Final Report and Recommendations

September 7th, 2011

Download Section 6 of 7

Part II.4 (recommended reference area site reports): pages 962 -1062 of 1272

This is one of seven download sections of Finding Sanctuary's final report, which was initially only made available to download as a single document. Because of the large size of the final report, we have made it available in this format for users who have had difficulty downloading it in one go or printing off individual pages from the large PDF.

Where possible, readers are advised to download the single document in preference to the separate download sections. Although the content is identical, the hyperlinks in the report's main Table of Contents and List of Maps are severed when the PDF is split.

II.4 Site reports for recommended reference areas

II.4.1 The Canyons recommended reference area

Basic site information

***Site centre location (datum used: ETRS89)*:**

Decimal Degrees		Degrees Minutes Seconds	
Lat	**Long**	**Lat**	**Long**
48.4701	-9.6315	48° 28' 12'' N	9° 37' 53'' W

***Site surface area*:** 34.55 km^2

***Biogeographic region*:**

JNCC regional sea: Atlantic South West Approaches and Western Channel and Celtic Sea
OSPAR region: Region III: Celtic Seas

Site boundary: The northern boundary of The Canyons recommended reference area abuts the boundary of The Canyons rMCZ and the UK Continental Shelf Limit. The boundaries have been drawn to ensure that the known patch of Cold Water Coral Reefs are situated in the centre of the site, and angled to capture a steep section of continental shelf slope (to capture a cross-section of seafloor habitats and diversity).

Sites to which the site is related: The Canyons reference area sits within the boundary of The Canyons rMCZ.

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 recommended reference area

Table II.4.1a shows a summary of the draft conservation objectives for this recommended reference area. This is an extract of the conservation objective summary tables in section II.2.6. All features in the table have draft conservation objectives, including those in the right-hand column, in line with the Conservation Objective Guidance. In this recommended reference area, the site is large enough to meet the ENG minimum viable size guidelines for all the listed features.

Table II.4.1a Draft conservation objectives for The Canyons recommended reference area. All features shown in the table have a draft conservation objective of 'recover to reference condition'. ***The full text of the draft conservation objectives can be found in appendix 15.***

	Viable size guidelines met	Viable size guidelines not met
Broad-scale habitats	Deep-sea bed	
FOCI habitats	Cold water coral reefs	

The following tables show ENG-related statistics for this site, reported from spatial data available in Finding Sanctuary's GIS datasets.

Table II.4.1b ***Subtidal broad-scale habitats*** *to be protected in this recommended reference area, 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 site (km^2)	% of total in study area	Source(s)
Deep-sea bed	34.51	2.16%	1

Table II.4.1c ***FOCI habitats*** *to be protected in this recommended reference area, based on an analysis of Finding Sanctuary's amalgamated GIS FOCI datasets (see appendix 8). Data source: JNCC / MESH Canyons survey data (*Davies *et al.*, 2008).

Habitat	Area covered (km^2)	Number of point records (total)	Number of point records (pre-1980)	Source(s)
Cold-water coral reefs		1		Davies *et al.* (2008)

*Table II.4.1d Habitats mapped from JNCC / MESH seafloor survey data (*Davies *et al.*, 2008*), represented within this recommended reference area.*

Habitat	Area covered within site (km^2)	% of total in study area
Communities of Deep-Sea Corals	0.17	100%
Deep-Sea Bedrock	4.28	7.6%
Deep-Sea Biogenic Gravel	0.47	0.8%
Deep-Sea Mixed Substrata	10.89	2.7%
Deep-Sea Mud	17.19	9.4%
Deep-Sea Sand	1.55	5.9%

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

Site summary

This recommended reference area is situated where recent survey data has shown cold water coral reefs to be present (Davies *et al.,* 2008). The reference area is located about 333km south-west of Land's End, and the depth of the site is between 250 and 450 metres below sea level. The site is located on the steep flanks of a submarine canyon on the continental shelf break, and it has been located to not just encompass the area of coral reef, but also a diversity of seafloor habitats across a range of depths.

Detailed site description

A recent MESH research cruise was carried out in the south-west Canyons. Detailed multibeam and backscatter survey focused on the canyons flanks, or interfluves, along with a boomer and sparker survey. Ground-truthing was undertaken using a drop frame equipped with high resolution digital stills and video. Communities of deep-sea corals (patches of cold water coral) were classified from video analysis of the Canyons. Habitats Directive Annex 1 bedrock reef and biogenic reef were all observed within the area. Cold water coral (*Lophelia pertusa*) reef was observed at the seaward entrance to, and within Explorer Canyon between 743-925m (Davies *et al*. 2008). The data from this

survey was used to create the detailed seafloor habitat map shown on the maps for this recommended reference area (map FR_009c at the end of this site report).

Biological data from the South West Canyons was undertaken by Howell *et al*. (2010a) over a thirteen day period in June 2007 on the Research Vessel 'Celtic Explorer'. One hundred and thirty-nine 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*. 2010a).
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

Reference areas will exclude all depositional and extractive activities, and might result in restrictions or management of potentially damaging and disturbing activities, as defined in the SNCB's draft reference area guidance document (available here[48]). This guidance is relatively clear and specific, therefore no further work on defining assumptions on management of reference areas was carried out.

Appendix 10 shows the content of the draft reference area guidance, converted into a layout similar to the layout for the assumptions/ implications tables presented in the rMCZ site reports – this was used at meetings as a template upon which to record site-specific comments. However, site-specific comments were limited, so we have not inserted the whole table here.

Stakeholder representatives from across many sectors were concerned about the implications of reference areas for the large range of activities affected (the Impact Assessment, to be finished in January 2012, will analyse these impacts in detail). On the other hand, conservation representatives highlighted the conservation benefits of highly protected areas. These generic comments apply to all recommended reference areas.

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

As stated above, there was much clearer guidance available on what activities will be restricted in reference areas, compared with MCZs in general. Therefore, the uncertainties around reference areas were much more limited.

A remaining uncertainty that stakeholder representatives highlighted repeatedly was about possible impacts on activities near the boundary of reference areas. Some activities might have knock-on impacts beyond the area where they are being carried out, e.g. sediment plumes from aggregate extraction, or from construction / infrastructure maintenance work. There is uncertainty over what 'buffer zones' might be needed around reference areas for such activities.

[48] http://www.naturalengland.org.uk/Images/MCZ-regional-guidance_tcm6-23451.pdf

Additional comments

No additional comments were recorded specifically for this site, but please refer to the general narrative for recommended reference areas in section II.2.3.

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.

Fishing representatives have stated that they will not support any recommendations for reference areas. In this site, there are specific concerns about impacts on non-UK fishermen using static gear (especially Spanish longlining). However, there is a wide recognition of the ecological uniqueness of the shelf break, and the coral reef habitat in particular. There is strong support from the conservation sector for this site, and compared to other recommended reference areas, this one is less controversial than others.

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 JNCC/MESH Canyons survey data (Davies *et al.*, 2008), supplied to the project by the JNCC. 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) and Wilson *et al.* (2001).

Site map series

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

- The first map (FR_060a) is the main site map showing the site 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_060b) shows the site boundary over broad-scale habitats, and records of habitat and species FOCI. The data shown on this map corresponds with the information in tables II.4.1b and II.4.1c, data sources are indicated in the tables.
- The third map (FR_060c) shows detailed biotope information for the seabed, from the JNCC/MESH survey data (Davies *et al.*, 2008).
- Most site reports contain a map showing socio-economic datasets. This one does not, as there is not much data to map, except for fisheries. 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.

Map: FR_060a

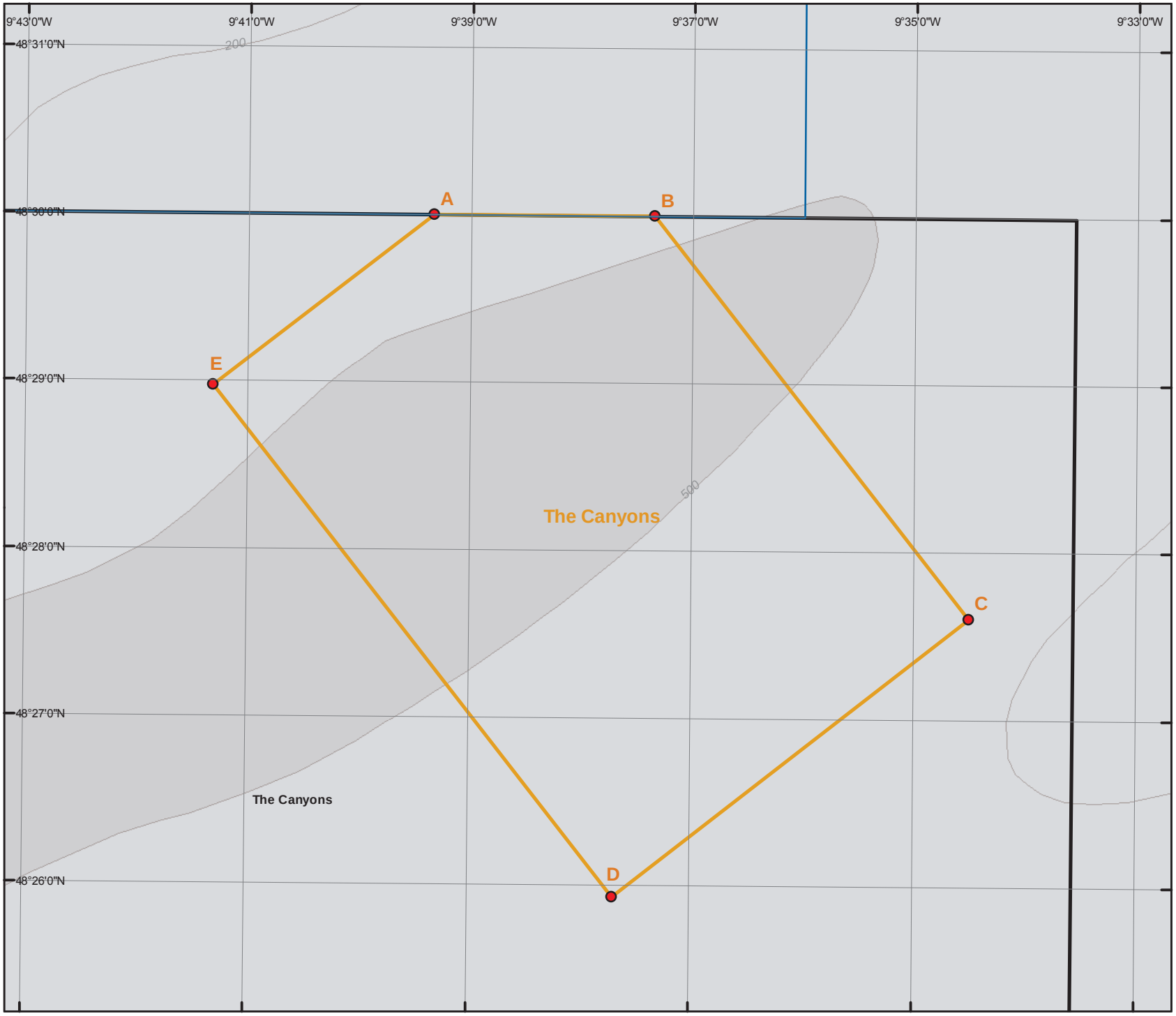
Version:26Aug11

The Canyons Recommended Reference Area

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: UTM29N.

0 1.5 3 km N

FINDING SANCTUARY



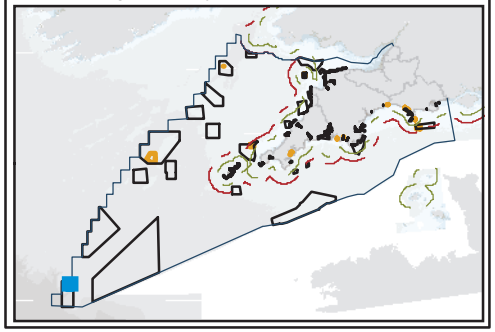
Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	48.5000	-9.6555	48° 30' 0" N	9° 39' 19" W
B	48.5000	-9.6225	48° 30' 0" N	9° 37' 20" W
C	48.4601	-9.5750	48° 27' 36" N	9° 34' 30" W
D	48.4321	-9.6282	48° 25' 55" N	9° 37' 41" W
E	48.4829	-9.6886	48° 28' 58" N	9° 41' 18" W

Map Legend

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

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



Map: FR_060b

Version:31Aug11

The Canyons Recommended Reference Area

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

0 0.5 1 2 km

N

FINDING SANCTUARY

9°42'30"W 9°40'0"W 9°37'30"W 9°35'0"W 9°32'30"W

48°30'0"N

48°29'0"N

48°28'0"N

48°27'0"N

48°26'0"N

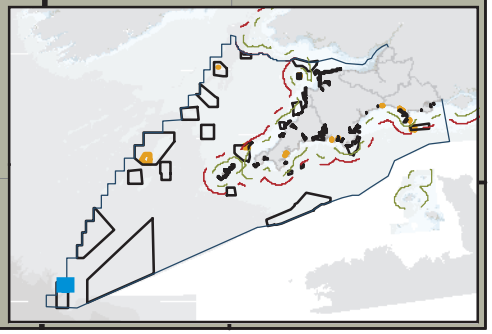
The Canyons

The Canyons

Map Legend

- UK Continental Shelf Limit
- Recommended reference area
- 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: FR_060c

Version:31Aug11

The Canyons Recommended Reference Area

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

0 0.5 1 2 km

N

FINDING SANCTUARY

9°42'30"W 9°40'0"W 9°37'30"W 9°35'0"W 9°32'30"W

48°30'0"N

48°29'0"N

48°28'0"N

48°27'0"N

48°26'0"N

The Canyons

The Canyons

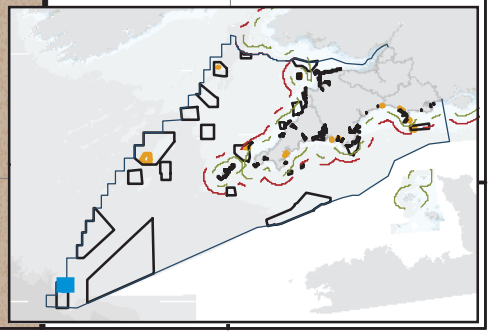
Map Legend

- 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.4.2 Greater Haig Fras recommended reference area

Basic site information

***Site centre location (datum used: ETRS89)*:**

Decimal Degrees		Degrees Minutes Seconds	
Lat	**Long**	**Lat**	**Long**
50.1585	-7.9588	50° 9' 30'' N	7° 57' 31'' W

***Site surface area*:** 148.23 km^2

Biogeographic region:

JNCC regional sea: Western Channel and Celtic Sea
OSPAR region: Region III: Celtic Seas

Site boundary: The northern boundary of the Greater Haig Fras recommended reference area is a straight east to west line which runs in parallel to the northern boundary of the Greater Haig Fras rMCZ and UK Continental Shelf Limit. The eastern boundary is a simple straight line from that runs north to south and similarly the southern boundary is a simple east to west line that runs parallel to this sites northern boundary. The western boundary of this site runs north to south in a south-west direction following the boundary of the Haig Fras cSAC before turning in a south-east direction to connect with the southern boundary of the site.

Sites to which the site is related: The Greater Haig Fras recommended reference area sits within the boundary of the Greater Haig Fras rMCZ and partially within the Haig Fras cSAC.

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

Features proposed for designation within Greater Haig Fras recommended reference area

Table II.4.2a shows a summary of the draft conservation objectives for this recommended reference area. This is an extract of the conservation objective summary tables in section II.2.6. All features in the table have draft conservation objectives, including those in the right-hand column, in line with the Conservation Objective Guidance. In this recommended reference area, the site is large enough to meet the ENG minimum viable size guidelines for all the listed features.

Table II.4.2a Draft conservation objectives for The Greater Haig Fras recommended reference area. All features shown in the table have a draft conservation objective of 'recover to reference condition'. ***The full text of the draft conservation objectives can be found in appendix 15.***

	Viable size guidelines met	Viable size guidelines not met
Broad-scale habitats	Moderate energy circalittoral rock Subtidal coarse sediment Subtidal mixed sediments Subtidal mud Subtidal sand	

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.4.2b **Subtidal broad-scale habitats** to be protected in this recommended reference area, 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 site (km^2)	% of total in study area	Source(s)
Moderate energy circalittoral rock	30.01	0.2%	1
Subtidal coarse sediment	48.20	0.2%	1
Subtidal sand	7.06	<0.1%	1
Subtidal mud	8.50	0.1%	1
Subtidal mixed sediments	54.45	1.5%	1

*Table II.4.2c **FOCI habitats** to be protected in this recommended reference area, 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]	75.58			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.

This recommended reference area intersects with the Haig Fras rock complex, an ENG-listed geological/ geomorphological feature of importance. The recommended reference area boundary contains 5.0% (3.71 km^2) of the feature, as mapped in MB102 data layers.

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

Site summary

Greater Haig Fras is an isolated, fully submarine bedrock outcrop located in the Celtic Sea, 95 km North West of the Isles of Scilly. It is the only substantial area of rocky reef in the Celtic Sea beyond the coastal margin. It supports a variety of fauna ranging from jewel anemones and Devonshire cup coral near the peak of the outcrop to encrusting sponges, crinoids and ross coral towards the base of the rock (where boulders surround its edge). The rock is granite, mostly smooth with occasional fissures. The rocky outcrop protrudes from an area of surrounding sediment and is approximately 45 km long, 15km wide, and in one area rises to a peak 1km wide, which lies just 38 m beneath the sea surface. Around the base of the shoal, boulders and cobbles partially embedded in sediment provide a complex habitat. Distinct biotopes are associated with both the rock habitat and the sediment 'pockets' which occur on the platform area (Rees, 2000; JNCC, 2008). The recommended reference area lies on the south-western side of the Haig Fras SAC, has a depth ranging from 76 to 132 metres below sea level, and is located approximately 155km off Land's End.

Detailed site description

On the uppermost parts of the Haig Fras shoal, the exposed bedrock is dominated by the jewel anemone *Corynactis viridis.* This region also supports encrusting sponges and bryozoans, as well as mobile fauna such as the sea urchin *Echinus esculentus* and gastropod mollusc *Calliostoma* spp. At the shallowest depth surveyed (c. 52 m), small patches of encrusting pink coralline algae were observed, indicating that the peak of the shoal protrudes into the photic zone. At depths of between 60 m and 70 m, the shoal bedrock is slightly covered in silt and is not widely colonised except by cup corals *Caryophyllia smithii* (which are abundant) and a few mobile species such as the urchin *Echinus esculentus*, *Calliostoma s*pp. and crinoids (*Antedon* spp.). High numbers of cup corals were also seen on parts of the rock platform away from the shoal. At the base of the shoal, the rock was covered with a thin layer of fine calcareous sand and mud and supported cup sponges, erect branching sponges, *Caryophyllia smithii* (although in lower numbers than shallower parts of the shoal) and crinoids. The boulders and cobbles around the base of the shoal supported encrusting sponge, *Caryophyllia smithii* and crinoids in low numbers; brittlestars, squat lobster (*Munida* spp.) and the Ross coral *Pentapora foliacea* (now *Pentapora fascialis*) were also present (Rees, 2000).
During the period 2000–2006, Ellis *et al*. (2007a) carried out approximately 150 tows with 2m-beam trawl have been undertaken 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.
JNCC and Cefas undertook a marine survey that integrated biodiversity and other environmental monitoring on the same cruise. The survey was conducted on the Cefas Research Vessel Endeavour from 20th January - 3rd February 2011 at, and in the vicinity of, the Haig Fras Site of Community Importance (SCI) (McBreen *et al*. 2011). Wilson *et al*, 2001 surveyed the benthic biodiversity of the Southern Irish Sea which included the Haig Fras.

Stakeholder narrative: Assumptions and Implications

Reference areas will exclude all depositional and extractive activities, and might result in restrictions or management of potentially damaging and disturbing activities, as defined in the SNCB's draft reference area guidance document (available here[49]). This guidance is relatively clear and specific, therefore no further work on defining assumptions on management of reference areas was carried out.

Appendix 10 shows the content of the draft reference area guidance, converted into a layout similar to the layout for the assumptions / implications tables presented in the rMCZ site reports – this was used at meetings as a template upon which to record site-specific comments. However, site-specific comments were limited, so we have not inserted the whole table here.

Stakeholder representatives from across many sectors were concerned about the implications of reference areas for the large range of activities affected (the Impact Assessment, to be finished in January 2012, will analyse these impacts in detail). On the other hand, conservation representatives highlighted the conservation benefits of highly protected areas. These generic comments apply to all recommended reference areas.

[49] http://www.naturalengland.org.uk/Images/MCZ-regional-guidance_tcm6-23451.pdf

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

As stated above, there was much clearer guidance available on what activities will be restricted in reference areas, compared with MCZs in general. Therefore, the uncertainties around reference areas were much more limited.

A remaining uncertainty that stakeholder representatives highlighted repeatedly was about possible impacts on activities near the boundary of reference areas. Some activities might have knock-on impacts beyond the area where they are being carried out, e.g. sediment plumes from aggregate extraction, or from construction / infrastructure maintenance work. There is uncertainty over what 'buffer zones' might be needed around reference areas for such activities.

Additional comments

No additional comments were recorded specifically for this site, but please refer to the general narrative for recommended reference areas in section II.2.3.

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.

Fishing representatives have stated that they will not support any recommendations for reference areas. This site has been located to avoid existing cable routes (including cables which are not included on the KISCA charts, but which the representative from The Crown Estate highlighted to the group), and to maximise the number of broad-scale habitats captured within the site. Given the distance from shore, it is relatively less controversial that other recommended reference areas.

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 information on the Natura 2000 sites to which this site is related may be found on the JNCC's website[50].

Further evidence underpinning the site can be found in the publications and datasets referred to in the detailed site description. Recent survey work has been carried out by the JNCC within the area of Haig Fras SAC, which will yield additional data to underpin this site.

[50] http://jncc.defra.gov.uk/page-4

Site map series

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

- The first map (FR_061a) is the main site map showing the site 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_61b) shows the site 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.4.2b, data sources are indicated in the table.
- Most 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). Map FR_013c, in the Greater Haig Fras rMCZ site report, shows the routes of nearby cables for which we have GIS data (KISCA data). We are aware of an additional cable route running past this site in the south-west, which The Crown Estate representative informed the Working Group about, and which resulted in the site boundary being adjusted to avoid overlaps with the recommended reference area.
- 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.

Map: FR_061a

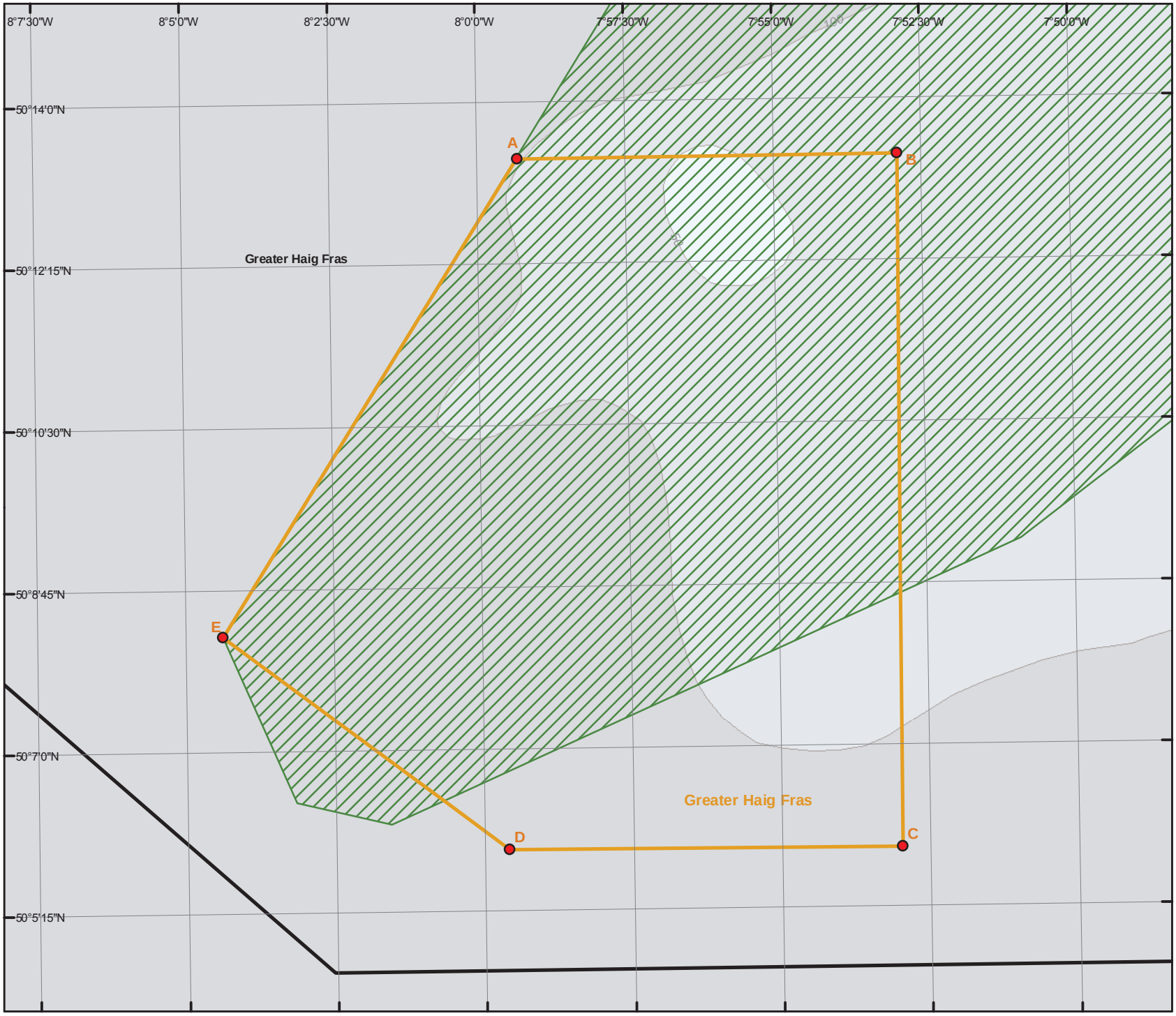
Version:25Aug11

Greater Haig Fras Recommended Reference Area

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: UTM29N.

0 2.5 5 km N

FINDING SANCTUARY



Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	50.2232	-7.9887	50° 13' 23" N	7° 59' 19" W
B	50.2234	-7.8816	50° 13' 24" N	7° 52' 53" W
C	50.0982	-7.8829	50° 5' 53" N	7° 52' 58" W
D	50.0985	-7.9932	50° 5' 54" N	7° 59' 35" W
E	50.1374	-8.0730	50° 8' 14" N	8° 4' 22" W

Map Legend

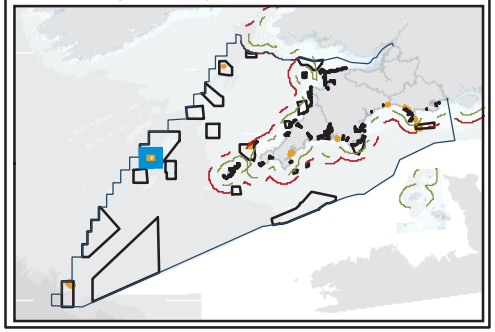
Recommended reference area

Recommended MCZ (rMCZ)

Existing MPAs

SAC

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



Map: FR_061b

Version:31Aug11

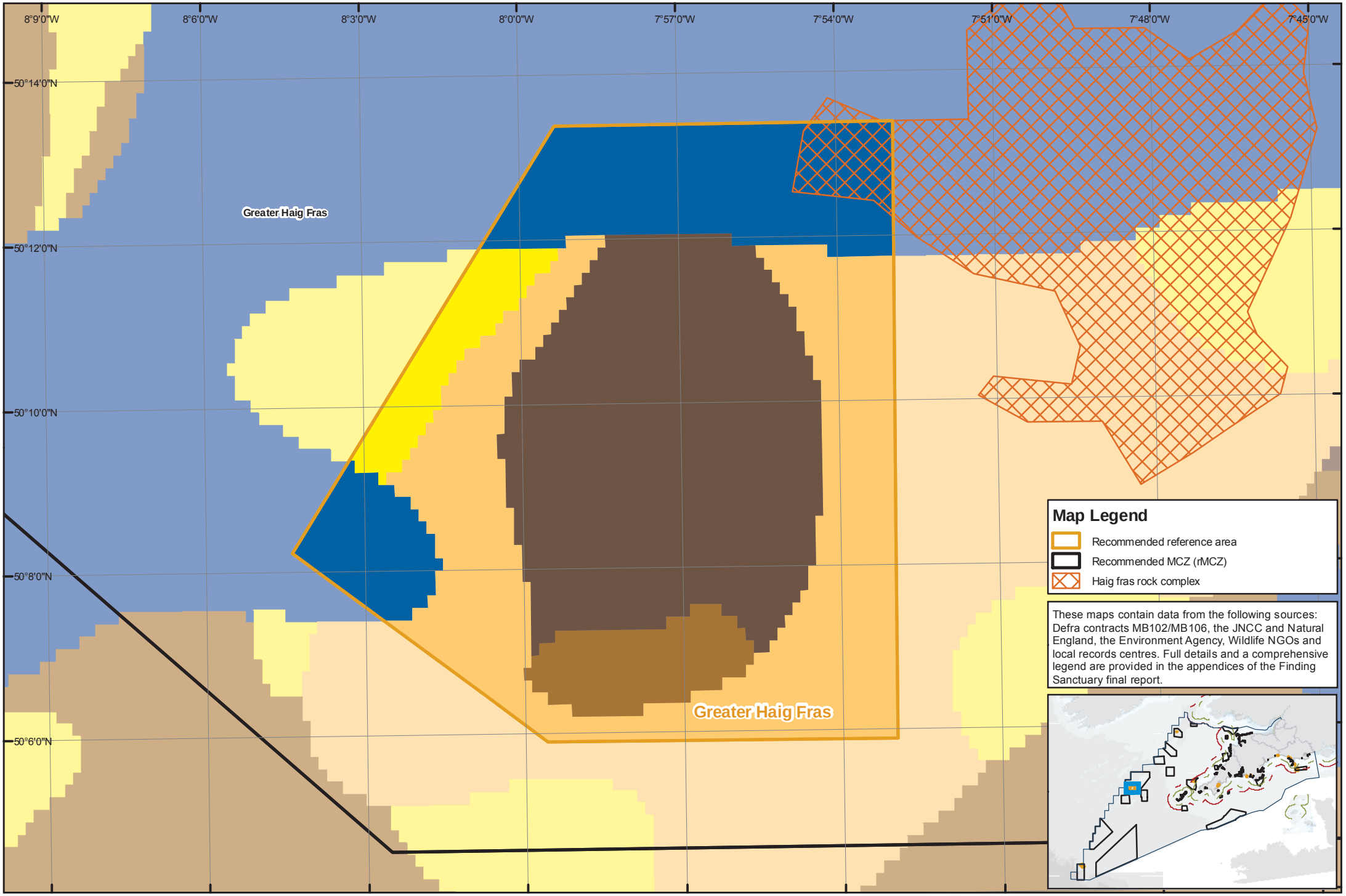
Greater Haig Fras Recommended Reference Area

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: UTM29N.

0 2.5 5 km

N

FINDING SANCTUARY



II.4.3 Celtic Deep recommended reference area

Basic site information

***Site centre location (datum used: ETRS89)*:**

Decimal Degrees		Degrees Minutes Seconds	
Lat	**Long**	**Lat**	**Long**
51.3559	-6.4012	51° 21' 21" N	6° 24' 4" W

***Site surface area*:** 1 km^2

***Biogeographic region*:**

JNCC regional sea: Western Channel and Celtic Sea
OSPAR region: Region III: Celtic Seas

Site boundary: The site is a simple square, with borders running north to south and east to west, in line with ENG guidelines. The northern and western boundaries running parallel to the northern and western boundaries of the Celtic Deep rMCZ.

Sites to which the site is related: The Celtic Deep recommended reference area sits within the boundary of the Celtic Deep rMCZ.

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 recommended reference area

Table II.4.3a shows a summary of the draft conservation objectives for this recommended reference area. This is an extract of the conservation objective summary tables in section II.2.6. All features in the table have draft conservation objectives, including those in the right-hand column, in line with the Conservation Objective Guidance. Features in the right-hand column are not counted towards the figures in section II.2.9 unless specifically stated.

Table II.4.3a Draft conservation objectives for Celtic Deep recommended reference area. All features shown in the table have a draft conservation objective of 'recover to reference condition'. ***The full text of the draft conservation objectives can be found in appendix 15.***

	Viable size guidelines met	Viable size guidelines not met
Broad-scale habitats		Subtidal mud
FOCI habitats	Mud Habitats in Deep Water	

The following tables show ENG-related statistics for this site, reported from spatial data available in Finding Sanctuary's GIS datasets.

*Table II.4.3b **Subtidal broad-scale habitats** to be protected in this recommended reference area, 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 site (km^2)	% of total in study area	Source(s)
Subtidal mud	1.00	<0.1%	1

*Table II.4.3c **FOCI habitats** to be protected in this recommended reference area, 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	2.00	6		1

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

Site summary

The Celtic Deep is a charted marine feature, a depression in the seabed where there are muddy sediments supporting a fishery for *Nephrops norvegicus*. The mud habitat in deep water FOCI habitat present in the site is unique in the south-west context, and is the main reason why the site is included in the recommended network. The recommended reference area at this location is very small (500m by 500m), just meeting the minimum viable ENG size guideline for the FOCI habitat. The depth of the site is 118 metres below chart datum, the nearest land is Pembrokeshire (about 90km to the north-east), and Hartland Point in North Devon (about 135km to the south-east).

Detailed site description

As the site is so small, it has not been possible to locate literature specific to that location. However, there is literature about the wider Celtic Deep, and some of it is reviewed here.

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). Bryozoan species occurring on hard substratum in depths of 159 to 1582m are recorded by Hayward & Ryland (1978).

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 m^2 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 Research Vessel Prince Madog during 1999 and 2000.

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.

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 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 examined included the mud habitat of the Celtic Deep and the shell-gravel habitat of the western English Channel.

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[51] and here[52]).

Stakeholder narrative: Assumptions and Implications

Reference areas will exclude all depositional and extractive activities, and might result in restrictions or management of potentially damaging and disturbing activities, as defined in the SNCB's draft reference area guidance document (available here[53]). This guidance is relatively clear and specific, therefore no further work on defining assumptions on management of reference areas was carried out.

Appendix 10 shows the content of the draft reference area guidance, converted into a layout similar to the layout for the assumptions / implications tables presented in the rMCZ site reports – this was

[51] http://www.marine-life.org.uk/fin-whale-discovery-in-celtic-sea-%28020611%29
[52] http://wildlifenews.co.uk/2011/21-giant-fin-whales-spotted-off-coast-of-britain/
[53] http://www.naturalengland.org.uk/Images/MCZ-regional-guidance_tcm6-23451.pdf

used at meetings as a template upon which to record site-specific comments. However, site-specific comments were limited, so we have not inserted the whole table here.

Stakeholder representatives from across many sectors were concerned about the implications of reference areas for the large range of activities affected (the Impact Assessment, to be finished in January 2012, will analyse these impacts in detail). On the other hand, conservation representatives highlighted the conservation benefits of highly protected areas. These generic comments apply to all recommended reference areas.

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

As stated above, there was much clearer guidance available on what activities will be restricted in reference areas, compared with MCZs in general. Therefore, the uncertainties around reference areas were much more limited.

A remaining uncertainty that stakeholder representatives highlighted repeatedly was about possible impacts on activities near the boundary of reference areas. Some activities might have knock-on impacts beyond the area where they are being carried out, e.g. sediment plumes from aggregate extraction, or from construction / infrastructure maintenance work. There is uncertainty over what 'buffer zones' might be needed around reference areas for such activities.

Additional comments

For this specific site, additional comments highlighted that there are multiple fisheries in this area. Please also refer to the general narrative for recommended reference areas in section II.2.3.

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.

Fishing representatives have stated that they will not support any recommendations for reference areas. Given the importance of the area for fisheries, the reference area was made the minimum size for the FOCI habitat 'mud habitats in deep water', as stipulated in the ENG. Other feedback has indicated that this small size is unenforceable at this distance from shore. VMS data would be too coarse-scale to even tell whether a vessel had been within the site boundaries. Although there is strong support from conservation interests for a reference area to be located in this area (given its additional ecological importance and FOCI habitat), the site, as it stands, is controversial.

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 relevant to the site can be found in the publications and datasets referred to in the detailed site description. There may be additional information relevant to the wider Celtic Deep area in Brown *et al.* (2003), Farrow and Fyfe (1988), Garrard (1977), O'Bried *et al.* (2009), Schratzberger *et al.* (2000), Scott *et al.* (2003), and Wilson *et al.* (2001).

Site map series

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

- The first map (FR_062a) is the main site map showing the site 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_062b) shows the site boundary over broad-scale habitats, and records of habitat and species FOCI. The data shown on this map corresponds with the information in tables II.4.3b and II.4.3c, data sources are indicated in the tables.
- Most 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).
- 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.

Map: FR_062a

Version:26Aug11

Celtic Deep Recommended Reference Area

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.

0 2.5 5 km N

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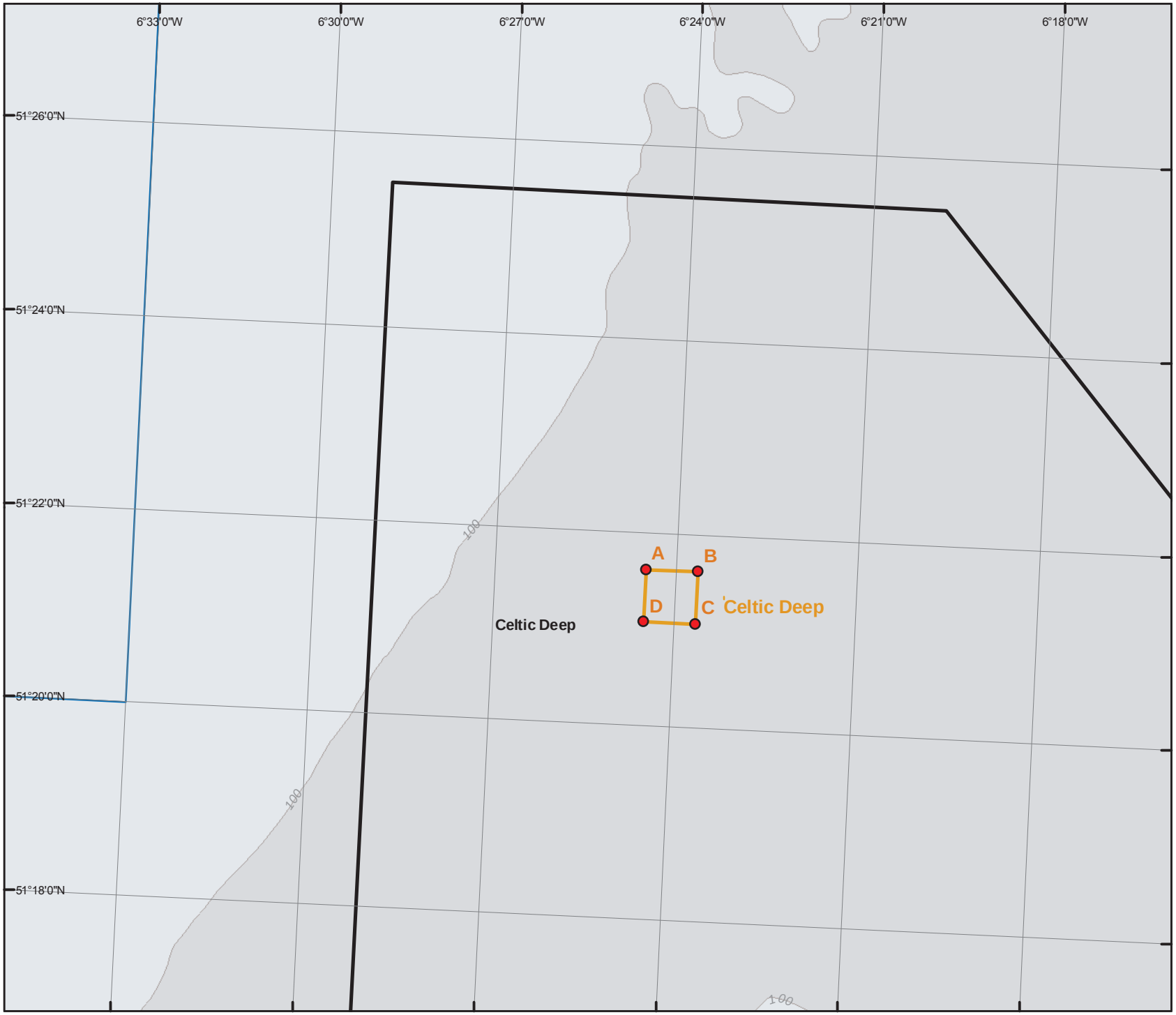


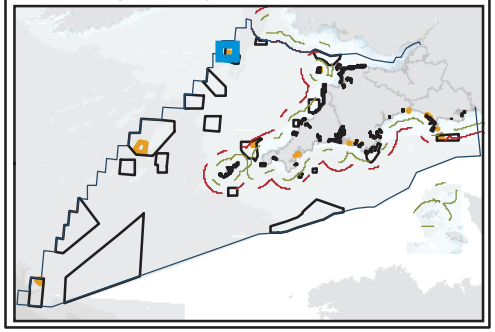
Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	51.3604	-6.4083	51° 21' 37" N	6° 24' 30" W
B	51.3604	-6.3940	51° 21' 37" N	6° 23' 38" W
C	51.3514	-6.3940	51° 21' 4" N	6° 23' 38" W
D	51.3514	-6.4083	51° 21' 4" N	6° 24' 30" W

Map Legend

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

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



Map: FR_062b

Version:31Aug11

Celtic Deep Recommended Reference Area

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.

0 0.25 0.5 km

N

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6°25'30"W 6°25'0"W 6°24'30"W 6°24'0"W 6°23'30"W 6°23'0"W

51°21'40"N

51°21'20"N

51°21'0"N

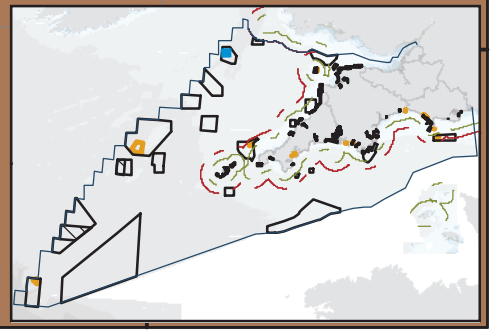
Celtic Deep

Celtic Deep

Map Legend

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.



II.4.4 South Dorset recommended reference area

Basic site information

***Site centre location (datum used: ETRS89)*:**

Decimal Degrees		Degrees Minutes Seconds	
Lat	**Long**	**Lat**	**Long**
50.3831	-2.3557	50° 22' 59'' N	2° 21' 20'' W

***Site surface area*:** 25 km^2

***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 5km borders running north to south and east to west, in line with ENG guidelines. This site sits between the 6nm and 12nm limits and as it sits entirely within the western extent of the South Dorset rMCZ, its borders run in parallel with this rMCZ.

Sites to which the site is related: The South Dorset recommended reference area sits within the boundary of the South Dorset rMCZ.

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 Dorset recommended reference area

Table II.4.4a shows a summary of the draft conservation objectives for this recommended reference area. This is an extract of the conservation objective summary tables in section II.2.6. All features in the table have draft conservation objectives, including those in the right-hand column, in line with the Conservation Objective Guidance. In this recommended reference area, the site is large enough to meet the ENG minimum viable size guidelines for all the listed features.

Table II.4.4a Draft conservation objectives for South Dorset recommended reference area. All features shown in the table have a draft conservation objective of 'recover to reference condition'. ***The full text of the draft conservation objectives can be found in appendix 15.***

	Viable size guidelines met	Viable size guidelines not met
Broad-scale habitats	High energy circalittoral rock Moderate energy circalittoral rock Subtidal mixed sediments	
FOCI habitats	Subtidal chalk	

The following tables show ENG-related statistics for this site, reported from spatial data available in Finding Sanctuary's GIS datasets.

*Table II.4.4b **Subtidal broad-scale habitats** to be protected in this recommended reference area, 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 site (km^2)	% of total in study area	Source(s)
High energy circalittoral rock	20.53	1.6%	1
Moderate energy circalittoral rock	3.70	<0.1%	1
Subtidal mixed sediments	0.78	<0.1%	1

*Table II.4.4c **FOCI habitats** to be protected in this recommended reference area, 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 chalk		3		1

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

Site summary

This recommended reference area encompasses the western portion of the South Dorset rMCZ, where there are records of the FOCI habitat subtidal chalk. The depth of the site is between 47m and 52m. It is located about 13km south-east of Portland Bill.

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.

Coggan & Diesing (2011) carried out a broad-scale mapping programme in the central Channel in order to provide information on the distribution, extent and character of potential Habitats Directive Annex I reef habitat to facilitate the selection of Special Areas of Conservation (SAC) in UK waters.

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 Dorset rMCZ. It may be that this work overlapped the zone, but further checks need to be made.

Although confirmed sightings have not been found in this area, there is anecdotal evidence to suggest this area is important as a wintering ground for seahorses (especially the Short Snouted Seahorse) which are known to go to great depths during the winter. We have a record of 254 feet off Dartmouth and it is not uncommon to find 60 to 70 feet records (Neil Garrick-Maidment, *pers. comm*.).

The seabed in the region is characterised mainly by muddy, sandy gravel which may include bedrock reef (Poulton *et al*. 2002). Holme (1953, 1966) and Holme & Barrett (1977) surveyed the bottom fauna of the English Channel and it is likely that they have included the area of the South Dorset site.

Stakeholder narrative: Assumptions and Implications

Reference areas will exclude all depositional and extractive activities, and might result in restrictions or management of potentially damaging and disturbing activities, as defined in the SNCB's draft reference area guidance document (available here[54]). This guidance is relatively clear and specific, therefore no further work on defining assumptions on management of reference areas was carried out.

Appendix 10 shows the content of the draft reference area guidance, converted into a layout similar to the layout for the assumptions/ implications tables presented in the rMCZ site reports – this was used at meetings as a template upon which to record site-specific comments. However, site-specific comments were limited, so we have not inserted the whole table here.

Stakeholder representatives from across many sectors were concerned about the implications of reference areas for the large range of activities affected (the Impact Assessment, to be finished in January 2012, will analyse these impacts in detail). On the other hand, conservation representatives highlighted the conservation benefits of highly protected areas. These generic comments apply to all recommended reference areas.

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

As stated above, there was much clearer guidance available on what activities will be restricted in reference areas, compared with MCZs in general. Therefore, the uncertainties around reference areas were much more limited.

A remaining uncertainty that stakeholder representatives highlighted repeatedly was about possible impacts on activities near the boundary of reference areas. Some activities might have knock-on impacts beyond the area where they are being carried out, e.g. sediment plumes from aggregate extraction, or from construction / infrastructure maintenance work. There is uncertainty over what 'buffer zones' might be needed around reference areas for such activities.

Additional comments

For this specific site, additional comments highlighted that there is a mackerel fishery in the area and the fishing industry has outstanding concerns over access for this fishery. Please also refer to the general narrative for recommended reference areas in section II.2.3.

[54] http://www.naturalengland.org.uk/Images/MCZ-regional-guidance_tcm6-23451.pdf

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.

Fishing representatives have stated that they will not support any recommendations for recommended reference areas. There is acceptance of the fact that this area contains rare records of the FOCI habitat subtidal chalk, and this is the main reason why this recommended reference area is located here. There is non-UK fishing interest in the area, and long-term tidal resource interest. Like other recommended reference areas, the site is controversial, with strong support from conservationists and strong concerns over the socio-economic impacts from many other sectors.

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 recommended reference area in Bastos *et al.* (2002, 2003), Donovan *et al.* (1961), Holme & Barrett (1977), Southward *et al.*(2004), and Spooner & Holme (1961).

Site map series

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

- The first map (FR_063a) is the main site map showing the site 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 (map FR_063b) shows the site boundary over broad-scale habitats, and records of habitat and species FOCI. The data shown on this map corresponds with the information in tables II.4.4b and II.4.4c, data sources are indicated in the tables.
- Most site reports contain a map showing socio-economic datasets. This one does not, as the human activity data relevant to this site is already included on map FR_027c in the South Dorset rMCZ site report (except for fisheries information, which is included in the interactive PDF maps supplied with the additional materials listed in 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.

Map: FR_063a

Version:24Aug11

South Dorset Recommended Reference Area

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.

0 0.5 1 2 km

N

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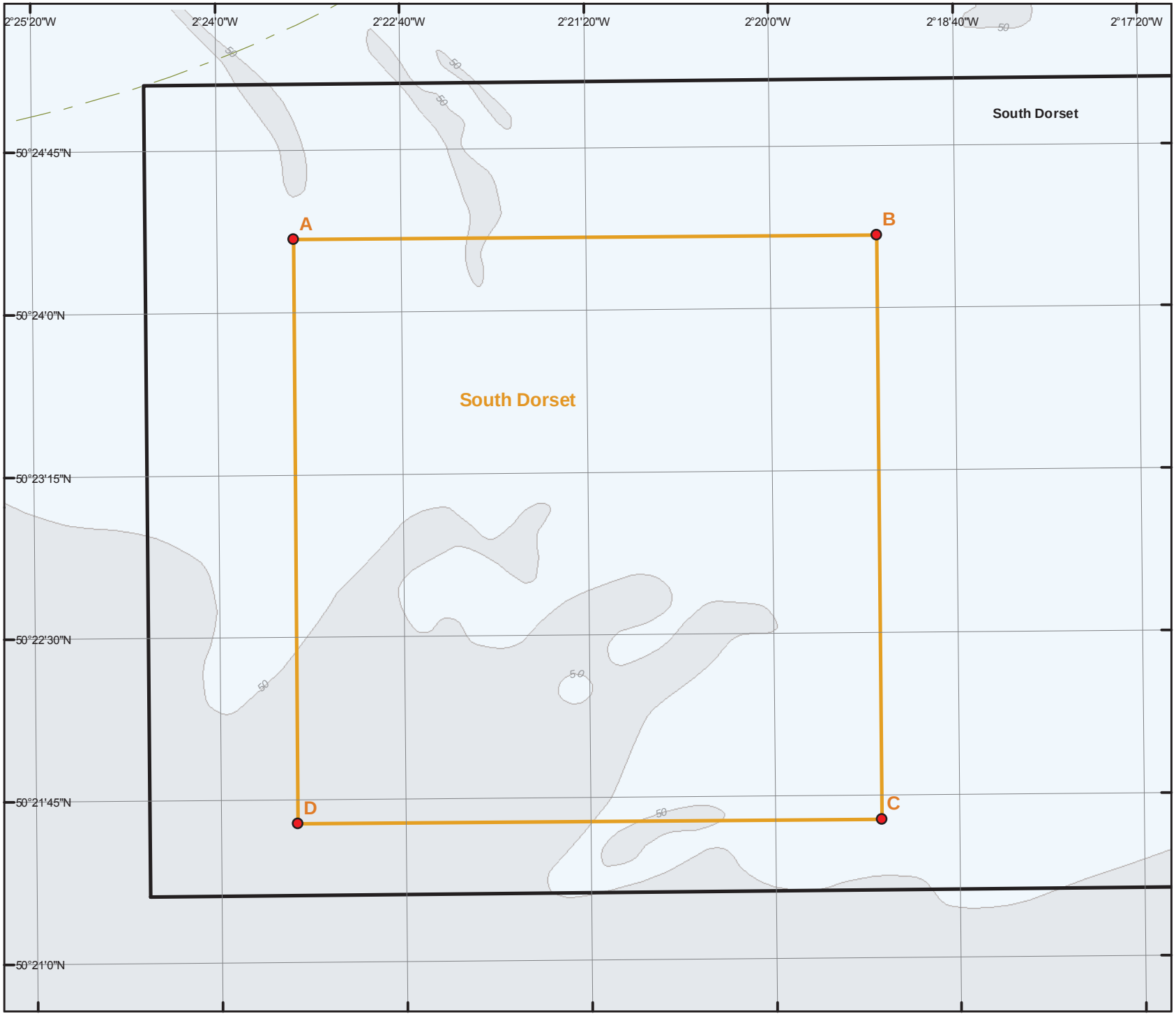


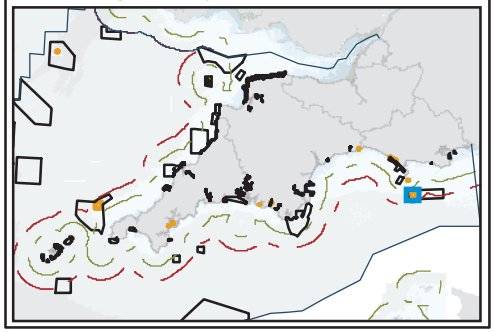
Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	50.4056	-2.3908	50° 24' 20" N	2° 23' 26" W
B	50.4056	-2.3204	50° 24' 20" N	2° 19' 13" W
C	50.3606	-2.3205	50° 21' 38" N	2° 19' 13" W
D	50.3607	-2.3908	50° 21' 38" N	2° 23' 26" W

Map Legend

- 6 nautical mile limit
- Recommended reference area
- Recommended MCZ (rMCZ)

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



Map: FR_063b

Version:31Aug11

South Dorset Recommended Reference Area

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.

0 0.5 1 2 km

N

FINDING SANCTUARY

2°25'30"W 2°24'0"W 2°22'30"W 2°21'0"W 2°19'30"W 2°18'0"W 2°16'30"W 2°15'0"W

50°25'0"N 50°24'0"N 50°23'0"N 50°22'0"N 50°21'0"N

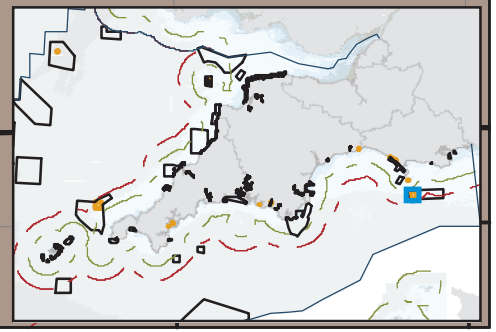
South Dorset

South Dorset

Map Legend

- 6 nautical mile limit
- Recommended reference area
- 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.4.5 South-East of Portland Bill recommended reference area

Basic site information

***Site centre location (datum used: ETRS89)*:**

Decimal Degrees		Degrees Minutes Seconds	
Lat	**Long**	**Lat**	**Long**
50.4883	-2.4105	50° 29' 18'' N	2° 24' 37'' W

***Site surface area*:** 250000 m^2

***Biogeographic region*:**

JNCC regional sea: Eastern Channel
OSPAR region: Region II: Greater North Sea

Site boundary: The site is a simple square, with borders running north to south and east to west, in line with ENG guidelines.

Sites to which the site is related: The South-East of Portland Bill recommended reference area sits within the boundary of the Studland to Portland dSAC.

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 Portland Bill recommended reference area

Table II.4.5a shows a summary of the draft conservation objectives for this recommended reference area. This is an extract of the conservation objective summary tables in section II.2.6. All features in the table have draft conservation objectives, including those in the right-hand column, in line with the Conservation Objective Guidance. Features in the right-hand column are not counted towards the figures in section II.2.9 unless specifically stated.

Table II.4.5a Draft conservation objectives for South-East of Portland Bill recommended reference area. All features shown in the table have a draft conservation objective of 'recover to reference condition'. ***The full text of the draft conservation objectives can be found in appendix 15.***

	Viable size guidelines met	Viable size guidelines not met
Broad-scale habitats		High energy circalittoral rock
FOCI habitats	Blue Mussel beds	

The following tables show ENG-related statistics for this site, reported from spatial data available in Finding Sanctuary's GIS datasets.

*Table II.4.5b **Subtidal broad-scale habitats** to be protected in this recommended reference area, 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 site (km^2)	% of total in study area	Source(s)
High energy infralittoral rock	0.25	<0.1%	1

*Table II.4.5c **FOCI habitats** to be protected in this recommended reference area, 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)
Blue Mussel beds [1]	0.24			4

[1] Dorset Wildlife Trust have stated that the Mussel beds habitat in this location is mussel bed on rock.

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

Site summary

This small recommended reference area just meets the minimum viable size guidance for the FOCI habitat Blue Mussel Beds, and the main reason for including the site within the recommended network was to represent mussel beds within the set of reference areas. The depth of the site ranges from 30 – 35 m, and the site is located 4km south-east of Portland Bill, within the Studland to Portland dSAC.

Detailed site description

The area was covered by the DORIS[55] survey, which provided detailed bathymetry data, and mapped an extensive mussel bed in the area, both shown the site maps at the end of this report. There is a significant seed mussel bed off Portland, which is primarily used for relaying in Poole Harbour (Wright & Bailey, 2009). Shambles Bank (just north of South-East of Portland) is surrounded by bedrock, with mussel beds (Bastos *et al.* 2003).

Stakeholder narrative: Assumptions and Implications

Reference areas will exclude all depositional and extractive activities, and might result in restrictions or management of potentially damaging and disturbing activities, as defined in the SNCB's draft reference area guidance document (available here[56]). This guidance is relatively clear and specific, therefore no further work on defining assumptions on management of reference areas was carried out.

Appendix 10 shows the content of the draft reference area guidance, converted into a layout similar to the layout for the assumptions / implications tables presented in the rMCZ site reports – this was

[55] http://www.dorsetwildlifetrust.org.uk/page283.html
[56] http://www.naturalengland.org.uk/Images/MCZ-regional-guidance_tcm6-23451.pdf

used at meetings as a template upon which to record site-specific comments. However, site-specific comments were limited, so we have not inserted the whole table here.

Stakeholder representatives from across many sectors were concerned about the implications of reference areas for the large range of activities affected (the Impact Assessment, to be finished in January 2012, will analyse these impacts in detail). On the other hand, conservation representatives highlighted the conservation benefits of highly protected areas. These generic comments apply to all recommended reference areas.

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

As stated above, there was much clearer guidance available on what activities will be restricted in reference areas, compared with MCZs in general. Therefore, the uncertainties around reference areas were much more limited.

A remaining uncertainty that stakeholder representatives highlighted repeatedly was about possible impacts on activities near the boundary of reference areas. Some activities might have knock-on impacts beyond the area where they are being carried out, e.g. sediment plumes from aggregate extraction, or from construction/ infrastructure maintenance work. There is uncertainty over what 'buffer zones' might be needed around reference areas for such activities.

Additional comments

For this specific site, additional comments from the fishing industry highlighted that there are multiple fisheries in the area. We also received information from the Dorset Wildlife Trust that suggested 'giant' dog-whelks – *Nucella lapillus,* twice the size of the usual intertidal ones can be found at this location (Peter Tinsley *pers. comm.*). Please also refer to the general narrative for recommended reference areas in section II.2.3.

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.

Fishing representatives have stated that they will not support any recommendations for recommended reference areas. Like other recommended reference areas, the site is controversial, with strong support from conservationists and strong concerns over the socio-economic impacts from many other sectors. The site was drawn with feedback from the Local Group, many members of that group considered the location of the site as the least bad location in terms of impacts on ongoing activities such as angling. The site has the minimum dimensions stipulated in the ENG for the FOCI habitat 'mussel beds', this is a reflection of the concern about socio-economic impacts of 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 and DORIS data. Refer to

appendix 8 for details, and to the tables above for data sources for specific features in this site. Further information on the Natura 2000 sites to which this site is related may be found on the JNCC's website[57].

Further evidence underpinning the site can be found in the publications and datasets referred to in the detailed site description.

The area was surveyed as part of the DORIS survey, a collaborative effort between Dorset Wildlife Trust, the Maritime and Coastguard Agency (MCA), the Channel Coastal Observatory (CCO) and the National Oceanographic Centre, Southampton (NOCS), funded by Viridor Credits (here is a weblink to further information[58]). The DORIS project provided us with detailed bathymetry data, shown on map FR_064c at the end of this report, as well as with FOCI records (see appendix 8).

The is located within the revised boundary of the Studland to Portland draft SAC, and Natural England may have additional information of relevance to this site in the site selection assessment document for this draft SAC (the public consultation on this draft SAC was due to start around the time that this report was being finalised).

Site map series

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

- The first map (FR_064a) is the main site map showing the site 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_064b) shows the site boundary over broad-scale habitats, and records of habitat and species FOCI. The data shown on this map corresponds with the information in tables II.4.5b and II.4.5c, data sources are indicated in the tables.
- The third map (FR_064c) shows detailed bathymetry data from the DORIS survey.
- Most 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).
- 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.

[57] http://jncc.defra.gov.uk/page-4
[58] http://www.dorsetwildlifetrust.org.uk/page283.html

Map: FR_064a

Version:26Aug11

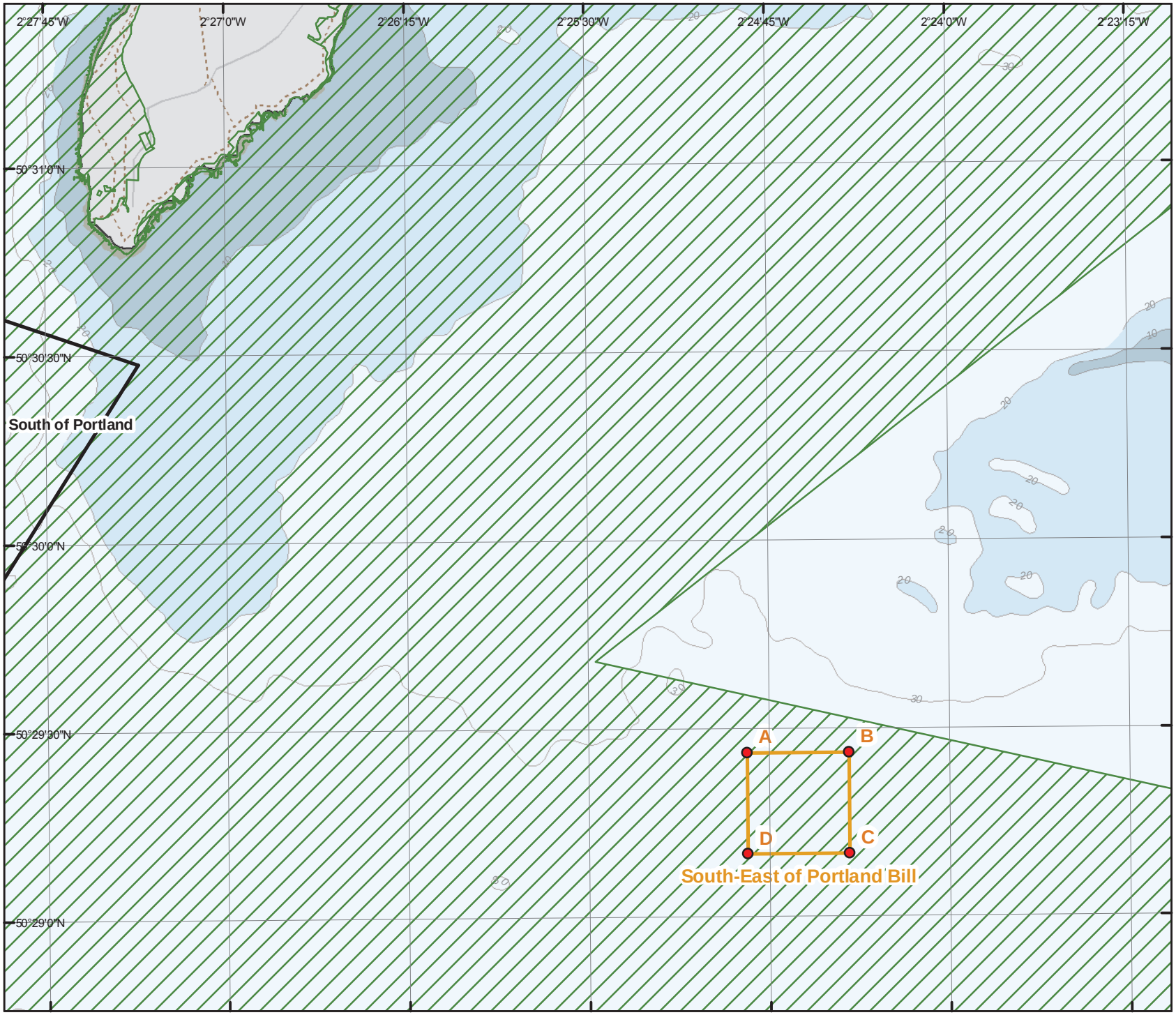
South East of Portland Bill Recommended Reference Area

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.

0 0.25 0.5 1 Km

N

FINDING SANCTUARY



Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	50.4906	-2.4140	50° 29' 26" N	2° 24' 50" W
B	50.4906	-2.4070	50° 29' 26" N	2° 24' 25" W
C	50.4861	-2.4070	50° 29' 9" N	2° 24' 25" W
D	50.4861	-2.4140	50° 29' 9" N	2° 24' 50" W

Map Legend

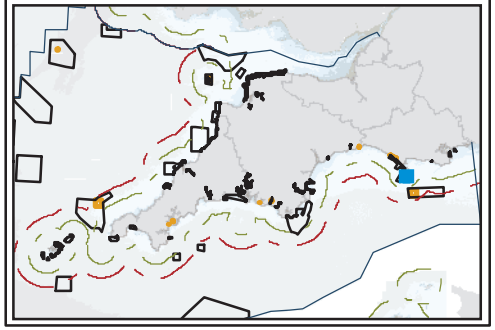
Recommended reference area

Recommended MCZ (rMCZ)

Existing MPAs

dSAC

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



Map: FR_064b

Version:31Aug11

South-East of Portland Bill Recommended Reference Area

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.

0 0.5 1 Km

N

FINDING SANCTUARY

2°28'0"W 2°27'0"W 2°26'0"W 2°25'0"W 2°24'0"W 2°23'0"W 2°22'0"W 2°21'0"W

50°30'40"N

50°30'0"N

50°29'20"N

50°28'40"N

50°28'0"N

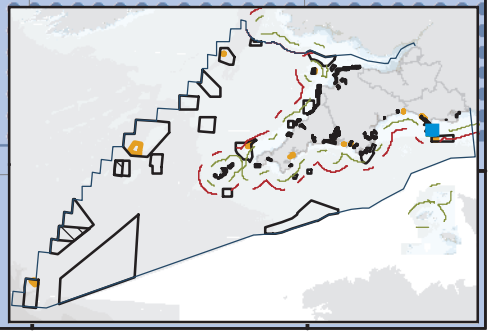
South of Portland

South-East of Portland Bill

Map Legend

- Recommended reference area
- 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: FR_064c

Version:31Aug11

South-East of Portland Bill Recommended Reference Area

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.

0 0.5 1 km N

FINDING SANCTUARY

2°26'0"W 2°25'30"W 2°25'0"W 2°24'30"W 2°24'0"W 2°23'30"W 2°23'0"W 2°22'30"W 2°22'0"W 2°21'30"W

50°30'20"N

50°30'0"N

50°29'40"N

50°29'20"N

50°29'0"N

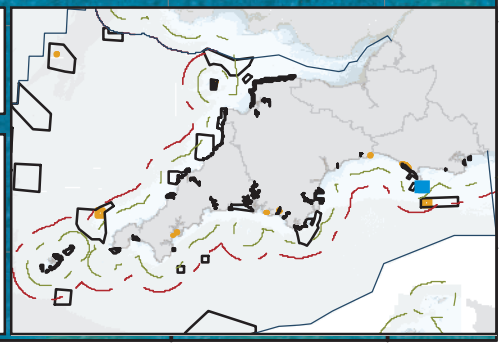
50°28'40"N

South-East of Portland Bill

Map Legend

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. This map also shows bathymetry data supplied by the DORIS (DORset Integrated Seabed Study) project. Full details and a comprehensive legend are provided in the appendices of the Finding Sanctuary final report.



II.4.6 The Fleet recommended reference area

Basic site information

***Site centre location (datum used: ETRS89)*:**

Decimal Degrees		Degrees Minutes Seconds	
Lat	**Long**	**Lat**	**Long**
50.6361	-2.5699	50° 38' 9'' N	2° 34' 11'' W

***Site surface area*:** 2.1 km^2

***Biogeographic region*:**

JNCC regional sea: Western Channel and Celtic Sea
OSPAR region: Region II: Greater North Sea

Site boundary: The Fleet recommended reference area sits within the northern half of the Fleet Lagoon and the northern, eastern and western boundaries follow the ordnance survey Boundary Line mean high water mark. The southern boundary is a simple straight line cutting across the lagoon from between an area between Gore Cove and Butterstreet Cove.

Sites to which the site is related: The Fleet recommended reference area sits within the boundary of the SAC, SPA and SSSI that cover the Fleet Lagoon and Chesil Beach.

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 Fleet recommended reference area

Table II.4.6a shows a summary of the draft conservation objectives for this recommended reference area. This is an extract of the conservation objective summary tables in section II.2.6. All features in the table have draft conservation objectives, including those in the right-hand column, in line with the Conservation Objective Guidance. Features in the right-hand column are not counted towards the figures in section II.2.9 unless specifically stated.

Table II.4.6a Draft conservation objectives for the Fleet recommended reference area. All features shown in the table have a draft conservation objective of 'recover to reference condition'. ***The full text of the draft conservation objectives can be found in appendix 15.***

	Viable size guidelines met	Viable size guidelines not met
Broad-scale habitats		Subtidal coarse sediment **Coastal saltmarshes and saline reedbeds**[1] **Intertidal coarse sediments**[1] **Intertidal mud**[1] **Intertidal sediments dominated by aquatic angiosperms**[1]
FOCI habitats		Seagrass Beds
FOCI species		*Tenellia adspersa* [2]

[1] None of the intertidal broad-scale habitats are represented in recommended reference areas that meet the minimum size guideline (5km), but recent SAP and SNCB advice has recognised that the size guideline is not realistic for intertidal habitats. The intertidal habitats have been highlighted in green to show that we are considering these to be represented within the current set of recommended reference areas (unlike the other features listed in the second column).

[2] The minimum patch size for *Tenellia adspersa* is the whole feature. As this recommended reference area does not cover the entire Fleet Lagoon, this site does not meet the minimum size guidance for this species.

The following tables show ENG-related statistics for this site, reported from spatial data available in Finding Sanctuary's GIS datasets.

Table II.4.6b ***Subtidal broad-scale habitats*** *to be protected in this recommended reference area, 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 site (km^2)	% of total in study area	Source(s)
Subtidal coarse sediment	1.80	<0.1%	1

Table II.4.6c ***Intertidal broad-scale habitats*** *to be protected in this recommended reference area, 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 site (km^2)	% of total in study area	Source(s)
Intertidal coarse sediments	0.02	0.1%	3
Intertidal mud	0.11	<0.1%	1, 3
Coastal saltmarshes and saline reedbeds	<0.01	<0.1%	1, 3
Intertidal sediments dominated by aquatic angiosperms	<0.01	0.1%	1

*Table II.4.6d **FOCI habitats** to be protected in this recommended reference area, 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)
Seagrass beds	1.09	5		1

*Table II.4.6e **FOCI species** to be protected in this recommended reference area, 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 Trewhella Survey Log 2010.*

Species	Number of point records (total)	Number of point records (pre-1980)	Source(s)
Tenellia adspersa	1		1

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

Site summary

The Fleet Lagoon is a large natural shallow inlet, separated from the sea by Chesil Beach. The coarse sediments of the inlet channel are predominately colonised by brown and red algae, whereas the soft mud beds of the lagoonal basin support seagrass*, Zostera* and*Ruppia* spp., and green algal meadows. Oysters *(Crassostrea gigas*) are cultivated in the eastern lagoon (Foden *et al*. 2005), although the recommended reference area boundary has been drawn to exclude the area where aquaculture takes place. A historic swannery (founded by Benedictine monks in the 1040s, now under private ownership) is located near Abbotsbury at the western end of the Fleet. The Fleet is the largest saline/ brackish lagoon in England, and has been designated as a protected area under a range of designations.

Detailed site description

The Fleet is a shallow tidal inlet some 13 km long connected to the sea by a narrow channel entering Portland Harbour (Davies, 1998). Tidal streams up to 4 knots have been recorded within the channel. Sea water percolates through Chesil Bank influencing salinity along the length of the Fleet (Davies, 1998). Low freshwater input results in fully saline or polyhaline conditions throughout most of the lagoon; only the Abbotsbury embayment at the western end has low-salinity brackish water (Whittaker 1980).

The lagoon was rated as a site of national marine biological importance by Holme & Bishop (1980). Following the formation of the Fleet Study Group in 1975, the area has been extensively studied with the results published in two seminar reports (Ladle 1981a, 1985a); these volumes include papers on physical aspects and hydrography (Carr 1981; Whittaker 1981a; Robinson 1981a, 1981b), algae (Burrows 1981), the distribution of the seagrasses *Zostera* and *Ruppia* (Holmes, 1983, 1985, 1993; Whittaker 1981b), invertebrates (Ladle 1981b; Seaward 1981), meiofauna (Humphrey 1985), ostracods (Whittaker 1981c), subtidal communities (Dyrynda 1985, 2003; Dyrynda & Farnham,

1985), fish (Ladle 1981c, 1985b), observations on the opisthobranch mollusc *Akera bullata* (Thompson & Seaward 1989), and an extensive bibliography (Ladle 1985a) (Davies, 1998).

Foden *et al.* (2005) conducted a survey every 3–4 weeks during summer 2002 (24th April to 27th August) at 7 stations within the Fleet Lagoon. At each station a field assay was employed for separating microalgal epiphytes. The dominant seagrass (macrophytes) and seaweed (macroalgae) species were identified and replicate samples taken.

Davison & Hughes (1998) carried out an integrated seasonal monitoring study during spring 1995 which was funded by WWF. The monitoring was undertaken at a cross-channel transect. The monitoring involved 1-2 monthly observations of percentage cover of *Zostera* within the Fleet. Trial monitoring work included the use of video transects (Dyrynda. in prep.).

Dyrynda & Cleator (1995) completed a series of cross-lagoonal transects, mapping benthic communities and providing information on variations of vegetative cover. Spencer *et al*. (1994) surveyed the intertidal area on areas of hard substrate (shell and stone) within the Fleet, of shell and stone, in the Dart, Devon Avon estuaries and in the Fleet whilst surveying spatfalls of the non-native oyster.

A detailed survey of species composition and density was conducted for seagrass in Fleet lagoon during 2002 (Bunker *et al*., 2004). With regard to area, *Z. marina* has been lost from the swannery in the lagoon since 1982, but a north-westward extension of *Z. noltii* range has occurred in West Fleet since 1999. *Ruppia* sp. has been lost from the Swannery Basin and west of Berry Coppice since in 1983, but distributions in the rest of the Fleet remain broadly unchanged since 1999 (Bunker *et al*., 2004). Porter *et al*, (2001) conducted seasonal monitoring of vegetation cover between January 1995 and January 1997.The shallow subtidal bottom (<1 m) was dominated by organic muds supporting seagrass meadows (two species of *Zostera*, two of *Ruppia*). Little *et al* (1989) described the distribution of molluscs in lagoonal shingle of the Fleet. Barnes (1989) gives an overview and conservation appraisal of the Fleet.

Stakeholder narrative: Assumptions and Implications

Reference areas will exclude all depositional and extractive activities, and might result in restrictions or management of potentially damaging and disturbing activities, as defined in the SNCB's draft reference area guidance document (available here[59]). This guidance is relatively clear and specific, therefore no further work on defining assumptions on management of reference areas was carried out.

Appendix 10 shows the content of the draft reference area guidance, converted into a layout similar to the layout for the assumptions / implications tables presented in the rMCZ site reports – this was used at meetings as a template upon which to record site-specific comments. However, site-specific comments were limited, so we have not inserted the whole table here.

Stakeholder representatives from across many sectors were concerned about the implications of reference areas for the large range of activities affected (the Impact Assessment, to be finished in January 2012, will analyse these impacts in detail). On the other hand, conservation representatives highlighted the conservation benefits of highly protected areas. These generic comments apply to all recommended reference areas.

[59] http://www.naturalengland.org.uk/Images/MCZ-regional-guidance_tcm6-23451.pdf

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

As stated above, there was much clearer guidance available on what activities will be restricted in reference areas, compared with MCZs in general. Therefore, the uncertainties around reference areas were much more limited.

A remaining uncertainty that stakeholder representatives highlighted repeatedly was about possible impacts on activities near the boundary of reference areas. Some activities might have knock-on impacts beyond the area where they are being carried out, e.g. sediment plumes from aggregate extraction, or from construction / infrastructure maintenance work. There is uncertainty over what 'buffer zones' might be needed around reference areas for such activities.

For this specific site, it was highlighted that Portland Harbour, which is approx 4-5km in distance at its closest point from this recommended reference area has expressed concern regarding the proximity of it and the potential impact it might have on the long term growth of the port (specifically in relation to construction of structures and dredging). Natural England advised that due to its distance from the recommended reference area this would not be the case and that future economic regeneration of the port would not be subject to any additional requirements over and above what already exists, as a result of this particular site.

Portland Port has requested that if there is any uncertainty that the above statement from Natural England does not hold true that any economic impact assessment would need to factor in not only the costs of the immediate economic impact on the port but the knock on effects to the region and the industries, such as renewables, that rely on the port being able to provide them with the facilities they need. In the event of uncertainty, consideration should be given to whether this site should remain within the network.

Additional comments

- *Ports and Harbours*
    - Portland Port is at the forefront of economic regeneration in the area and supports significant employment locally and regionally as well as bringing additional economic opportunities for the future. The port also offers a solution to current energy issues including security of supply and meeting renewable targets. Portland Gas, an internationally significant gas storage project (the current estimate of total development cost for the project is £456m), W4BRE, the green energy facility, and the planned Eneco wind park, are examples of companies that recognise this in the port and are prime examples of growth areas for the future.
    - The Government has approved Portland Port's long term strategic plan to reclaim some 35 acres in order fully to convert the Naval Base to a commercial port. This will entail investment of more than £70 million to take full advantage of Portland's unique features as a deep water, all weather port, strategically located on the South Coast with easy access to the shipping lanes to Europe, proximity to France and well positioned for ports on the Iberian Peninsula. Furthermore, Portland is the only port in the South West with the potential to take alongside very large cruise ships and, similarly, is the only remaining practical South Coast alternative to Portsmouth to berth the Royal Navy's new aircraft carriers.

Please also refer to the general narrative for recommended reference areas in section II.2.3.

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.

Fishing representatives have stated that they will not support any recommendations for recommended reference areas. Like other recommended reference areas, the site is controversial, with strong support from conservationists and strong concerns over the socio-economic impacts from many other sectors. There are concerns from the landowner who owns the private land alongside the upper Fleet, who is worried about potential impacts on the swannery at Abbotsbury, and on recreational activities. There has been some concern from the local water company relating to whether or not existing outfalls in the Fleet would be affected. The ports sector has voiced strong reservations about this site because of concerns about impacts on the planned expansion of Portland harbour (5km to the east of the site), although the Natural England representative considered it unlikely to have any impacts.

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, 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 information on the Natura 2000 sites to which this site is related may be found on the JNCC's website[60].

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_065a) is the main site map showing the site 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_065b) shows the site boundary over broad-scale habitats, and records of habitat and species FOCI. The data shown on this map corresponds with the information in tables II.4.6b to II.4.6e, data sources are indicated in the tables.
- Most site reports contain a map showing socio-economic datasets. This one does not, as there is limited human activity mapped in the site.

[60] 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.

Map: FR_065a

Version:25Aug11

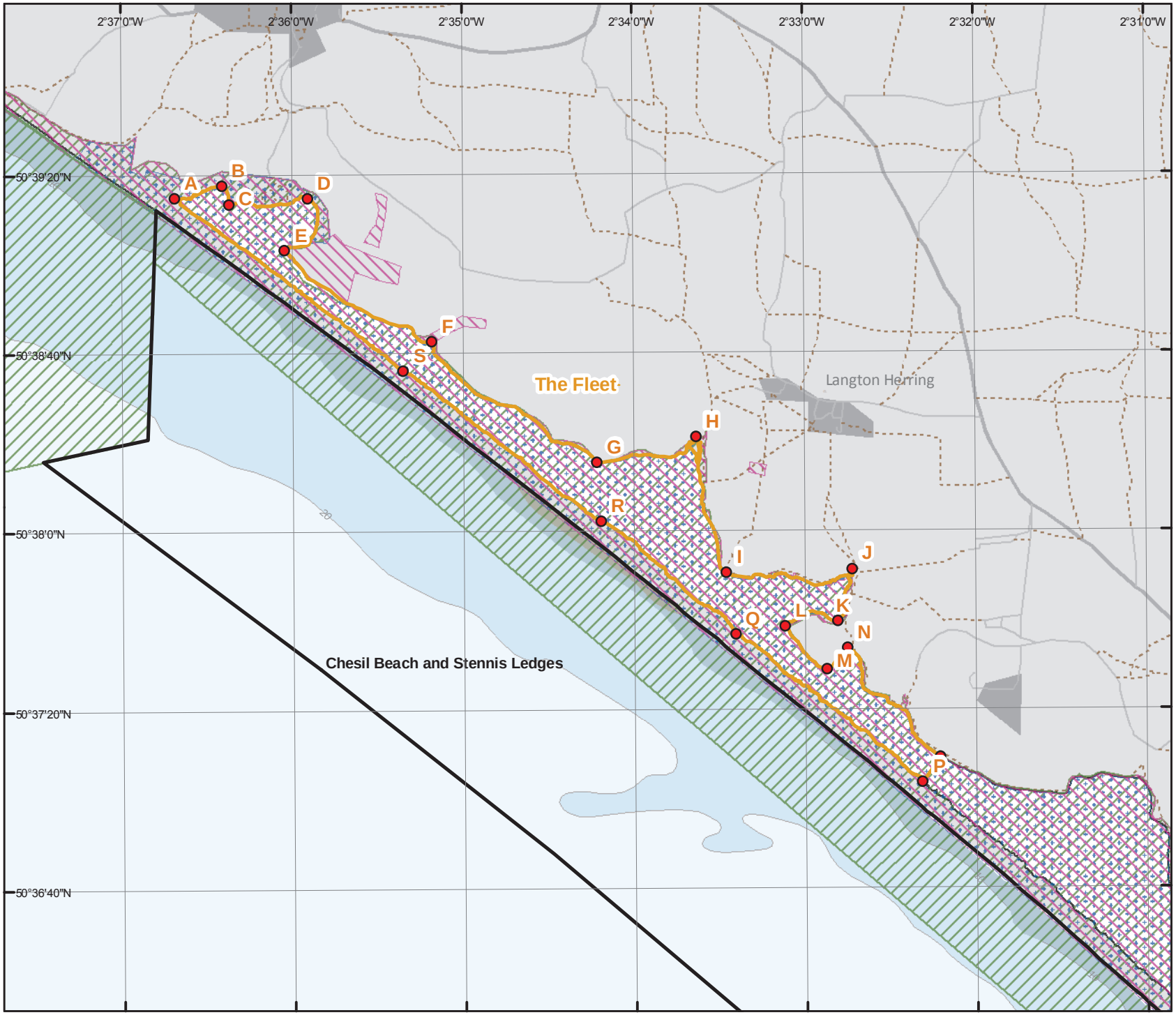
The Fleet Recommended Reference Area

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.

0 0.4 0.8 1.6 km

N

FINDING SANCTUARY



Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	50.6541	-2.6115	50° 39' 14" N	2° 36' 41" W
B	50.6549	-2.6068	50° 39' 17" N	2° 36' 24" W
C	50.6537	-2.6062	50° 39' 13" N	2° 36' 22" W
D	50.6541	-2.5985	50° 39' 14" N	2° 35' 54" W
E	50.6509	-2.6007	50° 39' 3" N	2° 36' 2" W
F	50.6452	-2.5864	50° 38' 42" N	2° 35' 11" W
G	50.6376	-2.5703	50° 38' 15" N	2° 34' 12" W
H	50.6392	-2.5605	50° 38' 21" N	2° 33' 37" W
I	50.6307	-2.5576	50° 37' 50" N	2° 33' 27" W
J	50.6309	-2.5454	50° 37' 51" N	2° 32' 43" W
K	50.6277	-2.5468	50° 37' 39" N	2° 32' 48" W
L	50.6274	-2.5519	50° 37' 38" N	2° 33' 6" W
M	50.6247	-2.5479	50° 37' 28" N	2° 32' 52" W
N	50.6260	-2.5459	50° 37' 33" N	2° 32' 45" W
O	50.6192	-2.5368	50° 37' 9" N	2° 32' 12" W
P	50.6176	-2.5386	50° 37' 3" N	2° 32' 18" W
Q	50.6269	-2.5568	50° 37' 36" N	2° 33' 24" W
R	50.6339	-2.5699	50° 38' 2" N	2° 34' 11" W
S	50.6433	-2.5892	50° 38' 35" N	2° 35' 21" W

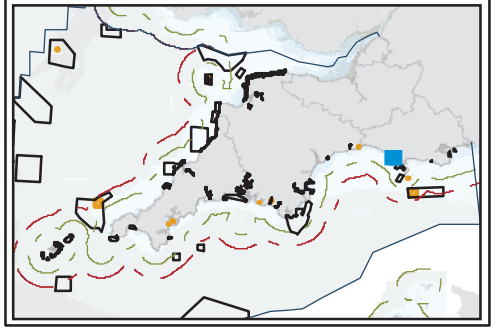
Map Legend

- Recommended reference area
- Recommended MCZ (rMCZ)

Existing MPAs

- SAC
- SPA
- SSSI (part of MPA network)

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



Map: FR_065b

Version:31Aug11

The Fleet Recommended Reference Area

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.

0 0.7 1.4 km

N

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2°37'0"W 2°36'0"W 2°35'0"W 2°34'0"W 2°33'0"W 2°32'0"W 2°31'0"W

50°39'20"N

50°38'40"N

50°38'0"N

50°37'20"N

50°36'40"N

Langton Herring

The Fleet

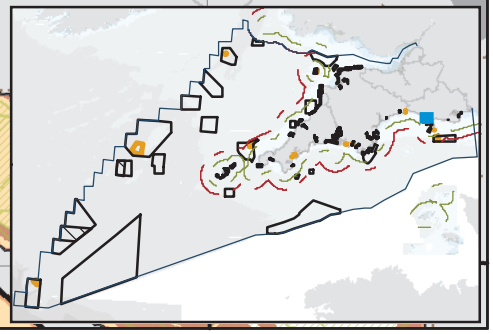
Chesil Beach and Stennis Ledges

Map Legend

Recommended reference area

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.4.7 Lyme Bay recommended reference area

Basic site information

Site centre location (datum used: ETRS89):

Decimal Degrees		Degrees Minutes Seconds	
Lat	**Long**	**Lat**	**Long**
50.7111	-2.9553	50° 42' 40'' N	2° 57' 19'' W

***Site surface area*:** 293623 m^2

***Biogeographic region*:**

JNCC regional sea: Western Channel and Celtic Sea
OSPAR region: Region II: Greater North Sea

Site boundary: The Lyme Bay recommended reference area is a simple square shape with borders running north to south and east to west. The Northern boundary follows the Ordnance Survey Boundary Line mean high water mark from Seven Rock Point in the west to an area just to the west of Devonshire Head.

Sites to which the site is related: The Lyme Bay recommended reference area is located within the boundary of the Lyme Bay and Torbay Bay cSAC.

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 Lyme Bay recommended reference area

Table II.4.7a shows a summary of the draft conservation objectives for this recommended reference area. All features in the table have draft conservation objectives, including those in the right-hand column, in line with the Conservation Objective Guidance. Features in the right-hand column are not counted towards the figures in section 11.2.9 unless specifically stated.

Table II.4.7a Draft conservation objectives for Lyme Bay recommended reference area. All features shown in the table have a draft conservation objective of 'recover to reference condition'. ***The full text of the draft conservation objectives can be found in appendix 15.***

	Viable size guidelines met	Viable size guidelines not met
Broad-scale habitats		High energy infralittoral rock Subtidal mixed sediments **Intertidal coarse sediments**[1]
FOCI habitats	*Sabellaria alveolata* reefs	
FOCI species	*Haliclystus auricula* *Padina pavonica*	

[1] None of the intertidal broad-scale habitats are represented in recommended reference areas that meet the minimum size guideline (5km), but recent SAP and SNCB advice has recognised that the size guideline is not realistic for intertidal habitats. The intertidal habitats have been highlighted in green to show that we are considering these to be represented within the current set of recommended reference areas (unlike the other features listed in the second column).

The following tables show ENG-related statistics for this site, reported from spatial data available in Finding Sanctuary's GIS datasets.

*Table II.4.7b **Subtidal broad-scale habitats** to be protected in this recommended reference area, 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 site (km^2)	% of total in study area	Source(s)
High energy infralittoral rock	0.18	<0.1%	1
Subtidal mixed sediments	0.07	<0.1%	1

*Table II.4.7c **Intertidal broad-scale habitats** to be protected in this recommended reference area, 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 site (km^2)	% of total in study area	Source(s)
Intertidal coarse sediments	0.04	0.2%	1

*Table II.4.7d **FOCI habitats** to be protected in this recommended reference area, 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)
Honeycomb worm (*Sabellaria alveolata*) reefs		1		1

*Table II.4.7e **FOCI species** to be protected in this recommended reference area, 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 Trewhella Survey Log 2010.*

Species	Number of point records (total)	Number of point records (pre-1980)	Source(s)
Haliclystus auricula	1		4
Padina pavonica	1		1

This recommended reference area 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 0.29 km^2 of seahorse area polygon (refer to appendix 8 for more information).

This rMCZ intersects with the Axmouth to Lyme Regis Undercliffs Geological Conservation Review site.

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

Site summary

The site extends from the shoreline to depths of approximately 10 metres below chart datum.

This recommended reference area is a very small area, included in the network recommendations in order to represent a variety of ENG-listed features (e.g. *Padina pavonica* and *Sabellaria alveolata* reefs) in the set of recommended reference areas. The site is located just off the Undercliffs at Lyme Regis, an area of historic coastal landslides that has been protected within a coastal (terrestrial) SAC.

Detailed site description

Since the site is so small, it has proved difficult to locate information that is relevant to the specific site within the literature.

There may be some relevant information in Schratzberger *et al.* (2000), who report on surveys that collected coarse sediments in Lyme bay between February and May 1999. *Padina pavonica* was recorded during the 1992-95 Devon Wildlife Trust Axmouth littoral survey. *Sabellaria alveolata* reefs were recorded in the Lyme Bay area during the 1994-95 Devon Wildlife Trust Exmouth to Chesil (Lyme Bay) survey. Wood (2003) surveyed the distribution, abundance and condition of pink sea fans in the Lyme bay area (3 different sites) during 2001-2002, 41 in total were found. No *Amphianthus dohrnii* was recorded. 2007 Seasearch recorded subtidal mixed sediment in Lyme Bay (Wood, 2007).

Stakeholder narrative: Assumptions and Implications

Reference areas will exclude all depositional and extractive activities, and might result in restrictions or management of potentially damaging and disturbing activities, as defined in the SNCB's draft reference area guidance document (available here[61]). This guidance is relatively clear and specific, therefore no further work on defining assumptions on management of reference areas was carried out.

Appendix 10 shows the content of the draft reference area guidance, converted into a layout similar to the layout for the assumptions / implications tables presented in the rMCZ site reports – this was used at meetings as a template upon which to record site-specific comments. However, site-specific comments were limited, so we have not inserted the whole table here.

Stakeholder representatives from across many sectors were concerned about the implications of reference areas for the large range of activities affected (the Impact Assessment, to be finished in January 2012, will analyse these impacts in detail). On the other hand, conservation representatives highlighted the conservation benefits of highly protected areas. These generic comments apply to all recommended reference areas.

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

[61] http://www.naturalengland.org.uk/Images/MCZ-regional-guidance_tcm6-23451.pdf

As stated above, there was much clearer guidance available on what activities will be restricted in reference areas, compared with MCZs in general. Therefore, the uncertainties around reference areas were much more limited.

A remaining uncertainty that stakeholder representatives highlighted repeatedly was about possible impacts on activities near the boundary of reference areas. Some activities might have knock-on impacts beyond the area where they are being carried out, e.g. sediment plumes from aggregate extraction, or from construction / infrastructure maintenance work. There is uncertainty over what 'buffer zones' might be needed around reference areas for such activities.

No additional comments were recorded specifically for this site, but please refer to the general narrative for recommended reference areas in section II.2.3.

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.

Fishing representatives have stated that they will not support any recommendations for recommended reference areas. Like other recommended reference areas, the site is controversial, with strong support from conservationists and strong concerns over the socio-economic impacts from many other sectors. This site is very small, and has elicited no specific further commentary.

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, Dorset Environmental Records Centre (DERC), and MB102. Refer to appendix 8 for details, and to the tables above for data sources for specific features in this site. Further information on the Natura 2000 sites to which this site is related may be found on the JNCC's website[62].

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_066a) is the main site map showing the site 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.

[62] http://jncc.defra.gov.uk/page-4

- The second map (FR_066b) shows the site boundary over broad-scale habitats, and records of habitat and species FOCI. The data shown on this map corresponds with the information in tables II.4.7b to II.4.7e, data sources are indicated in the tables.
- The third map (FR_066c) 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.

Map: FR_066a

Version:25Aug11

Lyme Bay Recommended Reference Area

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.

0 0.5 1 Km N

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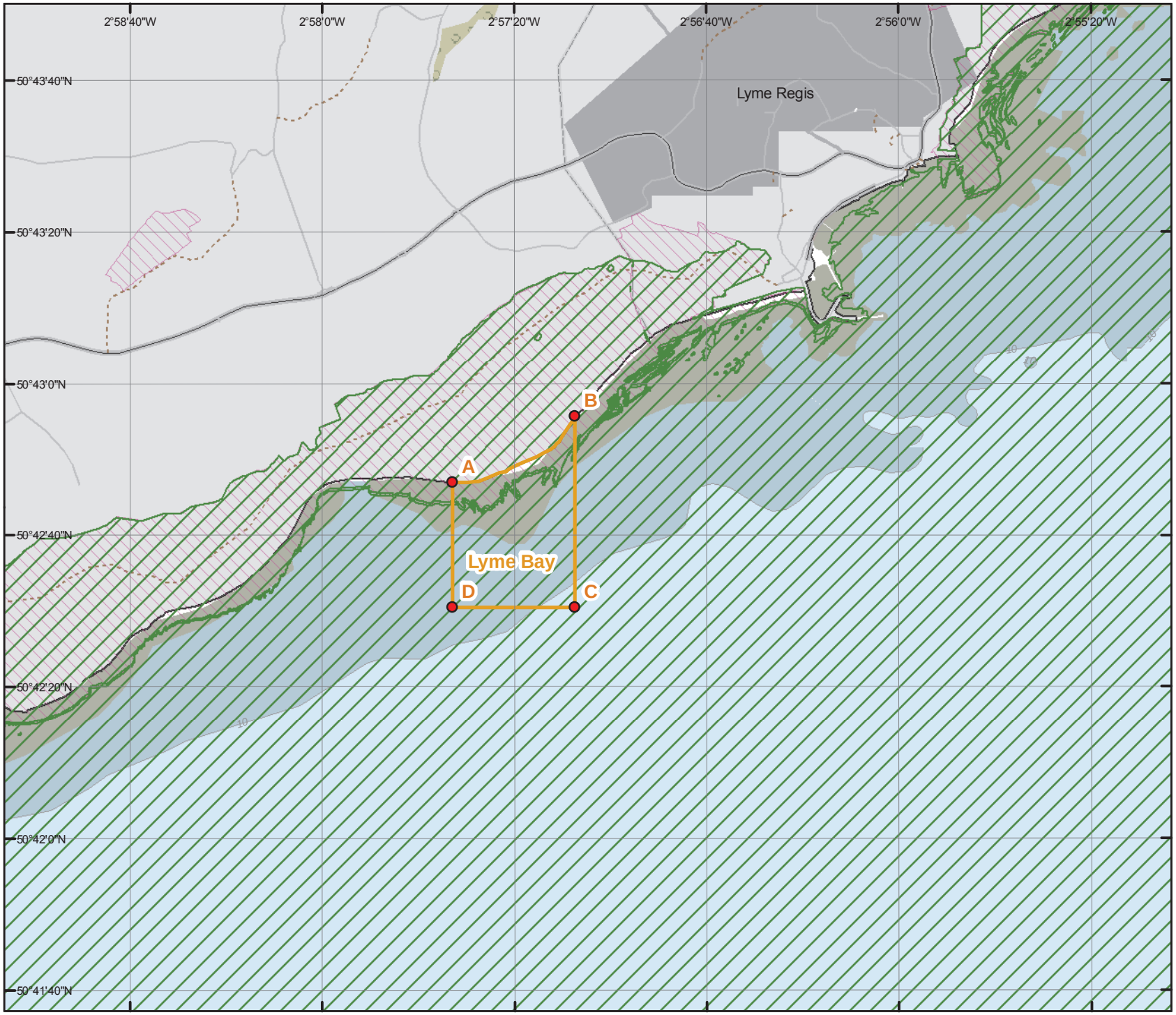


Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	50.7131	-2.9591	50° 42' 46" N	2° 57' 32" W
B	50.7155	-2.9520	50° 42' 55" N	2° 57' 7" W
C	50.7085	-2.9520	50° 42' 30" N	2° 57' 7" W
D	50.7085	-2.9591	50° 42' 30" N	2° 57' 32" W

Map Legend

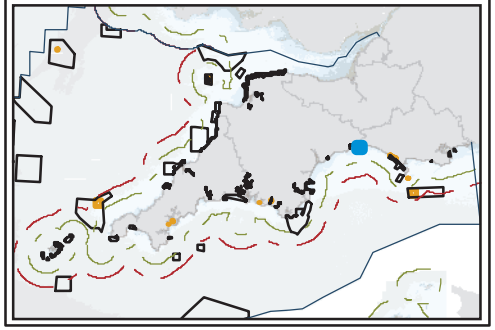
Recommended reference area

Existing MPAs

SAC

SSSI (not part of MPA network)

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



Map: FR_066b

Version:31Aug11

Lyme Bay Recommended Reference Area

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.

0 0.3 0.6 km N

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2°58'20"W 2°58'0"W 2°57'40"W 2°57'20"W 2°57'0"W 2°56'40"W 2°56'20"W 2°56'0"W

50°43'15"N

50°43'0"N

50°42'45"N

50°42'30"N

Lyme Regis

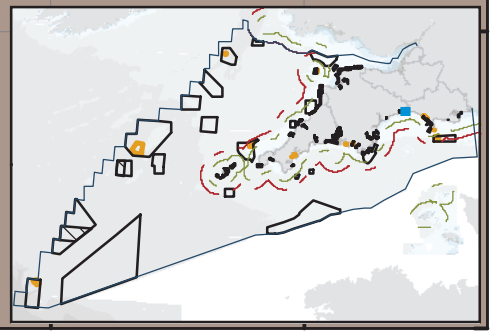
Lyme Bay

Map Legend

Recommended reference area

Geological Conservation Review (GCR) site

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: FR_066c

Version:6Sep11

Lyme Bay Recommended Reference Area

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.

0 0.5 1 Km N

FINDING SANCTUARY

2°59'20"W 2°58'40"W 2°58'0"W 2°57'20"W 2°56'40"W 2°56'0"W 2°55'20"W 2°54'40"W

50°43'40"N 50°43'20"N 50°43'0"N 50°42'40"N 50°42'20"N 50°42'0"N 50°41'40"N

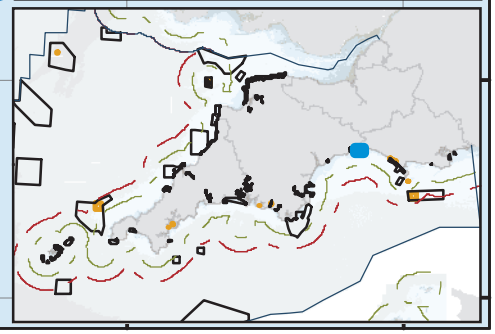
Lyme Regis

Lyme Bay

Map Legend

- Recommended reference area
- Fixed net restrictions
- Scallops closed season
- Licenced outfalls
- Coastal protection works
- Charted wrecks

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.4.8 Erme Estuary recommended reference area

Basic site information

***Site centre location (datum used: ETRS89)*:**

Decimal Degrees		Degrees Minutes Seconds	
Lat	**Long**	**Lat**	**Long**
50.3259	-3.9368	50° 19' 33'' N	3° 56' 12'' W

***Site surface area*:** 0.19 Km^2

***Biogeographic region*:**

JNCC regional sea: Western Channel and Celtic Sea
OSPAR region: Region II: Greater North Sea

Site boundary: The Erme Estuary recommended reference area sits in the upper extent of the estuary. The site boundary follows the Ordnance Survey Boundary Line mean high water mark. The southern boundary cuts across the estuary from the western bank between Pamfleet Wood and Skerill Coppice, to Tor Wood on the eastern bank. The eastern boundary extends roughly half way into the eastern tributary before continuing up the main estuary until the northern extent of Orcheton Wood where the boundary cuts back across the estuary onto the western bank just north of Efford House. From Efford house the western boundary continues south to join the southern boundary.

Sites to which the site is related: The Erme Estuary recommended reference area sits within the boundary of the Erme Estuary rMCZ, and the Erme Estuary SSSI.

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 Erme Estuary recommended reference area

Table II.4.8a shows a summary of the draft conservation objectives for this recommended reference area. This is an extract of the conservation objective summary tables in section II.2.6. All features in the table have draft conservation objectives, including those in the right-hand column, in line with the Conservation Objective Guidance. Features in the right-hand column are not counted towards the figures in section II.2.9 unless specifically stated.

Table II.4.8a Draft conservation objectives for Erme Estuary recommended reference area. All features shown in the table have a draft conservation objective of 'recover to reference condition'. ***The full text of the draft conservation objectives can be found in appendix 15.***

	Viable size guidelines met	Viable size guidelines not met
Broad-scale habitats		Low energy infralittoral rock Subtidal mud **Coastal saltmarshes and saline reedbeds**[1] **Intertidal mixed sediments**[1] **Intertidal mud**[1]
FOCI habitats	Sheltered muddy gravels	
FOCI species	*Anguilla anguilla*[2]	

[1] None of the intertidal broad-scale habitats are represented in recommended reference areas that meet the minimum size guideline (5km), but recent SAP and SNCB advice has recognised that the size guideline is not realistic for intertidal habitats. The intertidal habitats have been highlighted in green to show that we are considering these to be represented within the current set of recommended reference areas (unlike the other features listed in the second column).

[2] The European eel is included in draft conservation objectives for estuarine sites on the basis of evidence provided by the Environment Agency (see appendix 8). No minimum viable patch size for the species is included in the ENG.

The following tables show ENG-related statistics for this site, reported from spatial data available in Finding Sanctuary's GIS datasets.

Table II.4.8b ***Subtidal broad-scale habitats*** *to be protected in this recommended reference area, 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 site (km^2)	% of total in study area	Source(s)
Low energy infralittoral rock	0.02	0.2%	1
Subtidal mud	<0.01	<0.1%	1

Table II.4.8c ***Intertidal broad-scale habitats*** *to be protected in this recommended reference area, 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 site (km^2)	% of total in study area	Source(s)
Intertidal mud	0.13	<0.1%	1, 3
Intertidal mixed sediments	0.01	0.1%	1
Coastal saltmarshes and saline reedbeds	0.04	1.2%	3

Table II.4.8d ***FOCI habitats*** *to be protected in this recommended reference area, 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)
Sheltered muddy gravels	0.07			1

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

Site summary

The Erme is a narrow, sheltered estuary approximately 6.5 km long. It is very secluded, has steep wooded banks and a notified SSSI for its woodland interest. It lies within an Area of Outstanding Natural Beauty, and within the South Devon Heritage Coast (Davies 1998). The area around the Erme estuary is privately owned by the Flete Estate. The Erme Estuary is also designated as a Several Fishery and has managed bait and shellfish collecting (EEMAG, 2003). The estuary remains largely unaffected by industrialisation (compared with for example the Tamar estuary) and therefore has been the focus of a number studies (Price *et al.*2005). One of the reasons for the inclusion of this recommended reference area in the network was in recognition of the added ecological importance of estuaries in terms of productivity, and their ecological function as nursery areas.

Detailed site description

The following description applies to the estuary as a whole, including the small recommended reference area within it.

The habitats are predominantly sedimentary with some broken sand scoured bedrock at the mouth. Mobile sediments near the channel have a typical crustacean-polychaete community characterised by the amphipods *Bathyporeia pilosa* and *Eurydice pulchra*. More sheltered sediment infaunal communities are characterised by ragworm *Hediste diversicolor*. Low shore shingle and cobble habitats are colonised by the brackish water algae *Fucus ceranoide*s. The estuary is a spawning ground for sea trout and has a population of the European Otter (Davies 1998).

Anguilla anguilla was reported in the Erme during the 1992-97 Devon Wildlife Trust Stoke Point and Erme Estuary littoral survey.

Luoma & Bryan (1978) took sediment samples from the oxidized surface layer of intertidal sediments within the Erme to determine the availability of sediment-bound lead to *Scrobicularia plana*. Turner *et al.* (2009) collected sediment from the marine reaches of the estuary during June 2008. This was used as a control to antifouling paint contaminated sediment studies. Jones & Turner (2009) collected approximately 6 L of surficial sandy sediment at low water from the marine reaches of the estuary, and Sheehan *et al.*(2010) surveyed the Erme during July and August in the summers of 2003 and 2004. Sediments were classified as poorly sorted sandy muds (mean 5.3 ± 0.03 SE).

Sampling of four major taxonomic groups was carried out by Attrill *et al.* 2009) in the Erme estuary: oligochaetes; amphipod crustaceans (mainly *Gammarus* spp.); the ragworm *Nereis diversicolor* and either mysids (mainly *Neomysis integer)* or the brown shrimp *Crangon crangon*, depending on which was common.

Like all the main estuaries of the south-west, the Erme is potentially very important for seahorse populations as it provides food and shelter. The Seahorse Trust does not have sightings for seahorses in this area, but a lack of sightings does not mean that they are not there (Neil Garrick-Maidment, *pers. comm*.).

Stakeholder narrative: Assumptions and Implications

Reference areas will exclude all depositional and extractive activities, and might result in restrictions or management of potentially damaging and disturbing activities, as defined in the SNCB's draft reference area guidance document (available here[63]). This guidance is relatively clear and specific, therefore no further work on defining assumptions on management of reference areas was carried out.

Appendix 10 shows the content of the draft reference area guidance, converted into a layout similar to the layout for the assumptions / implications tables presented in the rMCZ site reports – this was used at meetings as a template upon which to record site-specific comments. However, site-specific comments were limited, so we have not inserted the whole table here.

Stakeholder representatives from across many sectors were concerned about the implications of reference areas for the large range of activities affected (the Impact Assessment, to be finished in January 2012, will analyse these impacts in detail). On the other hand, conservation representatives highlighted the conservation benefits of highly protected areas. These generic comments apply to all recommended reference areas.

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

As stated above, there was much clearer guidance available on what activities will be restricted in reference areas, compared with MCZs in general. Therefore, the uncertainties around reference areas were much more limited.

A remaining uncertainty that stakeholder representatives highlighted repeatedly was about possible impacts on activities near the boundary of reference areas. Some activities might have knock-on impacts beyond the area where they are being carried out, e.g. sediment plumes from aggregate extraction, or from construction / infrastructure maintenance work. There is uncertainty over what 'buffer zones' might be needed around reference areas for such activities.

No additional comments were recorded specifically for this site, but please refer to the general narrative for recommended reference areas in section II.2.3.

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.

Fishing representatives have stated that they will not support any recommendations for recommended reference areas. Like other recommended reference areas, the site is controversial, with strong support from conservationists and strong concerns over the socio-economic impacts from many other sectors. The Erme estuary water bailiff has highlighted concern over impacts of the site on a Bass angling business in the estuary.

[63] http://www.naturalengland.org.uk/Images/MCZ-regional-guidance_tcm6-23451.pdf

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, 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.

Site map series

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

- The first map (FR_067a) is the main site map showing the site 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_067b) shows the site boundary over broad-scale habitats, and records of habitat and species FOCI. The data shown on this map corresponds with the information in tables II.4.8b to II.4.8d, data sources are indicated in the tables. The area with dark red dots is a polygon for the FOCI habitat 'sheltered muddy gravels', layered on top of broad-scale habitat data.
- Most site reports contain a map showing socio-economic datasets. This one does not, please refer instead to the site report for the Erme Estuary rMCZ (map FR_037c).
- 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.

Map: FR_067a

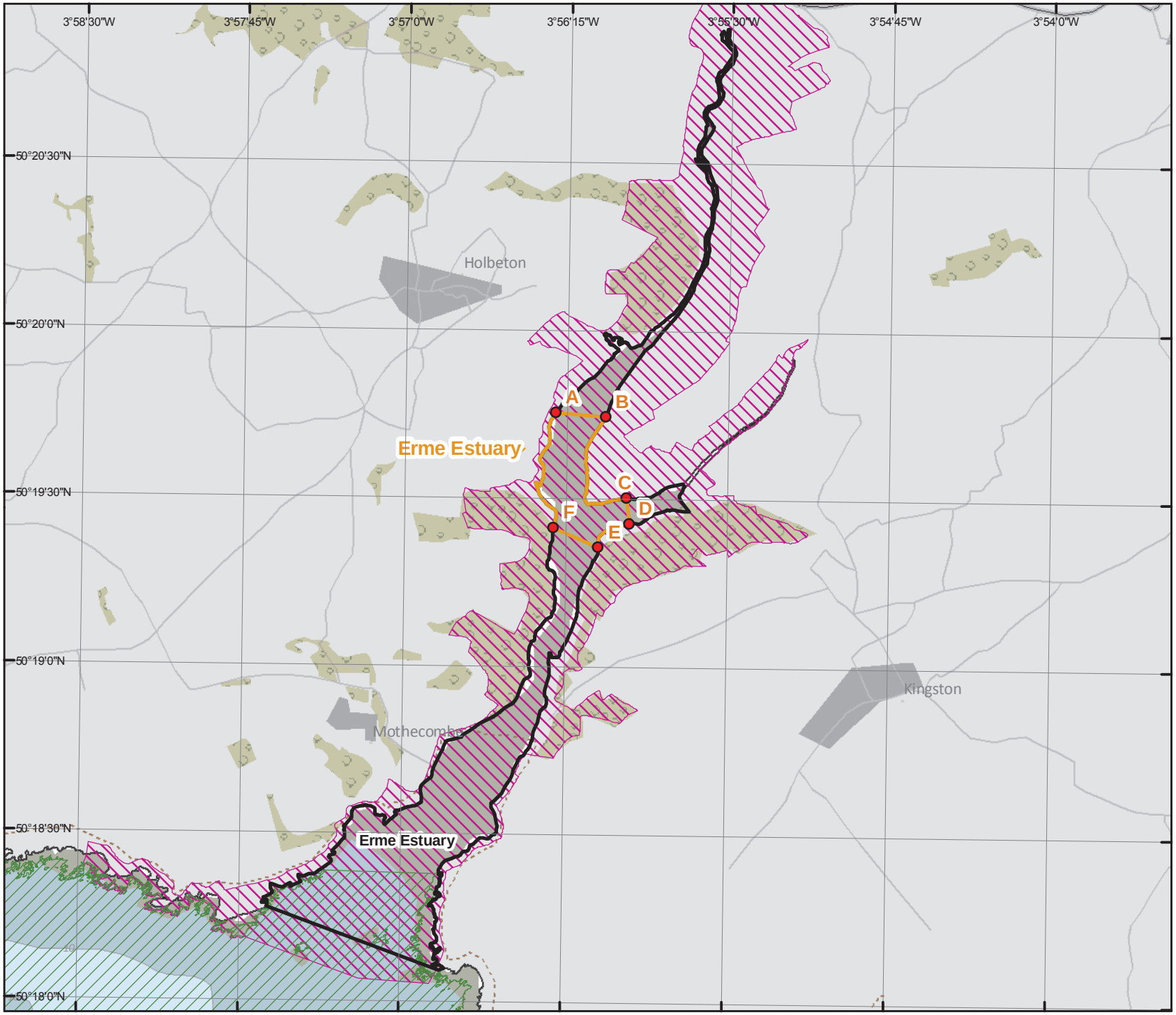
Version:31Aug11

Erme Estuary Recommended Reference Area

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.

0 0.75 1.5 Km N

FINDING SANCTUARY



Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	50.3292	-3.9384	50° 19' 45" N	3° 56' 18" W
B	50.3291	-3.9345	50° 19' 44" N	3° 56' 4" W
C	50.3250	-3.9328	50° 19' 30" N	3° 55' 58" W
D	50.3238	-3.9326	50° 19' 25" N	3° 55' 57" W
E	50.3226	-3.9350	50° 19' 21" N	3° 56' 5" W
F	50.3235	-3.9385	50° 19' 24" N	3° 56' 18" W

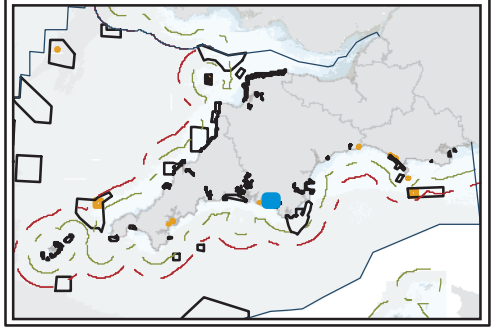
Map Legend

- Recommended reference area
- Recommended MCZ (rMCZ)

Existing MPAs

- SAC
- SSSI (part of MPA network)

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



Map: FR_067b

Version:31Aug11

Erme Estuary Recommended Reference Area

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.

0 100 200 400 m

N

FINDING SANCTUARY

3°56'45"W 3°56'30"W 3°56'15"W 3°56'0"W 3°55'45"W 3°55'30"W 3°55'15"W 3°55'0"W

50°19'50"N

50°19'40"N

50°19'30"N

50°19'20"N

50°19'10"N

Erme Estuary

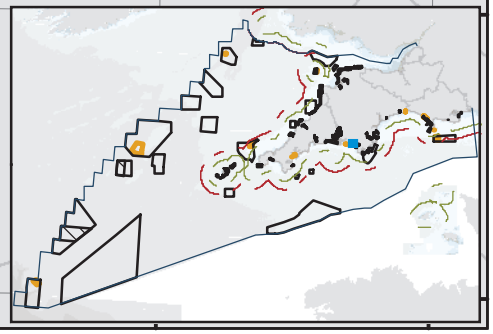
Erme Estuary

Map Legend

Recommended reference area

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.4.9 Mouth of the Yealm recommended reference area

Basic site information

***Site centre location (datum used: ETRS89)*:**

Decimal Degrees		Degrees Minutes Seconds	
Lat	**Long**	**Lat**	**Long**
50.3136	-4.0712	50° 18' 49'' N	4° 4' 16'' W

***Site surface area*:** 35407.6 m^2

***Biogeographic region*:**

JNCC regional sea: Western Channel and Celtic Sea
OSPAR region: Region II: Greater North Sea

Site boundary: The site boundary follows the Ordnance Survey Boundary Line mean high water mark from The Tomb in the west to just east of Season point. At the time that the boundary was discussed and mapped, we did not have a suitable GIS low water mark available for mapping the site boundary, so the lower boundary marked on the map should be seen as an approximation – the recommendation is for a purely intertidal site that stops at the low water mark. The lower boundary of the Wembury Point SSSI may be a visual indication of where the boundary should lie.

Sites to which the site is related: The Mouth of the Yealm recommended reference area sits within the boundary of Yealm Estuary SSSI.

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 Mouth of the Yealm recommended reference area

Table II.4.9a shows a summary of the draft conservation objectives for this recommended reference area. This is an extract of the conservation objective summary tables in section II.2.6. All features in the table have draft conservation objectives, including those in the right-hand column, in line with the Conservation Objective Guidance. Features in the right-hand column are not counted towards the figures in section II.2.9 unless specifically stated.

Table II.4.9a Draft conservation objectives for Mouth of the Yealm recommended reference area. All features shown in the table have a draft conservation objective of 'recover to reference condition'. ***The full text of the draft conservation objectives can be found in appendix 15.***

	Viable size guidelines met	Viable size guidelines not met
Broad-scale habitats		**High energy intertidal rock**[1] **Intertidal coarse sediments**[1] **Moderate energy intertidal rock**[1]
FOCI habitats		Estuarine rocky habitats[2] Seagrass Beds[2]

[1] None of the intertidal broad-scale habitats are represented in recommended reference areas that meet the minimum size guideline (5km), but recent SAP and SNCB advice has recognised that the size guideline is not realistic for intertidal habitats. The intertidal habitats have been highlighted in green to show that we are considering these to be represented within the current set of recommended reference areas (unlike the other features listed in the second column).

[2] The Mouth of the Yealm recommended reference area only covers the intertidal. Estuarine rocky habitats and Seagrass beds may be present in the intertidal, or they might only be found only in the subtidal area. If the latter is the case, the features should come off the list for this site. [At the time the site boundary was being defined, we did not have a definitive low water line to use to delimit this site, nor to use in spatial analyses].

The following tables show ENG-related statistics for this site, reported from spatial data available in Finding Sanctuary's GIS datasets.

Table II.4.9b ***Subtidal broad-scale habitats*** *to be protected in this recommended reference area, 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 site (km^2)	% of total in study area	Source(s)
High energy infralittoral rock	0.02	<0.1%	1

Table II.4.9c ***Intertidal broad-scale habitats*** *to be protected in this recommended reference area, 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 site (km^2)	% of total in study area	Source(s)
High energy intertidal rock	0.01	0.1%	1
Moderate energy intertidal rock	<0.01	<0.1%	1
Intertidal coarse sediments	<0.01	<0.1%	1, 3

Table II.4.9d ***FOCI habitats*** *to be protected in this recommended reference area, 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)
Estuarine rocky habitats	<0.01			1
Seagrass beds	<0.01			1

This recommended reference area 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 0.02 km^2 of seahorse area polygon (refer to appendix 8 for more information).

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

Site summary

This is a small recommended reference area that is entirely intertidal. It is included in the recommendations to represent intertidal features in the set of recommended reference areas. The site is located along a stretch of rocky coastline with patches of sand and coarse sediment, in between Wembury and the Yealm estuary.

Detailed site description:

The following description relates to the estuary as a whole. The site itself is a small stretch of intertidal habitat along the western estuary mouth.

The mouth of the Yealm opens into Wembury Bay. The estuary is tidal for 6.5km inland with two side creeks: Newton Creek in the lower estuary and Cofflete Creek in the upper reaches. The Yealm is a very sheltered estuary; the sand bar at the mouth greatly reduces wave action even at the entrance. For the majority of the length of the estuary, it is less than 300 m wide and fringed by steep and mainly wooded slopes. Upper shore habitats are predominantly rocky with mainly sedimentary lower shores. Sand at the mouth gives way to muddy shingle on soft mud in the upper reaches (Davies, 1998). A general description of the estuary is given by Hunt (1977).

Powell *et al.* (1978) considered the estuary to have primary biological importance. Three areas were highlighted for their importance: the south shore between Newton Creek and Misery Point, Cellars beach and the rocks to the west, and the Yealm sand bank. Littoral zones between Newton Creek and Misery Point were sheltered with a narrow band of rocks on the upper shore with muddy gravel in the mid and low shore zones. Low shore habitats had rich infaunal communities characterised by polychaetes, sipunculids and bivalve molluscs. At Cellars beach, sandy shores have a seagrass bed *Zostera marina* on the low shore and in the shallow sublittoral. Large numbers of the razor shell, *Ensis arcuatus* are found in the clean sand of the Yealm sand bank.

Littoral habitats and their associated communities were surveyed by Cunningham & Hawkins (1985) who, from six sites, recorded a total of 82 taxa. More recently, Hiscock & Moore (1986) described seven littoral and six sublittoral habitats and communities within the estuary. Within the channel, the substrata are mainly of cobbles and pebbles subject to tidal streams with a high species richness which is considered of national importance (Hiscock and Moore, 1986). Large quantities of the red alga *Gracilaria foliifera*, were present in the Yealm estuary.

Wave-sheltered bedrock occurred at the entrance to the Yealm. The area of Cellar Beach included a wide range of rocky and sediment shore habitats. Open bedrock and boulder communities were colonised by patchy *Pelvetia canaliculata* on the upper shore with a high abundance of *Chthalamus montagui*, *Littorina 'saxatilis'* and *L. littorea*. Limpets, barnacles, *Fucus vesiculosus* and *Enteromorpha* sp. provided patchy cover to most of the upper midshore (Hiscock & Moore, 1986).

Sand with gravel and pebbles occurred at the entrance to the Yealm. Cellar Beach extended down to a wide area of sand which was sampled at the lower midshore and lower shore. Communities

present dominated visibly and in samples by *Lanice conchilega*, *Pygospio elegans*, *Spio martinensis* and *Corophium crassicorne*. Large specimens of *Ensis ensis* and *Glycera* sp. were occasional (Hiscock & Moore, 1986). Fine clean sand colonised in places by dense *Zostera marina* also occurred at the entrance to the Yealm (Hiscock & Moore, 1986). Johnson *et al.* (2007) studied the intertidal mud meiofauna within the Yealm over a two-week period.

The University of Plymouth have supported B.Sc. dissertations in the Yealm area including investigations into seagrass epiphytic biomass and fauna (Strong, A. 'An investigation into seagrass complexity, epiphyte biomass and epiphytic fauna'; and Webster, P. 'The infaunal benthic community structure in a seagrass bed'. The *Z. Marina* bed at Cellars Cove on the River Yealm was partially mapped by divers in July 1996.)

Attrill *et al.* (2000) investigated a subtidal *Zostera marina* bed located at Cellars Cove (opposite shore to the recommended reference area) within the mouth of the Yealm estuary. Sheehan (2007) examined mid-shore intertidal mudflats and sands 3 times a week for 1 month. Sheehan *et al*. (2008) investigated the impact of crab-tiling on the population structure of *Carcinus maenas*. This was determined by sampling crabs from tiled estuaries and non-tiled estuaries using baited drop-nets. Data were collected on two sampling occasions; October-November 2004 and May-June 2005. Scarlett *et al.* (1999) collected *Z. marina* plants from the Yealm estuary UK at low water spring tides (around midday) from summer 1997 to spring 1998 for use within exposure experiments. Sheehan *et al*. (2010) conducted sediment surveys within the Yealm estuary.

Stakeholder narrative: Assumptions and Implications

Reference areas will exclude all depositional and extractive activities, and might result in restrictions or management of potentially damaging and disturbing activities, as defined in the SNCB's draft reference area guidance document (available here[64]). This guidance is relatively clear and specific, therefore no further work on defining assumptions on management of reference areas was carried out.

Appendix 10 shows the content of the draft reference area guidance, converted into a layout similar to the layout for the assumptions/ implications tables presented in the rMCZ site reports – this was used at meetings as a template upon which to record site-specific comments. However, site-specific comments were limited, so we have not inserted the whole table here.

Stakeholder representatives from across many sectors were concerned about the implications of reference areas for the large range of activities affected (the Impact Assessment, to be finished in January 2012, will analyse these impacts in detail). On the other hand, conservation representatives highlighted the conservation benefits of highly protected areas. These generic comments apply to all recommended reference areas.

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

As stated above, there was much clearer guidance available on what activities will be restricted in reference areas, compared with MCZs in general. Therefore, the uncertainties around reference areas were much more limited.

[64] http://www.naturalengland.org.uk/Images/MCZ-regional-guidance_tcm6-23451.pdf

A remaining uncertainty that stakeholder representatives highlighted repeatedly was about possible impacts on activities near the boundary of reference areas. Some activities might have knock-on impacts beyond the area where they are being carried out, e.g. sediment plumes from aggregate extraction, or from construction/ infrastructure maintenance work. There is uncertainty over what 'buffer zones' might be needed around reference areas for such activities.

No additional comments were recorded specifically for this site, but please refer to the general narrative for recommended reference areas in section II.2.3.

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.

Fishing representatives have stated that they will not support any recommendations for recommended reference areas. Like other recommended reference areas, the site is controversial, with strong support from conservationists and strong concerns over the socio-economic impacts from many other sectors.

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, 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.

Site map series

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

- The first map (FR_068a) is the main site map showing the site 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_068b) shows the site boundary over broad-scale habitats, and records of habitat and species FOCI. The data shown on this map corresponds with the information in tables II.4.9b to II.4.9d, data sources are indicated in the tables.
- The third map (FR_068c) 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.

Map: FR_068a

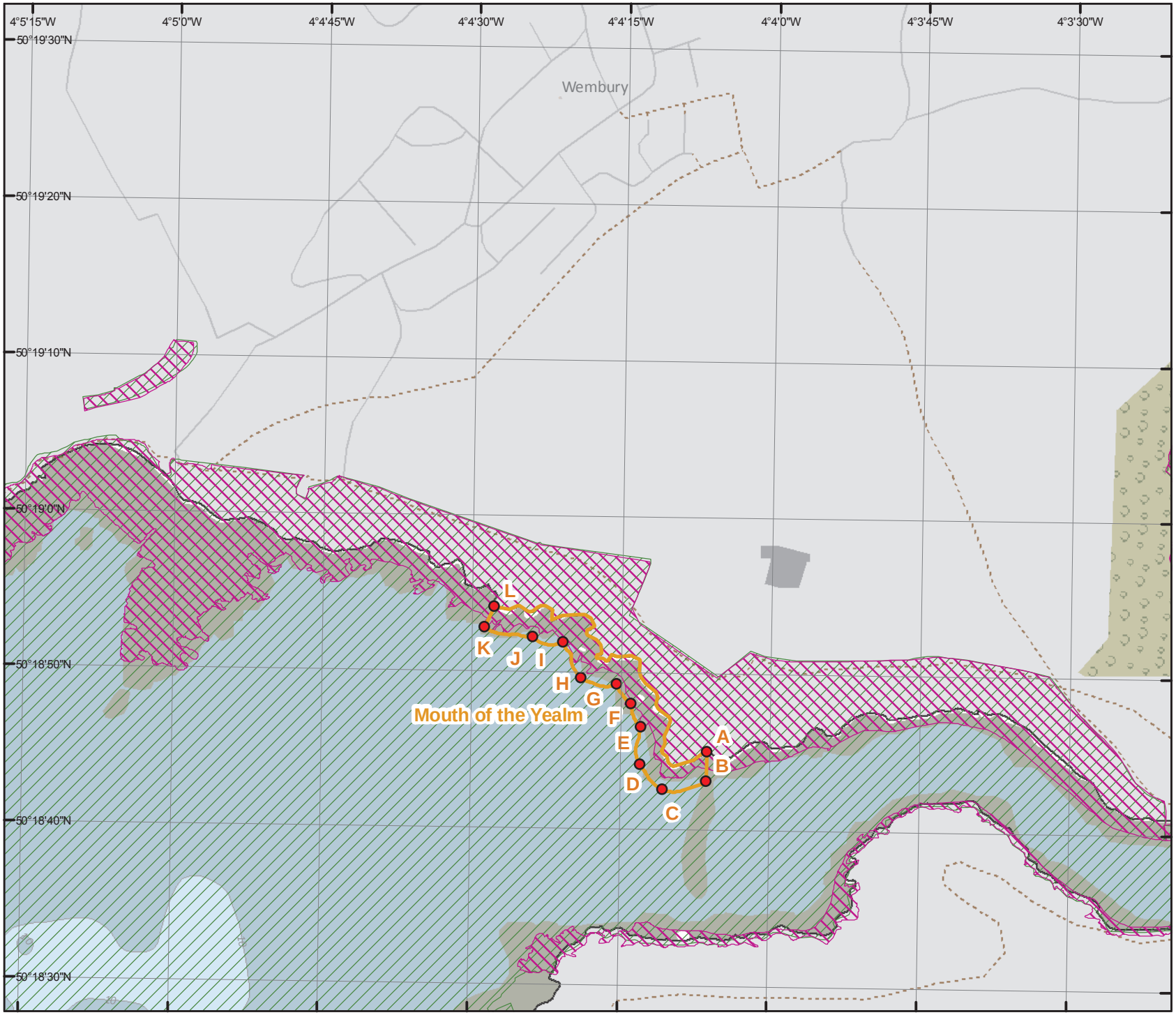
Version:31Aug11

Mouth of The Yealm Recommended Reference Area

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.

0 125 250 500 m N

FINDING SANCTUARY



Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	50.3125	-4.0684	50° 18' 44" N	4° 4' 6" W
B	50.3120	-4.0684	50° 18' 43" N	4° 4' 6" W
C	50.3118	-4.0696	50° 18' 42" N	4° 4' 10" W
D	50.3123	-4.0703	50° 18' 44" N	4° 4' 12" W
E	50.3129	-4.0703	50° 18' 46" N	4° 4' 12" W
F	50.3133	-4.0705	50° 18' 47" N	4° 4' 13" W
G	50.3137	-4.0710	50° 18' 49" N	4° 4' 15" W
H	50.3138	-4.0719	50° 18' 49" N	4° 4' 18" W
I	50.3144	-4.0725	50° 18' 51" N	4° 4' 20" W
J	50.3145	-4.0733	50° 18' 52" N	4° 4' 23" W
K	50.3147	-4.0746	50° 18' 52" N	4° 4' 28" W
L	50.3150	-4.0744	50° 18' 54" N	4° 4' 27" W

Map Legend

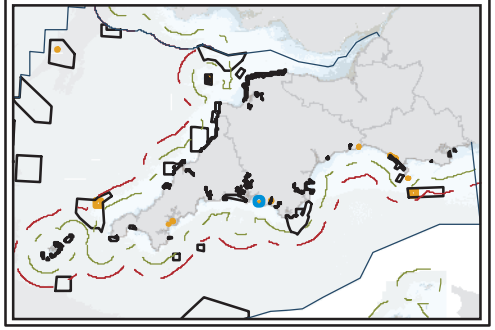
Recommended reference area

Existing MPAs

SAC

SSSI (part of MPA network)

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



Map: FR_068b

Version:31Aug11

Mouth of The Yealm Recommended Reference Area

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.

0 90 180 m N

FINDING SANCTUARY

4°4'35"W 4°4'28"W 4°4'21"W 4°4'14"W 4°4'7"W 4°4'0"W 4°3'53"W 4°3'46"W

50°18'56"N

50°18'52"N

50°18'48"N

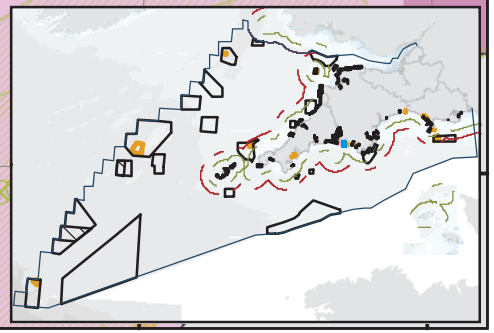
50°18'44"N

50°18'40"N

Map Legend

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.



Map: FR_068c

Version:5Sep11

Mouth of The Yealm Recommended Reference Area

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.

0 125 250 500 m

N

FINDING SANCTUARY

4°5'30"W 4°5'15"W 4°5'0"W 4°4'45"W 4°4'30"W 4°4'15"W 4°4'0"W 4°3'45"W 4°3'30"W 4°3'15"W

50°19'20"N

50°19'10"N

50°19'0"N

50°18'50"N

50°18'40"N

50°18'30"N

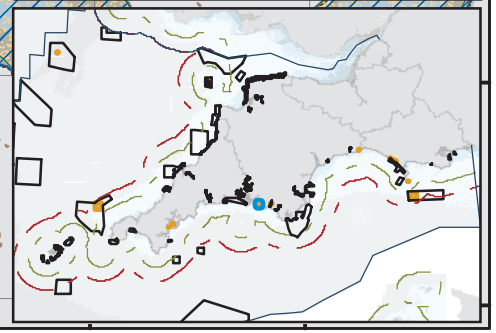
Wembury

Mouth of the Yealm

Map Legend

- Recommended reference area
- Fixed net restrictions
- Trawling and trammel net restrictions
- Anchorages
- charted wrecks

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.4.10 The Fal recommended reference area

Basic site information

***Site centre location (datum used: ETRS89)*:**

Decimal Degrees		Degrees Minutes Seconds	
Lat	**Long**	**Lat**	**Long**
50.1676	-5.0278	50° 10' 3'' N	5° 1' 40'' W

***Site surface area*:** 715195.1 m^2

***Biogeographic region*:**

JNCC regional sea: Western Channel and Celtic Sea
OSPAR region: Region III: Celtic Seas

Site boundary: The Fal recommended reference area is rectangular in shape. The northern boundary is a straight east to west line from an area on the east bank of the Fal in line with Tregear Vean (which is further inland). The western boundary is a straight line which runs north to south in a south-west direction before the southern boundary comes inland in a straight line to an area on the east bank of the river in line with Newton Farm (which is further inland). The eastern boundary then follows the Ordnance Survey Boundary Line mean high water mark until it joins the northern boundary.

Sites to which the site is related: The Fal recommended reference area sits within the boundary 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 Fal recommended reference area

Table II.4.10a shows a summary of the draft conservation objectives for this recommended reference area. This is an extract of the conservation objective summary tables in section II.2.6. All features in the table have draft conservation objectives, including those in the right-hand column, in line with the Conservation Objective Guidance. Features in the right-hand column are not counted towards the figures in section II.2.9 unless specifically stated.

Table II.4.10a Draft conservation objectives for The Fal recommended reference area. All features shown in the table have a draft conservation objective of 'recover to reference condition'. ***The full text of the draft conservation objectives can be found in appendix 15.***

	Viable size guidelines met	Viable size guidelines not met
Broad-scale habitats		Subtidal coarse sediment Subtidal macrophyte-dominated sediment Subtidal sand **Intertidal coarse sediments**[1] **Low energy intertidal rock**[1]
FOCI habitats	Maërl Beds Seagrass Beds	
FOCI species	*Lithothamnion corallioides* *Ostrea edulis* *Phymatolithon calcareum*	*Cruoria cruoriaeformis* [2] *Gobius couchi* [2] *Grateloupia montagnei* [2]
	Anguilla anguilla[3]	

[1] None of the intertidal broad-scale habitats are represented in recommended reference areas that meet the minimum size guideline (5km), but recent SAP and SNCB advice has recognised that the size guideline is not realistic for intertidal habitats. The intertidal habitats have been highlighted in green to show that we are considering these to be represented within the current set of recommended reference areas (unlike the other features listed in the second column).

[2] The Fal recommended reference area, is a little smaller than the minimum size requirement of 1km. Enlarging this site westwards, however, would not capture more of the same habitat (maërl and seagrass beds), as the depth increases to the west – so enlarging the site to meet the minimum size guidelines would probably not provide more habitat suitable for these species.

[3] The European eel is included in draft conservation objectives for estuarine sites on the basis of evidence provided by the Environment Agency (see appendix 8). No minimum viable patch size for the species is included in the ENG.

The following tables show ENG-related statistics for this site, reported from spatial data available in Finding Sanctuary's GIS datasets.

Table II.4.10b ***Subtidal broad-scale habitats*** *to be protected in this recommended reference area, 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 site (km^2)	% of total in study area	Source(s)
Subtidal coarse sediment	0.05	<0.1%	1
Subtidal sand	0.38	<0.1%	1, 2
Subtidal macrophyte-dominated sediment	0.26	1.3%	1

Table II.4.10c ***Intertidal broad-scale habitats*** *to be protected in this recommended reference area, 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 site (km^2)	% of total in study area	Source(s)
Low energy intertidal rock	0.02	0.5%	1
Intertidal coarse sediments	<0.01	<0.1%	3

*Table II.4.10d **FOCI habitats** to be protected in this recommended reference area, 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	0.24	11		1
Seagrass beds	0.34	2		1

*Table II.4.10e **FOCI species** to be protected in this recommended reference area, 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 Trewhella Survey Log 2010.*

Species	Number of point records (total)	Number of point records (pre-1980)	Source(s)
Cruoria cruoriaeformis	1		1
Gobius couchi	1		1
Grateloupia montagnei	1		1
Lithothamnion corallioides	5		1
Ostrea edulis	3	1	1
Phymatolithon calcareum	7	1	1, 3

This recommended reference area 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 0.45 km^2 of seahorse area polygon (refer to appendix 8 for more information).

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

Site summary

The recommended reference area in the Fal estuary is a small area located just north of St Mawes. It has a depth range from mean high water to 7 -8 metres below chart datum. The reason for including this area as a recommended reference area is because of its particularly rich benthic habitat and species diversity; with two important FOCI habitats present (maërl beds and seagrass beds).

Detailed site description

There is a lot of information on the Fal estuary system, and some of the literature is briefly reviewed below. It has been harder to find information relating just to the specific location of the recommended reference area, as it is such a small site.

The most site-specific relevant information was found in Farnham & Bishop, 1985; Farnham & Jephson, 1977; Rostron (1985) and James (1983). St Mawes bank has the most extensive bed of the unattached calcified seaweed (maërl) in England and Wales (Farnham & Bishop, 1985; Farnham & Jephson, 1977). Maerl beds attract many other species particularly those sheltering amongst the branching interstices, for example, the rare Couch's goby (*Gobius couchii*). Two species of maërl have been identified, *Phymatolithon calcareum* and *Lithothamnium coralloides*. Inshore of the maërl

bed, seagrass (*Zostera marina*) is present on the sandy substrata (Rostron, 1985). Down to some 16m, the seabed was covered with live maërl (James, 1983). The maërl was mixed with pebbles, mud and a considerable amount of shell. Many burrowing species were present, including a possible record of the anemone *Halcampoides purpurea*. Large numbers of *Asterias rubens* and *Cancer pagurus* were working over this section. From 16m down to 30m, the seabed slopes steeply, with many rather bare rocky outcrops. These had small amounts of *Verruca stroemia* and *Nemertesia antennina* and clumps of smaller hydroids, particularly *Campanularia hinksii* and *Halecium* spp. (James, 1983). At the bottom of the channel (around 34m), the bottom consisted of broken shell and sand, with rocky outcrops. There is a large bed of *Pecten maximus* at this depth which is apparently little dredged due to the rocky nature of the bottom. *Laminaria saccharina* (*Saccharina latissima*) was the main kelp recorded, growing on some of the larger pebbles among the maërl (James, 1983).

Rostron (1985) carried out intertidal surveys between 2nd and 9th May, 1985. Various types of shore with rocky, muddy or mixed substrata were surveyed. Twenty-four intertidal and 51 subtidal sites were surveyed. Trawls and dredges obtained from 7 areas and suction samples from 3 sites were examined. Shores of St Mawes bank dominated by fucoid algae with a rich variety of species under the canopy and within rockpools. The Percuil River, inland of Carricknath Point/St Mawes Harbour, has rich sublittoral and littoral communities. Patches of sublittoral rock, an uncommon habitat within the ria system, provide suitable substrata for a rich sponge and ascidian community. Substrata within the Fal estuary are predominantly sediments. Fine mud is present intertidally in the upper reaches of the rivers and creeks and also in the deep central channel where it passes through Carrick Roads (Rostron, 1985).

The wider Fal and Ruan estuary complex has long been recognised as a site of major marine biological importance (Davies, 1998). Within the littoral environment, there is a wide range of habitats from moderately exposed rock to very sheltered sediment. Sites within the estuary, notably Place Cove and Carricknath Point, have been studied since 1955 by scientists from the Plymouth Marine Laboratory. Many of these records are unpublished; the Cornish Biological Records Unit retains a large amount of data for the area (Davies, 1998). Slow tidal currents and a high rate of siltation results in a general lack of sublittoral rock habitats and the presence of extensive sediment banks. Within the littoral environment, there is a wide range of habitats from moderately exposed rock to very sheltered sediment (Davies, 1998). Bryan & Gibbs (1983) describe the rocky shore communities within the Fal.

Sheltered rocky shores from Amsterdam Point to Carricknath Point were algal dominated and displayed well developed zonation patterns. Bishop & Holme (1980) rated the whole of the St Mawes Inlet of national marine biological importance for the sediment communities present. Sheltered flats composed of sand and muddy sand had a wide range of burrowing invertebrate species which were classified as '*Echinocardium – siliqua*', '*Pallustra*' and '*Lanice*' communities (Rostron, 1985).

Place cove is a sheltered sediment cove with rich infaunal communities. The communities present were dominated by polychaete worms *Myxicola infundibulum*, *Sabella pavonica* and *Lanice conchilega*, the bivalves, *Chamelea gallina* (*Venus striatula*), *Angulus* (*Tellina*) *tenuis* and razor shells *Ensis arcuatus* (Rostron, 1985).

Turnaware Point to King Harry Reach provides examples of littoral and sublittoral communities on bedrock, shingle and in coarse sediment and was considered of regional importance (Rostron, 1985). Littoral communities typical of sheltered shores, the growth from of some groups such as the sponges were characteristic of marine inlets. At Turnaware Point, a substrata of tideswept stony

sediment had high species richness. Sublittoral communities considered to be similar to an impoverished open coast community but with growth forms of sponges typical of sheltered conditions (Rostron, 1985).

The Fal-Ruan estuary was surveyed by Bunker & Perrins (1993) under contract to the National Rivers Authority (Davies, 1998). The Fal was a major source of native oysters (*Ostrea edulis*) but a combination of over-fishing, pollution, poor spat-fall and more recently an outbreak of the disease, *Bonammia*, has led to a decline in the Oyster fishery (Davies, 1998).

Two surveys of the South West England estuaries were undertaken by Craig & Moreton (1986) during the periods June-August 1981 and October 1982. Sediment samples were collected at low water from intertidal sites. Luoma & Bryan (1978) collected sediment samples from the oxidized surface layer of intertidal sediments. Widdows *et al.* (2007a) measured sediment properties and macrofauna. The Devoran site on a branch of the Fal estuary (represented a firm consolidated mud in front of an extensive saltmarsh of *Salicornia europaea*). *Cruoria cruoriaeformis* and *Gobius couchii* was reported in the Fal during the 1985 OPRU HRE Fal Estuary survey (Rostron, 1985). *Lithothamnion corallioides* and *Phymatolithon calcareum* was also reported during the 1985 OPRU HRE Fal Estuary survey (Rostron, 1985) and the 2001/2002 Falmouth and Helford sublittoral survey. *Ostrea edulis* was reported in 2009 during the Cefas survey of the Fal and Solent. Ongoing research is being carried out by the Falmouth Habitat Project directed by Miss Trudy Russell at the Falmouth Marine School.

Stakeholder narrative: Assumptions and Implications

Reference areas will exclude all depositional and extractive activities, and might result in restrictions or management of potentially damaging and disturbing activities, as defined in the SNCB's draft reference area guidance document (available here[65]). This guidance is relatively clear and specific, therefore no further work on defining assumptions on management of reference areas was carried out.

Appendix 10 shows the content of the draft reference area guidance, converted into a layout similar to the layout for the assumptions / implications tables presented in the rMCZ site reports – this was used at meetings as a template upon which to record site-specific comments. However, site-specific comments were limited, so we have not inserted the whole table here.

Stakeholder representatives from across many sectors were concerned about the implications of reference areas for the large range of activities affected (the Impact Assessment, to be finished in January 2012, will analyse these impacts in detail). On the other hand, conservation representatives highlighted the conservation benefits of highly protected areas. These generic comments apply to all recommended reference areas.

The ports sector (and Falmouth Harbour Commissioners specifically) have serious concerns about the potential implications of this recommended reference area. They are not in favour of it being implemented. They requested that the information in the following bullet points be noted in this site report:

- Port of Falmouth has a significant role in serving the local, regional and national economy and is of strategic significance to the County of Cornwall. The Port facilitates a diverse range of activities with marine-based industry, commercial shipping, recreational activities and

[65] http://www.naturalengland.org.uk/Images/MCZ-regional-guidance_tcm6-23451.pdf

aquaculture generating significant socio-economic value for the local Cornish economy. These activities, specifically commercial activities within Falmouth Port significantly contribute towards the local Cornish and wider national economy. Falmouth Port is a key source of employment for the region where the shipping industry also supports the tourism sector. Annual turnover of the port is in the region of £45 million/ annum (of which the Inner Harbour generates approx. 10%) and the capital investment in the port master plan over the next 10 years is expected to be in the region of £140 million which includes main channel dredging and construction of new berths.

- The recommended reference site is in the limits of the port jurisdiction and situated in an active part of the Port of Falmouth. The locality including the reference site and the port are within an existing SAC, and the SAC brings with it its own legal and environmental requirements. The port considers that sufficient protection is in place already. There is concern that by having a reference site within a SAC, additional regulatory requirements will be introduced.
- A thorough Economic Impact Assessment is outstanding and essential in order to assess the immediate and future economic impact of this reference site on the port. Furthermore the site risks navigational safety having been used in the recent past for casualty reception and sheltering vessels. A serious question should be raised about the viability of an active port and reference site in such close proximity and in this case the economic significance of the port and navigational safety should take priority.
- Natural England have advised that despite the close proximity of the site to the docks that this should not impact on the future expansion of the port (specifically construction of structures and dredging). If this does not hold true, the ports representative stated that the direct impact on the port and any impact on industries that may use it should be factored into the impact assessment and a reference site in this location should be reconsidered. Falmouth Harbour has and continues to pursue Government permissions to develop the port, including building new structures to develop the port, and this should be a major factor in considering whether this is an appropriate location for a reference site.
- This recommended reference area overlaps with the several order for an existing traditional oyster dredge fishery (sail and oar).

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

As stated above, there was much clearer guidance available on what activities will be restricted in reference areas, compared with MCZs in general. Therefore, the uncertainties around reference areas were much more limited.

A remaining uncertainty that stakeholder representatives highlighted repeatedly was about possible impacts on activities near the boundary of reference areas. Some activities might have knock-on impacts beyond the area where they are being carried out, e.g. sediment plumes from aggregate extraction, or from construction/ infrastructure maintenance work. There is uncertainty over what 'buffer zones' might be needed around reference areas for such activities.

Additional comments

- *Recreational Sea Angling*

  - It has been highlighted that sea angling, including catch and release, occurs at this location and these activities can be hard to police. Catch and release angling is not viable for soft species e.g. Mackerel and herring
  - The local Cornish Federation of Sea Anglers practices catch and release and have set higher than legal catch sizes, reflecting an attitude which is in favour of conservation.

- *Commercial Fishing*
  - Very important area for prawn fishing (winter only).

Please also refer to the general narrative for recommended reference areas in section II.2.3.

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.

Fishing representatives have stated that they will not support any recommendations for recommended reference areas. Like other recommended reference areas, the site is controversial, with strong support from conservationists and strong concerns over the socio-economic impacts from many other sectors.

This site has strong support from conservationists, as it has such a rich benthic habitat. Other stakeholders have also recognised that this site is an efficient location for contributing towards the ENG requirements for reference areas. However, Falmouth Harbour Commissioners are strongly opposed to the site, for the reasons stated above.

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, Cornwall Wildlife Trust 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. Further information on the Natura 2000 sites to which this site is related may be found on the JNCC's website[66].

Site map series

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

- The first map (FR_070a) is the main site map showing the site 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,

[66] http://jncc.defra.gov.uk/page-4

minutes and decimal seconds has been provided in the additional materials section (see Appendix 14) for plotting purposes.

- The second map (FR_070b) shows the site boundary over broad-scale habitats, and records of habitat and species FOCI. The data shown on this map corresponds with the information in tables II.4.10b to II.4.10e, data sources are indicated in the tables. The pink squares on this map are polygon data for the maërl bed FOCI habitat, not the high-energy infralittoral rock broad-scale habitat (the symbology used is similar for both, see appendix 7). The biophysical interactive PDF maps (in additional materials, see appendix 14) allow individual data layers to be individually clicked on and off, which may help visual interpretation of the information.
- The third map (FR_070c) 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.

Map: FR_070a

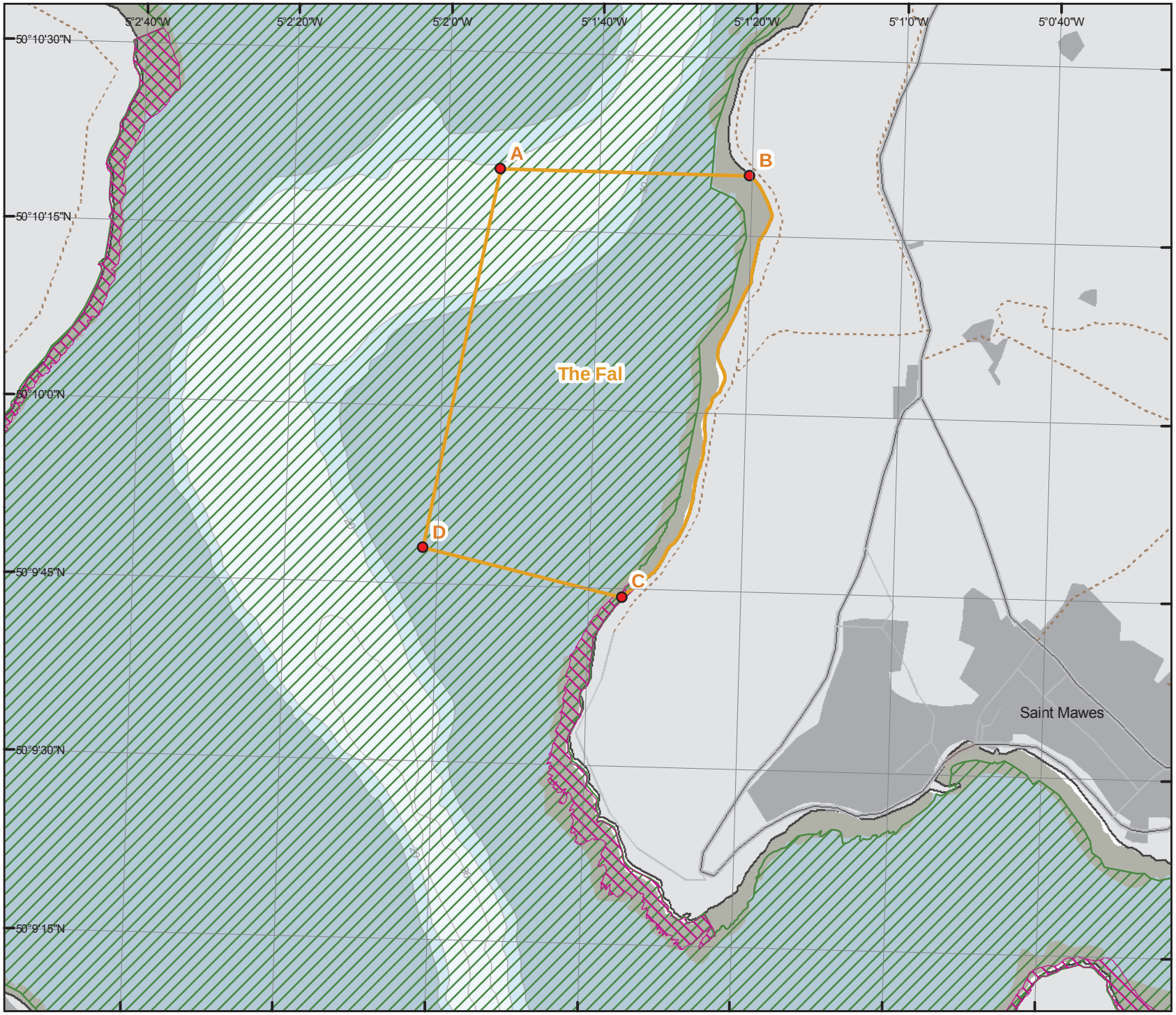
Version:25Aug11

The Fal Recommended Reference Area

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.

0 175 350 700 m N

FINDING SANCTUARY



Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	50.1723	-5.0314	50° 10' 20" N	5° 1' 53" W
B	50.1723	-5.0223	50° 10' 20" N	5° 1' 20" W
C	50.1623	-5.0265	50° 9' 44" N	5° 1' 35" W
D	50.1633	-5.0339	50° 9' 48" N	5° 2' 1" W

Map Legend

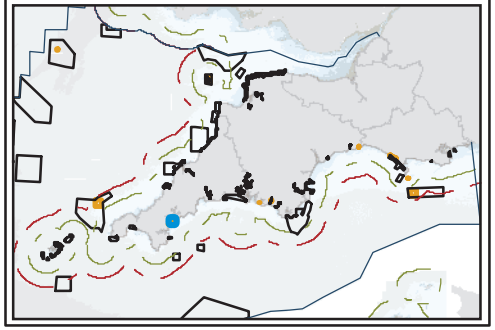
Recommended reference area

Existing MPAs

SAC

SSSI (part of MPA network)

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



Map: FR_070b

Version:31Aug11

The Fal Recommended Reference Area

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.

0 125 250 500 m

N

FINDING SANCTUARY

5°2'42"W 5°2'24"W 5°2'6"W 5°1'48"W 5°1'30"W 5°1'12"W 5°0'54"W 5°0'36"W

50°10'24"N

50°10'12"N

50°10'0"N

50°9'48"N

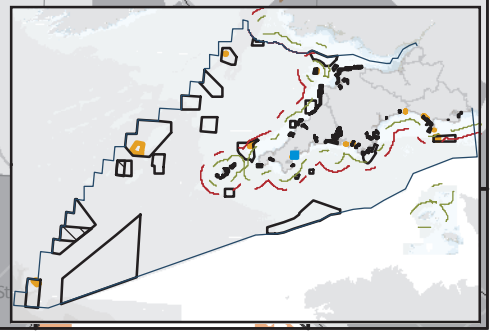
50°9'36"N

The Fal

Map Legend

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.



Map: FR_070c

Version:5Sep11

The Fal Recommended Reference Area

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.

0 175 350 700 m

N

FINDING SANCTUARY

5°3'0"W 5°2'30"W 5°2'0"W 5°1'30"W 5°1'0"W 5°0'30"W 5°0'0"W

50°10'30"N 50°10'15"N 50°10'0"N 50°9'45"N 50°9'30"N 50°9'15"N

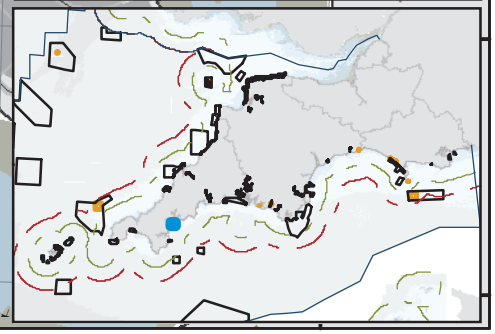
The Fal

Saint Mawes

Map Legend

- Recommended reference area
- Water skiing area
- Power and telecommunications cables (KISCA)
- Charted wrecks

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.4.11 Swanpool recommended reference area

Basic site information

The Swanpool Lagoon in Falmouth is the only place in English waters where the trembling sea mat *Victorella pavida* has been recorded. It would need to be a reference area in order to meet the ENG. However, the site falls above the OS Boundary Line mean high water line, which is the line we use to define the limit of our study region. Therefore, it is viewed by some to be beyond the remit of Finding Sanctuary.

***Site centre location (datum used: ETRS89)*:**

Decimal Degrees		Degrees Minutes Seconds	
Lat	**Long**	**Lat**	**Long**
50.1428	-5.0781	50° 8' 34'' N	5° 4' 41'' W

***Site surface area*:** 64347.5 m^2

***Biogeographic region*:**

JNCC regional sea: Western Channel and Celtic Sea
OSPAR region: Region III: Celtic Seas

Site boundary: The site is technically outside the limits of the study area (above the OS Boundary Line MHW). At the time of the planning discussions, no detailed terrestrial basemap GIS data was available to the project. The boundary for this site is very roughly drawn, to indicate the location of the Swanpool lagoon, but not following the exact boundary of the lagoon. If this site is to be implemented, then the site boundary should be re-drawn around the lagoon feature, using a standard terrestrial basemap such as OS Mastermap.

Sites to which the site is related: The Swanpool recommended reference area sits within the boundary 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 Swanpool recommended reference area

Table II.4.11a shows a summary of the draft conservation objectives for this recommended reference area. This is an extract of the conservation objective summary tables in section II.2.6. All features in the table have draft conservation objectives, including those in the right-hand column, in line with the Conservation Objective Guidance. Features in the right-hand column are not counted towards the figures in section II.2.9 unless specifically stated.

Table II.4.11a Draft conservation objectives for Swanpool recommended reference area. All features shown in the table have a draft conservation objective of 'recover to reference condition'. ***The full text of the draft conservation objectives can be found in appendix 15.***

	Viable size guidelines met	Viable size guidelines not met
FOCI species		*Victorella pavida*

The following tables show ENG-related statistics for this site, reported from spatial data available in Finding Sanctuary's GIS datasets.

*Table II.4.11b **FOCI species** to be protected in this recommended reference area, 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 Trewhella Survey Log 2010.*

Species	Number of point records (total)	Number of point records (pre-1980)	Source(s)
Victorella pavida	102		1

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

Site summary

Swanpool is a lagoon, fed by two freshwater streams, formed behind a sand and shingle bar on the coast at Falmouth (Davies, 1998). It is included in the set of recommended reference areas because it is the only known location in the region where the FOCI species *Victorella pavida* is recorded.

Detailed site description

Swanpool has the only natural population in Britain of a species of Bryozoan, the trembling sea mat *Victorella pavida* (Whitten, 1990). From 1968 to 1982 a series of investigations studied the hydrography and ecology of the pool (Barnes *et al*. 1971; Dorey *et al*. 1973; Little, 1985; 1986). Carter *et al*. (2010) monitored the life-cycle of *V. pavida* in its natural habitat within Swanpool. The results from the study suggest that any changes in the hydrographic regime at Swanpool could have significant consequences for the survival of *V. pavida*.

Stakeholder narrative: Assumptions and Implications

Reference areas will exclude all depositional and extractive activities, and might result in restrictions or management of potentially damaging and disturbing activities, as defined in the SNCB's draft reference area guidance document (available here[67]). This guidance is relatively clear and specific, therefore no further work on defining assumptions on management of reference areas was carried out.

Appendix 10 shows the content of the draft reference area guidance, converted into a layout similar to the layout for the assumptions / implications tables presented in the rMCZ site reports – this was used at meetings as a template upon which to record site-specific comments. However, site-specific comments were limited, so we have not inserted the whole table here.

[67] http://www.naturalengland.org.uk/Images/MCZ-regional-guidance_tcm6-23451.pdf

Stakeholder representatives from across many sectors were concerned about the implications of reference areas for the large range of activities affected (the Impact Assessment, to be finished in January 2012, will analyse these impacts in detail). On the other hand, conservation representatives highlighted the conservation benefits of highly protected areas. These generic comments apply to all recommended reference areas.

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

As stated above, there was much clearer guidance available on what activities will be restricted in reference areas, compared with MCZs in general. Therefore, the uncertainties around reference areas were much more limited.

A remaining uncertainty that stakeholder representatives highlighted repeatedly was about possible impacts on activities near the boundary of reference areas. Some activities might have knock-on impacts beyond the area where they are being carried out, e.g. sediment plumes from aggregate extraction, or from construction/ infrastructure maintenance work. There is uncertainty over what 'buffer zones' might be needed around reference areas for such activities.

Additional comments

No additional comments were recorded specifically for this site, but please refer to the general narrative for recommended reference areas in section II.2.3.

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.

Fishing representatives have stated that they will not support any recommendations for recommended reference areas. Very few human activities of significance occur in Swanpool, so there is relatively less concern over this site compared to others. However, there is also less strong support from conservationists for this site compared to others, as most conservationists would rate the ecological value of other sites in the network above this one, especially given that Swanpool is already a designated SSSI, and *V. pavida* is already protected within it.

In comparison to other sites in the network, a lot less time was spent discussing or working on the narrative and boundary definition of this site. As stated above, it is viewed by some, technically, to fall beyond the remit of this project.

Supporting documentation

GIS data used for reporting the quantitative habitat and species figures in the tables above includes the following sources: 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 Bamber

(1998). Further information on the Natura 2000 sites to which this site is related may be found on the JNCC's website[68].

Site map series

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

- The first map (FR_071a) is the main site map showing the site 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_071b) shows the site 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.4.11b, data sources are indicated in the table.
- Most site reports contain a map showing socio-economic datasets. This one does not, as there is limited human activity within the site.
- 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.

[68] http://jncc.defra.gov.uk/page-4

Map: FR_071a

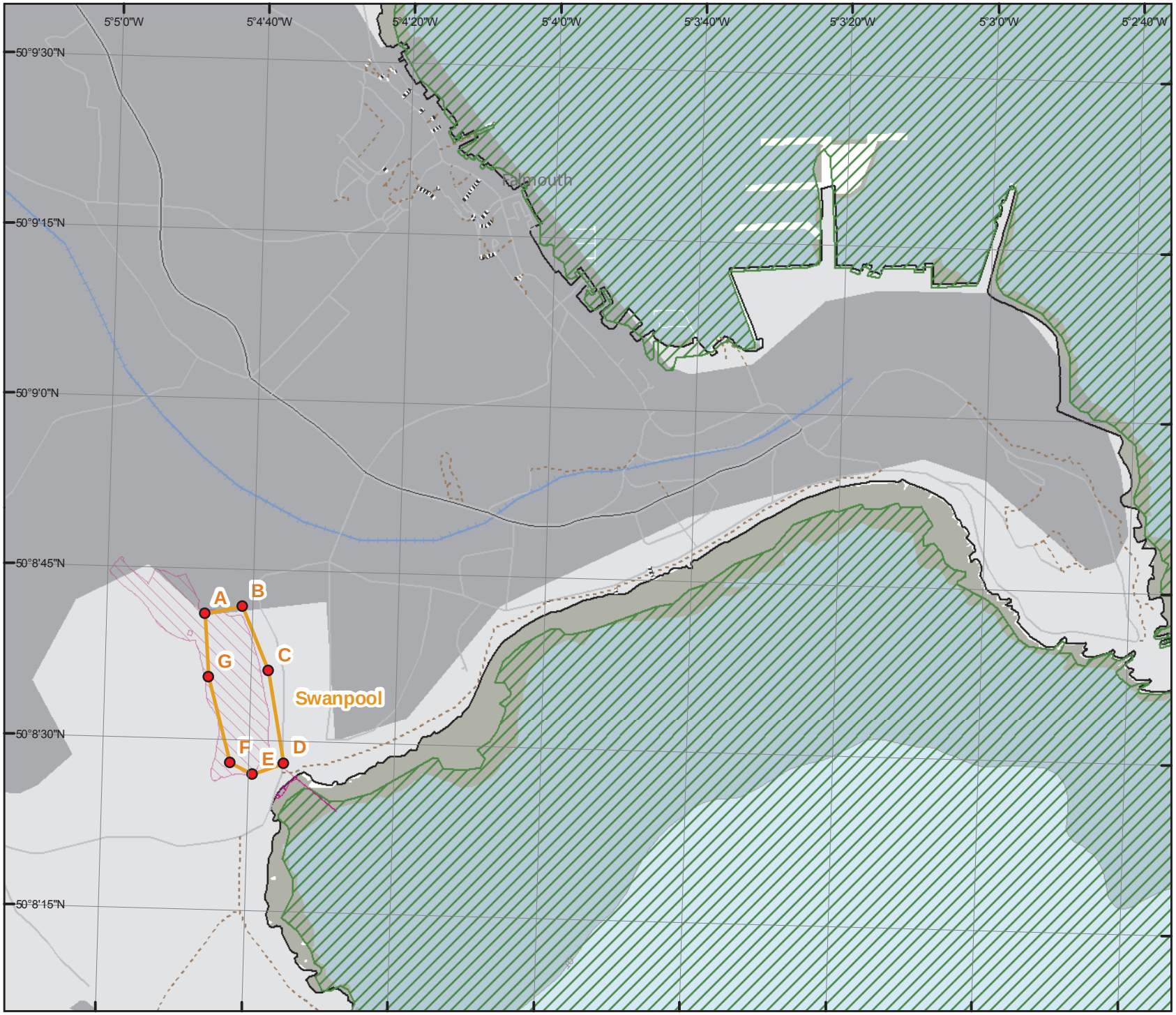
Version:24Aug11

Swanpool Recommended Reference Area

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.

0 375 750 m N

FINDING SANCTUARY



Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	50.1447	-5.0796	50° 8' 41" N	5° 4' 46" W
B	50.1449	-5.0782	50° 8' 41" N	5° 4' 41" W
C	50.1434	-5.0771	50° 8' 36" N	5° 4' 37" W
D	50.1411	-5.0764	50° 8' 28" N	5° 4' 35" W
E	50.1408	-5.0776	50° 8' 26" N	5° 4' 39" W
F	50.1411	-5.0785	50° 8' 27" N	5° 4' 42" W
G	50.1432	-5.0794	50° 8' 35" N	5° 4' 45" W

Map Legend

Recommended reference area

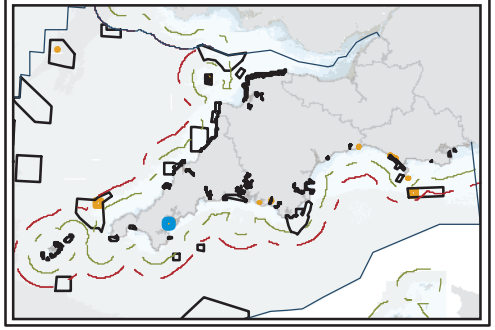
Existing MPAs

SAC

SSSI (part of MPA network)

SSSI (not part of MPA network)

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



Map: FR_071b

Version:31Aug11

Swanpool Recommended Reference Area

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.

0 50 100 200 m

N

FINDING SANCTUARY

5°5'4"W 5°4'56"W 5°4'48"W 5°4'40"W 5°4'32"W 5°4'24"W 5°4'16"W 5°4'8"W

50°8'45"N

50°8'40"N

50°8'35"N

50°8'30"N

50°8'25"N

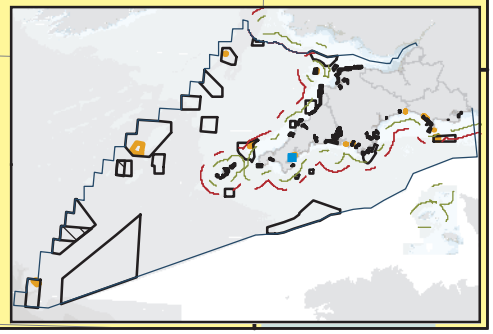
50°8'20"N

Swanpool

Map Legend

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.



II.4.12 Cape Bank recommended reference area

Basic site information

***Site centre location (datum used: ETRS89)*:**

Decimal Degrees		Degrees Minutes Seconds	
Lat	**Long**	**Lat**	**Long**
50.2796	-5.8568	50° 16' 46'' N	5° 51' 24'' W

***Site surface area*:** 24.99 km^2

***Biogeographic region*:**

JNCC regional sea: Western Channel and Celtic Sea
OSPAR region: Region III: Celtic Seas

Site boundary: The site is a simple square, with borders running north to south and east to west, in line with ENG guidelines. The northern boundary is in line with the northern boundary of the Cape Bank rMCZ.

Sites to which the site is related: The Cape Bank recommended reference area sits within the boundary of the Cape Bank rMCZ and the Cape Bank section of the Land's End and Cape Bank cSAC.

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 Cape Bank recommended reference area

Table II.4.12a shows a summary of the draft conservation objectives for this recommended reference area. This is an extract of the conservation objective summary tables in section II.2.6. All features in the table have draft conservation objectives, including those in the right-hand column, in line with the Conservation Objective Guidance. In this recommended reference area, the site is large enough to meet the ENG minimum viable size guidelines for all the listed features.

Table II.4.12a Draft conservation objectives for Cape Bank recommended reference area. All features shown in the table have a draft conservation objective of 'recover to reference condition'. ***The full text of the draft conservation objectives can be found in appendix 15.***

	Viable size guidelines met	Viable size guidelines not met
Broad-scale habitats	High energy circalittoral rock High energy infralittoral rock Moderate energy circalittoral rock Moderate energy infralittoral rock Subtidal coarse sediment	
FOCI species	*Palinurus elephas* [1] *Eunicella verrucosa*[1]	

[1] There are no records in our spatial datasets of these species within the boundaries of this site, but a recent NE SAC survey (Natural England, 2010) confirmed the presence of both species on Cape Bank. We therefore assume these species are represented within this site.

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.4.12b **Subtidal broad-scale habitats** to be protected in this recommended reference area, 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 site (km^2)	% of total in study area	Source(s)
High energy infralittoral rock	0.70	<0.1%	1
Moderate energy infralittoral rock	0.69	0.2%	1
High energy circalittoral rock	0.42	<0.1%	1
Moderate energy circalittoral rock	20.59	0.1%	1
Subtidal coarse sediment	2.60	<0.1%	1

*Table II.4.12c **FOCI habitats** to be protected in this recommended reference area, 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]	3.16			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 areas of high benthic biodiversity, offshore bird aggregation areas, or areas of seasonal or persistent sea surface temperature fronts, please refer to the data layers supplied in the interactive PDF presented alongside this report.

Site summary

Cape Bank lies to the west of the Land's End peninsula and extends to almost 25 km from the coast. The area contains a crescent-shaped Annex I reef system, which is protected under the Land's End and Cape Bank cSAC. The recommended reference area at Cape Bank is located within the cSAC and rMCZ boundaries, approximately 16km north-west of Cape Cornwall. The site's depth range is 35 and 60 metres below sea level.

Detailed site description

The reefs within the cSAC are fully submarine, upstanding features which are composed of almost entirely of granite. The crescent shaped system of offshore upstanding rocky reefs forms the major feature of conservation interest within the cSAC. It measures about 35km along its central spine and 12km at its widest point. The reef is characterised by high biodiversity tide-swept communities such as sponges, faunal and algal turfs and crustose communities (Natural England, 2010).

The site's south westerly position on the British coast means that the sub-littoral zone is exposed to the full force of the waves and oceanic swells coming in from the Atlantic, as well as experiencing full

salinity, given the absence of any major source of fresh water runoff from the land (Natural England, 2010).

Two multidisciplinary (acoustic and sampling) surveys were conducted in 2007 by CEFAS (2008) as part of work to identify the site boundary for the cSAC. A total of 540 km of acoustic survey lines (sidescan sonar and multibeam bathymetry) were run at the which equated to a coverage of 215 km^2. Digital video and stills data were collected at 27 sites and 12 scallop dredge sites were sampled along with 13 Hamon grabs sites CEFAS (2008). An inshore survey was also conducted to collect only acoustic and optical data (i.e. sidescan sonar and visual data) on the upstanding shallow inshore reef areas CEFAS (2008).

The outer part of Cape Bank is characterised by at least three sub-parallel, high linear rock ridges which extend for over 20 km in a slightly curving S-NNE trending arc. These ridges sit on a rock platform at a depth of 45 to 55 m and can reach up to 25 m high and be over a kilometre wide with steep slopes and cover over 100 km2 in total area (Natural England, 2010).

Palinurus elephas was reported in the Cape Bank area during the 2007 Natural England Cape Bank Annex I habitat survey. The offshore upstanding rocky reefs areas are the most biodiverse of all rocky reef habitats within the site. The most abundant biotope in this area is *Caryophyllia smithii* and sponges with *Pentapora foliacea*, *Porella compressa* and crustose communities on wave-exposed circalittoral rock (Natural England, 2010).

Poulton *et al.* (2002) In Jones *et al.* (2004) have described the sediment types of the Cape Bank area using models supported by ground-truthing.

Stakeholder narrative: Assumptions and Implications

Reference areas will exclude all depositional and extractive activities, and might result in restrictions or management of potentially damaging and disturbing activities, as defined in the SNCB's draft reference area guidance document (available here[69]). This guidance is relatively clear and specific, therefore no further work on defining assumptions on management of reference areas was carried out.

Appendix 10 shows the content of the draft reference area guidance, converted into a layout similar to the layout for the assumptions/ implications tables presented in the rMCZ site reports – this was used at meetings as a template upon which to record site-specific comments. However, site-specific comments were limited, so we have not inserted the whole table here.

Stakeholder representatives from across many sectors were concerned about the implications of reference areas for the large range of activities affected (the Impact Assessment, to be finished in January 2012, will analyse these impacts in detail). On the other hand, conservation representatives highlighted the conservation benefits of highly protected areas. These generic comments apply to all recommended reference areas.

[69] http://www.naturalengland.org.uk/Images/MCZ-regional-guidance_tcm6-23451.pdf

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

As stated above, there was much clearer guidance available on what activities will be restricted in reference areas, compared with MCZs in general. Therefore, the uncertainties around reference areas were much more limited.

A remaining uncertainty that stakeholder representatives highlighted repeatedly was about possible impacts on activities near the boundary of reference areas. Some activities might have knock-on impacts beyond the area where they are being carried out, e.g. sediment plumes from aggregate extraction, or from construction/ infrastructure maintenance work. There is uncertainty over what 'buffer zones' might be needed around reference areas for such activities.

Additional comments

For this specific site, additional comments from the fishing industry highlighted that the area is potted for shellfish and there are outstanding concerns over access for the shellfishery. Handline fishermen (from outside the Steering Group) have commented that they have more marks in northern part of Cape Bank than southern part, and that the recommended reference area is located in one of the worst parts of the area as far as their interests are concerned (this feedback was not available to the Working Group, so it was not taken into consideration).

Please also refer to the general narrative for recommended reference areas in section II.2.3.

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.

Fishing representatives have stated that they will not support any recommendations for recommended reference areas. Like other recommended reference areas, the site is controversial, with strong support from conservationists and strong concerns over the socio-economic impacts from many other sectors.

Support for this site from the renewables sector will depend on whether a buffer is required surrounding a reference area, and whether this will add extra burden to future developments in the nearby area. The reason for locating the reference area in that specific location was in part to avoid cable routes, not all of which are represented on KISCA charts, but which the representative from The Crown Estate highlighted to the group. Local small-scale handliners (fishing for bass, mackerel and haddock, amongst others) do not support 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 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 Dipper (1981) and Hiscock (1981). Further information on the Natura 2000 sites to which this site is related may be found on the JNCC's website[70].

Site map series

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

- The first map (FR_072a) is the main site map showing the site 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_072b) shows the site 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.4.2b, data sources are indicated in the table.
- Most site reports contain a map showing socio-economic datasets. This one does not – refer instead to map FR_050c, included in the Cape Bank rMCZ site report. 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.

[70] http://jncc.defra.gov.uk/page-4

Map: FR_072a

Version:25Aug11

Cape Bank Recommended Reference Area

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.

0 1.5 3 6 km

N

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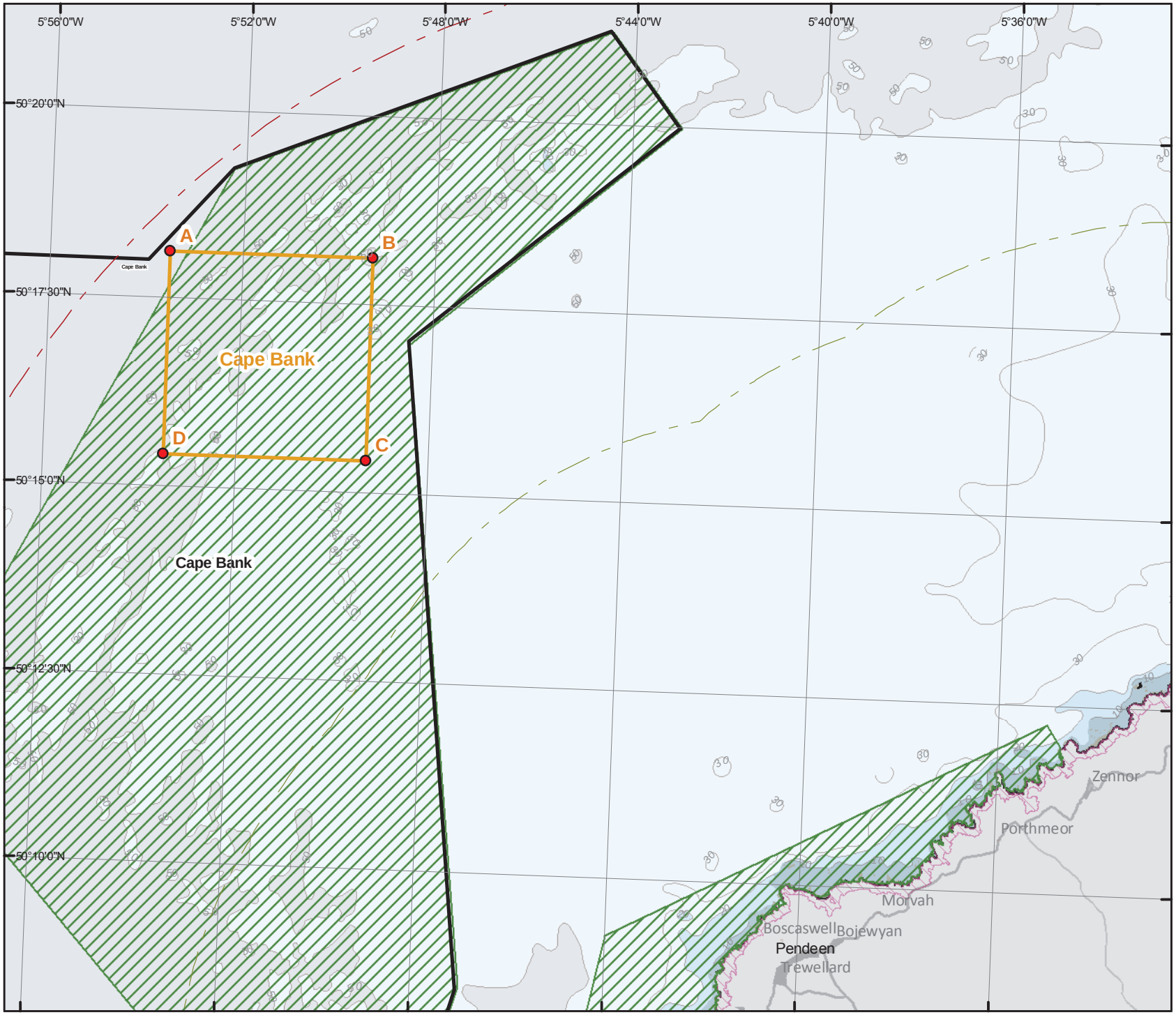


Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	50.3020	-5.8919	50° 18' 7" N	5° 53' 30" W
B	50.3021	-5.8217	50° 18' 7" N	5° 49' 18" W
C	50.2571	-5.8218	50° 15' 25" N	5° 49' 18" W
D	50.2571	-5.8919	50° 15' 25" N	5° 53' 30" W

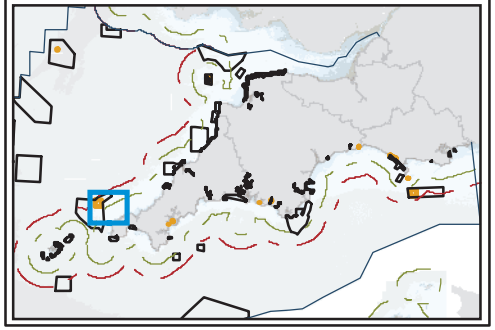
Map Legend

- 6 nautical mile limit
- 12 nautical mile limit
- Recommended reference area
- 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.



Map: FR_072b

Version:31Aug11

Cape Bank Recommended Reference Area

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.

0 1.5 3 Km

N

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5°58'0"W 5°56'0"W 5°54'0"W 5°52'0"W 5°50'0"W 5°48'0"W 5°46'0"W 5°44'0"W 5°42'0"W

50°19'30"N

50°16'0"N

50°16'30"N

50°15'0"N

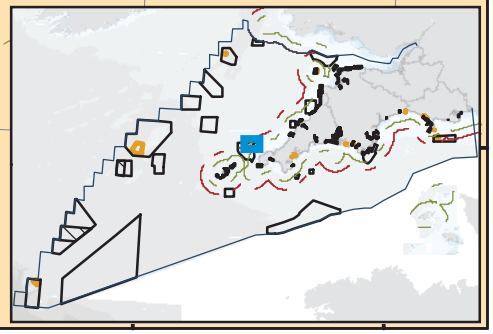
Cape Bank

Cape Bank

Map Legend

- 6 nautical mile limit
- 12 nautical mile limit
- Recommended reference area
- 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.4.13 Lundy recommended reference area

Basic site information

***Site centre location (datum used: ETRS89)*:**

Decimal Degrees		Degrees Minutes Seconds	
Lat	**Long**	**Lat**	**Long**
51.1859	-4.6575	51° 11' 9'' N	4° 39' 27'' W

***Site surface area*:** 3.7 km^2

***Biogeographic region*:**

JNCC regional sea: Western Channel and Celtic Sea
OSPAR region: Region III: Celtic Seas

Site boundary: The site boundary is identical to the boundary of the existing Lundy no-take zone.

Sites to which the site is related: The Lundy recommended reference area is identical to the boundary of the existing Lundy no-take zone and sits within the Lundy MCZ and 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 Lundy recommended reference area

Table II.4.13a shows a summary of the draft conservation objectives for this recommended reference area. This is an extract of the conservation objective summary tables in section II.2.6. All features in the table have draft conservation objectives, including those in the right-hand column, in line with the Conservation Objective Guidance. Features in the right-hand column are not counted towards the figures in section II.2.9 unless specifically stated.

Table II.4.13a Draft conservation objectives for Lundy recommended reference area. All features shown in the table have a draft conservation objective of 'recover to reference condition'. ***The full text of the draft conservation objectives can be found in appendix 15.***

	Viable size guidelines met	Viable size guidelines not met
Broad-scale habitats		Moderate energy circalittoral rock Moderate energy infralittoral rock Subtidal coarse sediment Subtidal sand
FOCI habitats	Fragile sponge & anthozoan communities on subtidal rocky habitats	Mud Habitats in Deep Water
FOCI species	*Amphianthus dohrnii* *Leptopsammia pruvoti* *Phymatolithon calcareum*	*Eunicella verrucosa* *Palinurus elephas*

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.4.13b **Subtidal broad-scale habitats** to be protected in this recommended reference area, 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 site (km^2)	% of total in study area	Source(s)
Moderate energy infralittoral rock	0.99	0.3%	1
Moderate energy circalittoral rock	0.04	<0.1%	1
Subtidal coarse sediment	0.14	<0.1%	1
Subtidal sand	2.53	<0.1%	1

*Table II.4.13c **FOCI habitats** to be protected in this recommended reference area, 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)
Fragile sponge & anthozoan communities on subtidal rocky habitats		1	1	1
Mud habitats in deep water[1]		12	12	1
Subtidal sands and gravels[2]	2.21			1

[1] The presence of this habitat at Lundy has been questioned by a member of the SAP who knows the area first hand (see detailed site description for this site and the Lundy MCZ).

[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.4.13d **FOCI species** to be protected in this recommended reference area, 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 Trewhella Survey Log 2010.*

Species	Number of point records (total)	Number of point records (pre-1980)	Source(s)
Amphianthus dohrnii	1		1
Eunicella verrucosa	37	14	1, 5
Leptopsammia pruvoti	12	1	1, 5
Palinurus elephas	2	1	1
Phymatolithon calcareum	1	1	1

This recommended reference area 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 1.56 km^2 of seahorse area polygon (refer to appendix 8 for more information).

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

Site summary

Lundy is a small island lying 18 km off the North Devon coast (Davies, 1998). It measures just 5 km by 1.25 km and has 15 km of coastline ranging from very exposed to very sheltered from wave action. Most of the island is formed of granite with softer slate in the south-east corner, off the south coast and offshore of the north coast. Rock-type strongly influences the shores of the island: the majority of the coast comprises steep granite cliffs with inaccessible shores of granite boulders below. A breeding colony of grey seals *Halichoerus grypus* is present on the island (Davies, 1998). Studies of the marine biology of Lundy are summarised in Hiscock (1997). In 1973, the island became the first voluntary marine nature reserve in Britain and, in November 1986, Britain's first statutory Marine Nature Reserve. The management plan was published by English Nature (1993). After the Marine and Coastal Access Act came into force, Lundy became an MCZ.

There has been a small no-take zone on the eastern side of Lundy since 2003, and it is this no-take zone that is recommended as a reference area. The site extends from the shoreline to depths of approximately 30 metres below sea level.

Detailed site description

The full salinity reefs are both infralittoral and circalittoral (>50 m depth), and are highly influenced by coastal processes. Several communities at their northern limit of distribution occur here. Fragile long-lived species, such as the soft coral *Parerythropodium coralloides*, sea-fans *Eunicella verrucosa* and erect branching sponges, are present, as are all five British species of cup-coral (English Nature, 2000).

The communities of benthic fauna around Lundy are unusually rich with many rare and delicate slow-growing species (McDouall, 2006). Hiscock (1981a) described the distribution of species with depth on sediment. The highest diversity of fauna and flora was present in conditions of weak wave action but moderate tidal streams, mainly the northern part of the east coast of Lundy. Many of the conspicuous Mediterranean– Atlantic elements of the fauna were recorded in that area. For example, the rare alga *Carpomitra costata*, red sea-fingers *Alcyonium glomeratum*, the anemones *Parazoanthus axinellae* and *Aiptasia mutabilis* and the southern species of cup coral *Leptopsammia pruvoti* (Hiscock, 1981a) which was recorded during a preliminary study on the Porifera of Lundy (Hiscock *et al*. 1983).

There is a particularly rich diversity of seaweeds - 316 species have been recorded, approximately 50% of the UK total (McDouall, 2006). This may in part be a reflection of survey effort, and the intense study it has received by phycologists over 60 years, but it is considered genuinely very rich. It is the most northerly site for *Laminaria ochroleuca* in the UK. In 2008, alien species of seaweed were recorded that had not been reported in earlier studies (Brodie *et al.* 2007).The communities of benthic fauna are also unusually rich with many rare and delicate slow-growing species (McDouall, 2006). A number of nationally rare and scarce species have been recorded from coarse sediments around Lundy, including the sea squirt *Molgula oculata* and the brown seaweed *Choristocarpus tenellus*. The red band fish *Cepola rubescens* occurs in subtidal mud around Lundy (McDouall, 2006).

Lundy is home to Short Snouted Seahorses and even though the actual sightings have been low in number, the habitat is perfect to support a reasonable population in this area (Neil Garrick-Maidment, *pers. comm.*). Seahorses *Hippocampus hippocampus* and *Hippocampus guttulatus*, Crawfish *Palinurus elephas*, and *Phymatolithon calcareum* have all been recorded during Seasearches around Lundy, although the presence of *Phymatolithon calcareum* could not be verified on later surveys and its presence has been questioned. Three dive surveys on rock and boulder areas in 2007 recorded *Eunicella verrucosa* and *Palinurus elephas* (Sharrock, 2008). Broad-scale habitats are already protected by the SAC (Keith Hiscock, *pers. comm*.)

Leptopsammia pruvoti was also recorded during the 1983 MCS Lundy MNR sublittoral survey; 1978-79 SWBSS Lundy sublittoral survey; and 1983-1984 Lundy and Isles of Scilly sessile epifaunal survey. *Palinurus elephas* specimens were recorded during the 1978-79 SWBSS Lundy sublittoral survey. A number of nationally rare and scarce species have been recorded from coarse sediments around Lundy, including the sea squirt *Molgula oculata* and the brown seaweed *Choristocarpus tenellus*. The red band fish *Cepola rubescens* occurs in subtidal mud around Lundy (McDouall, 2006). Warwick & Davies (1977) surveyed the sublittoral sediments and macrofauna in the Bristol Channel and around Lundy.

Hall-Spencer *et al.* (2007) and Munn *et al.* (2008) examined bacterial cultures from two *Eunicella verrucosa* specimens (which were described as necrotic) from Lundy to compare differences in the activity levels of bacterial enzymes. Wood (2003) conducted a pink sea fan survey from 2001-2002 during which the distribution, abundance and condition of sea fans were surveyed, and 100 sea fans were recorded from Lundy (east and west sides). *Eunicella verrucosa* has also been recorded around Lundy during the MCS Lundy MNR sublittoral survey (1983) and various SeaSearch surveys. Southward *et al*. (2004) carried out dredging, trawling, and SCUBA diving to recover *Solidobalanus fallax*, during which active searches for *Eunicella verrucosa* were carried out (record on Petes Pinnacle, Lundy Island at 28 m on *E. verrucosa*).

Stakeholder narrative: Assumptions and Implications

Reference areas will exclude all depositional and extractive activities, and might result in restrictions or management of potentially damaging and disturbing activities, as defined in the SNCB's draft reference area guidance document (available here[71]). This guidance is relatively clear and specific, therefore no further work on defining assumptions on management of reference areas was carried out.

Appendix 10 shows the content of the draft reference area guidance, converted into a layout similar to the layout for the assumptions/ implications tables presented in the rMCZ site reports – this was used at meetings as a template upon which to record site-specific comments. However, site-specific comments were limited, so we have not inserted the whole table here.

Stakeholder representatives from across many sectors were concerned about the implications of reference areas for the large range of activities affected (the Impact Assessment, to be finished in January 2012, will analyse these impacts in detail). On the other hand, conservation representatives highlighted the conservation benefits of highly protected areas. These generic comments apply to all recommended reference areas.

[71] http://www.naturalengland.org.uk/Images/MCZ-regional-guidance_tcm6-23451.pdf

Stakeholder narrative: Uncertainties and Additional Comments

Uncertainties

As stated above, there was much clearer guidance available on what activities will be restricted in reference areas, compared with MCZs in general. Therefore, the uncertainties around reference areas were much more limited.

A remaining uncertainty that stakeholder representatives highlighted repeatedly was about possible impacts on activities near the boundary of reference areas. Some activities might have knock-on impacts beyond the area where they are being carried out, e.g. sediment plumes from aggregate extraction, or from construction / infrastructure maintenance work. There is uncertainty over what 'buffer zones' might be needed around reference areas for such activities. The site is located in a high tidal resource area, and changing it from a no-take zone to a reference area would preclude any future construction of tidal energy devices within the site boundaries.

Additional comments

No additional comments were recorded specifically for this site, but please refer to the general narrative for recommended reference areas in section II.2.3.

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.

Fishing representatives have stated that they will not support any recommendations for recommended reference areas. Given that the site is already a no-take zone, there is less controversy and more support for this site than for other recommended reference areas. There is tidal resource at Lundy, and the renewables sector have stated some concern, because the current no-take zone does not theoretically prevent renewables developments, whereas a reference area would (and there is uncertainty over the need for a buffer area). However, they also recognise the ecological importance of the site, and the fact that a reference area located within the no-take zone would have less socio-economic impact than a similar sized reference area elsewhere. The wardens on Lundy support 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, Seasearch 2009, 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 Hiscock *et*

al. (1973). Further information on the Natura 2000 sites to which this site is related may be found on the JNCC's website[72].

Site map series

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

- The first map (FR_073a) is the main site map showing the site 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_073b) shows the site boundary over broad-scale habitats, and records of habitat and species FOCI. The data shown on this map corresponds with the information in tables II.4.13b to II.4.13d, data sources are indicated in the tables.
- Most site reports contain a map showing socio-economic datasets. This one does not – refer instead to map FR_055d, in the Lundy MCZ site report. 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.

[72] http://jncc.defra.gov.uk/page-4

Map: FR_073a

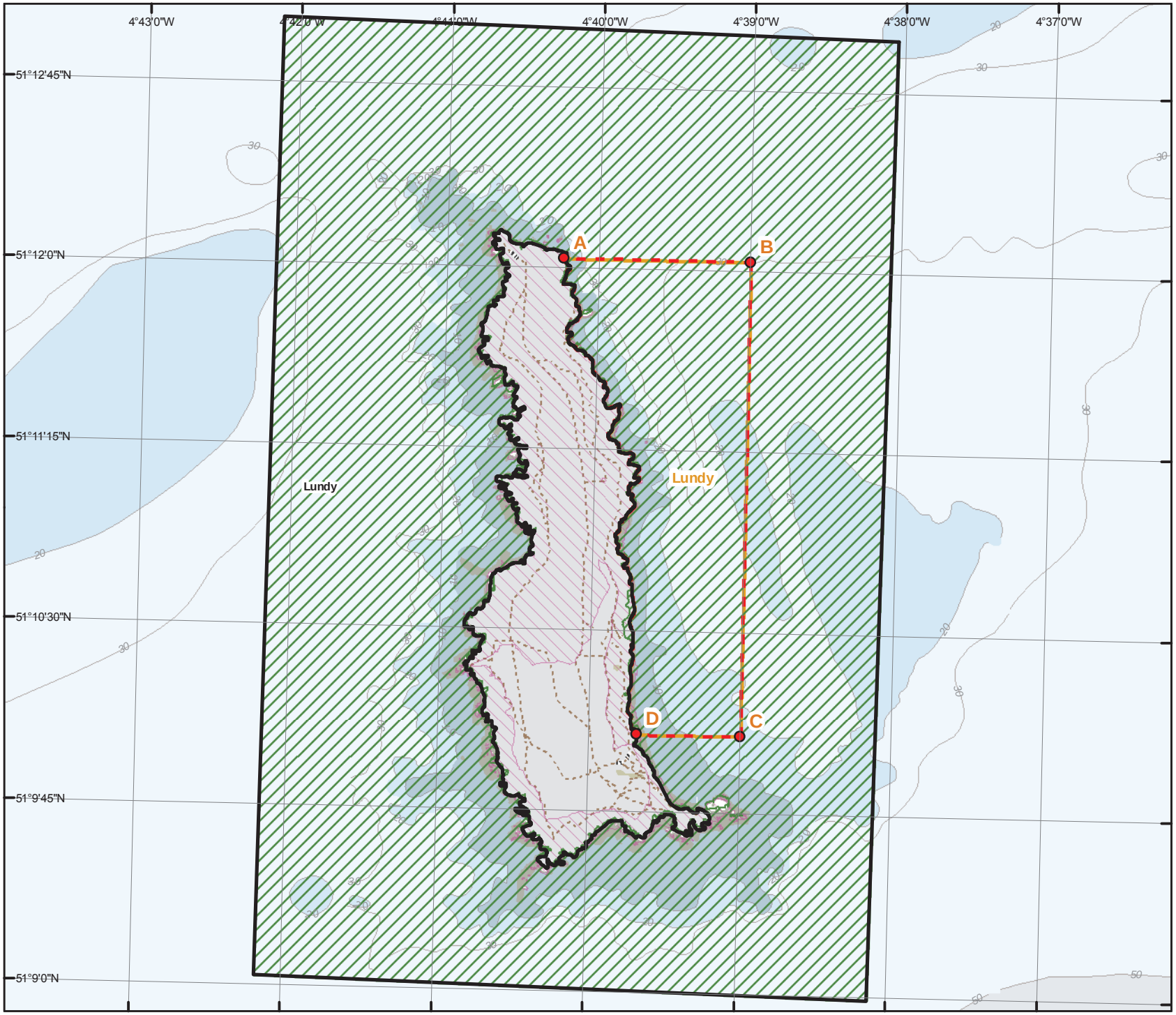
Version:31Aug11

Lundy Recommended Reference Area

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.

0 0.5 1 2 km N

FINDING SANCTUARY



Lat/Long Co-ordinates (WGS84)

	Decimal degrees		Degrees Minutes Seconds	
	Lat	Long	Lat	Long
A	51.2007	-4.6705	51° 12' 2" N	4° 40' 13" W
B	51.2007	-4.6500	51° 12' 2" N	4° 38' 59" W
C	51.1678	-4.6500	51° 10' 4" N	4° 38' 59" W
D	51.1678	-4.6614	51° 10' 4" N	4° 39' 40" W

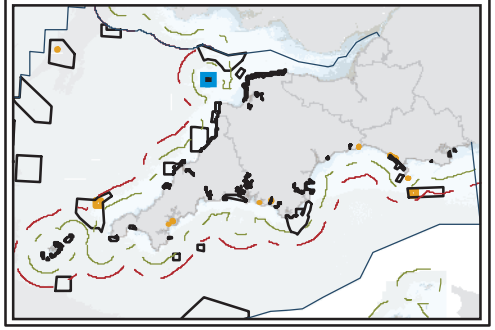
Map Legend

- Recommended reference area
- Recommended MCZ (rMCZ)

Existing MPAs

- SAC
- Lundy NTZ
- SSSI (not part of MPA network)

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



Map: FR_073b

Version:31Aug11

Lundy Recommended Reference Area

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.

0 0.5 1 Km

N

FINDING SANCTUARY

4°42'45"W 4°42'0"W 4°41'15"W 4°40'30"W 4°39'45"W 4°39'0"W 4°38'15"W 4°37'30"W 4°36'45"W

51°12'0"N 51°11'30"N 51°11'0"N 51°10'30"N 51°10'0"N 51°9'30"N

Lundy

Lundy

Map Legend

Recommended reference area

MCZ

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.