.uk/mpas or www.jncc.defra.gov.uk/scottishmpas

Document version control			
Version	Date	Author	Reason / Comments
Version 1	21/09/2012	Ben James, Laura Clark, Morven Carruthers and Andy Douse	Revised protected feature / MPA proposal format, updating search location version (ver. 5).
Version 2	04/10/2012	Siobhan Mannion	Formatting revisions to take account of initial comments.
Version 3	18/10/2012	Laura Clark, Lisa Kamphausen	Production and insertion of revised mapping. Updates and edits.
Version 4	19/10/2012	John Baxter	QA review.
Version 5	19/10/2012	Lisa Kamphausen	Refinements in response to QA review comments.
Version 6	17/11/2012	Ben James	Review.
Version 7	06/12/2012	Ian Bainbridge	QA review and sign-off.
Version 8	19/07/2013	Laura Clark	Updated into possible MPA format.
Version 9	16/08/2013	Ben James	Review.
Version 10	20/08/2013	John Baxter	QA review and sign-off.
Version 11	18/07/2014	Laura Steel and Morven Carruthers	Updated into MPA format with refinements in response to 2013 consultation and IER feedback.
Version 12	05/08/2014	Ben James	Review.
Version 13	12/08/2014	John Baxter	QA review and sign-off.

Distribution list			
Format	Version	Issue date	Issued to
Electronic	7	14/12/2012	SNH web publication.
Electronic	10	20/08/2013	SNH web publication [A987946 / 7(#8)].
Electronic	13	01/09/2014	Marine Scotland officials.
Electronic	13	02/09/2014	SNH web publication [A1333193 / 21(#21)].

CLYDE SEA SILL NATURE CONSERVATION MPA - DATA CONFIDENCE ASSESSMENT

Figure 1 Clyde Sea Sill MPA



Map projected in Europe Albers Equal Area Conic (Modified Standard Parallels - Standard Parallel 1 = 50.2; Standard Parallel 2 = 58.5). The exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown Copyright). Landmass Ordnance Survey © Crown Copyright and database right 2013. All rights reserved. Scotland (Adjacent waters) Updated by the Law of the Sea Division, United Kingdom Hydrographic Office October 2005. Bathymetry © Crown Copyright 2014. All rights reserved. License No. EK001-201310001. Not to be used for navigation. MPAs ©SNH 2014.

CLYDE SEA SILL NATURE CONSERVATION MPA - DATA CONFIDENCE ASSESSMENT

MPA name	Clyde Sea Sill	Assessor(s)	BJ; LC; MC; AD; SM; LS
<p>Clyde Sea Sill MPA (Figure 1) stretches across the mouth of the Clyde Sea running from the Mull of Kintyre to Corsewall Point on the Rhinns of Galloway. The MPA incorporates the core part of a persistent thermal front that extends across the sill, a breeding black guillemot population on Sanda, Sheep Island and Glunimore Island and circalittoral and offshore sand and coarse sediment communities representative of Scotland's seas more generally. Fronts, which are essentially boundaries between water masses of differing temperature or salinity, can concentrate nutrients and plankton and are often associated with pelagic biodiversity hotspots. The sill is of recognised importance to local fish stocks and the outer boundary of the MPA mirrors that of an existing fisheries restriction area for spring spawning cod. In 2001 an estimated 410¹ black guillemots were recorded on Sanda and Sheep Island, representing approximately 1.1% of the GB population (Mitchell <i>et al.</i>, 2004). More recent counts in 2013 (Swann, 2013) and 2014 (Swann, in prep.) recorded lower and potentially declining numbers of birds (approximately 340 / 230 birds respectively). The landward boundary of the MPA is at the level of mean low water spring (MLWS) tides. Black guillemots are a notified interest of the existing Sanda Islands Site of Special Scientific Interest (SSSI) which confers protection to nesting habitat around the three small islands adjacent to the MPA.</p> <p>The MPA also incorporates geodiversity interests from the Marine Geomorphology of the Scottish Shelf Seabed feature which are also known to extend beyond the site boundary. Mobile, mixed sandy substrates have been reworked by tidal currents to create sand ribbon fields, sand wave fields and sand banks. The known distribution of these structures correlates well with that of the circalittoral and offshore sand and coarse sediment communities biodiversity feature which is distributed across the floor of the central part of the sill.</p>			

Protected features			
Biodiversity	<i>Black guillemot (BG)</i> <i>Circalittoral and offshore sand and coarse sediment communities (CCS)</i> ² <i>Fronts (FR)</i>	Geodiversity	<i>Marine Geomorphology of the Scottish Shelf Seabed - sand ribbon fields, sand wave fields and sand banks (GEO)</i>

Data used in assessment			
Version of GeMS database	Ver.4	Other datasets used in feature maps (specify) -	<ul style="list-style-type: none"> Contextual mapping (coastline; bathymetry; MPA boundaries; other protected areas). Marine Recorder data [for null records on Map A - ver. 190614]. Marine Scotland fisheries restriction areas (Firth of Clyde Area 2 [CA41] - Map D). Scottish Environment Protection Agency (SEPA) monitoring stations (Map D).

Summary of data confidence assessment (see detailed assessment on following pages)							
Confident in underpinning data		Yes	✓	Partial		No	
Confident in presence of identified features?	✓ All features	Data suitable to define extent of individual protected features	✓		Partial		*
			All features				

¹ Black guillemot count numbers quoted in this document have been rounded up / down to the nearest ten.

² Comprising 'Circalittoral coarse sediment' (**SS.SCS.CCS**) and in particular '*Mediomastus fragilis*, *Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel habitats' (**SS.SCS.CCS.[MedLumVen]** - A5.14[2]), 'Offshore circalittoral coarse sediment' (**SS.SCS.OCS** - A5.15), 'Circalittoral fine sand' (**SS.SSa.CFiSa** - A5.25) and 'Offshore circalittoral sand' (**SS.SSa.OSa** - A5.27).

CLYDE SEA SILL NATURE CONSERVATION MPA - DATA CONFIDENCE ASSESSMENT

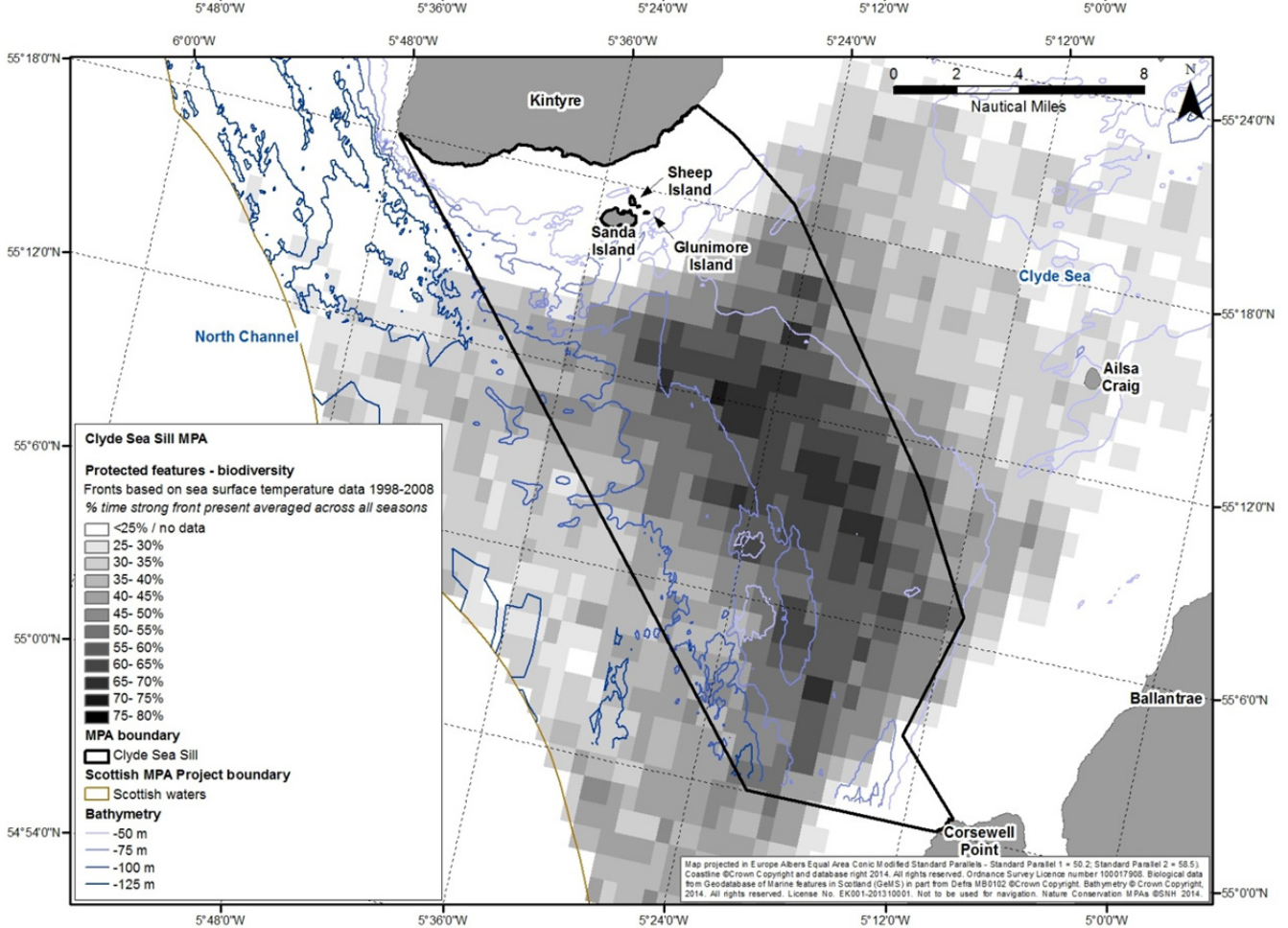
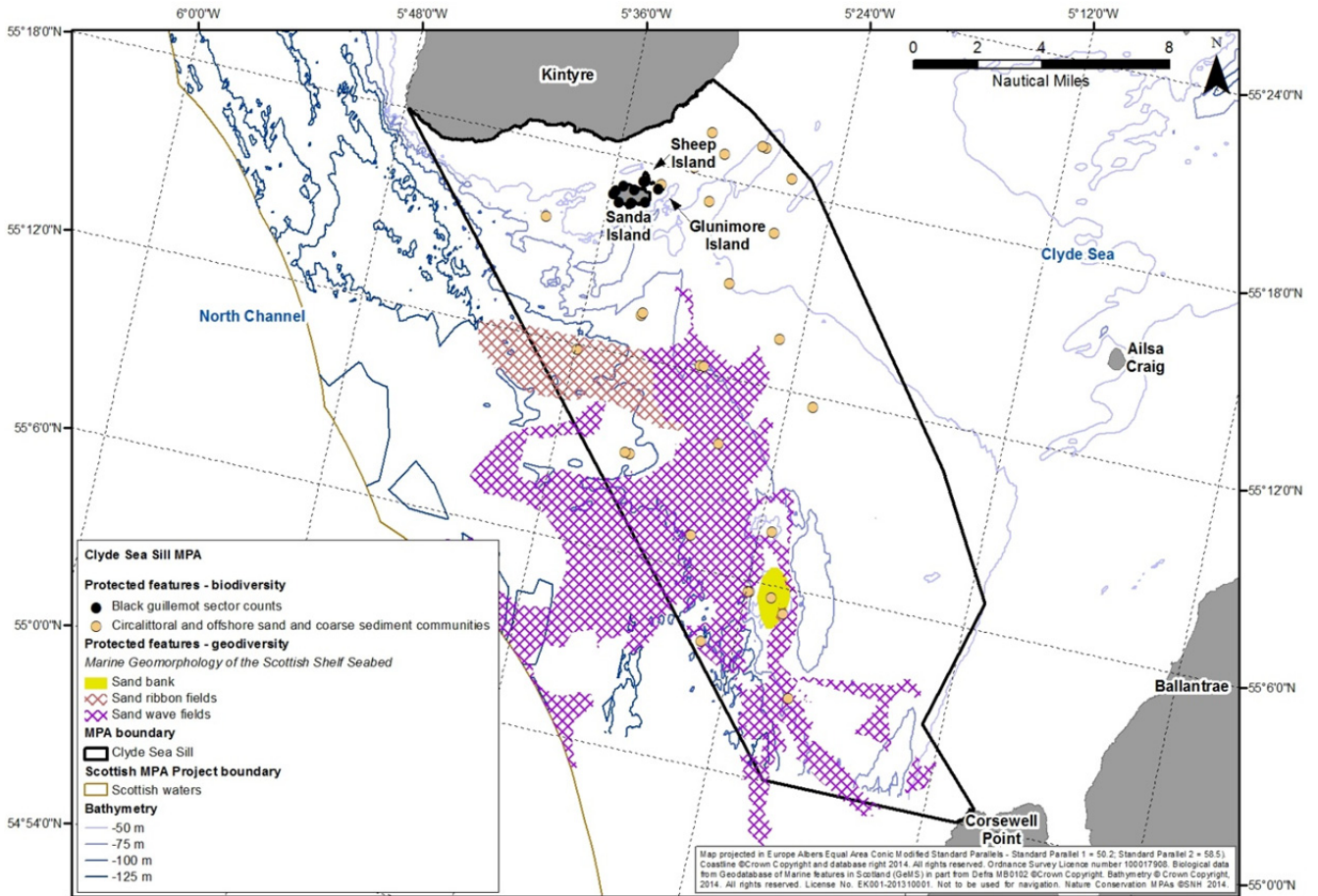
Summary of data confidence assessment (see detailed assessment on following pages)

Summary

We have high confidence in the data underpinning this MPA and in the presence of all protected features (for known distribution see Figures 2i and 2ii overleaf). The biodiversity feature data presented range from <6 to >12 years old. Black guillemot data were collected in 2001 as part of the Seabird 2000 census (Mitchell et al., 2004) and in 2013 and 2014 (Swann, 2013; in prep.). These recent counts show a decrease in the numbers of breeding black guillemots within the MPA. Whilst comparable with the number of birds recorded here during the earlier 1982-85 Seabird Colony Register survey (250 birds - Lloyd et al., 1991), further investigation is required to determine whether management action is required (e.g. predator control measures). Additional details are provided in the management options paper produced for this MPA. The seasonal frequent fronts modelled datalayer is based on ocean thermal imagery collected between 2000 and 2009 and shows the distribution and persistence of the fronts (Miller et al., 2010). Circalittoral and offshore sand and coarse sediment communities were recorded in 2012 (Moore and Atkinson, 2012; Allen, 2013). Geodiversity feature data have been drawn from a range of sources (see Brooks et al., 2009; 2013).

CLYDE SEA SILL NATURE CONSERVATION MPA - DATA CONFIDENCE ASSESSMENT

Figures 2i and ii The known distribution of protected features within Clyde Sea Sill MPA



CLYDE SEA SILL NATURE CONSERVATION MPA - DATA CONFIDENCE ASSESSMENT

Data confidence assessment	Our assessment of data confidence is based on consideration of the age and source of the data, sampling methods used and overall coverage across the MPA (see also Maps A - D). Other protected areas are shown on Map D.
-----------------------------------	---

Age of protected feature data (Map A)					
Number of records collected within last 6 years	Many BG;CCS;FR	Number of records collected 6-12 years ago	Many FR	Number of records >12 years old	Many BG;FR;GEO
Comments	<p>The data used in the assessment span all three age classes. Survey work to confirm the current status of the breeding black guillemot population was undertaken in 2013 (Swann, 2013) and 2014 (Swann, in prep.). Black guillemot data were also collected as part of the Seabird 2000 census in 2001 (Mitchell et al., 2004) with earlier records available from the Seabird Colony Register census undertaken in 1985 (results summarised in Lloyd et al., 1991 - records not incorporated within the GeMS database due to their age and not mapped here). The 2001 and 2014 count data are displayed in Map C. The circalittoral and offshore sand and coarse sediment communities were recorded in early 2012 (Moore and Atkinson, 2012; Allen, 2013). Information on front presence, persistence and distribution is based on ocean thermal imagery collected between 2000 - 2009. Information on the distribution of the components of the Marine Geomorphology of the Scottish Shelf Seabed geodiversity feature was derived from Caston (1976); UKHO (1978); British Geological Survey (BGS) (1996); and, Vincent et al. (2004).</p>				

Source of protected feature data (Map B)					
Targeted data collection for nature conservation purposes	✓	Statutory monitoring (marine licensing etc.)		Fisheries survey work	
Data collection associated with development proposals (EIA etc.)		Recreational / volunteer data collection	✓	Other (specify) -	✓
Comments	<p>The 2013 (Swann, 2013) and 2014 (Swann, in prep.) black guillemot survey work and the nationwide Seabird 2000 census (Mitchell et al., 2004) were undertaken for nature conservation purposes and conducted by professional and volunteer ornithologists. The circalittoral and offshore sand and coarse sediment communities were recorded during a Marine Scotland nature conservation-orientated seabed survey in 2012 (Moore and Atkinson, 2012; Allen, 2013). Information on the frontal system was derived from satellite-based sea surface temperature observations, collected to improve our understanding of oceanographic processes and global climate patterns. The geodiversity feature and component interests were identified through a Defra-led research project (Brooks et al., 2009) and a subsequent SNH and JNCC commissioned desk-based review (Brooks et al., 2013). Both studies were undertaken to inform the identification of MPAs (see also Gordon et al., 2013 for further details).</p>				

Sampling methods / resolution							
Feature	Modelled	Acoustic / remote sensing	Remote video / camera	Infaunal - grab / core	Sediment	Diving	Visual census
BG							✓
CCS			✓	✓	✓		
FR	✓	✓					
GEO	✓	✓			✓		

CLYDE SEA SILL NATURE CONSERVATION MPA - DATA CONFIDENCE ASSESSMENT

Sampling methods / resolution	
Comments	<i>Black guillemot records were obtained using visual census methods in 2013 and 2014 and as part of the Seabird 2000 project. In almost all cases, records are based on a single count. Counts are conducted within 2 hours of first light in the pre-breeding period when birds can be counted on the sea just offshore from their breeding areas. The circalittoral and offshore sand and coarse sediment communities were sampled using infaunal grab and remote video techniques. Infrared Advanced Very High Resolution Radiometer (AVHRR) satellite data, with a spatial resolution of 1.2 km, were converted into sea surface temperature (SST) data. Computer modelling of these data enable the distribution and persistence of fronts to be mapped (percentage of average seasonal front frequency). The distribution of the components of the Marine Geomorphology of the Scottish Shelf Seabed geodiversity feature were derived from early side-scan sonar work in the 1970s (Caston, 1976), seabed sediment mapping undertaken by the British Geological Survey (BGS, 1996) and through data collation work completed as part of the Irish Sea Pilot study (reported in Vincent et al., 2004).</i>
Protected feature data coverage (Maps A - D)	
Across the MPA	
Large numbers of protected feature records distributed across the MPA	Numerous protected feature records scattered across the MPA with some clumping ✓ Numerous protected feature records possibly with some clumping. Boundary not defined solely by recorded feature distribution
Few or isolated protected feature records - possibly clumped	
For individual features	
Multiple records of individual protected features providing an indication of extent and distribution throughout the MPA	✓ <i>All features</i> Few or scattered records of specific protected features making extent and broad distribution assessment difficult
Few or isolated records of specific protected features	
Are acoustic remote sensing data available?	No
Has the extent of seabed habitat protected features been mapped?	<i>Yes - predicted habitat mapping for CCS (Map C) derived from Envision Mapping Ltd. (2014). The study concluded high to moderate confidence for the predictive seabed habitat polygons.</i>
Comments	<i>Black guillemots are largely confined to Sanda and Sheep Island in the north-western part of the Clyde Sea Sill MPA. Simple modelling of black guillemot foraging range data, based on limited survey findings, suggests that approximately 95% of foraging occurs within 2 km of the coastline where they nest (SNH, 2012). Incorporation of the core part of the persistent thermal front that extends across the sill has resulted in a boundary that accommodates the foraging requirements of the black guillemot (albeit recognising that they are only likely to utilise a small area of the front adjacent to the islands) (see Map C). The front itself may extend closer to the shore at either end of the sill than displayed on Figure 2ii, the modelling techniques used to visualise the sea surface temperature data have some detection limitations very close to the coast (Miller et al., 2010; 2014). The outer south-western boundary line of the MPA mirrors that of an existing fisheries restriction area (CA41 - see Map D). The circalittoral and offshore sand and coarse sediment communities feature is distributed across the floor of the sill, running from the north-east to the south-west. This biodiversity protected feature overlaps spatially with the tidally-worked mobile sediments of interest under the Marine Geomorphology of the Scottish Shelf Seabed geodiversity feature. Additional data on the circalittoral sand communities are also available from Scottish Environment Protection Agency (SEPA) routine seabed monitoring stations distributed along the sill (see Map D).</i>

CLYDE SEA SILL NATURE CONSERVATION MPA - DATA CONFIDENCE ASSESSMENT

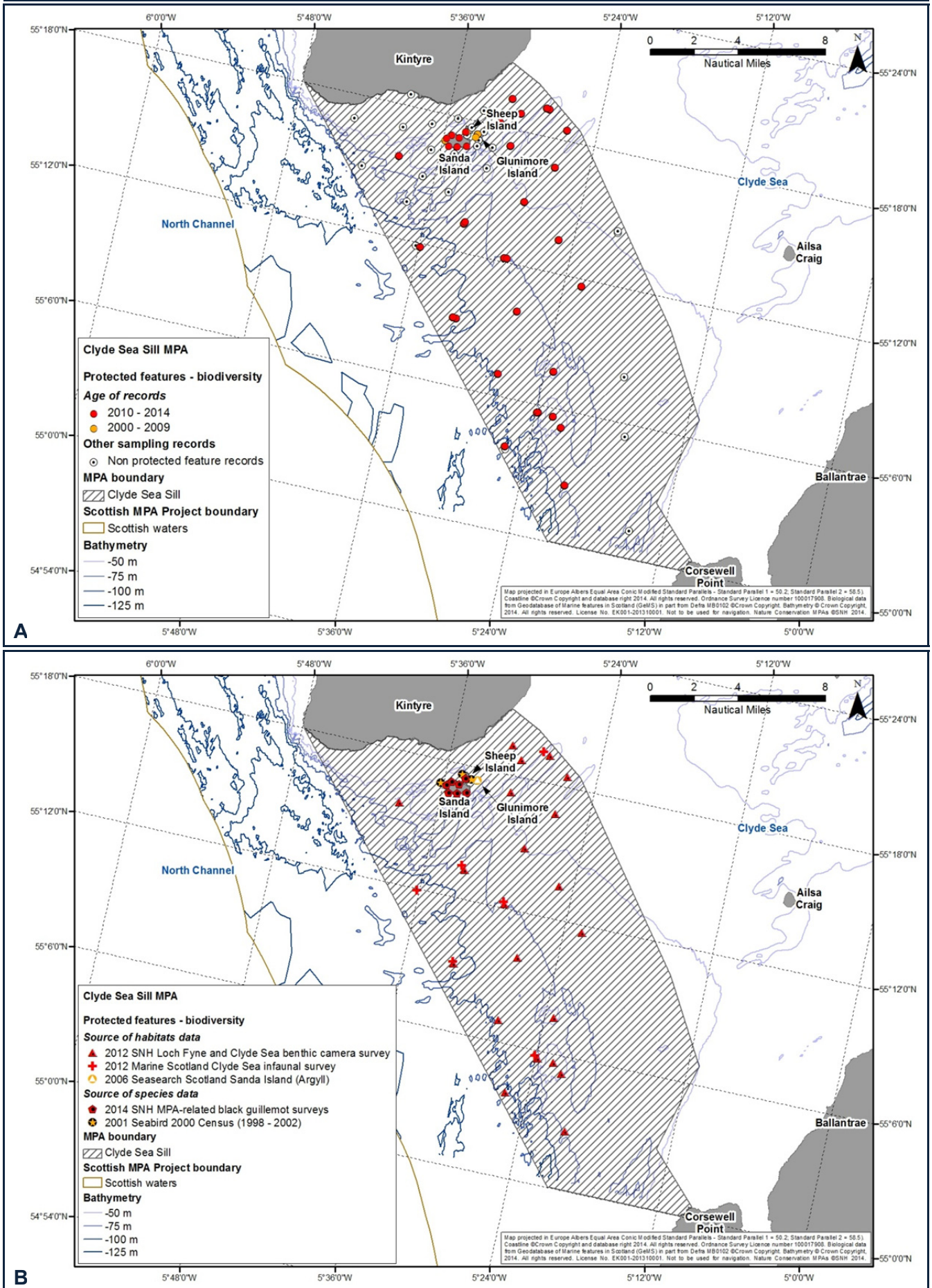
Data sources and bibliography			
Year	Title	Survey (Map B)	Features covered
In prep.	Swann, R. (in prep.). Marine Protected Area - related black guillemot surveys, 2014. <i>Scottish Natural Heritage Commissioned Report No. 792</i> . Available from http://www.snh.org.uk/pdfs/publications/commissioned_reports/792.pdf	2014 SNH MPA-related black guillemot surveys	BG
2014	Envision Mapping Ltd. (2014). Predictive Mapping of MPA protected features within selected possible Nature Conservation MPAs in Scottish territorial waters using available datasets. <i>Scottish Natural Heritage Commissioned Report No. 600</i> . Available from http://www.snh.org.uk/pdfs/publications/commissioned_reports/600.pdf		CCS
2014	Miller, P.I., Xu, W. and Lonsdale, P. (2014). Seasonal shelf-sea front mapping using satellite ocean colour to support development of the Scottish MPA network. <i>Scottish Natural Heritage Commissioned Report No. 538</i> . Available from http://www.snh.org.uk/pdfs/publications/commissioned_reports/538.pdf		FR
2013	Allen, J.H. (2013). Infaunal analysis of grab samples collected from the Clyde Sea, in March 2012. <i>Scottish Natural Heritage Commissioned Report 539</i> . Available from http://www.snh.org.uk/pdfs/publications/commissioned_reports/539.pdf	2012 Marine Scotland Clyde Sea infaunal survey	CCS
2013	Brooks, A.J., Kenyon, N.H., Leslie, A., Long, D. and Gordon, J.E. (2013). Characterising Scotland's marine environment to define search locations for new Marine Protected Areas. Part 2: The identification of key geodiversity areas in Scottish waters. <i>Scottish Natural Heritage Commissioned Report No. 432</i> . Available from http://www.snh.org.uk/pdfs/publications/commissioned_reports/432.pdf		GEO
2013	Gordon, J.E., Brooks, A.J., Rennie, A.G., James, B.D., Chaniotis, P.D., Kenyon, N.H., Leslie, A.B. and Long, D. (2013). The selection of Nature Conservation Marine Protected Areas (MPAs) in Scotland - assessment of geodiversity interests. <i>Scottish Natural Heritage Commissioned Report No. 633</i> . Available from http://www.snh.org.uk/pdfs/publications/commissioned_reports/633.pdf		GEO
2013	Swann, R. (2013). Marine Protected Area and Marine Renewable - related black guillemot surveys. <i>Scottish Natural Heritage Commissioned Report No. 612</i> . Available from http://www.snh.org.uk/pdfs/publications/commissioned_reports/612.pdf		BG
2012	SNH. (2012). <i>Marine Protected Areas and black guillemot (Cepphus grylle)</i> . Position paper for 4 th MPA Workshop, Heriot-Watt University, 14-15 March 2012. Available from http://www.scotland.gov.uk/Resource/0038/00389462.doc		BG
2012	Moore, C.G. and Atkinson, R.J.A. (2012). Biological analyses of underwater video from research cruises in the Clyde Sea, Loch Torridon and the Inner Sound, the North Minch, Loch Eriboll and off Orkney. <i>Scottish Natural Heritage Commissioned Report No. 536</i> . Available from http://www.snh.org.uk/pdfs/publications/commissioned_reports/536.pdf	2012 SNH Loch Fyne and Clyde Sea benthic camera survey	CCS

CLYDE SEA SILL NATURE CONSERVATION MPA - DATA CONFIDENCE ASSESSMENT

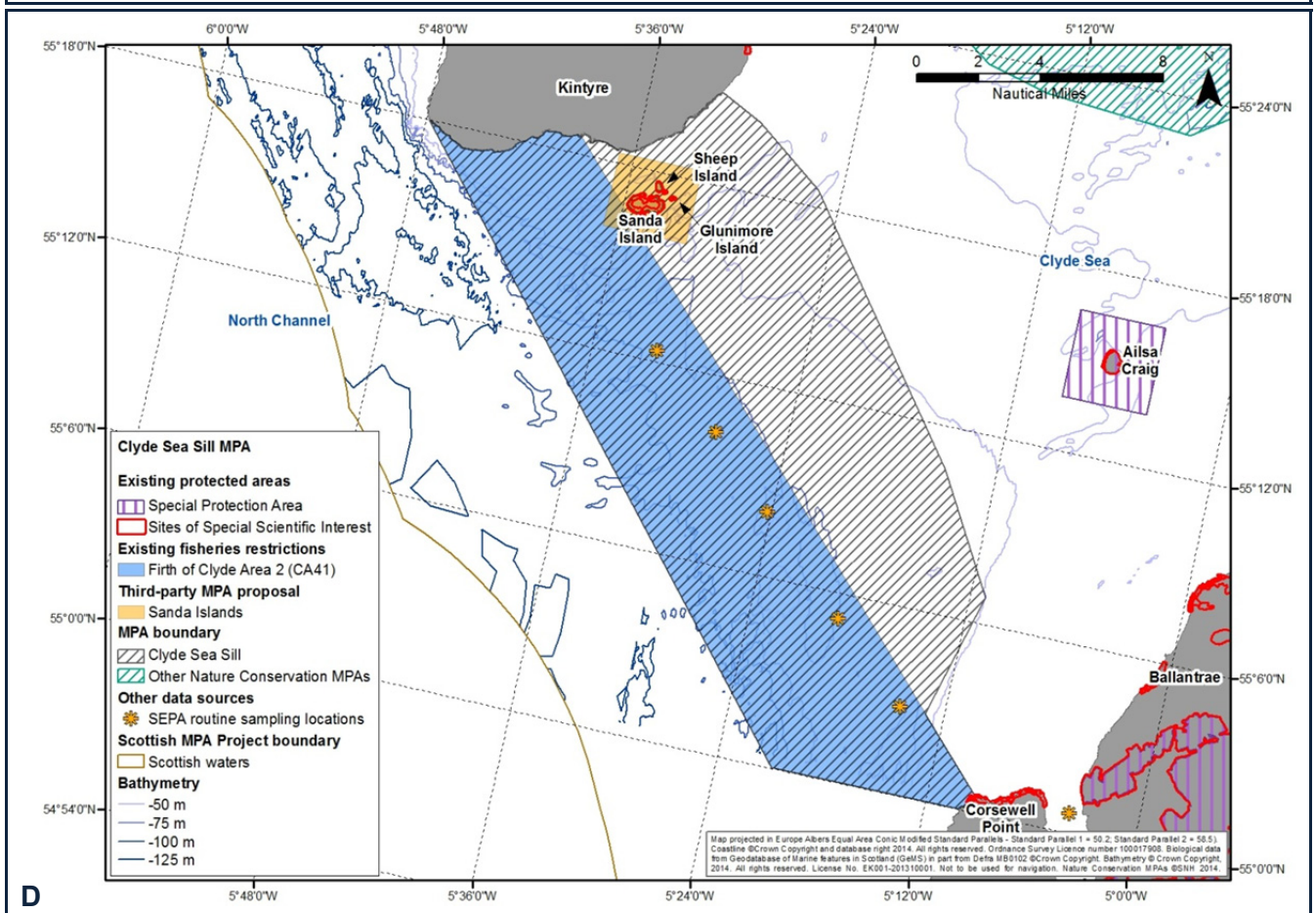
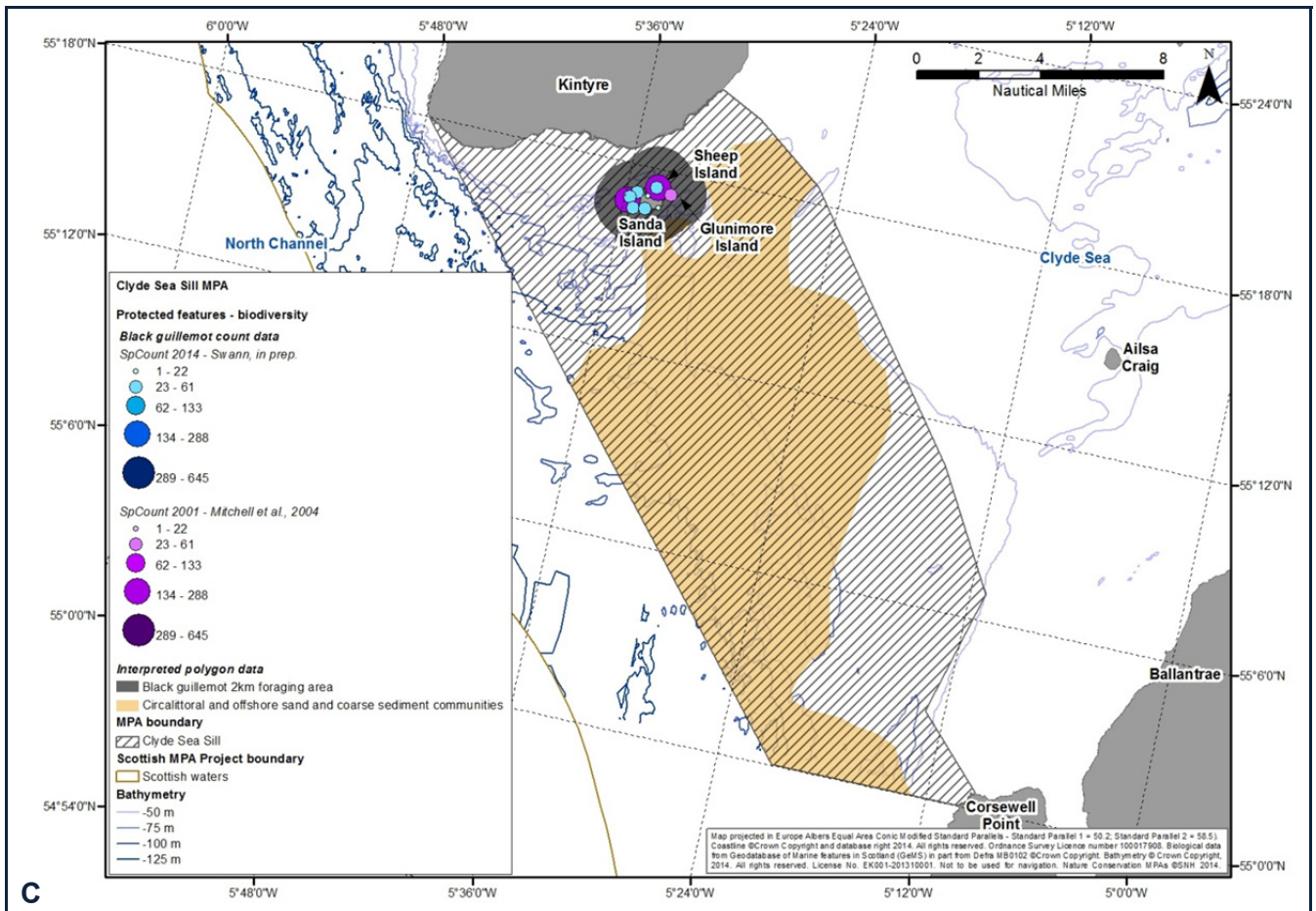
Data sources and bibliography			
Year	Title	Survey (Map B)	Features covered
2010	Miller, P.I., Christodoulou, S. and Saux-Picart, S. (2010). <i>Oceanic thermal fronts from Earth observation data - a potential surrogate for pelagic diversity</i> . Report to the Department of Environment, Food and Rural Affairs. Defra Contract No. MB102. Plymouth Marine Laboratory, subcontracted by ABPmer, Task 2F, pp. 24. Available from http://randd.defra.gov.uk/Document.aspx?Document=MB0102_9104_TRP.pdf		FR
2009	Brooks, A.J., Roberts, H., Kenyon, N.H. and Houghton, A.J. (2009). <i>Accessing and developing the required biophysical datasets and datalayers for Marine Protected Areas network planning and wider marine spatial planning purposes. Report No 8: Task 2A. Mapping of Geological and Geomorphological Features</i> . ABP Marine Environmental Research Ltd. Available from http://randd.defra.gov.uk/Document.aspx?Document=mb0102_8589_TRP.pdf		GEO
2006	Seasearch. (2006). <i>Sanda Island. 05/06 July 2006 - Summary report</i> . Available from http://www.seasearch.org.uk/downloads/Sanda.pdf	2006 Seasearch Scotland Sanda Island (Argyll)	CCS
2004	Mitchell, P.I., Newton, S.F., Ratcliffe, N. and Dunn, T.E. (eds.). (2004). <i>Seabird Populations of Britain and Ireland: results of the Seabird 2000 census (1998-2002)</i> . T and A.D. Poyser, London, pp 511. ISBN 0 7136 6901 2. Available from http://jncc.defra.gov.uk/page-1548	2001 Seabird 2000 Census (1998-2002)	BG
2004	Vincent, M.A., Atkins, S.M., Lumb, C.M., Golding, N., Lieberknecht, L.M. and Webster, M. (2004). <i>Marine nature conservation and sustainable development - the Irish Sea Pilot</i> . Report to Defra by the Joint Nature Conservation Committee, Peterborough. Available from http://jncc.defra.gov.uk/pdf/irishseapilot_all.pdf		GEO (sand wave fields)
1996	British Geological Survey. (1996). Clyde 55N 06W sea bed sediments and Quaternary, 1:250,000 geological map.		GEO (sand ribbon fields)
1991	Lloyd C., Tasker M.L. and Partridge K. (1991). <i>The status of seabirds in Britain and Ireland</i> . Poyser, London.		BG
1978	UKHO. (1978). Admiralty Chart 2199: North Channel Northern Part.		GEO (sand bank)
1976	Caston, G.F. (1976). The floor of the North Channel, Irish Sea: a side-scan sonar survey. <i>NERC Institute of Geological Sciences Report No. 76/7</i> .		GEO (sand ribbon fields)

CLYDE SEA SILL NATURE CONSERVATION MPA - DATA CONFIDENCE ASSESSMENT

THE EVIDENCE-BASE



CLYDE SEA SILL NATURE CONSERVATION MPA - DATA CONFIDENCE ASSESSMENT



**Scottish MPA Programme
Data confidence assessment**

SOUTHERN TRENCH POSSIBLE MPA

JUNE 2019

Further information on the Scottish MPA network and protected areas management is available at -

www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork

For the full range of MPA site documents and more on the fascinating range of marine life to be found in Scotland's seas, please visit -

www.nature.scot/mpas or www.incc.defra.gov.uk/scottishmpas

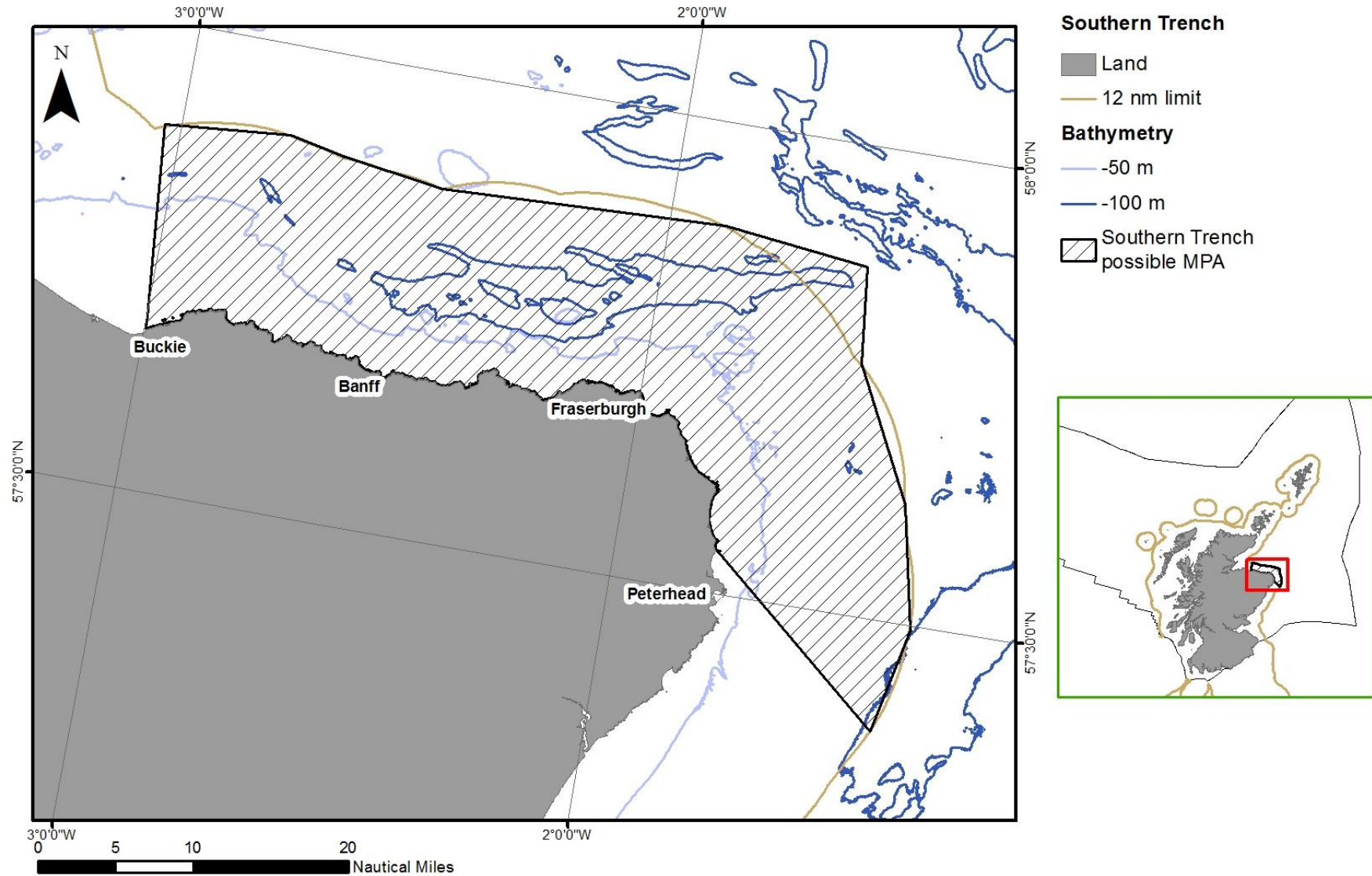
Document version control			
Version	Date	Author	Reason / Comments
Version 1	29/01/2014	Laura Clark	Revised MPA proposal format, updating MPA search location version (ver. 10 - 20/12/2012).
Version 2-4	17/02/2014-17/07/2014	Various	Refinements and document development.
Version 5	21/07/2014	John Baxter	QA review and sign-off.
Version 6	24/07/2014	Katie Gillham	Edits to address QA comments.
Version 7	16/03/2015	Ben James and Graham Epstein	Updated into possible MPA format with revised maps.
Version 8	07/04/2015	Katie Gillham	Review prior to Scientific Advisory Committee.
Version 9	18/09/2018	Sam Black and Katie Gillham	Review and Update.
Version 10	21/09/2018	Ben James	QA Review.
Version 11	25/09/2018	Sam Black	Refinements in response to initial QA review. Finalisation for SNH Scientific Advisory Committee.
Version 12	17/10/2018	Sam Black and Katie Gillham	Address comments from SNH Scientific Advisory Committee.
Version 13	17/10/2018	Ben James	QA review.
Version 14	18/10/2018	Sam Black and Katie Gillham	Finalisation for SNH Senior Leadership Team review.
Version 15	02/11/2018	Sam Black	Finalisation for SNH Protected Areas Committee.
Version 16	04/04/2019	Sam Black, Sarah Cunningham	Updating scale bar on adjusted density maps for minke whale following SAC comments. Addition of burrowed mud data from MS suitable <i>Nephrops</i> ground layer. Final review of text.

Distribution list			
Format	Version	Issue date	Issued to
Electronic	SL10	20/12/2012	SNH web publication [B1149456 / 25(#44)].
Electronic	2	17/02/2014	SNH SAC MPA Sub-group.
Electronic	5	23/07/2014	Marine Scotland officials.
Electronic	5	24/07/2014	SNH web publication [A1122998 / 16(#24)].
Electronic	8	13/04/2015	SNH SAC MPA Sub-group.
Electronic	8	16/11/2015	SNH web publication [A1568157 / 12(#20)].
Electronic	9	20/09/2018	Ben James.

Electronic	10	25/09/2018	Sally Thomas.
Electronic	11	28/09/2018	SNH Scientific Advisory Committee.
Electronic	14	18/10/2018	Sally Thomas (SLT).
Electronic	15	02/11/2018	SNH Protected Areas Committee.
Electronic	16	05/04/2019	Marine Scotland officials.

SOUTHERN TRENCH POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Figure 1 Southern Trench possible MPA



Map projected in Europe Albers Equal Area Conic (Modified Standard Parallels - Standard Parallel 1 = 50.2; Standard Parallel 2 = 58.5). Coastline ©Crown copyright and database right [2019]. All rights reserved. Ordnance Survey Licence number 100017908. The exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown Copyright). Landmass Ordnance Survey © Crown Copyright and database right 2019. All rights reserved. Scotland (Adjacent waters) Updated by the Law of the Sea Division, United Kingdom Hydrographic Office 2019. Biological data from Geodatabase of Marine features in Scotland (GeMS) in part from Defra MB0102 ©Crown Copyright. Bathymetry © Crown Copyright 2019. All rights reserved. License No. EK001-201310001. Not to be used for navigation. Copyright and database right 2019. pMPAs ©SNH 2019. 21.03.2019

Name of possible MPA	Southern Trench	Assessor(s)	BJ; LC; SM; LK; KG; MC; SB
-----------------------------	-----------------	--------------------	----------------------------

Southern Trench possible MPA is shown on Figure 1. It is shaped around the Southern Trench, a large undersea valley consisting of an area of deep water (~250 m) extending along the south of the outer Moray Firth, approximately 10 km from the coast between Banff and Fraserburgh. The Southern Trench is an exceptional example of an enclosed (glacial) seabed basin and is regarded as scientifically important in helping to understand ice sheet drainage patterns in this region. Detailed morphological analysis suggests it was formed from at least two erosion events operating in different directions (Brooks *et al.*, 2013). Shelf deeps in the possible MPA are enclosed topographic depressions on the sea bed which, in most cases, are created by glacial erosion during periods of low sea level. The resulting deeps have remained open and are significantly deeper than surrounding sea bed. The waters off Fraserburgh produce frontal zones with strong horizontal gradients in surface and/or bottom temperatures. Fronts can concentrate nutrients and plankton and are often associated with pelagic biodiversity hotspots as they attract prey assemblages and higher trophic level foragers such as cetaceans. The southern boundary of the possible MPA has been shaped to incorporate the core part of the front off Fraserburgh. The geology and hydrography of the possible MPA form a backdrop for a further two protected features: burrowed mud and minke whale. Minke whales are sighted particularly frequently in the outer Moray Firth (the northern section of the possible MPA) during summer. Burrowed mud has been recorded both inside and outside the shelf deep area (Greathead *et al.*, 2007; Allan *et al.*, 2012; Hirst *et al.*, 2012; Moore, 2017). The possible MPA also overlaps the marine part of the Troup, Pennan and Lion's Heads Special Protection Area (SPA) and with the Southern Moray Firth third-party MPA proposal submitted jointly by Whale and Dolphin Conservation, the Hebridean Whale and Dolphin Trust and Cetacean Research and Rescue Unit for minke whale.

Proposed protected features			
Biodiversity	<i>Burrowed mud (BM)</i> <i>Fronts (FR)</i> <i>Minke whale (MW)</i> <i>Shelf deeps (SD)</i>	Geodiversity	<i>Quaternary of Scotland - sub-glacial tunnel valleys and moraines (GEO)</i> <i>Submarine Mass Movement - slide scars (GEO)</i>

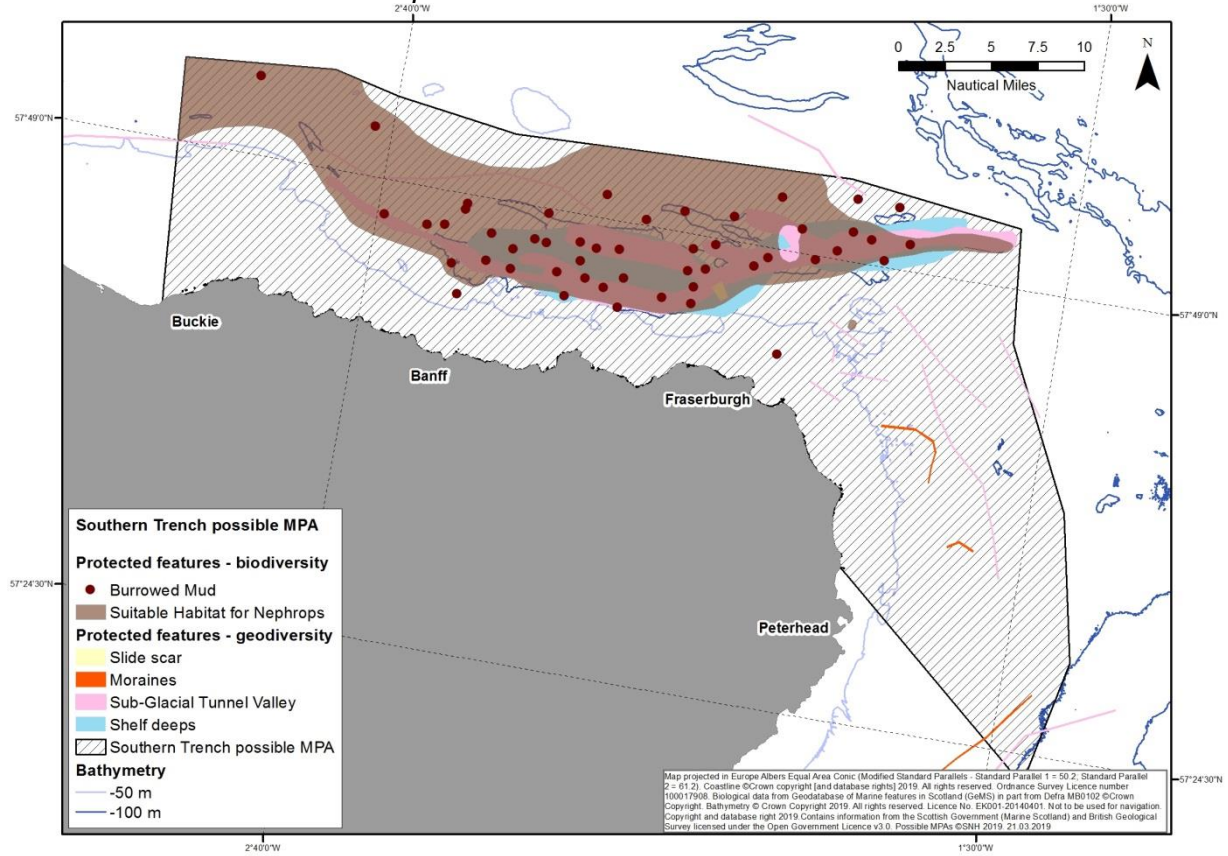
Data used in assessment			
<i>Version of GeMS database</i>	<i>Ver.7</i>	<i>Other datasets used in feature map (specify) -</i>	<ul style="list-style-type: none"> • <i>Contextual mapping (coastline; bathymetry; MPA boundaries; other protected areas).</i> • <i>MSS 2008-10 Nephrops database (Allan et al., 2012).</i> • <i>MSS Suitable Habitat for Nephrops data (MSS, 2017).</i> • <i>Habitat modelling: Aggregated effort-corrected sightings data and modelled predicted densities and persistence of minke whale 2000 - 2012 (Paxton et al., 2014a).</i> • <i>Seasonal frequent fronts data layers at 1.2 km resolution based on ocean thermal imagery (Dec 1998 - Nov 2008) (Miller et al., 2010).</i> • <i>Seasonal frequent fronts datalayers at 300 m and 1 km resolution based on ocean colour imagery (2009 - 2011) (Miller et al., 2014).</i> • <i>SEA 5 BGS multibeam survey (Holmes et al., 2004).</i> • <i>Civil Hydrography Programme (CHP) multibeam bathymetry survey coverage, Todhead point to Bosies Bank (CHP, 2009).</i> • <i>Marine Scotland multibeam dataset (Marine Scotland, 2011; shown in Hirst et al., 2012).</i>

Summary of data confidence assessment (see detailed assessment on following pages)						
Confident in underpinning data		Yes	✓	Partial		No
Confident in presence of identified features?	✓	Data suitable to define extent of individual proposed protected features	✓	Partial	x	
			FR;SD;GEO;MW	BM		
Summary	<p><i>We are confident in the presence of the proposed protected features within the possible MPA and the underpinning data. The data on these features are shown in Figure 2i - iv overleaf.</i></p> <p><i>The shelf deeps of the Southern Trench were mapped as part of a Strategic Environmental Assessment (Holmes et al., 2004), supplemented by data from a Marine Scotland multibeam survey in 2011 (Marine Scotland, 2011). Burrowed mud has been recorded at a coarse resolution across and beyond the shelf sill by Marine Scotland Nephrops fisheries surveys in 2008 - 2010 (Allan et al., 2012), by a Marine Scotland seabed habitat survey in 2011 (Hirst et al., 2012) and by CEFAS in 2015 (Moore, 2017). The extent of burrowed mud is reasonably well defined in the northern part of the possible MPA, but data are lacking to define its distribution in the southern part. The presence and distribution of seasonal frontal systems within the possible MPA has been determined from ocean thermal imagery (Miller et al., 2010; 2014), and data on the geodiversity proposed protected features stem from a number of sources (collated through Brooks et al., 2013).</i></p> <p><i>There is high confidence in the presence of minke whales, based on effort-corrected sightings data collated for the Joint Cetacean Protocol (JCP) and additional datasets, as analysed by Paxton et al. (2014a) to inform the Scottish MPA Programme. The analysis used survey data (2000 - 2012) from 23 distinct datasets and includes data (2010 - 2012) from the Cetacean Research and Rescue Unit (CRRU) that runs a programme of surveys in a region of the outer Moray Firth overlapping the possible MPA. Adjusted observed densities for minke whale, based on all the data available for spring, summer and autumn, suggest that the species is observed at high relative densities within the possible MPA compared to wider Scottish territorial waters. When these data are modelled, an area of the outer Moray Firth overlapping the possible MPA is persistently predicted to support above average densities of minke whale (this is seasonal and at the scale of Scottish territorial waters) over the period from 2000 to 2012 (Paxton et al., 2014a).</i></p>					

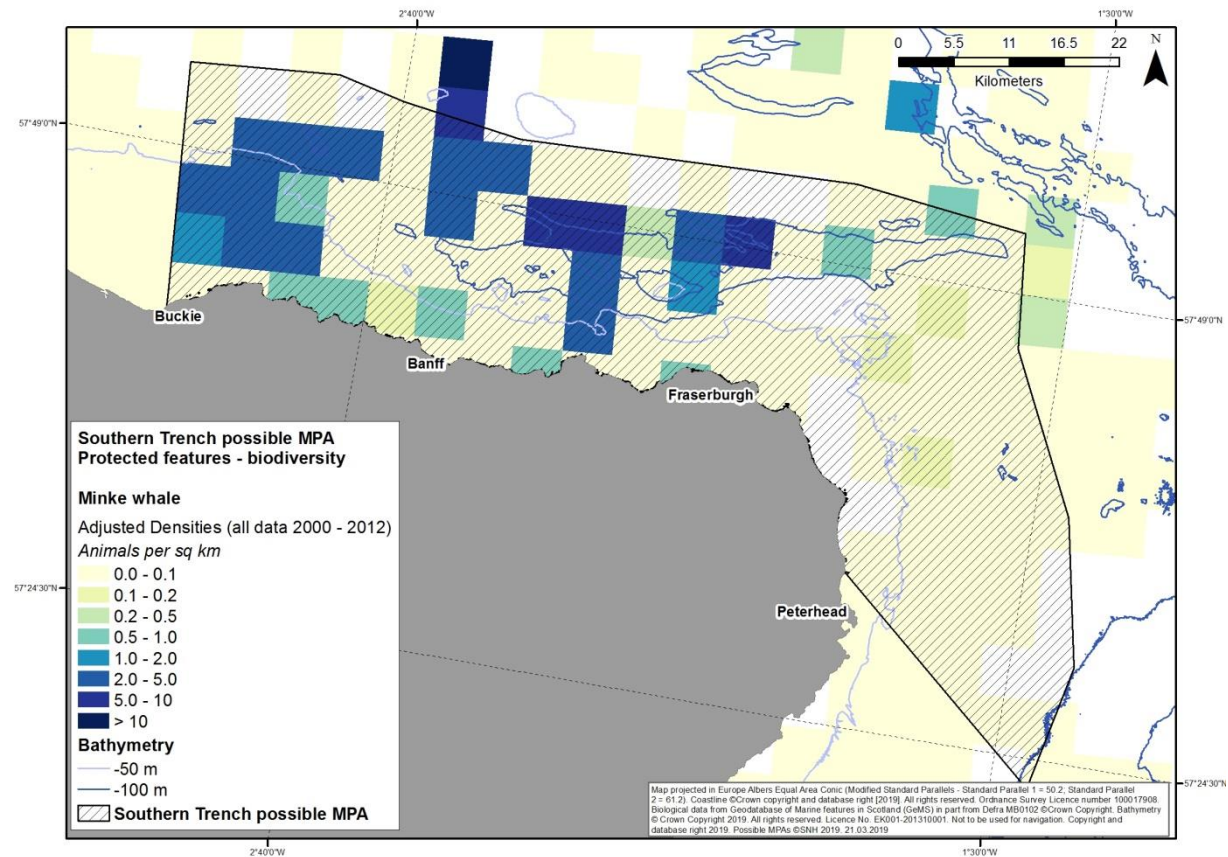
SOUTHERN TRENCH POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Figures 2i - iv The known/modelled distribution¹ of proposed protected features within the Southern Trench possible MPA

(i)

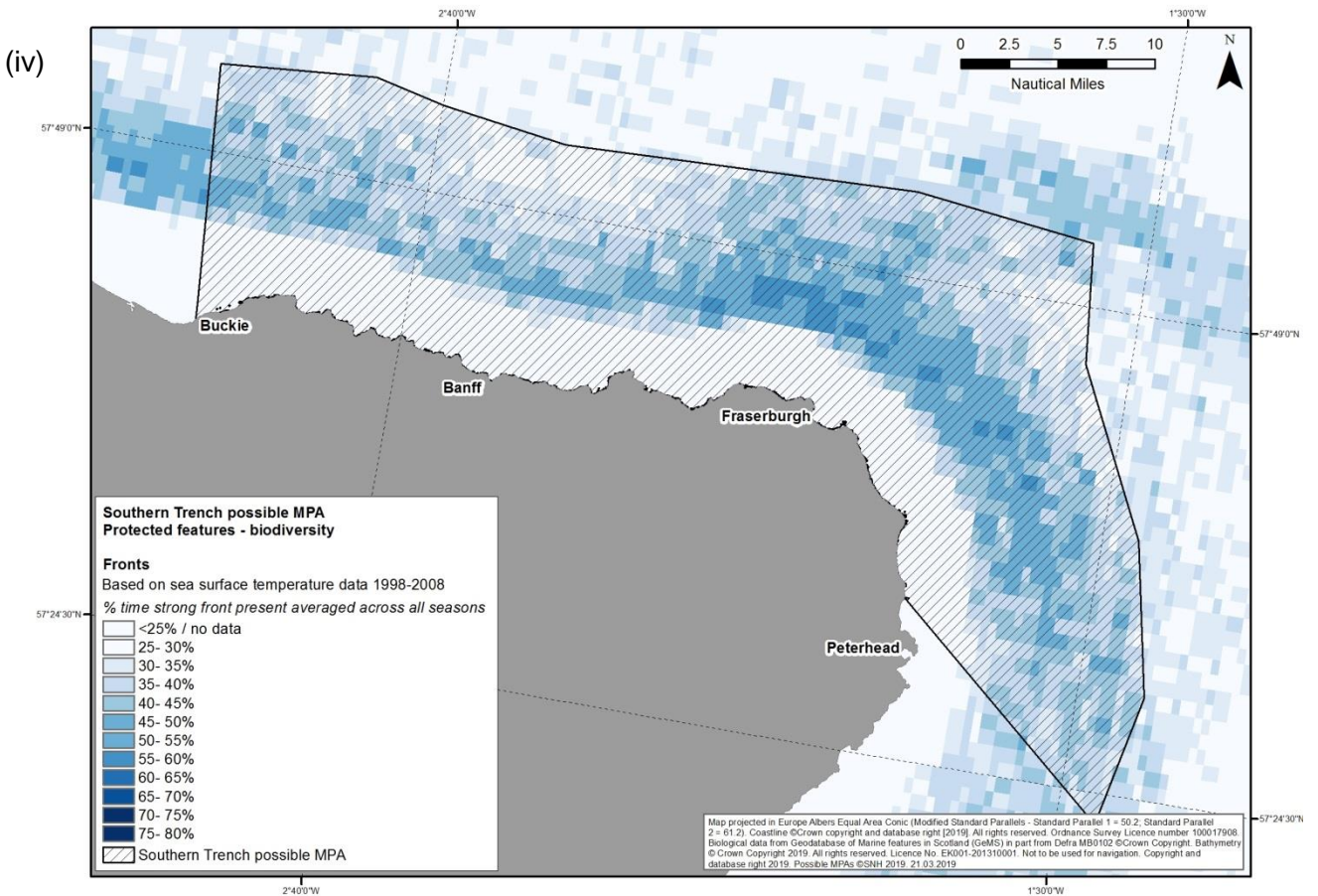
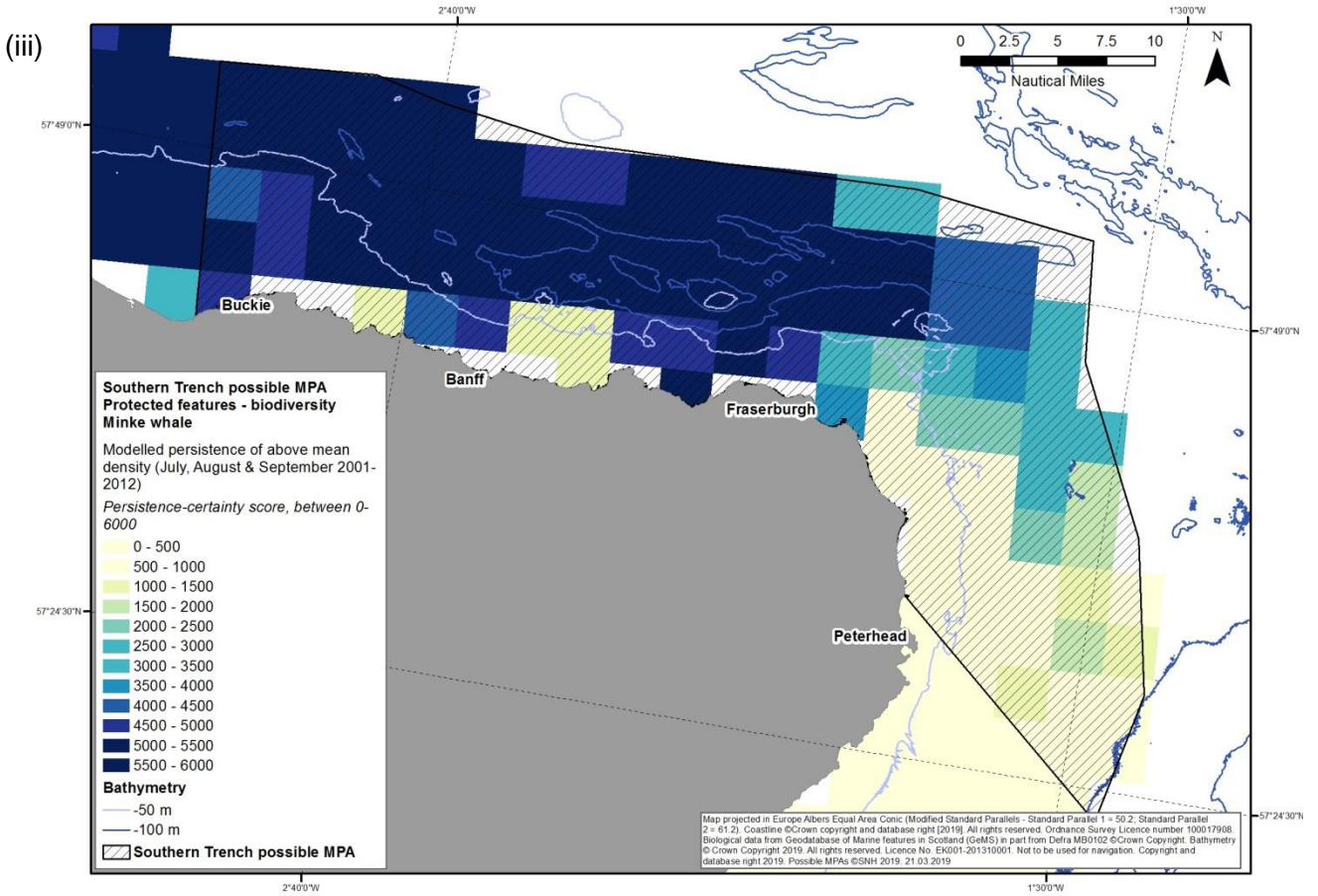


(ii)



¹ Note: The Submarine Mass Movement (Slide scars) proposed protected feature is under-represented in the mapping of geodiversity interests within the possible MPA. Grid boxes used in modelling work are 5 x 5 km.

SOUTHERN TRENCH POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT



SOUTHERN TRENCH POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Data confidence assessment	Our assessment of data confidence is based on consideration of the age and sources of the data, sampling methods used and overall coverage across the possible MPA (see Figure 2i-iv and Maps A - E). Existing protected areas are shown on Map G.
-----------------------------------	--

Age of proposed protected feature data					
Number of records collected within last 6 years	Many <i>BM;FR;SD; MW;GEO</i>	Number of records collected 6-12 years ago	Many <i>BM;FR;SD; MW;GEO</i>	Number of records >12 years old	Some <i>FR; MW</i>
Comments	<p><i>The shelf deeps of the Southern Trench were mapped as part of SEA 5 (Holmes et al., 2004) and Marine Scotland multibeam surveys of the area (Marine Scotland, 2011). Records of burrowed mud across and beyond the shelf sill were made between 2008 and 2010 by Marine Scotland Nephrops fisheries surveys (Allan et al., 2012), in 2011 by the Marine Scotland East Coast PMF survey (Hirst et al., 2012) and in 2015 by CEFAS (Moore, 2017). Ocean thermal imagery has informed the presence and distribution of seasonal frontal systems in a study that used data from December 1998 - November 2008 (Miller et al., 2010; 2014). Minke whale data comprise datasets collated for the Joint Cetacean Protocol (JCP) and additional datasets, as analysed by Paxton et al. (2014a), as part of spatial modelling undertaken to inform the Scottish MPA Project. Twenty-three separate datasets (with records from between 2000-2012) were used to inform the analysis, including CRRU data (2010 - 2012) that were collected from within the possible MPA.</i></p>				

Source of proposed protected feature data					
Targeted data collection for nature conservation purposes	✓	Statutory monitoring (marine licensing etc.)		Fisheries survey work	✓
Data collection associated with development proposals (EIA etc.)	✓	Recreational / volunteer data collection	✓	Other (specify) -	
Comments	<p><i>Burrowed mud has been recorded as a result of Nephrops fishery survey work undertaken by Marine Scotland (Allan et al., 2012) and targeted nature conservation surveys (Hirst et al., 2012; Moore 2017). Data regarding shelf deeps, fronts and geodiversity features have been recorded through the SEA/MS multibeam survey (Holmes et al., 2004; Marine Scotland, 2011) and ocean thermal imagery studies by Defra (Miller et al., 2010). Further geodiversity features were derived from a data collation exercise undertaken as part of a Defra-led research project (Brooks et al., 2009) with key geodiversity areas in Scottish waters subsequently identified through an SNH and JNCC commissioned desk-based review (Brooks et al., 2013).</i></p> <p><i>Minke whale data comprise datasets collated for the Joint Cetacean Protocol (JCP) and additional datasets, as analysed by Paxton et al. (2014a) to inform the Scottish MPA Programme. The analysis used 23 different datasets including: the SCANS & SCANSII projects coordinated by the Sea Mammal Research Unit; the European Seabirds at Sea studies coordinated by the Joint Nature Conservation Committee; data from the Sea Watch Foundation that come from a range of different projects and surveys, including data collected by volunteers; Hebridean Whale and Dolphin Trust data; University of Aberdeen data from the Moray Firth and data from the Cetacean Research and Rescue Unit, that run a programme of surveys in the outer Moray Firth overlapping the possible MPA. The full list of datasets used in the analysis is described in Paxton et al. (2014a & b).</i></p>				

SOUTHERN TRENCH POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Sampling methods / resolution							
Feature	Modelled	Acoustic / remote sensing	Remote video / camera	Infaunal - grab / core	Sediment	Diving	Visual census
BM	✓	✓	✓	✓	✓		
FR	✓						
MW	✓						✓
SD	✓	✓	✓				
Comments	<p>The MS-led fisheries and nature conservation-oriented surveys sampled burrowed mud using grab and remote video methodologies (Allan et al., 2012; Hirst et al., 2012). The shape of the shelf deeps have been modelled using SEA / Marine Scotland multibeam datasets (Holmes et al., 2004; Marine Scotland, 2011). The distribution of fronts is derived from ocean thermal imagery data at 1 - 4 km resolution, collected between December 1998 and November 2008 (Miller et al., 2010; 2014). The resulting frequent thermal front layers are mapped to a resolution of 1.2 km. All minke whale data were collected by visual census and only effort-corrected boat and aircraft-based sightings data were used (Paxton et al., 2014a). Twenty-three distinct datasets were aggregated as part of the analysis. All data were collected by observers who had observation as their primary task while on effort. The data were used to create estimated densities (corrected for availability and detectability) of minke whale per square km. These are mapped at a resolution of 5 km x 5 km. Generalised Estimating Equation (GEE) models were then used to predict relative densities of minke whale for all of Scottish territorial waters on a 5 km x 5 km resolution grid. The highest survey effort for minke whale across Scottish waters is during summer, which reflects both the seasonal occurrence of the species and the fact that cetacean surveys are highly dependent on weather and sea-state.</p>						

Proposed protected feature data coverage							
<i>Across the possible MPA</i>							
Large numbers of proposed protected feature records distributed across the possible MPA		Numerous proposed protected feature records scattered across the possible MPA with some clumping	✓	Numerous proposed protected feature records possibly with some clumping. Boundary not defined solely by recorded feature distribution		Few or isolated proposed protected feature records - possibly clumped	
<i>For individual features</i>							
Multiple records of individual proposed protected features providing an indication of extent and distribution throughout the possible MPA	✓ BM;FR; MW	Few or scattered records of specific proposed protected features making extent and broad distribution assessment difficult		Few or isolated records of specific proposed protected features			
Are modelled data available to facilitate understanding of feature distribution across the possible MPA?				Yes – available modelled data provides a good understanding of the distribution of the proposed protected features (see Maps 2i-iv and Maps A-B).			

SOUTHERN TRENCH POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Proposed protected feature data coverage	
Comments	<p><i>There is high confidence in the presence of all proposed protected features in this possible MPA. The data suitably define the extent of fronts, shelf deeps and geodiversity features. The extent of burrowed mud is well defined in the northern part of the possible MPA, but data are lacking to define its distribution in the southern part.</i></p> <p><i>There is high confidence in the seasonal presence of high relative densities of minke whale within the possible MPA (relative to wider Scottish waters) based on effort corrected sightings of minke whale, and also from modelling which predicts that the Moray Firth persistently supports above average densities of the species during summer. Areas to the west of the possible MPA which are predicted to persistently support above average densities of minke whale have not been included in the boundary because of a lack of effort corrected sightings data.</i></p>

Data sources and bibliography		
Year	Title	Features covered
2019	Moore, C. G. (2019). Biological analyses of underwater video from monitoring and research cruises in Lochs Ailort and Fyne, the Sounds of Barra and Mull, inner Moray Firth, off Wester Ross, Noss Head and Rattray Head, and around the Southern Trench in outer Moray Firth. Scottish Natural Heritage Research Report No. 1085. Available from < https://www.nature.scot/snh-research-report-1085-biological-analyses-underwater-video-monitoring-and-research-cruises >	BM
2017	Marine Scotland Science. (2017). Suitable Habitat for Nephrops data. Area Management - Norway Lobster (Nephrops norvegicus) - Functional Units. Metadata ID: Marine_Scotland_FishDAC_1993. Available from < https://spatialdata.gov.scot/geonetwork/srv/eng/catalog.search#/metadata/Marine_Scotland_FishDAC_1993 >	BM
2017	Miller, F., McCallum, S., White, A., Azzarello, J. & Caryl, F. (2017). Predictive mapping of seabed features within selected Special Areas of Conservation and Nature Conservation MPAs in Scottish territorial waters using available datasets. Scottish Natural Heritage Commissioned Report No. 980. Available from < https://www.nature.scot/snh-commissioned-report-980-predictive-mapping-seabed-features-within-selected-special-areas >	BM
2017	Moore, C.G. (2017). Biological analyses of underwater video from ongoing monitoring and research cruises in Lochs Sunart, Etive and Alsh, sea lochs off South Skye, the Sounds of Barra and Arisaig and around the Southern Trench. <i>Scottish Natural Heritage Commissioned Report No. 959</i> . Available from < https://www.nature.scot/snh-commissioned-report-959-biological-analyses-underwater-video-ongoing-monitoring-and-research >	BM
2014	Miller, P.I., Xu, W. and Lonsdale, P. (2014). Seasonal shelf-sea front mapping using satellite ocean colour to support development of the Scottish MPA network. <i>Scottish Natural Heritage Commissioned Report No. 538</i> . Available from < https://www.nature.scot/snh-commissioned-report-538-seasonal-shelf-sea-front-mapping-using-satellite-ocean-colour-support >	FR
2014	Paxton, C.G.M., Scott-Hayward, L.A.S. and Rexstad, E. (2014a). Statistical approaches to aid the identification of Marine Protected Areas for minke whale, Risso's dolphin, white-beaked dolphin and basking shark. <i>Scottish Natural Heritage Commissioned Report No. 594</i> . Available from < https://www.nature.scot/snh-commissioned-report-594-statistical-approaches-aid-identification-marine-protected-areas-minke >	MW
2014	Paxton, C.G.M., Scott-Hayward, L.A.S. and Rexstad, E. (2014b). Review of available statistical approaches to help identify Marine Protected Areas for cetaceans and basking shark. <i>Scottish Natural Heritage Commissioned Report No. 573</i> . Available from < https://www.nature.scot/snh-commissioned-report-573-review-available-statistical-approaches-help-identify-marine-protected >	MW

SOUTHERN TRENCH POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

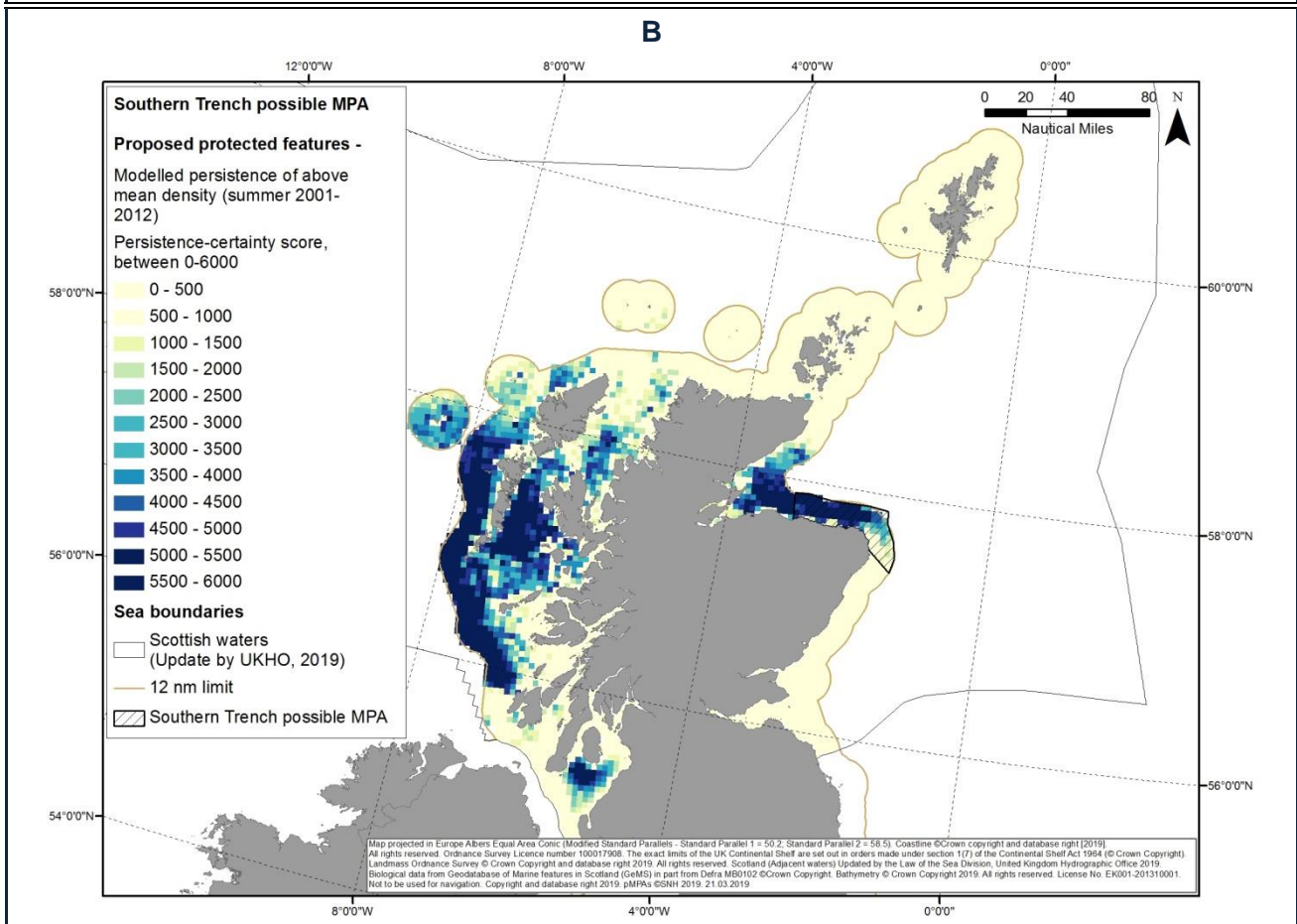
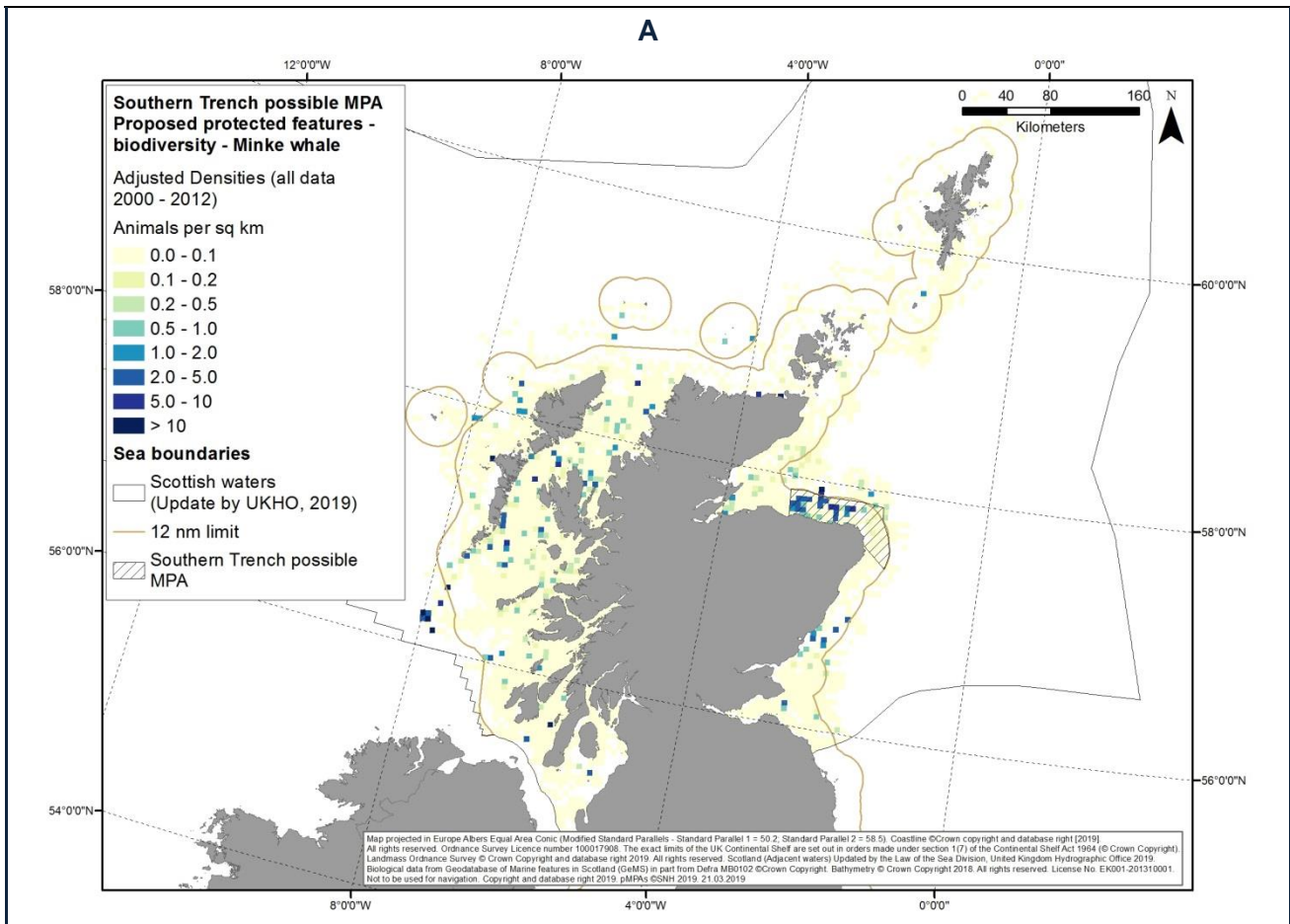
Data sources and bibliography		
Year	Title	Features covered
2013	Brooks, A.J., Kenyon, N.H., Leslie, A., Long, D. and Gordon, J.E. (2013). Characterising Scotland's marine environment to define search locations for new Marine Protected Areas. Part 2: The identification of key geodiversity areas in Scottish waters (final report). <i>Scottish Natural Heritage Commissioned Report No. 432</i> . Available from < http://www.nls.uk/e-monographs/2013/432.pdf >	GEO
2012	Allan, L., Demain, D., Weetman, A., Dobby, H. and McLay, A. (2012). Data mining of the <i>Nephrops</i> survey database to support the Scottish MPA Project. <i>Scottish Marine and Freshwater Science</i> 3(9). ISSN: 2043-7722. Available from < http://www.scotland.gov.uk/Resource/0041/00410486.pdf >	BM
2012	Hirst, N.E., Clark, L. and Sanderson, W.G. (2012). The distribution of selected MPA search features and Priority Marine Features off the NE coast of Scotland. <i>Scottish Natural Heritage Commissioned Report No. 500</i> . Available from < https://www.nature.scot/snh-commissioned-report-500-distribution-selected-mpa-search-features-and-priority-marine-features >	BM
2012	Scottish Natural Heritage. (2012). <i>Marine Protected Areas and cetaceans. Position paper for the 4th MPA Workshop, Heriot-Watt University, 14-15 March 2012</i> . Available from < http://www.scotland.gov.uk/Resource/0038/00389523.doc >	MW
2012	SNH and JNCC. (2012). <i>Marine Protected Areas and large scale features. Position paper for the 4th MPA Workshop, Heriot-Watt University, 14-15 March 2012</i> . Available from < https://www.nature.scot/scottish-mpa-project-large-scale-features-position-paper >	SD
2011	Marine Scotland. (2011). <i>British Geological Survey marine multibeam survey of Noss Head and Southern Trench on behalf of Marine Scotland and Scottish Natural Heritage</i> . Data shown in Hirst <i>et al.</i> , 2012.	GEO
2010	Miller, P.I., Christodoulou, S. and Saux-Picart, S. (2010). <i>Oceanic thermal fronts from Earth observation data - a potential surrogate for pelagic diversity</i> . Report to the Department of Environment, Food and Rural Affairs. Defra Contract No. MB102. Plymouth Marine Laboratory, subcontracted by ABPmer, Task 2F, pp. 24. Available from < http://randd.defra.gov.uk/Document.aspx?Document=MB0102_9104_TRP.pdf >	FR
2009	Brooks, A.J., Roberts, H., Kenyon, N.H. and Houghton, A.J. (2009). <i>Assessing and developing the required biophysical datasets and datalayers for Marine Protected Areas network planning and wider marine spatial planning purposes. Report No 8: Task 2A. Mapping of Geological and Geomorphological Features</i> . ABP Marine Environmental Research Ltd. Available from < http://randd.defra.gov.uk/Document.aspx?Document=mb0102_8589_TRP.pdf >	GEO
2009	CHP. (2009). <i>Civil Hydrography Programme Data. Todhead Point to Bosies Bank HI115</i> . Accessed March 2014.	GEO
2008	Bradwell, T., Stoker, M.S., Golledge, N.R., Wilson, C.K., Merritt, J.W., Long, D., Everest, J.D., Hestvik, O.B., Stevenson, A.G., Hubbard, A.L., Finlayson, A.G. and Mathers, H.E. (2008). The northern sector of the last British Ice Sheet: Maximum extent and demise. <i>Earth-Science Reviews</i> 88: 207-226.	GEO
2007	Greathead, C.F., Donnan, D.W., Mair, J.M. and Saunders, G.R. (2007). The sea pens <i>Virgularia mirabilis</i> , <i>Pennatula phosphorea</i> and <i>Funiculina quadrangularis</i> : distribution and conservation issues in Scottish waters. <i>Journal of Marine Biological Association of the UK</i> 87:1095-1103.	BM
2007	Robinson, K.P., Baumgartner, N., Eisfeld, S.J., Clark, N.M., Culloch, R.M., Haskins, G.M., Zapponi, L., Whaley, A.R., Weare, J.S. and Tetley, M.J. (2007). The summer distribution and occurrence of cetaceans in coastal waters in the outer southern Moray Firth in northeast Scotland (UK). <i>Lutra</i> 50: 19-30.	MW

SOUTHERN TRENCH POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

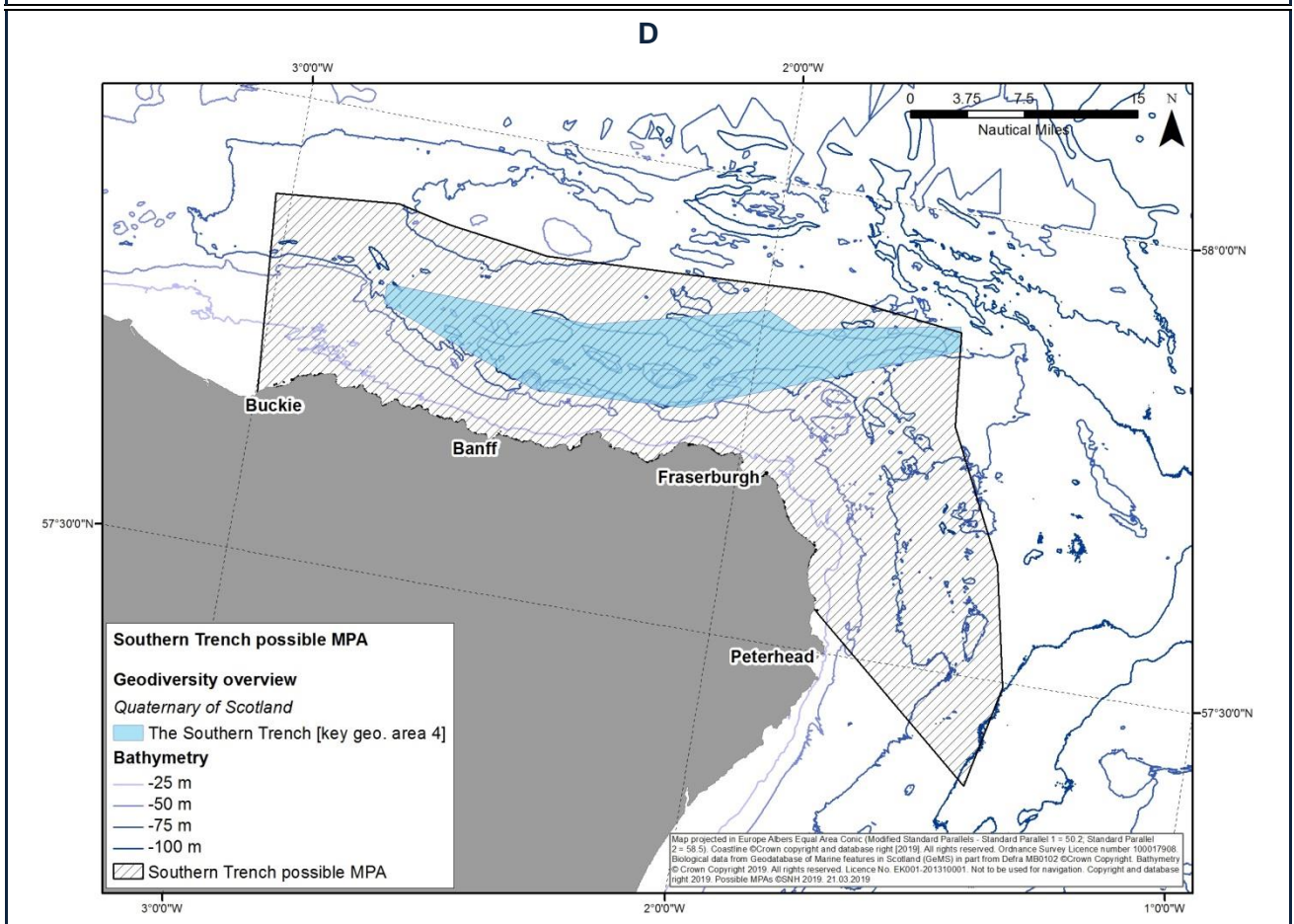
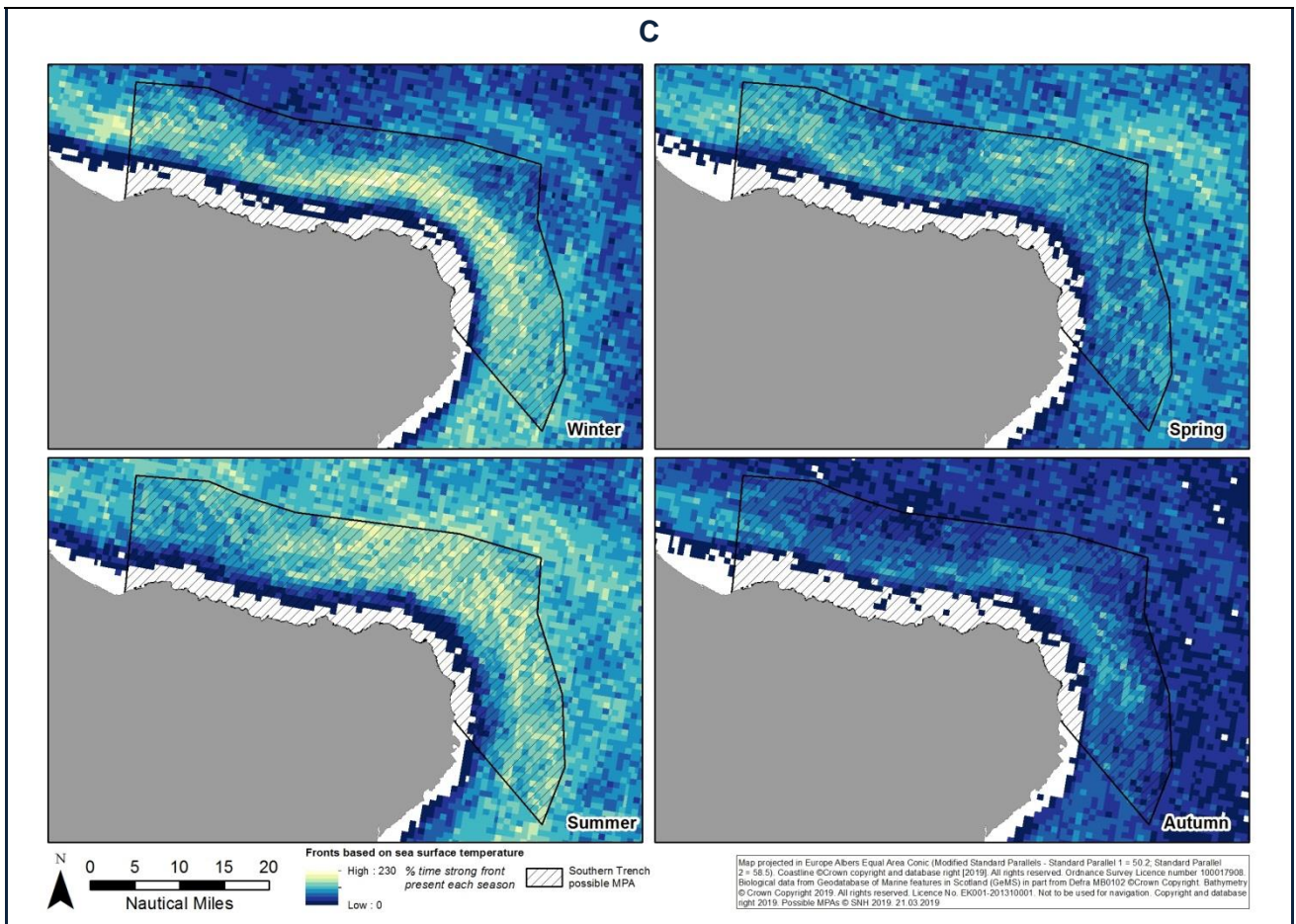
Data sources and bibliography		
Year	Title	Features covered
2004	Holmes, R., Bulat, J., Henni, P., Holt, J., James, C., Kenyon, N., Leslie, A., Long, D., Musson, R., Pearson, S. and Stewart, H. (2004). DTI Strategic Environmental Assessment Area 5 (SEA5): Seabed and superficial geology and processes. <i>British Geological Survey Report CR/04/064N</i> . BGS, Edinburgh.	GEO

SOUTHERN TRENCH POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

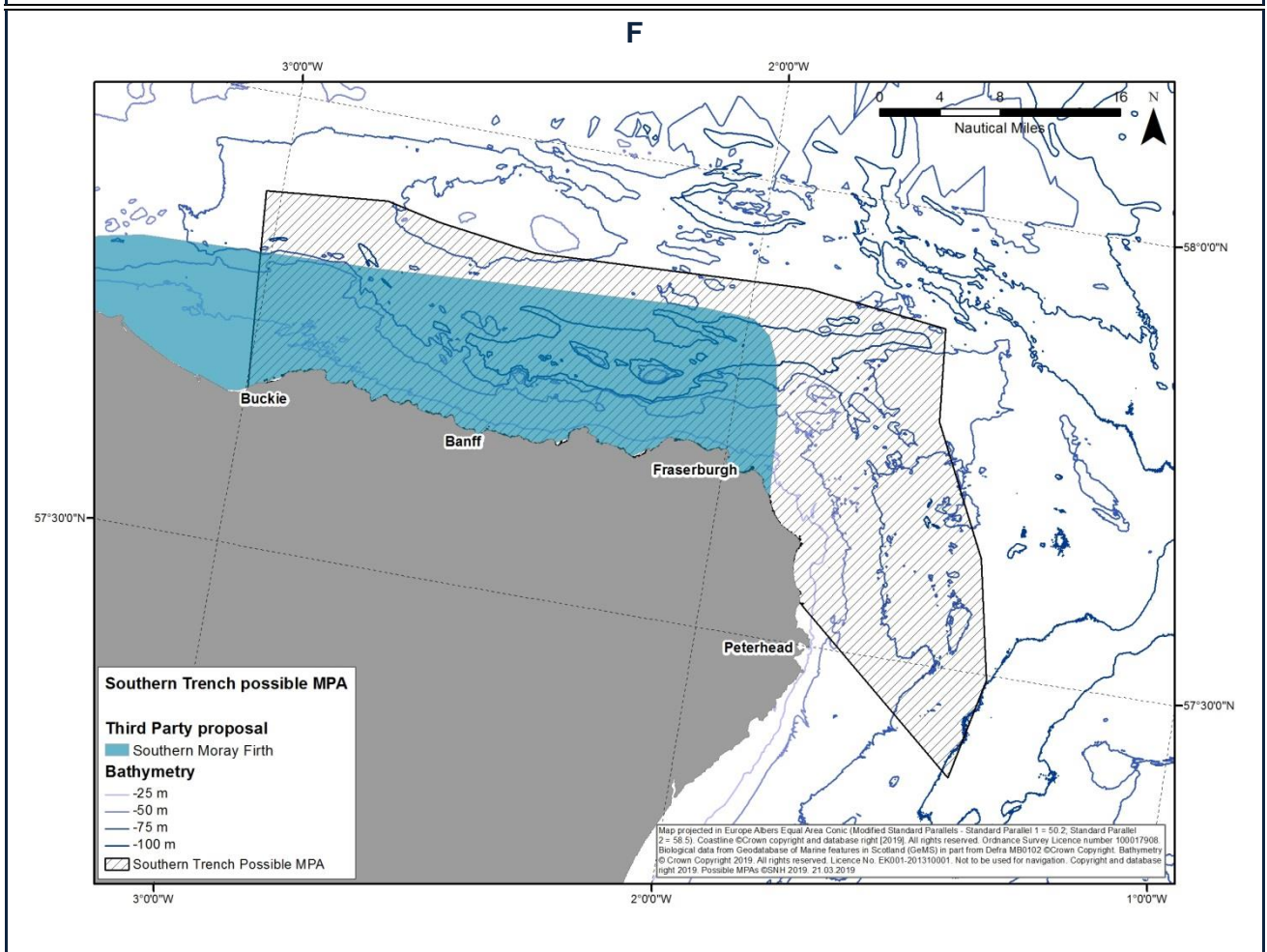
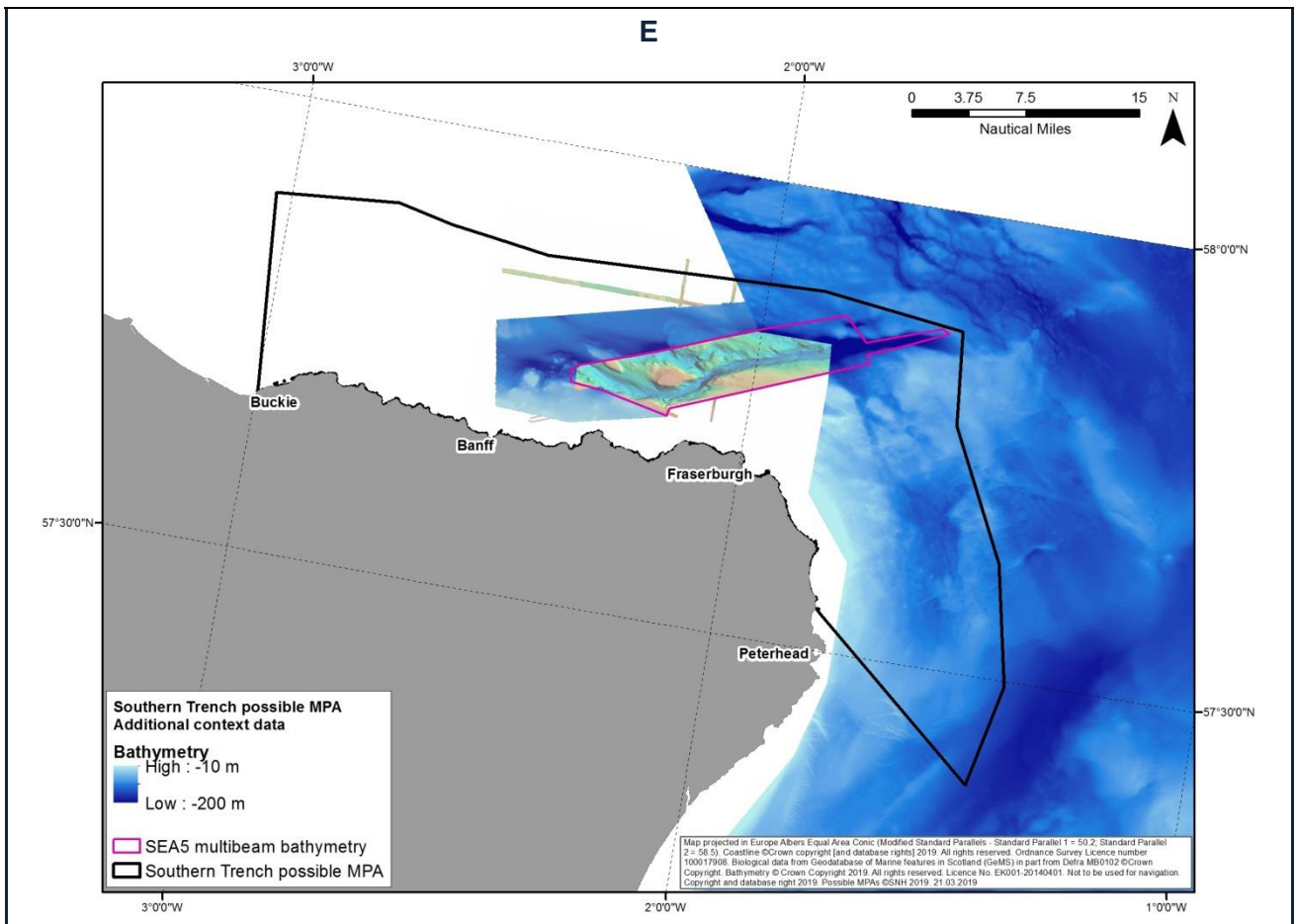
THE EVIDENCE-BASE



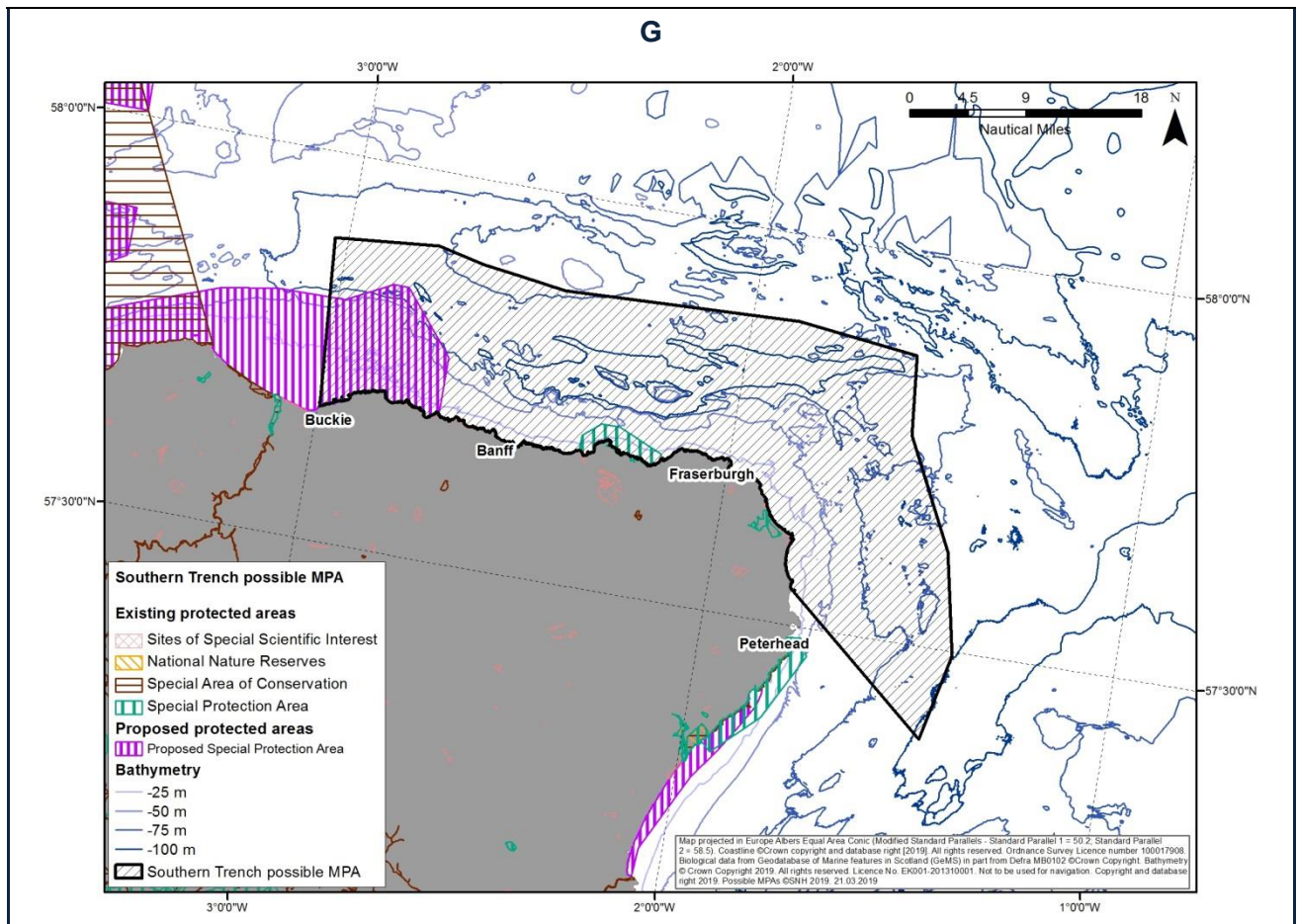
SOUTHERN TRENCH POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT



SOUTHERN TRENCH POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT



SOUTHERN TRENCH POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT



**Scottish MPA Programme
Data confidence assessment**

SEA OF THE HEBRIDES POSSIBLE MPA

JUNE 2019

Further information on the Scottish MPA network and protected areas management is available at -

www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork

For the full range of MPA site documents and more on the fascinating range of marine life to be found in Scotland's seas, please visit -

www.nature.scot/mpas or www.incc.defra.gov.uk/scottishmpas

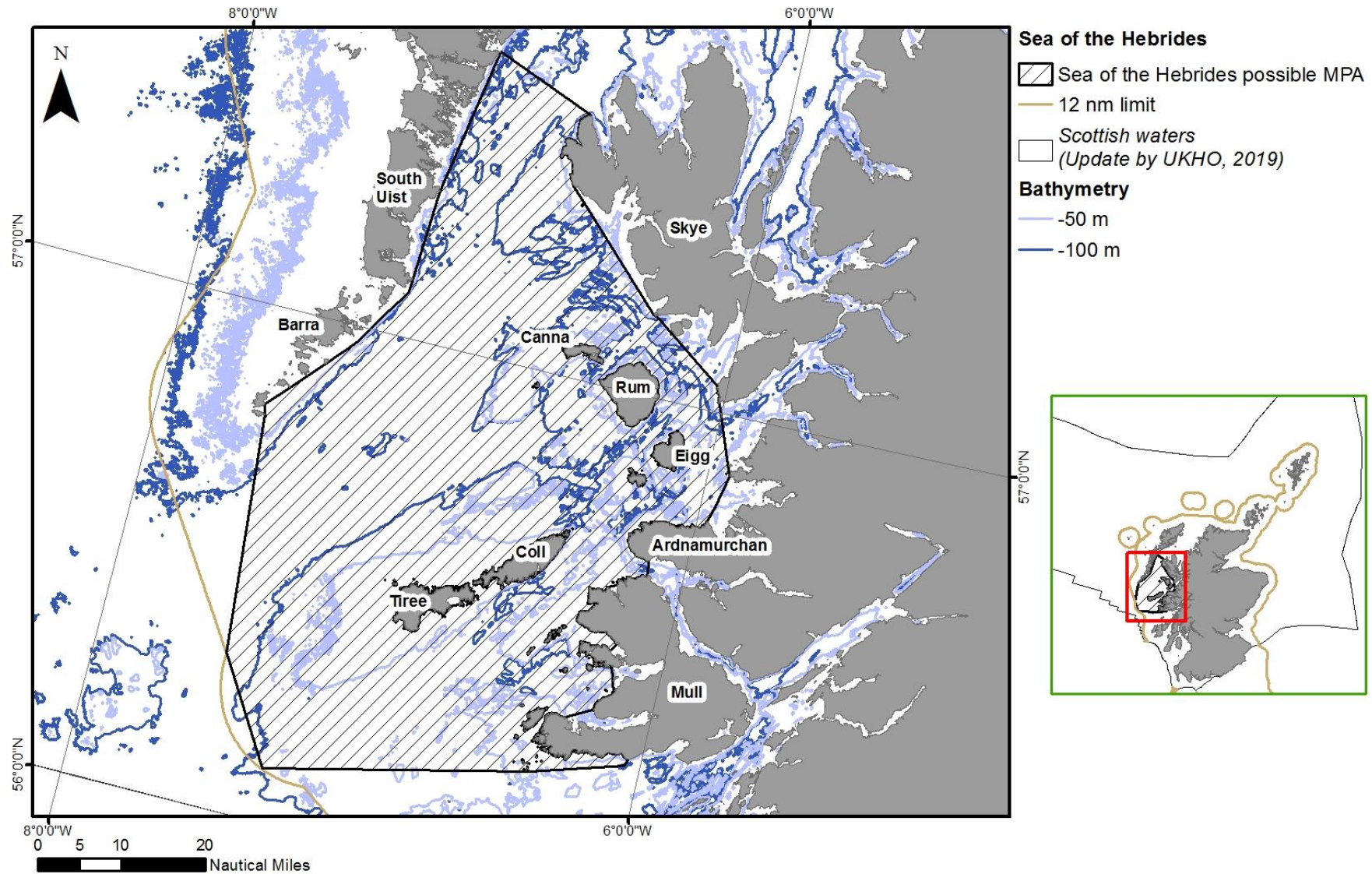
Document version control			
Version	Date	Author	Reason / Comments
Version 1	29/01/2014	Laura Clark	Revised MPA proposal format, updating MPA search location version (ver. 11 - 14/01/2013).
Version 2	17/02/2014	Morven Carruthers	Revised text and mapping, name change.
Version 3-4	26/03/2014-23/04/2014	Morven Carruthers, Suz Henderson & Katie Gillham	Revisions to address comments from SAC and mapping updates.
Version 5	21/07/2014	John Baxter	QA review and sign-off.
Version 6	22/07/2014	Katie Gillham	Edits to address QA comments.
Version 7	26/03/2015	Ben James & Graham Epstein	Updated into possible MPA format.
Version 8	13/03/2015	John Baxter	QA review and sign-off.
Version 9	07/04/2015	Katie Gillham, Ben James and Graham Epstein	Address comments from QA ready for Scientific Advisory Committee.
Version 10	18/09/2018	Sam Black & Katie Gillham	Review and Update.
Version 11	21/09/2018	Ben James	QA Review.
Version 12	27/09/2018	Sam Black	Refinements in response to initial QA review. Finalisation for SNH Scientific Advisory Committee.
Version 13	17/10/2018	Sam Black and Katie Gillham	Review and Update.
Version 14	17/10/2018	Ben James	QA Review.
Version 15	18/10/2018	Sam Black and Katie Gillham	Refinement in response to initial QA review. Finalisation for SNH Senior Leadership Team review.
Version 16	02/11/2018	Sam Black	Finalisation for SNH Protected Areas Committee.
Version 17	05/04/2019	Sam Black, Sarah Cunningham	Updating scale bar on adjusted density maps for minke whale and basking shark following SAC comments. Final review of text.

Distribution list			
Format	Version	Issue date	Issued to
Electronic	SL11	14/01/2013	SNH web publication [B1149441 / 28(#49)]
Electronic	2	17/02/2014	SNH SAC MPA Sub-group
Electronic	5	23/07/2014	Marine Scotland officials

Electronic	6	24/07/2014	SNH web publication [A1185177 / 21(#26)]
Electronic	9	13/04/2015	SNH SAC MPA Sub-group
Electronic	9	16/11/2015	SNH web publication [A1581182 / 7(#11)]
Electronic	10	20/09/2018	Ben James
Electronic	11	27/09/2018	Sally Thomas
Electronic	11	28/09/2018	SNH Scientific Advisory Committee
Electronic	14	18/10/2018	Sally Thomas (SLT)
Electronic	15	02/11/2018	SNH Protected Areas Committee
Electronic	17	05/04/2019	Marine Scotland officials.

SEA OF THE HEBRIDES POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Figure 1 Sea of the Hebrides possible MPA



Map projected in Europe Albers Equal Area Conic (Modified Standard Parallels - Standard Parallel 1 = 50.2; Standard Parallel 2 = 58.5). Coastline ©Crown copyright and database right [2019]. All rights reserved. Ordnance Survey Licence number 100017908. The exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown Copyright). Landmass Ordnance Survey © Crown Copyright and database right 2019. All rights reserved. Scotland (Adjacent waters) Updated by the Law of the Sea Division, United Kingdom Hydrographic Office 2019. Biological data from Geodatabase of Marine features in Scotland (GeMS) in part from Defra MB0102 ©Crown Copyright. Bathymetry © Crown Copyright 2019. All rights reserved. License No. EK001-201310001. Not to be used for navigation. Copyright and database right 2019. pMPAs ©SNH 2019. 21.03.2019

SEA OF THE HEBRIDES POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Name of possible MPA	Sea of the Hebrides	Assessor(s)	SH; LC; MC; SM; BJ; GE; KG; SB
<p>The Sea of the Hebrides possible MPA is shown in Figure 1. The possible MPA covers the Sea of the Hebrides between the east coast of the Outer Hebrides and the west coasts of Skye, Mull and the Ardnamurchan Peninsula, incorporating waters around the islands of Rum, Eigg, Muck, Coll and Tiree. In the north the proposal is bounded by a line between Dunvegan Head on Skye to Aird nam Madadh on Uist. The southern boundary extends from the south-eastern tip of Mingulay to the south-west coast of Mull. This possible MPA encompasses the Small Isles MPA, an area of water encircling the isles of Rum and Canna. It also encompasses the Southern Hebrides third-party proposal. The size of the Sea of the Hebrides possible MPA reflects the mobile nature of two of the protected features (basking shark and minke whale) and the inclusion of a large-scale fronts feature. Basking shark and minke whale occur throughout the possible MPA, with basking shark recorded particularly around Coll, Tiree, Skerryvore and Hyskier and minke whale recorded most frequently in the north-west along the coast of the Outer Hebrides, as well as around the Small Isles. Frequent fronts are present to the south-west of Tiree at the boundary between the tidally-mixed zone on the relatively shallow inner shelf of Skerryvore and more stratified waters further away from the shelf, with smaller frontal areas forming around other headlands and areas with complex topography. The possible MPA also encompasses part of an internationally important example of a non-tropical shelf carbonate system (Brooks <i>et al.</i>, 2013; Gordon <i>et al.</i>, 2013). The Inner Hebrides Carbonate Production Area represents the Marine Geomorphology of the Scottish Shelf Seabed geodiversity feature and is responsible for generating carbonate-rich sediments (e.g. that have a high shell content derived from animals that live in / on the sea bed or, in more shallow tide-swept locations, calcium carbonate input from banks of maerl gravel (maerl is a coralline seaweed)). These sediments supply the carbonate sands of the coastal machair that in turn supports specific and diverse grassland vegetation. Machair is one of the rarest habitats in Europe and is confined globally to the north and north-west of Scotland and the north-west of Ireland.</p>			

Proposed protected features			
Biodiversity	<i>Basking shark (BS)</i> <i>Fronts (FR)</i> <i>Minke whale (MW)</i>	Geodiversity	<i>Marine Geomorphology of the Scottish Shelf Seabed (Inner Hebrides Carbonate Production Area) (GEO)</i>

Data used in assessment			
Version of GeMS database	Ver.7	Other datasets used in feature map (specify) -	<ul style="list-style-type: none"> <i>Habitat modelling: Amalgamated effort corrected sightings data; modelled predicted densities; and, persistence of minke whale & basking shark 2000 - 2012 (Paxton et al., 2014a).</i> <i>Basking shark satellite telemetry: SPOT and SPLASH-F data 2012-2015 (Witt et al., 2016).</i> <i>Defra MB0102 Task 2F: Seasonal frequent fronts data layers at 1.2 km resolution, based on ocean thermal imagery (December 1998 - November 2008 (Miller et al., 2010).</i> <i>Seasonal frequent fronts datalayers: based on ocean colour imagery (chlorophyll-a) at 300 m and 1 km resolution, 2009 - 2011 (Miller et al., 2014).</i>

Summary of data confidence assessment (see detailed assessment on following pages)							
Confident in underpinning data		Yes	✓	Partial		No	
Confident in presence of identified features?	✓	Data suitable to define extent of individual proposed protected features	✓		Partial		*
				BS;FR;MW			

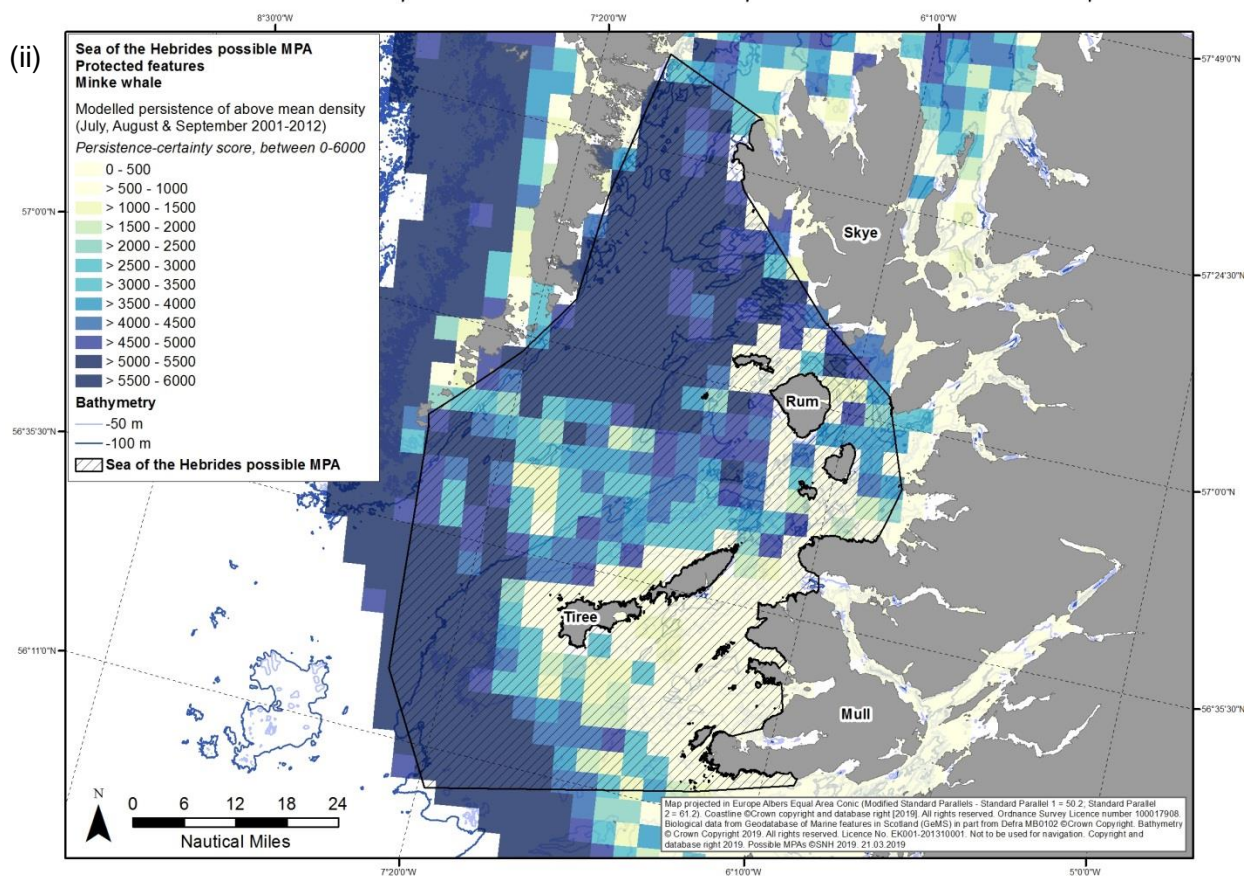
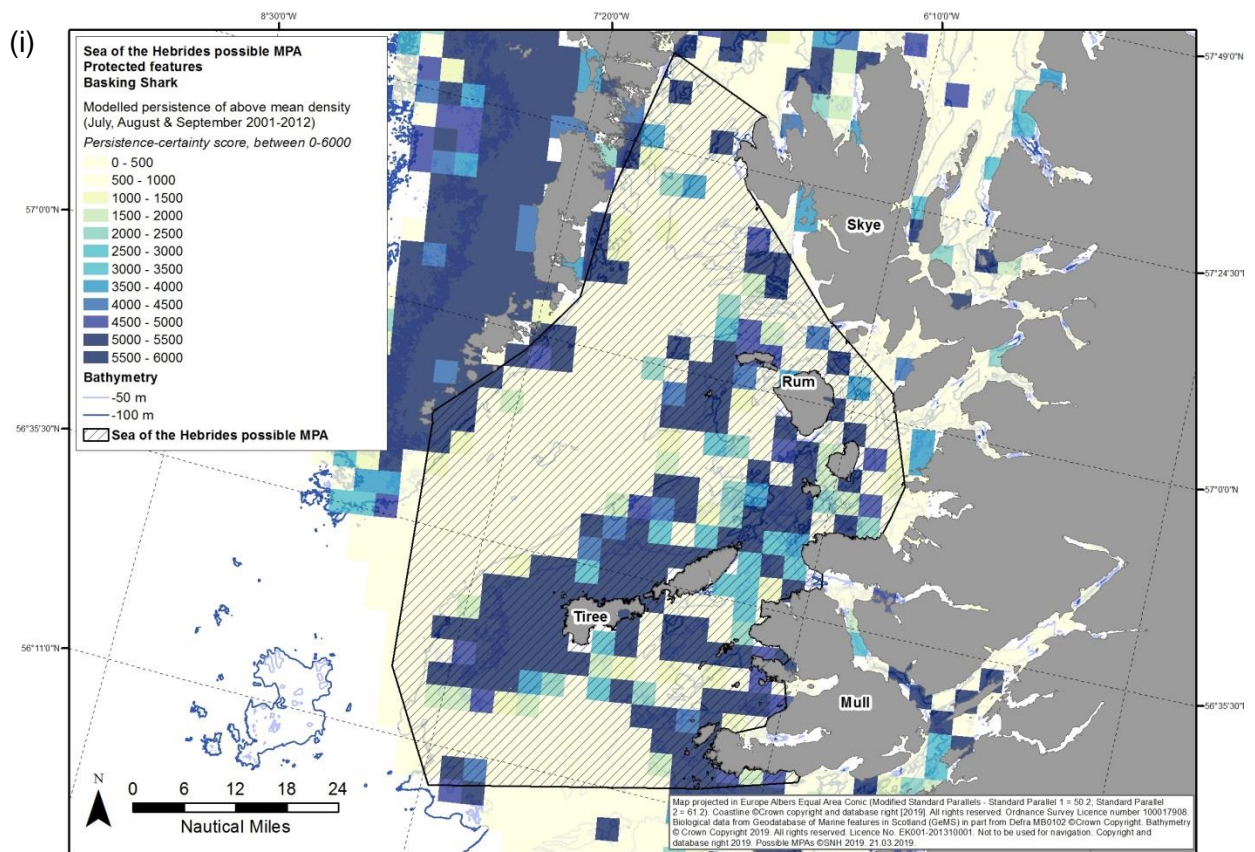
SEA OF THE HEBRIDES POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Summary of data confidence assessment (see detailed assessment on following pages)	
Summary	<p><i>We are confident in the presence of the proposed protected features within the possible MPA and the underpinning data. The data on these features are shown in Figures 2i - iii overleaf.</i></p> <p><i>Frequent front maps derived from satellite ocean thermal imagery have been used to assess the presence and distribution of seasonal fronts within the possible MPA and highlight the presence of a strong front in the area to the south-west of Tiree. Simplified tidal mixing maps (based on depth and tidal speeds) similarly highlight regions of strong mixing around headlands or in areas with complex topography, and areas of increased stratification further offshore, with fronts forming at the boundaries (Miller et al., 2010; 2014).</i></p> <p><i>For both minke whale and basking shark, there is high confidence in the presence of the features based on effort-corrected sightings data collated for the Joint Cetacean Protocol (JCP)¹ and analysed by Paxton et al. (2014a) as part of spatial modelling undertaken to inform the Scottish MPA Programme. The spatial modelling used survey data (2000 - 2012) from 23 distinct datasets and includes data (up to 2012) from Hebridean Whale and Dolphin Trust (HWDT) that runs a series of surveys throughout summer on the west coast, including in the area of the possible MPA. It also includes data available from Wave Action/The Wildlife Trust basking shark project that had a study area overlapping the possible MPA. For minke whale, the spatial models particularly highlight an area in the north-west of the possible MPA, predicting that it supports persistently higher than average densities of the species. These predictions are backed up by effort corrected data that indicate that minke whales are observed seasonally throughout the possible MPA, but particularly frequently in the north and west. Basking sharks are predicted to occur consistently at higher than average densities in the south and east of the possible MPA, particularly around Coll and Tiree. Again, these predictions are backed up by effort-corrected sightings data. For both species, the analyses used data from spring, summer and autumn, as very limited records of minke whale and basking shark are available for winter months in Scottish waters. This is partly a result of surveys being targeted at times when weather is less likely to be a limiting factor but also linked to seasonal changes in distribution of the species, both of which are recorded in the possible MPA most frequently during summer months.</i></p> <p><i>For basking sharks, there are also data available from an SNH-commissioned basking shark tagging research project (July 2012 - 2014) in partnership with the University of Exeter (Witt et al., 2016). SPOT (Smart Position Only Tag) and SPLASH-F data indicate that all 33 basking sharks (8 sharks in 2012, 15 sharks in 2013, 10 sharks in 2014) tagged with these devices showed a degree of site fidelity within the possible MPA, particularly around the areas of SW Tiree, Gunna Sound and Hyskeir during the months of July, August and September.</i></p>

¹ While basking sharks were not included in the JCP, in many cases this species had been recorded by JCP data providers and so the relevant datasets were included by Paxton *et al.* (2014a) in the spatial modelling undertaken to inform the Scottish MPA Programme.

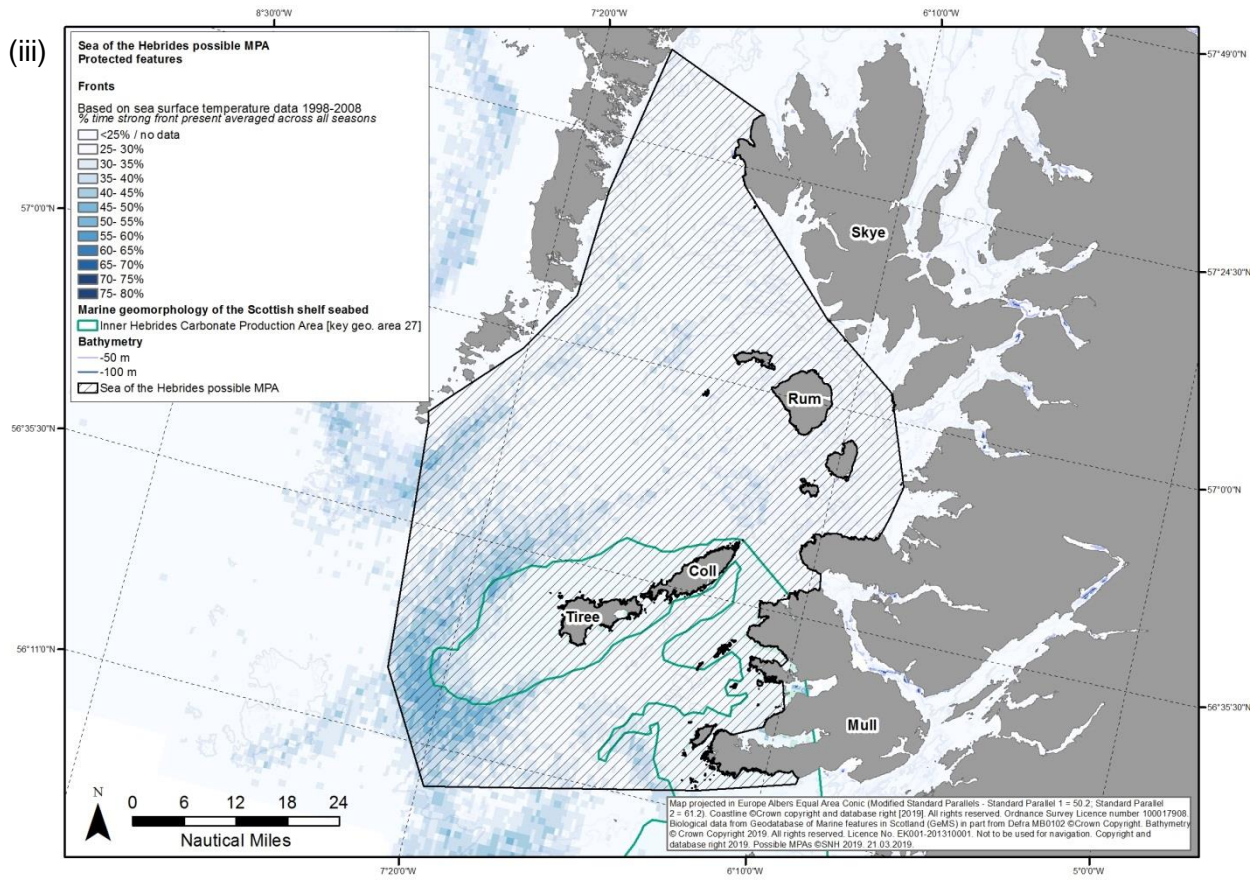
SEA OF THE HEBRIDES POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Figures 2i -iii The known/modelled distribution² of proposed protected features within the Sea of the Hebrides possible MPA (components of the Marine Geomorphology of the Scottish Shelf Seabed geodiversity feature not mapped)



² Grid boxes used in modelling work are 5 x 5 km.

SEA OF THE HEBRIDES POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT



SEA OF THE HEBRIDES POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Data confidence assessment	Our assessment of data confidence is based on consideration of the age and sources of the data, sampling methods used and overall coverage across the possible MPA (see also Maps A - H). Existing protected areas are shown on Map J.
-----------------------------------	--

Age of proposed protected feature data (Figure 2 and Maps A - H)					
Number of records collected within last 6 years	Many BS;FR;MW	Number of records collected 6-12 years ago	Many BS;FR;MW	Number of records >12 years old	Few BS;MW
Comments	<p><i>The age of the proposed protected feature data in the possible MPA vary, with many records from the last 6 years, as well as from 6 - 12 and >12 years ago. Ocean thermal imagery was used to determine the presence and distribution of seasonal frontal systems in a study which used data from between December 1998 and November 2008 (Miller et al., 2010; 2014).</i></p> <p><i>Data for minke whale and basking shark comprise datasets collated for the Joint Cetacean Protocol (JCP) and additional datasets, as analysed by Paxton et al. (2014a) as part of spatial modelling undertaken to inform the MPA project. Twenty-three distinct datasets (with records from between 2000 - 2012) were used to inform the analysis, including HWDT data (2002 - 2012) and data from Wave Action/The Wildlife Trust basking shark project data (2003 - 2006). The basking shark tagging research project has data from July 2012 - 2015 (Witt et al., 2016).</i></p>				

Source of proposed protected feature data (Figure 2 and Maps A - H)					
Targeted data collection for nature conservation purposes	✓	Statutory monitoring (marine licensing etc.)		Fisheries survey work	
Data collection associated with development proposals (EIA etc.)		Recreational / volunteer data collection	✓	Other (specify) -	
Comments	<p><i>Minke whale and basking shark data comprise datasets collated for the Joint Cetacean Protocol (JCP) and additional datasets, as analysed by Paxton et al. (2014a) as part of spatial modelling undertaken to inform the MPA programme. The analysis used 23 different datasets including: the SCANS & SCANS-II projects coordinated by the Sea Mammal Research Unit; the European Seabirds at Sea studies coordinated by the Joint Nature Conservation Committee; University of Aberdeen data; and data from Sea Watch Foundation, The Wildlife Trust and Hebridean Whale and Dolphin Trust surveys (the former led by Colin Speedie from Wave Action) from various different projects including data collected by volunteers. The full list of datasets used in the analysis is described in Paxton et al. (2014a & b). A joint research project between SNH and the University of Exeter collected data on basking shark movements using satellite telemetry between 2012 and 2015 (Witt et al., 2016). Data on fronts were collated and analysed as part of a Defra-led contract to map frequent thermal fronts based on satellite derived ocean thermal imagery (Miller et al., 2010; 2014). The geodiversity features were derived through the same Defra-led data collation project (Brooks et al., 2009) with the key geodiversity areas subsequently identified through an SNH and JNCC commissioned desk-based review (Brooks et al., 2013).</i></p>				

SEA OF THE HEBRIDES POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Sampling methods / resolution							
Feature	Modelled	Acoustic / remote sensing / telemetry	Remote video / camera	Infaunal - grab / core	Sediment	Fisheries survey	Visual census
BS	✓	✓					✓
FR		✓					
MW	✓						✓
Comments	<p><i>Minke whale and basking shark data used in spatial models were sampled by visual census and only effort-corrected boat and aircraft-based sightings data were used. For the analyses, 23 distinct datasets were incorporated, containing data from a range of platforms including vessels and aircraft. To be used in the analyses all data had to be collected by observers who had observation as their primary task while on effort. Separate analyses were carried out for each of minke whale and basking shark. The data were used to create estimated densities (corrected for availability and detectability) of each species per square km, mapped at a resolution of 5 km x 5 km. Generalised Estimating Equation (GEE) models were then used to predict relative densities for both minke whale and basking shark over the whole of Scottish territorial waters on a 5 km x 5 km resolution grid. The highest survey effort for both species throughout Scottish waters is during summer, which reflects the seasonal presence of both species, as well as that cetacean and shark surveys are highly dependent on weather and sea-state (Witt et al., 2016).</i></p> <p><i>Basking shark tagging data were collected using SPOT (Smart Position Only Tags) and SPLASH-Fastloc tags from Wildlife Computers. SPOTs transmit locations (when at the surface) to satellites using the Argos System (www.argos-system.org) with an accuracy of up to 350 m. Data were filtered to remove lower confidence locations in terms of Argos quality and biological impossible scenarios based on e.g. turning angles and potential swimming speeds. All SPLASH-F tags transmit locations when at surface that approach GPS accuracy (less than 100 m) using snapshots of radio signals produced by GPS satellites and Fastloc technology.</i></p> <p><i>The distribution of fronts is derived from ocean thermal imagery data at 1 - 4 km resolution, collected between December 1998 and November 2008. The resulting frequent thermal front layers are mapped to a resolution of 1.2 km (Miller et al., 2010; 2014).</i></p>						

Proposed protected feature data coverage (Figure 2 and Maps A - H)							
Across the possible MPA							
Large numbers of proposed protected feature records distributed across the possible MPA		Numerous proposed protected feature records scattered across the possible MPA with some clumping	✓	Numerous proposed protected feature records possibly with some clumping. Boundary not defined solely by recorded feature distribution		Few or isolated proposed protected feature records - possibly clumped	
For individual features							
Multiple records of individual proposed protected features providing an indication of extent and distribution throughout the possible MPA	✓ MW;BS; FR	Few or scattered records of specific proposed protected features making extent and broad distribution assessment difficult		Few or isolated records of specific proposed protected features			

SEA OF THE HEBRIDES POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

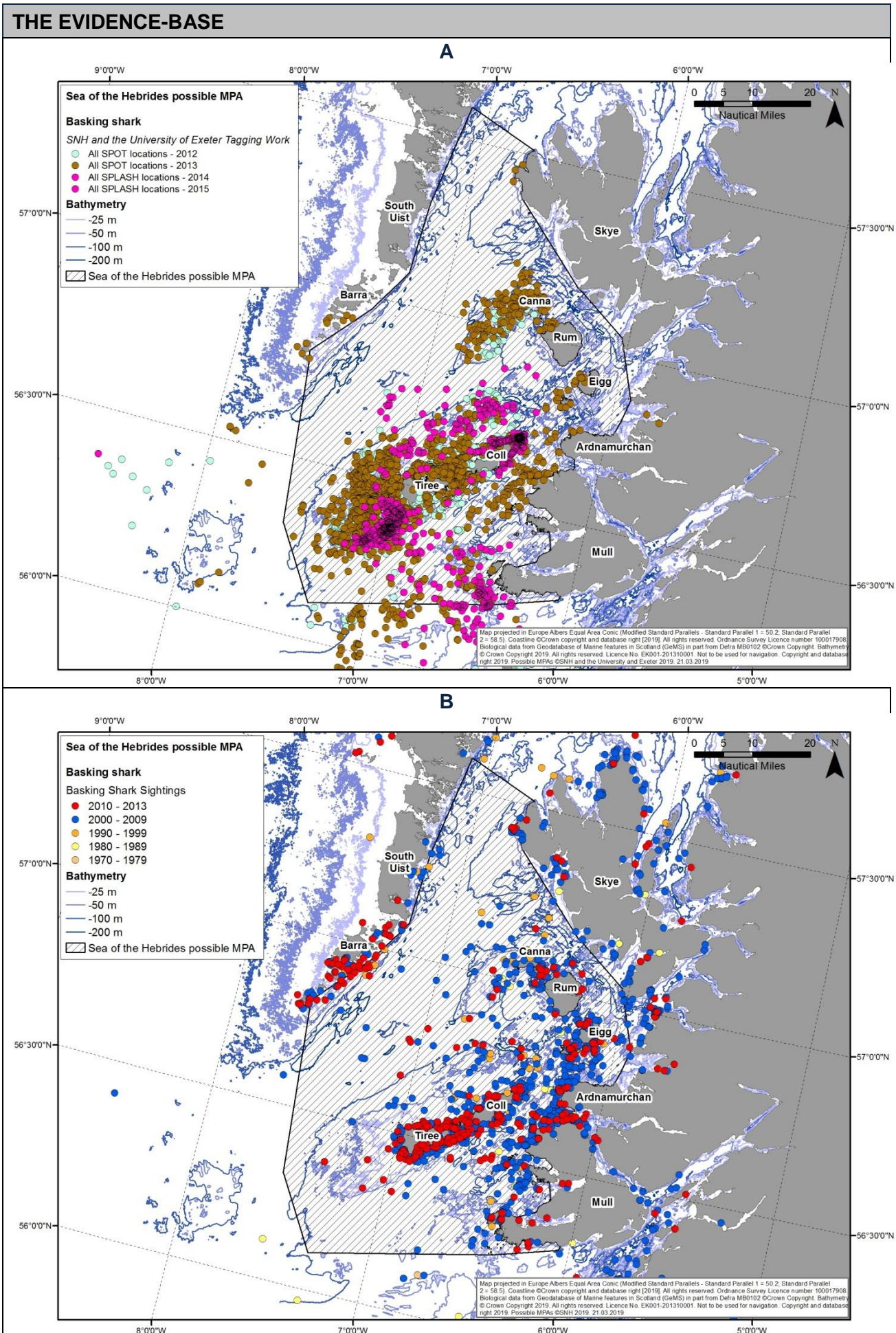
Proposed protected feature data coverage (Figure 2 and Maps A - H)	
Are modelled data available to facilitate understanding of feature distribution across the possible MPA?	Yes – available modelled data provides a good understanding of the distribution of the proposed protected features (see Maps 2i-iii and Maps C-F).
Comments	<i>There is high confidence in the seasonal presence of minke whale and basking shark within the possible MPA based on effort-corrected sightings, and from spatial modelling. Effort-corrected sightings data indicate that minke whales occur seasonally in high numbers across the west coast of Scotland, while modelled data particularly highlights parts of the Sea of the Hebrides, encompassed by the possible MPA, as persistently supporting higher than average densities of the species during summer (compared to wider Scottish waters). Basking sharks are observed in high numbers within the Sea of the Hebrides, particularly around Tiree, Coll and Hyskeir, based on effort-corrected sightings data. These areas are also highlighted as persistently supporting above average densities of basking shark during summer. Modelled data on fronts (Miller et al., 2014) shows their distribution across the possible MPA, highlighting the importance of the south-west. Geodiversity data adequately inform the extent and distribution of the geological features of interest.</i>

Data sources and bibliography		
Year	Title	Features covered
2016	Witt, M.J., Doherty, P.D., Godley, B.J. Graham, R.T. Hawkes, L.A. and Henderson, S.M. (2016). Basking shark satellite tagging project: insights into basking shark (<i>Cetorhinus maximus</i>) movement, distribution and behaviour using satellite telemetry. Final Report. <i>Scottish Natural Heritage Commissioned Report No. 908</i> . Available from < https://www.nature.scot/snh-commissioned-report-908-basking-shark-satellite-tagging-project-insights-basking-shark >	BS
2014	Paxton, C.G.M., Scott-Hayward, L.A.S. and Rexstad, E. (2014a). Statistical approaches to aid the identification of Marine Protected Areas for minke whale, Risso's dolphin, white-beaked dolphin and basking shark. <i>Scottish Natural Heritage Commissioned Report No. 594</i> . Available from < https://www.nature.scot/snh-commissioned-report-594-statistical-approaches-aid-identification-marine-protected-areas-minke >	MW, BS
2014	Paxton, C.G.M., Scott-Hayward, L.A.S. and Rexstad, E. (2014b). Review of available statistical approaches to help identify Marine Protected Areas for cetaceans and basking shark. <i>Scottish Natural Heritage Commissioned Report No. 573</i> . Available from < https://www.nature.scot/snh-commissioned-report-573-review-available-statistical-approaches-help-identify-marine-protected >	MW, BS
2014	Miller, P.I., Xu, W. and Lonsdale, P. (2014). Seasonal shelf-sea front mapping using satellite ocean colour to support development of the Scottish MPA network. <i>Scottish Natural Heritage Commissioned Report No. 538</i> . Available from < https://www.nature.scot/snh-commissioned-report-538-seasonal-shelf-sea-front-mapping-using-satellite-ocean-colour-support >	FR
2013	Brooks, A.J., Kenyon, N.H., Leslie, A., Long, D. and Gordon, J.E. (2013). Characterising Scotland's marine environment to define search locations for new Marine Protected Areas. Part 2: The identification of key geodiversity areas in Scottish waters (final report). <i>Scottish Natural Heritage Commissioned Report No. 432</i> . Available from < http://www.nls.uk/e-monographs/2013/432.pdf >	GEO
2013	Gordon, J.E., Brooks, A.J., Rennie, A.G., James, B.D., Chaniotis, P.D., Kenyon, N.H., Leslie, A.B. and Long, D. (2013). The selection of Nature Conservation Marine Protected Areas (MPAs) in Scotland - assessment of geodiversity interests. <i>Scottish Natural Heritage Commissioned Report No. 633</i> . Available from < https://www.nature.scot/snh-commissioned-report-633-selection-nature-conservation-mpas-scotland-assessment-geodiversity >	GEO
2013	Marine Conservation Society (1970-2013). Contextual mapping includes data from the MCS basking shark sightings database (1970-2013).	

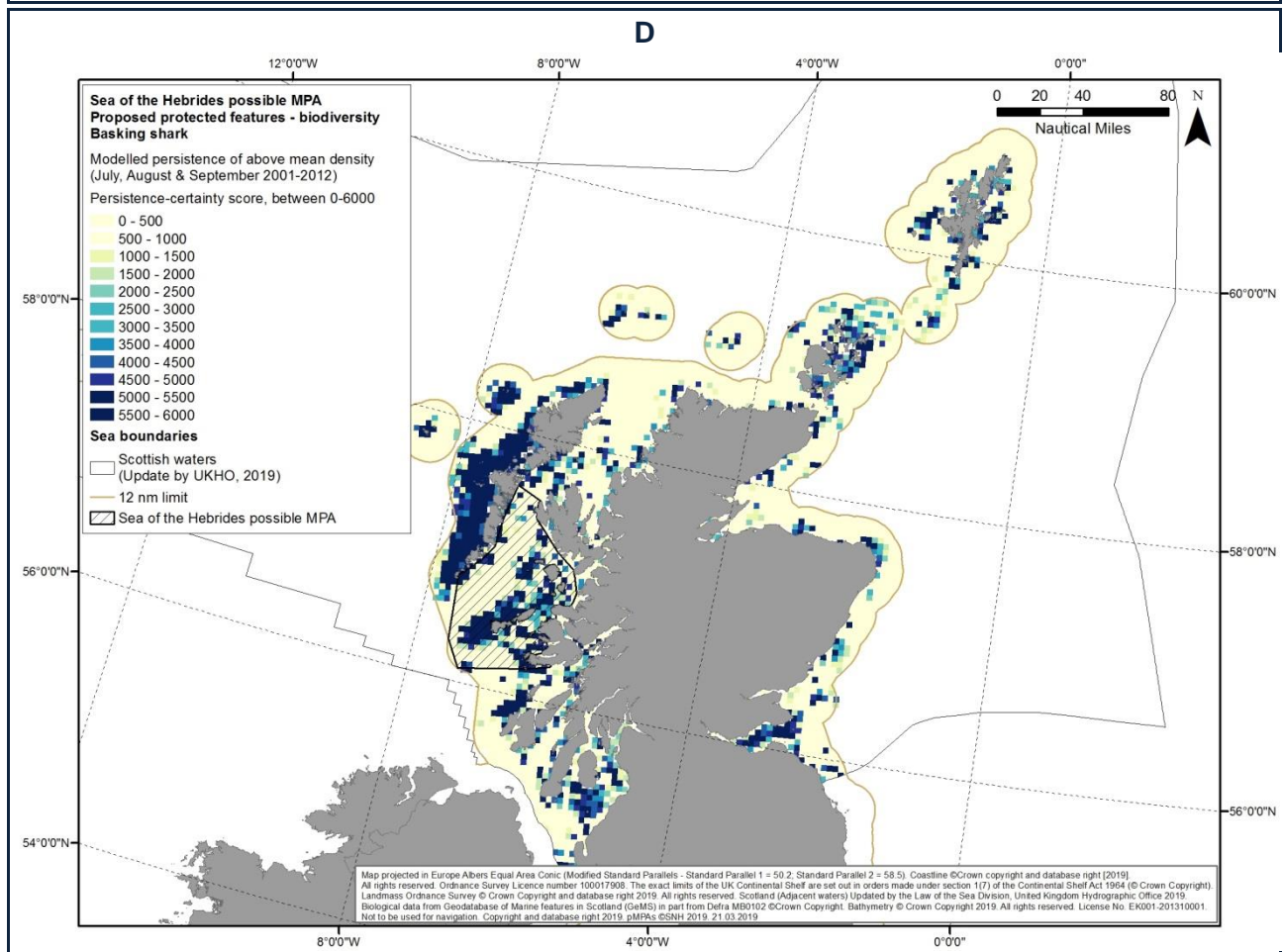
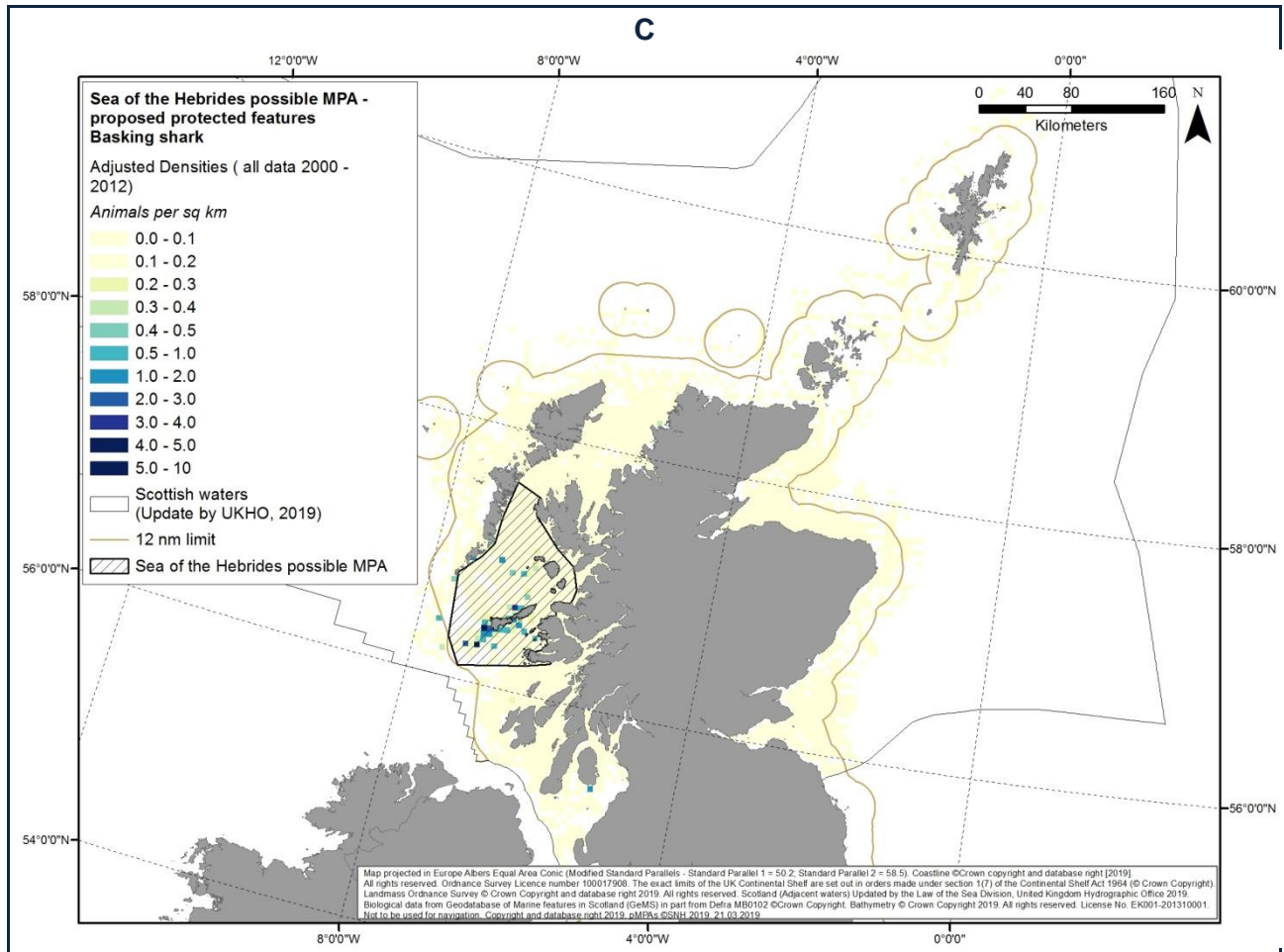
SEA OF THE HEBRIDES POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Data sources and bibliography		
Year	Title	Features covered
2012	Scottish Natural Heritage. (2012). <i>Marine Protected Areas and cetaceans. Position paper for the 4th MPA Workshop, Heriot-Watt University, 14-15 March 2012.</i> Available from < http://www.scotland.gov.uk/Resource/0038/00389523.doc >	MW, BS
2012	Anderwald, P., Evans, P.G.H., Dyer, R., Dale, A., Wright, P.J. and Hoelzel A.R. (2012). Spatial scale and environmental determinants in minke whale habitat use and foraging. <i>Marine Ecology Progress Series</i> 450 : 259-274.	MW
2010	Miller, P.I., Christodoulou, S. and Saux-Picart, S. (2010). <i>Oceanic thermal fronts from Earth observation data - a potential surrogate for pelagic diversity.</i> Report to the Department of Environment, Food and Rural Affairs. Defra Contract No. MB102. Plymouth Marine Laboratory, subcontracted by ABPmer, Task 2F, pp.24. Available from < http://randd.defra.gov.uk/Document.aspx?Document=MB0102_9104_TRP.pdf >	FR
2009	Brooks, A.J., Roberts, H., Kenyon, N.H. and Houghton, A.J. (2009). <i>Assessing and developing the required biophysical datasets and datalayers for Marine Protected Areas network planning and wider marine spatial planning purposes. Report No 8: Task 2A. Mapping of Geological and Geomorphological Features.</i> ABP Marine Environmental Research Ltd. Available from < http://randd.defra.gov.uk/Document.aspx?Document=mb0102_8589_TRP.pdf >	GEO
2009	Speedie, C.D., Johnson, L. A. and Witt, M.J. (2009). Basking shark hotspots on the west coast of Scotland: Key sites, threats and implications for conservation of the species. <i>SNH Commissioned Report No. 339.</i> Available from < https://www.nature.scot/snh-commissioned-report-339-basking-shark-hotspots-west-coast-scotland >	BS
2005	Sims, D.W., Southall, E.J., Tarling, G.A. and Metcalfe, J.D. (2005). Habitat-specific normal and reverse diel vertical migration in the plankton-feeding basking shark. <i>Journal of Animal Ecology</i> 74 : 755-761.	BS
2004	Macleod, K., Fairbairns, R., Gill, A., Fairbairns, B., Gordon, J., Blair-Myers, C., and Parsons, E.C.M. (2004). Seasonal distribution of minke whales <i>Balaenoptera acutorostrata</i> in relation to physiography and prey off the Isle of Mull, Scotland. <i>Marine Ecology Progress Series</i> 277 : 263-274.	MW
2003	Reid, J.B., Evans, P.G.H. and Northridge, S.P. (2003). <i>Atlas of Cetacean distribution in north-west European waters.</i> 76 pages. Available from < http://jncc.defra.gov.uk/page-2713 >	MW

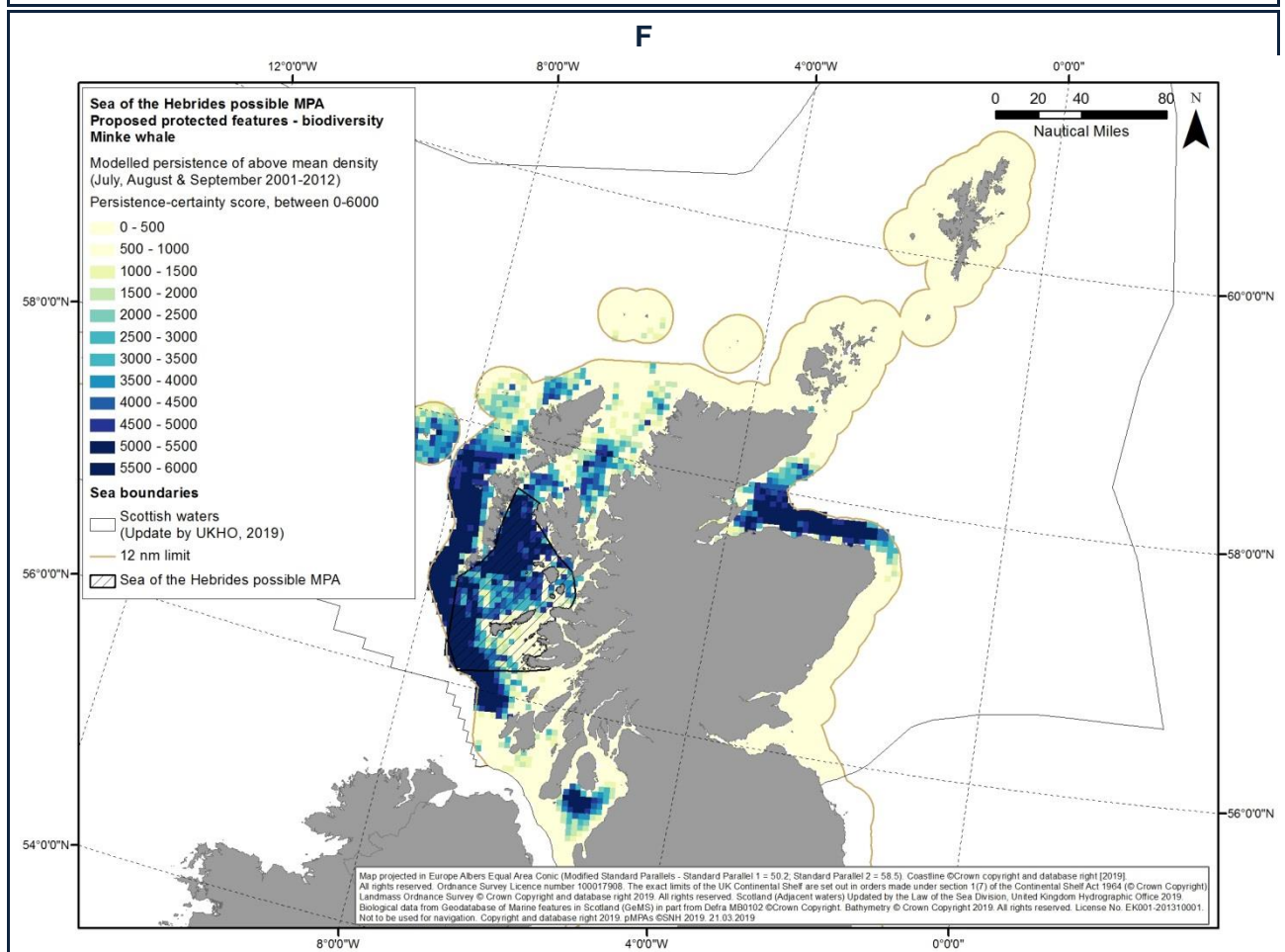
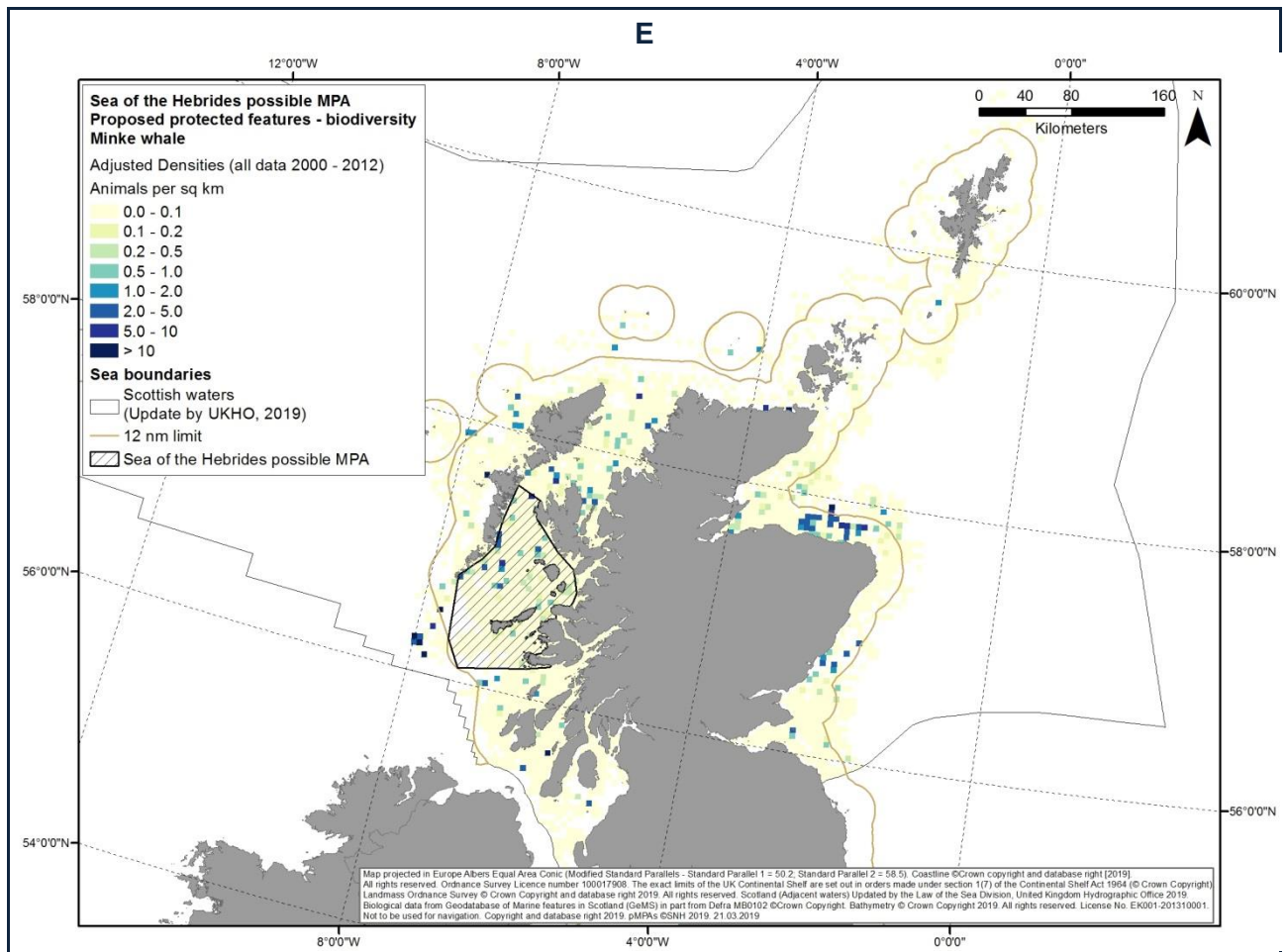
SEA OF THE HEBRIDES POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT



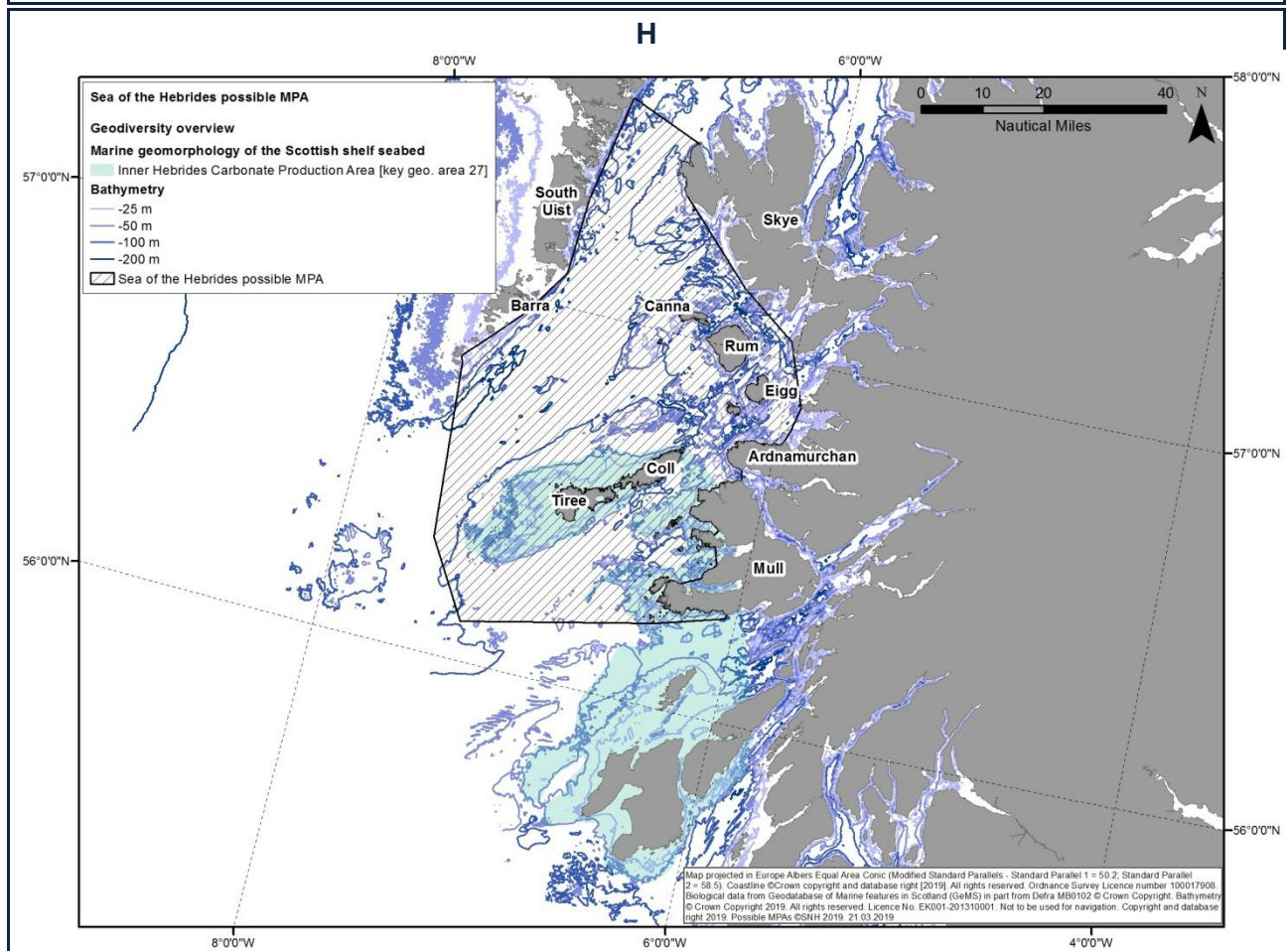
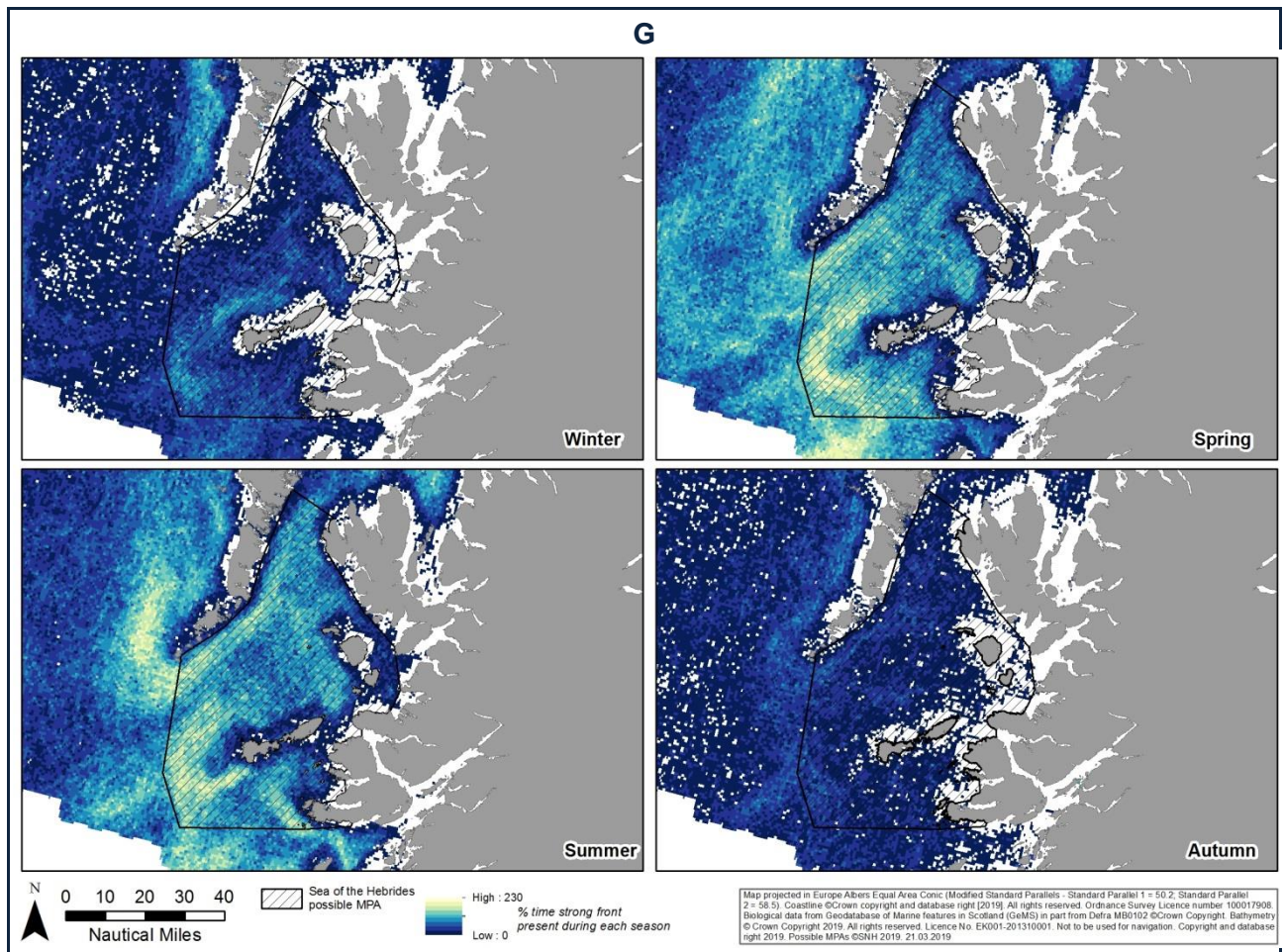
SEA OF THE HEBRIDES POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT



SEA OF THE HEBRIDES POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT



SEA OF THE HEBRIDES POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT



SEA OF THE HEBRIDES POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

