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Marine Scotland

Northern North Sea Proposal

September 2016

Joint Recommendation regarding the protection of Special Areas of Conservation and Marine Protected Areas in the North Sea, designated under the EU Habitats Directive 92/43/EEC of 21 May 1992 and the EU Marine Strategy Framework Directive 2008/56/EC of 17 June 2008, using the provisions of Article 11 and Article 18 of Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy

Contents

1 Summary of proposal

This Joint Recommendation contains a proposal for the regulation of fisheries activity and is initiated by the UK and submitted to the European Commission jointly by the UK and [insert Member States here], being those Member States who have a direct management interest. It presents fisheries management proposals for three Special Areas of Conservation (SACs) and eight Marine Protected Areas (MPAs) located in the UK part of the Northern North Sea. These measures are considered necessary to comply with Article 6 of the Habitats Directive and Article 13(4) of the Marine Strategy Framework Directive.

2 Summary of recommendations to be implemented

2.1 Braemar Pockmarks SAC

The aim of the proposal is to protect Submarine structures made by leaking gases (habitat code 1180) from potential deterioration from fishing activity. The proposed measures would prohibit all demersal fishing gears within the SAC. Details of the proposal are in section A.

2.2 Central Fladen MPA

The aim of the proposal is to protect burrowed mud (seapen and burrowing megafauna communities and tall seapen (*Funiculina quadrangularis*) components) from potential deterioration from fishing activity. The proposed measures would prohibit demersal mobile fishing gears on a zonal basis within the MPA. Details of the proposal are in section B.

2.3 East of Gannet and Montrose Fields MPA

The aim of the proposal is to protect deep-sea mud habitat and ocean quahog aggregations (including sands and gravels as their supporting habitat) from potential deterioration from fishing activity. The proposed measures would prohibit beam trawl and dredge fishing gears from the whole MPA, and demersal trawl and seine gears on a zonal basis within the MPA. Details of the proposal are in section C.

2.4 Faeroe-Shetland Sponge Belt MPA

The aim of the proposal is to protect deep-sea sponge aggregations, offshore subtidal sands and gravel habitat and ocean quahog aggregations from potential deterioration from fishing activity. The proposed measures would prohibit all demersal fishing gears overlapping the deep-sea sponge and ocean quahog aggregations, with a further restriction on demersal mobile gear protecting additional sand and gravel habitat. Details of the proposal are in section D.

2.5 Firth of Forth Banks Complex MPA

The aim of the proposal is to protect ocean quahog aggregations and offshore subtidal sands and gravel habitat from potential deterioration from fishing activity. The proposed measures prohibit all demersal trawls and dredges (use of seine net is permitted) on a zonal basis within the MPA. Details of the proposal are in section E.

2.6 North-East Faeroe-Shetland Channel MPA

The aim of the proposal is to protect deep-sea sponge aggregations, offshore subtidal sands and gravel, and offshore deep-sea mud habitats from potential deterioration from fishing activity. The proposed measures prohibit all demersal fishing gears overlapping the deep sea sponge aggregations, with a further restriction on all demersal mobile gears to protect the sedimentary habitats. Details of the proposal are in section F.

2.7 Norwegian Boundary Sediment Plain MPA

The aim of the proposal is to protect ocean quahog aggregations (including sands and gravels as their supporting habitat) from potential deterioration from fishing activity. The proposed measures prohibit all demersal mobile fishing gears from the MPA (with seine net fishing excepted in around half of the MPA). Details of the proposal are in section G.

2.8 Pobie Bank SAC

The aim of the proposal is to protect Annex I reef (habitat code 1170) from potential deterioration from fishing activity. The proposed measures prohibit all demersal mobile fishing gears on a zonal basis within the SAC. Details of the proposal are in section H.

2.9 Scanner Pockmark SAC

The aim of the proposal is to protect submarine structures made by leaking gases (habitat code 1180) from potential deterioration from fishing activity. The proposed measures prohibit all demersal fishing gears from the SAC. Details of the proposal are in section J.

2.10 Turbot Bank MPA

The aim of the proposal is to protect sandeels from potential deterioration from fishing activity. The proposed measures prohibit directed fishing for sandeels within the MPA. Details of the proposal are in section K.

3 Non-technical summary of control and enforcement requirements

It is envisaged that control and enforcement will be delivered through the Vessel Monitoring System (VMS), supplemented with risk analysis and deployment of aerial and ships to the areas as required. For some sites, enhanced VMS reporting is requested to aid compliance efforts.

4 Non-technical summary of how measures were designed

The measures in this document have been designed using a risk based approach. Intervention is only proposed for features where it is considered that interactions with fishing activity may pose a risk to achievement of the conservation objectives. In designing the measures the pattern of fleet activity has been taken into account and will be allowed to continue as much as possible within the legal framework.

5 Non-technical summary of the economic analysis

VMS data has been used to estimate the amount of fishing effort that takes place within the relevant ICES rectangles. This is then used to estimate the amount that takes place within a protected area, and how much is affected by the proposed management measures. These proportions are multiplied by the reported catch values for ICES rectangles to provide a value for the MPA and impact of the management measures for each member state which provided data.

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6 Introduction

This joint recommendation contains a proposal for the regulation of fisheries activity and is initiated by the United Kingdom (UK) and submitted to the European Commission jointly by the UK and [insert Member States here], being those Member States having a direct management interest in the sea area where measures are being proposed.

The overall aim of this joint recommendation is to ensure that fisheries are managed in accordance with Article 6 of the EU Habitats Directive[1], and Article 13 of the EU Marine Strategy Framework Directive (MSFD)[2].

It is the intention of the UK government (as the initiating Member State) to take forward measures in respect to fisheries activities exercised by all vessels including those carrying the flag of other EU Member States. The proposals in this document have been developed in accordance with Article 11 and Article 18 of Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy (the CFP)[3].

[1] Council Directive 92/43/EEC, of 21 May 1992, on the conservation of natural habitats and of wild fauna and flora:

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1992L0043:20070101:EN:PDF

[2] Council Directive 2008/56/EEC, of 17 June 2008, establishing a framework for community action in the field of marine environmental policy:

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:164:0019:0040:EN:PDF

[3] Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:354:0022:0061:EN:PDF

7 Principles

This section describes the legal framework designation of Marine Protected Areas (MPAs) and Special Areas of Conservation (SACs), and the implementation of fisheries management measures. It also describes certain aspects of our approach which is applicable to all sites. There is also a summary of how we have engaged stakeholders.

7.1 Common Fisheries Policy

According to Article 11 of the CFP Member States are empowered to adopt conservation measures that are necessary to comply with their obligations under Article 6 of the EU Habitats Directive and Article 13(4) of the MSFD.

Where measures are required outwith waters where the member state has exclusive competence the European Commission (EC) is empowered to adopt such measures by means of delegated acts.

The initiating Member State shall provide the EC and Member States who have a direct management interest with relevant information on the measures required, including their rationale, scientific evidence in support, and details on their practical implementation and enforcement.

Member States shall consult the relevant Advisory Councils.

The initiating Member State and the other Member States who have a direct management interest may submit a joint recommendation within six months from the provision of sufficient information.

The Commission shall adopt the measures, taking into account any available scientific advice, within three months from receipt of a complete request.

The 11 information items described in the EU guidance for developing fisheries management for MPA document[4] provides the basis for the content of this proposal. It describes how the United Kingdom, as the initiating Member State, has taken the Commission's criteria for decision making into account as well as the requirements for regional coordination in line with the CFP.

7.2 Implementation of Natura 2000 in United Kingdom

The following regulations, as amended from time to time, provide the legal basis for the designation of Natura 2000 sites according to the EU Habitats Directive (92/43/EEC) and the EU Wild Birds Directive (2009/147/EC) in the UK. These regulations also transpose the protective provisions of Article 6 of the EU Habitats Directive into UK law.

a) The Offshore Marine Conservation (Natural Habitats, &c) Regulations 2007[5] in relation to the offshore area around the UK. The offshore area extends from the limit of the territorial sea to the UK Continental Shelf Claim Limit.

b) The Conservation of Habitats and Species Regulations 2010[6] in relation to English and Welsh Territorial Waters

c) The Conservation (Natural Habitats, &c.) Regulations 1994[7] in relation to Scottish Territorial Waters.

[4] http://ec.europa.eu/environment/nature/natura2000/marine/docs/fish_measures.pdf

[5] http://www.legislation.gov.uk/uksi/2007/1842/contents/made

[6] http://www.legislation.gov.uk/uksi/2010/490/contents/made

[7] http://www.legislation.gov.uk/uksi/1994/2716/contents/made

7.3 Designation of Natura 2000 sites in United Kingdom

Special Areas of Conservation (SACs) are designated for habitats and species listed in Annex 1 and 2 of the EU Habitats Directive. The UK currently has 108 SACs with marine components, covering 7.6% of the UK sea area. Eighty eight of these SACs are completely in inshore waters[8], 16 are completely in offshore waters[9], and there are four sites which have parts in both inshore and offshore waters. Those with offshore components are shown in figure 1 below.

7.4 Implementation of Article 13(4) of Marine Strategy Framework Directive in United Kingdom

The following Acts of Parliament provide the legal basis for the designation of sites to comply with Article 13(4) of the MSFD in the UK.

a) The Marine and Coastal Access Act 2009[10] (as amended) provides for the designation of Marine Conservation Zones or Marine Protected Areas in UK offshore waters, and English Inshore waters.

The Marine (Scotland) Act 2010[11] provides for the designation of Marine Protected Areas in Scottish Inshore waters.

7.5 Designation of sites under Article 13(4) of Marine Strategy Framework Directive in United Kingdom

Each of the four devolved administrations within the UK are responsible for the identification, designation and management of protected sites within their respective marine waters.

[8] http://jncc.defra.gov.uk/page-4170

[9] http://jncc.defra.gov.uk/page-1455

[10] http://www.legislation.gov.uk/ukpga/2009/23/contents

[11] http://www.legislation.gov.uk/asp/2010/5/contents

The Scottish Government has designated 30 MPAs under article 13(4) of the MSFD. Of the 30 MPAs, 17 are in territorial waters and 13 in offshore waters. Management measures for all these sites are expected to be implemented by the end of 2017. Those with offshore components are shown in figure 1 below.

7.6 Sites being considered in this document

In this document there are proposals for management measures for 10 sites in the North Sea. These are listed below and shown in figure 2.

Braemar Pockmarks SAC

Central Fladen MPA

East of Gannet and Montrose Field MPA

Faroe-Shetland Sponge Belt MPA

Firth of Forth Banks Complex MPA

North-east Faroe-Shetland Channel MPA

Norwegian Boundary Sediment Plain MPA

Pobie Bank Reef SAC

Scanner Pockmarks SAC

Turbot Bank MPA

7.7 Sites not considered in this document

There is no proposal in the document for the Northwest Orkney MPA. This MPA is for the protection of sandeels. The seabed in this location prevents a sandeel fishery taking place. Therefore the site is considered to be naturally protected.

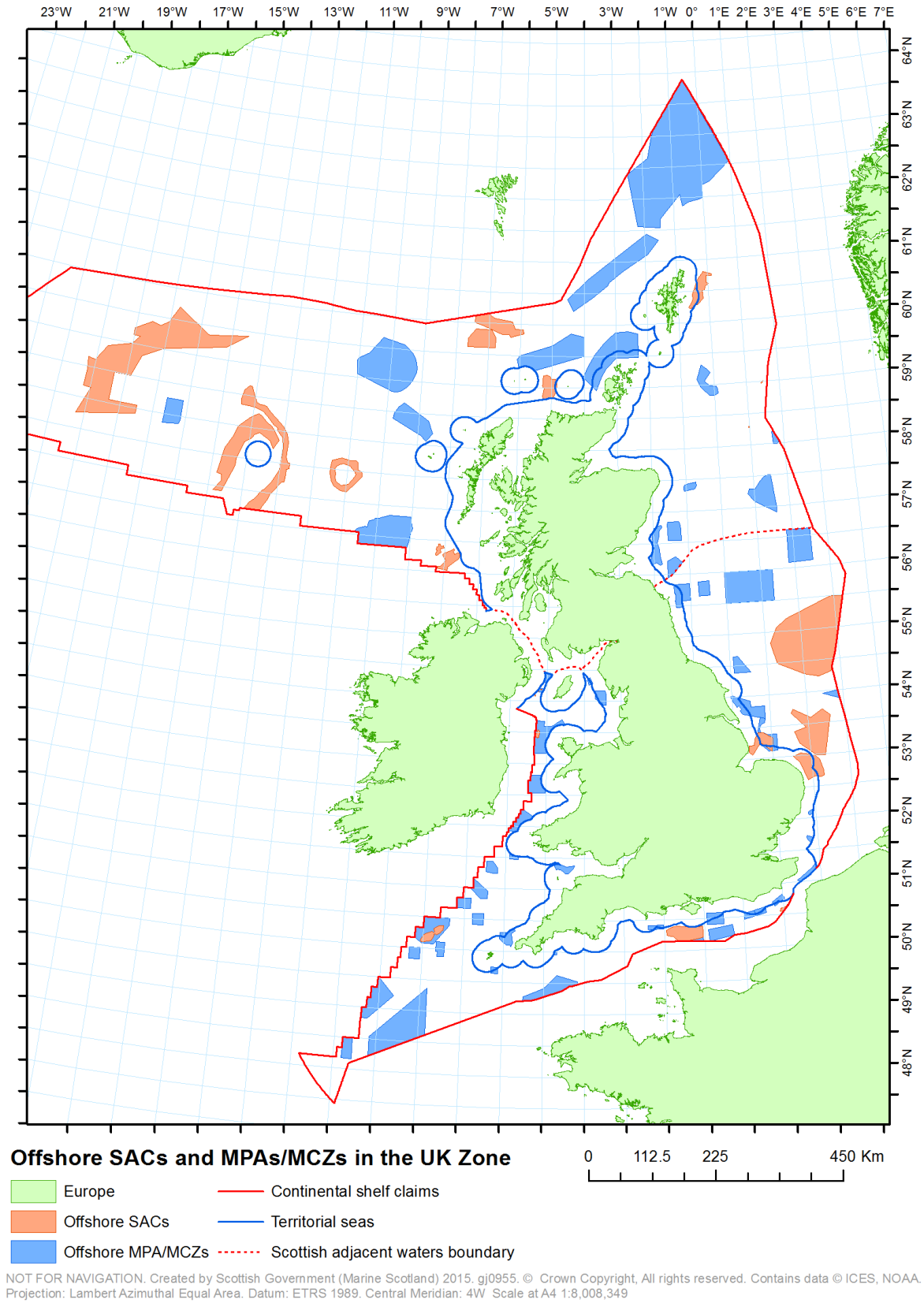

Figure 1: UK offshore Special Areas of Conservation (including candidates), Marine Protected Areas, and Marine Conservation Zones

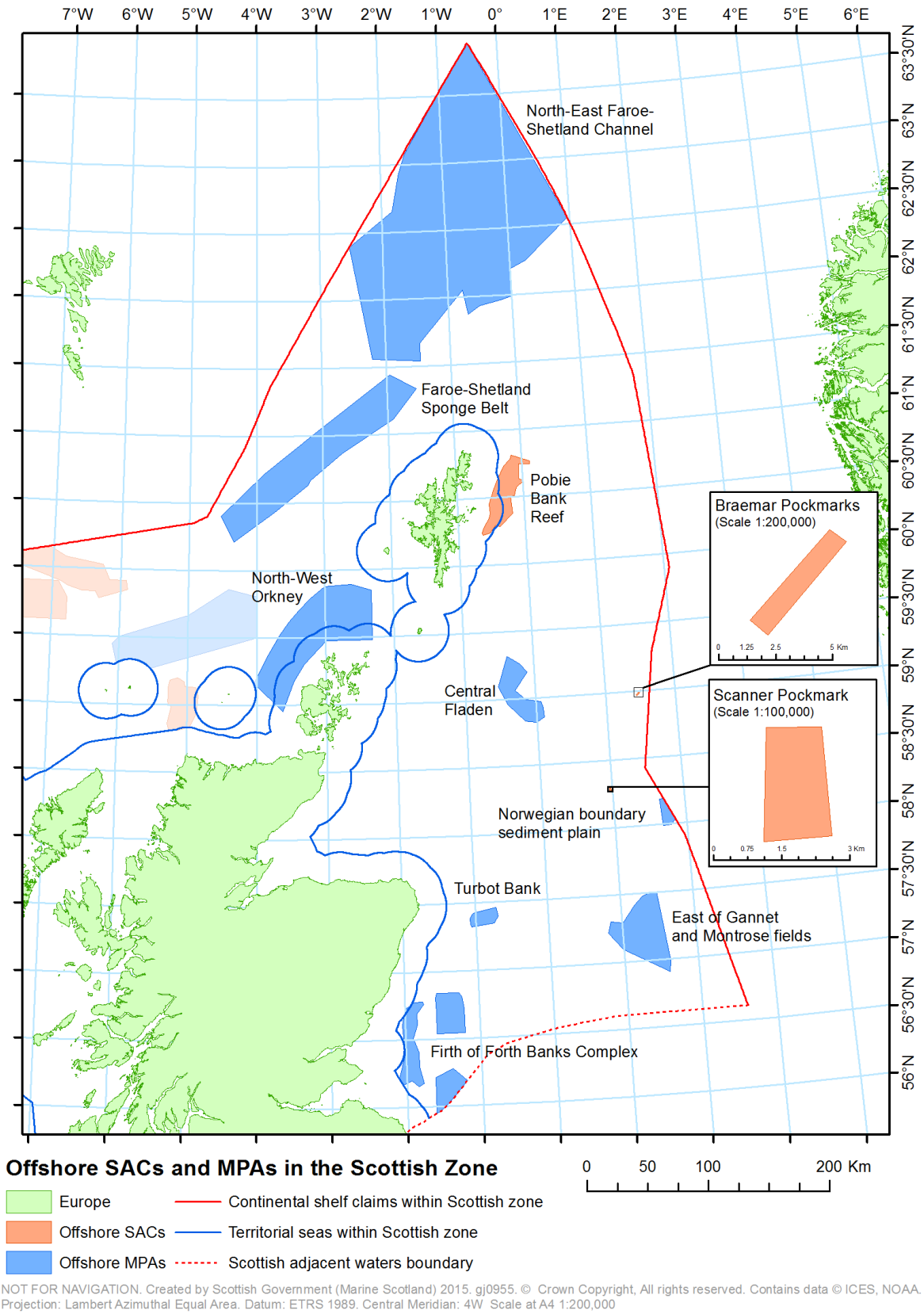

Figure 2: UK offshore Special Areas of Conservation and Marine Protected Areas in the Northern North Sea.

7.8 Scientific basis

7.8.1 Risk based approach

A range of MPA fisheries management options are available to managers, differing in the degree of restriction they would place on fishing operations, and the risk they would pose to achieving the conservation objectives. These have been grouped into three broad categories of possible management: No additional management, additional management to reduce/limit pressures and additional management to remove pressures.

Although it is not generally possible to quantify the degree of risk to achieving the conservation objectives posed by each option, it is possible to identify where risks may exist, and where this could be reduced through the introduction of management measures.

Risks have been evaluated using existing data and information on protected features and our understanding of the relationships between the feature and relevant activities. This relationship determines how much flexibility there is available to managers in the design of measures. There tends to be little flexibility in designing measures for the most vulnerable features, whereas less sensitive habitats lend themselves to more creative management solutions.

7.8.2 Independent review

Depending on the outcome of this initial consultation independent review and/or advice may be sought. This will be done where there is a significant difference of opinion over the design of the measures.

7.9 Engagement

7.9.1 Stakeholder workshops

Stakeholder workshops were held in June 2013, April 2014 and March 2015 to discuss potential fisheries management measures for the offshore SAC and MPA sites. These workshops were attended by fishing industry representatives, environmental Non-Governmental Organisations and marine scientists.

The proposals for each site take into account views expressed at each workshop and aim to balance protection of the marine ecosystem against socio-economic fishing interests.

7.9.2 Co-ordination and consultation with other member states

To be completed

7.9.3 Involvement of the North Sea Advisory Council

Members of the North Sea Advisory Council (NSAC) participated in the workshops where the measures were initially designed.

A presentation of the developing measures was made to the NSAC in January 2016.

To be completed

7.9.4 Involvement of the Scheveningen Group

To be completed

7.9.5 Public participation

To be completed

7.10 Transparency

In this proposal the UK has been transparent on the data being used, the steps being taken and the methodology used, as well as the involvement of stakeholders.

Add more text during process

7.11 Proportionality

The approach was designed to deliver proportionate regulatory proposals. In other words seeking to balance the need to achieve conservation objectives whilst avoid unnecessary restriction to on-going fishing activity. The European Commission guidance describes such a proportionate approach towards balancing sustainable exploitation of resources and the application of a precautionary approach to conserve important habitats.

7.12 Non-discrimination

The measures in these proposals have been designed solely to address the risk posed by fishing gears to the protected features and/or the functioning of the ecosystem within the protected area. No other factors have been material considerations.

7.13 Site condition monitoring

Marine Scotland/JNCC are currently leading a research and development programme to develop an integrated system of monitoring for marine biodiversity across Scottish/UK waters.

The programme aims to provide a coherent framework for biodiversity monitoring to meet the requirements of existing and future monitoring and assessment obligations including those under the EU Marine Strategy Framework Directive, EU Habitats and EU Wild Birds Directives and the OSPAR Convention.

Monitoring and assessment of protected sites constituting the UK network of Marine Protected Areas will be an integral part of this programme.

Monitoring in UK offshore waters will be based on the principles outlined in the JNCC's Common Standards Monitoring Guidance (JNCC, 2004).

In Scotland a protected area specific monitoring strategy is under development, with a draft version expected to be published in the near future.

7.14 Surveillance

7.14.1 Vessel Monitoring System

The provisions of Article 50 (3) and (4) of Council Regulation (EC) No 1224/2009 should be applied. Within each site section there is a recommendation for frequency of data transmission. Where possible this remains at the minimum requirement of once every 2 hours. However in some cases a variation is required due to scale of site or complexity of the management measures. Where a variation is recommended the change of frequency of data transmissions should commence immediately upon entry to the area, and end upon exit from the area.

Vessels not permitted to fish in the area in question must have all gear lashed and stowed during the transit so that it cannot be readily used. Transit should be at a speed of at least 6 knots except in the case of force majeure or adverse conditions. In such cases, the master shall immediately inform the fisheries monitoring centre of the flag Member State which shall then inform the competent authorities of the coastal Member State.

7.14.2 Aerial and surface surveillance

A risk analysis approach will be used to determine the frequency of surveillance. This will be a combination of routine patrolling to gather intelligence and specific patrolling to investigate potential breaches of the regulation.

8 Other human activities

Within the site-level sections only activities which may have impacted on the protected features are considered. Those which do not have any effect are not detailed. For example commercial shipping passes through all of the sites in varying degrees of frequency. This is a surface activity whereas most of the protected areas are for benthic species/habitats. We have concluded that shipping has no effect on the protected areas. Similarly pelagic fishing methods have been scoped out of consideration.

8.1 Requirement to assess licensed activities

Before giving consent to licensed activities the competent authority must ensure compliance with the underpinning legislation. These requirements are designed to prevent adverse impact occurring. This process does not apply to fisheries.

8.2 Future oil and gas development

A number of the protected areas overlap with license blocks identified by the Department of Business, Energy, and Industrial Strategy (BEIS) and these may be subject to further oil and gas development in the future. Any such development will be subject to environmental assessment.

9 Technical description of the fisheries activity analysis

The first step of the analysis was to estimate the amount of fishing effort for each gear type. The gear type for each UK vessel was identified from the EU logbook entry for each day of potential fishing activity. For non-UK vessels the main gear type from the EU fleet register was selected.

Taking all Vessel Monitoring System (VMS) reports where the speed was between 0 and 6 knots the following analysis was undertaken. Using ARCGIS the following spatial joins were performed sequentially; join to ICES rectangles; join to MPAs / SACs; join to management measures for that gear type.

Effort was then estimated by summing the time elapsed in hours since the last VMS report for each vessel. By country and gear type total effort for ICES rectangles; MPAs / SACs; and management measures was calculated. This was then tabulated as shown in the site level documents based upon the 5 year average from 2009 to 2013.

A call was made for catch value data from each member state. This was provided in slightly different formats so a suitable common approach was used. This involved taking the total catch value for each gear type for ICES rectangles where MPAs / SACs are located. A five year average per country per gear type for each group of ICES rectangles was calculated.

Using proportions from the effort analysis the estimated value for a fishery within MPAs / SACs was calculated, along with the value affected by the management measures. This data is tabulated as required and shown in the site level documents based upon the 5 year average from 2009 to 2013.

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Section A

11 Braemar Pockmarks Special Area of Conservation (SAC)

11.1 Site description

Braemar Pockmarks SAC as shown in figures 2 and A1 is located approximately 240 km east of the Orkney Islands. There are 27 pockmark depressions within the site ranging in size from 40cm deep with an area of 330m² to 4m deep and 10,000m² in area. The Braemar pockmarks were discovered initially during rig site surveys as part of the Braemar oil field development. Further industry-led surveys in 2001 and 2003 confirmed the presence of Annex I habitat submarine structures made by leaking gases (code 1180).

The pockmarks at the site are shallow, ovoid seabed depressions which were probably formed by the venting of biogenic/petrogenic fluids or gases into the water column (Hovland & Judd, 2009). Large blocks, pavement slabs and smaller fragments of methane derived authigenic carbonate (MDAC) have been deposited through a process of precipitation during the oxidation of methane gas.

Survey data from 2012 suggested strong evidence of active gas seepage including presence of MDAC and gas bubbles in the water column (Rance et al., 2013).

Exposed carbonate structures provide a habitat for marine fauna usually associated with rocky reef, as well as highly specific chemosynthetic organisms which feed off both methane (seeping from beneath the seafloor) and its by-product, hydrogen sulphide (Judd, 2001). Larger blocks of exposed carbonate may also provide shelter for mobile demersal species (Figure A2).

The full overview of the data used to support site identification along with information on confidence in feature presence and extent is available in the JNCC Braemar Pockmark SAC Site Information Centre.

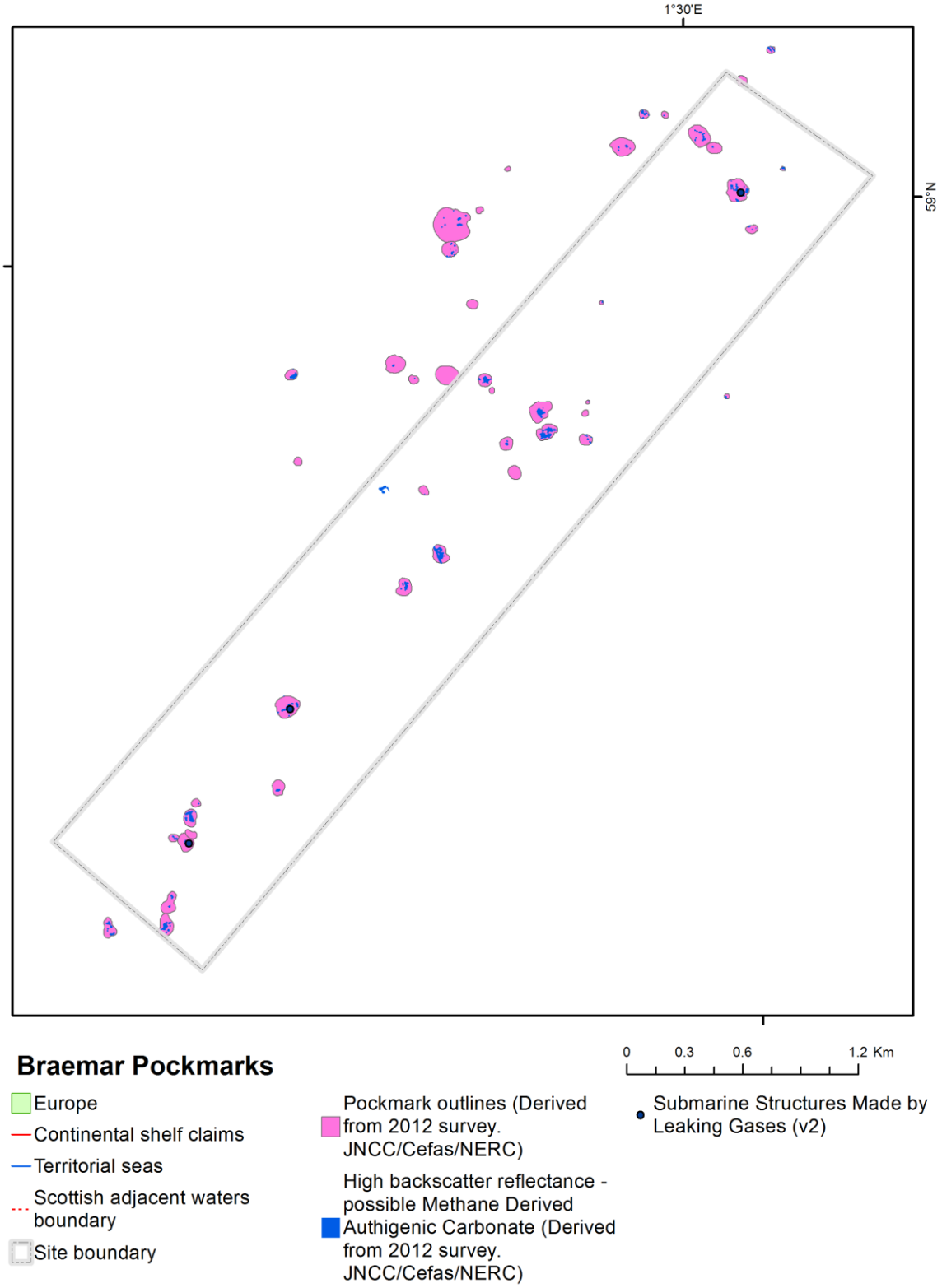

Figure A1: Braemar Pockmarks SAC site map including distribution of protected features

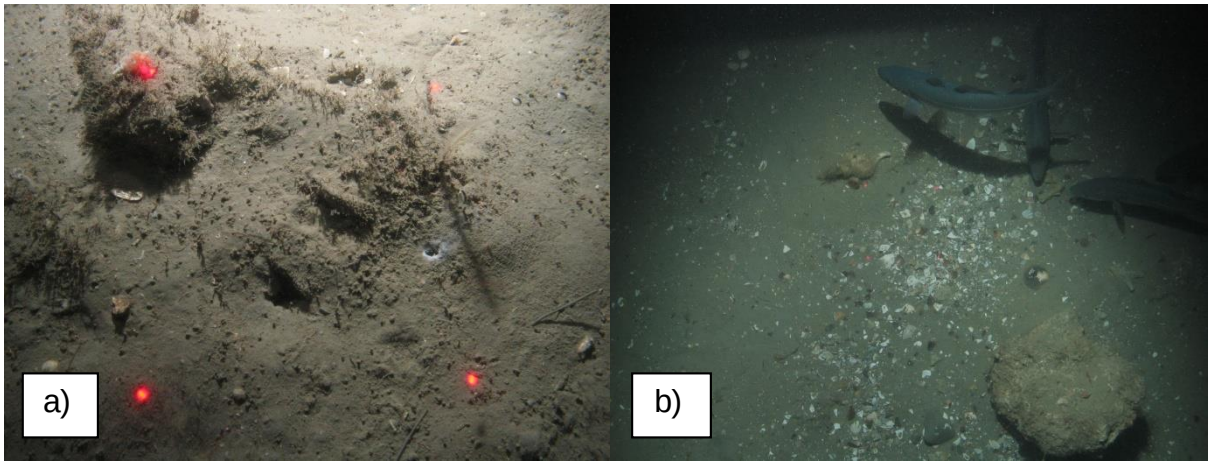

Figure A2: Feature images from Braemar Pockmarks SAC, showing a) methane derived authigenic carbonate (MDAC) partially covered by sediment, and b) a block of MDAC with shell hash on mud sediment with hunting Saithe (*Pollacius virens*) © JNCC/Cefas

11.2 Why the site was designated

The Braemar Pockmarks site is located in the Northern North Sea and represents a range of different sizes and forms of Annex I "Submarine structures made by leaking gases" (H1180). It therefore makes a contribution to the Natura 2000 network for this habitat. The faunal communities are representative of those present on submarine structures made by leaking gases, consisting of organisms dependent on chemosynthesis as well as anemones and hydroids (Hartley, 2005).

11.3 The site boundary

The site was defined using the JNCC marine SAC boundary definition guidelines (JNCC, 2012a). The boundary was drawn as a simple polygon around the known extent of the pockmarks at the time of designation. This included a buffer of 375m from the edge of the pockmark depression which equates to three times the maximum water depth of 125m. This results in the SAC being just 5km^2 in area with Submarine structures made by leaking gases found throughout.

11.4 Conservation objectives

Conservation objectives set out the desired quality of the protected features within a SAC. The conservation objective for the Braemar Pockmarks SAC is to, subject to natural change, restore the submarine structures made by leaking gases to favourable condition such that:

- The natural environmental quality is restored;
- The natural environmental processes are maintained; and
- The extent, physical structure, diversity, community structure and typical species representative of the submarine structures made by leaking gases in the Northern North Sea are restored.

12 Anthropogenic Pressures

12.1 All demersal mobile gears (including dredge, beam trawl, bottom trawl, and seines)

Direct evidence of impacts of towed gears to submarine structures made by leaking gasses is limited. However, the biological communities that develop on exposed structures typically include many of the same species that can be found on subtidal rocky habitats in similar environmental conditions and it is likely that the effects of fishing will be similar.

The use of towed fishing gears is likely to cause damage or death of fragile, erect species, such as sponges and corals (Freese et al., 1999; Løkkeborg, 2005). Other species such as hydroids, anemones, bryozoans, tunicates and echinoderms are vulnerable to mobile fishing gear (McConnaughey et al., 2000; Sewell & Hiscock, 2005). Recovery is likely to be slow (Foden et al., 2010). Where fragile, slow growing species occur, even low levels of fishing have the potential to change the structure and function of the habitats and may result in the loss of some characteristic species.

12.2 All demersal static gears (including gillnets, trammel nets, long lines, pots and traps)

There is no direct evidence from which to determine impacts of static gears on submarine structures made by leaking gases. However, the biological communities that develop on exposed structures typically include many of the same species that can be found on subtidal rocky habitats in similar environmental conditions and it is likely that the effects of fishing will be similar.

Mechanical impacts of static gear (e.g. weights and anchors hitting the seabed, hauling gear over seabed, rubbing/entangling effect of ropes) can damage some species (Eno et al., 1996). Other species appear to be resilient to individual fishing operations but the effects of high fishing intensity are unknown (Eno et al., 2001). Recovery may be slow, resulting in significant reduction or even loss of characteristic species (Foden et al., 2010). The individual impact of a single fishing operation may be slight but cumulative damage may be significant (Eno et al., 2001; Foden et al., 2010).

12.3 Other human activities

The SAC takes its name from the nearby Braemar Hydrocarbon Field. The wellhead of this field and connecting pipelines lie just outside the site boundary, with its 500m exclusion zone overlapping with the site. Any maintenance or decommissioning work which occurs on this well would be expected to occur within the exclusion zone and therefore could impact the site. There is also one completed exploration wellhead within the site. There is one telecommunications cable running across the north of the site in an east to west direction. This cable is out of service.

13 Proposed fisheries management measures

This section provides details of how the measures were determined.

13.1 Options considered for fisheries management

Table A1 provides a summary of the management advice set out against the various options that have been considered.

Table A1: Summary of fisheries management advice

Activity	Management options considered
Demersal mobile gears	**No additional management:** There is a significant risk of not achieving the conservation objectives for the submarine structures made by leaking gases.
	Reduce/limit pressures: This option would reduce, but not entirely eliminate, the risk of degradation to the submarine structures caused from leaking gases feature as a result of direct impact from fishing activities. Appropriate management could include closure of the known extent of the feature within the site. However, a risk of impact with patches of feature not identified during survey would remain. Recent survey evidence suggests that patches of feature extend across the site beyond those listed in the original submission thus the risk of damage to the feature from fishing activity within the site is high. Although the risk of damage to the feature is likely to be highest for heavy gear components, restrictions may be appropriate for all bottom contact gears to minimise the risk of fragmentation of exposed feature. Areas to be covered by management restrictions would include a buffer zone around the known features equal to three times the water depth to reduce any risk of accidental contact with the feature. The location of areas to be covered by management restrictions would be decided in consultation with fishers.
	Remove/avoid pressures: This option would reduce the risk of degradation to any submarine structures made by leaking gases feature within the site boundary to the lowest possible levels. Restrictions would be required for all demersal towed gears within the full extent of the site boundary. The boundary already includes a buffer zone around the known features equal to three times the water depth to reduce any risk of accidental contact with the feature.
Demersal static gears	**No additional management**: The risk of deterioration of the submarine structures made by leaking gases from set netting is considered minimal. This option is considered appropriate for all demersal static gears. However, if static gear fishing were to increase and monitoring showed evidence of detrimental effects, it may be necessary to apply restrictions in the future

13.2 Proposed management option and rationale

Table A2 provides details of the chosen management approach and further explanation is provided below.

Table A2: Chosen management approach

Protected feature	Gear type	Option chosen	Approach to management
Submarine structures made by leaking gases (1180)	Demersal mobile and static gear	Remove / avoid pressures	Prohibit all demersal fisheries from the SAC

Management measures are proposed for demersal towed gears to remove the risk to achieving the conservation objective posed by these gears. In addition, while the risk to achieving the conservation objective posed by demersal static gears is considered minimal, the scale of this site means that control and enforcement of fishing activity within the SAC would be very difficult. Therefore the simplest approach is to prohibit all demersal gears across the whole SAC.

14 Measures envisaged for control, enforcement, and compliance

This section describes the measures that are proposed for implementation.

14.1 Vessel Monitoring System

The frequency of data transmissions shall be of at least once every 10 minutes. This is due to the small scale of the site.

14.2 Key provisions to include in EC regulation

Table A3 provides details of the gear types to be prohibited by the measures and Table A4 provides co-ordinates of the area to which the measures should be applied. All of the co-ordinates are provided in WGS84 datum and the last co-ordinate joins back to the first in the table. All co-ordinates are joined by geodesic lines. A map of the measures is shown in figure A2.

Table A3: Demersal fishing gears to be prohibited

Gear types to be prohibited by the proposed measures	Habitat code	Gear code Annex XI in EU Regulation No. 404/2011	International standard Classification of Fishing Gears (ISSCFG)
Beam trawl	1180	TBB	TBB
Bottom trawl		OTB, OTT, PTB, TBN, TBS, TB	OTB, OTT, OT, PTB, TB
Seines		SDN, SSC, SX, SV	SB, SV, SDN, SSC, SPR, SX
Dredges		DRB, HMD	DRB, DRH
Gillnets and entangling nets		GN, GNC, GND, GNS, GTN, GTR	GEN, GN, GNC, GND, GNS, GTN, GTR
Hooks and lines		LHM, LHP, LL, LLD, LLS, LTL, LX	LHM, LHP, LLS, LLD, LL, LTL, LX
Pots and traps		FIX, FPO	FIX, FPO, FYK

Table A4: Co-ordinates of prohibited area (all demersal fishing gears)

Point	Latitude	Longitude
A	58° 58.385' N	001° 26.248' E
B	59° 00.387' N	001° 30.205' E
C	59° 00.068' N	001° 30.948' E
D	58° 57.996' N	001° 26.993' E

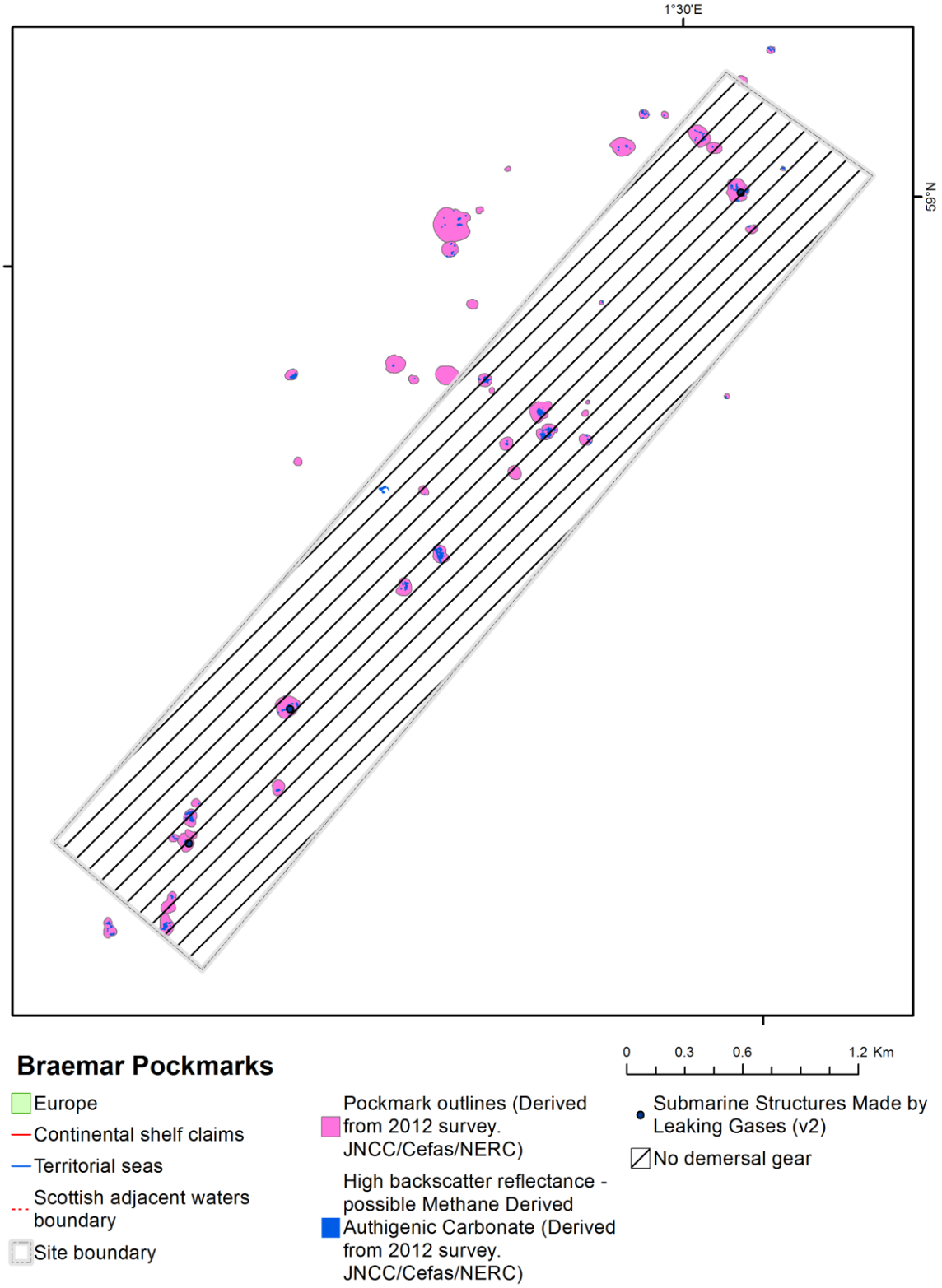

Figure A3: Braemar Pockmarks SAC map of proposed measures

15 Fleet activity at Braemar Pockmarks SAC

This SAC is only 5km^2 in area. Therefore it is not possible to assess fishing activity in the area with any degree of certainty. Mobile gear activity is depicted in Figures A4 to A6 through a kernel density estimation of Vessel Monitoring System data. There is no recorded static gear activity in 2009 to 2013.

16 Assessment of potential displacement effects

The fishing effort that will be displaced is relatively low and therefore is unlikely to impact on any particular area. The SAC represents less than 0.01% of an ICES rectangle.

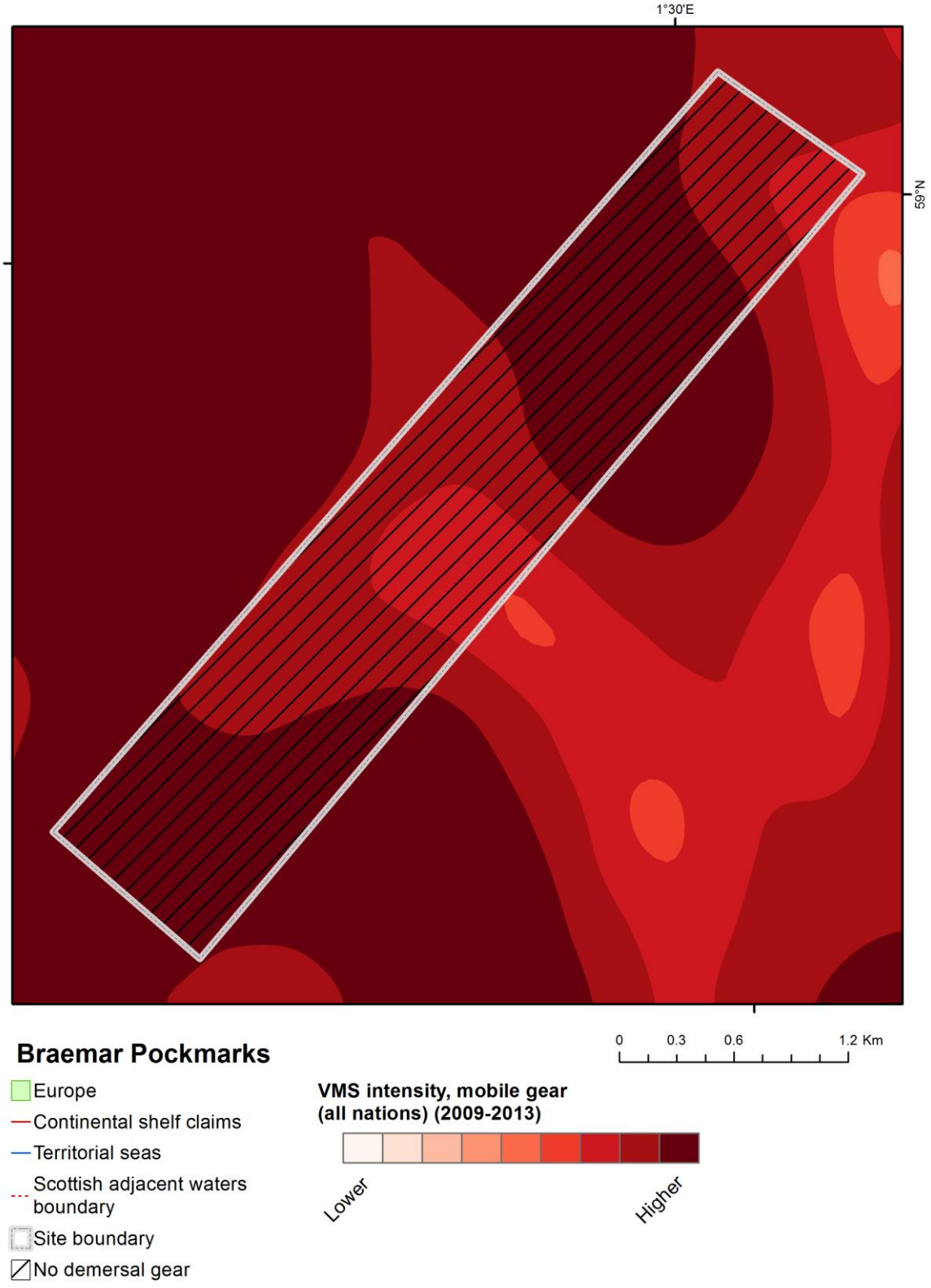

Figure A4: Braemar Pockmarks SAC map of proposed measures with mobile fishing VMS intensity layer for all vessels 2009-13

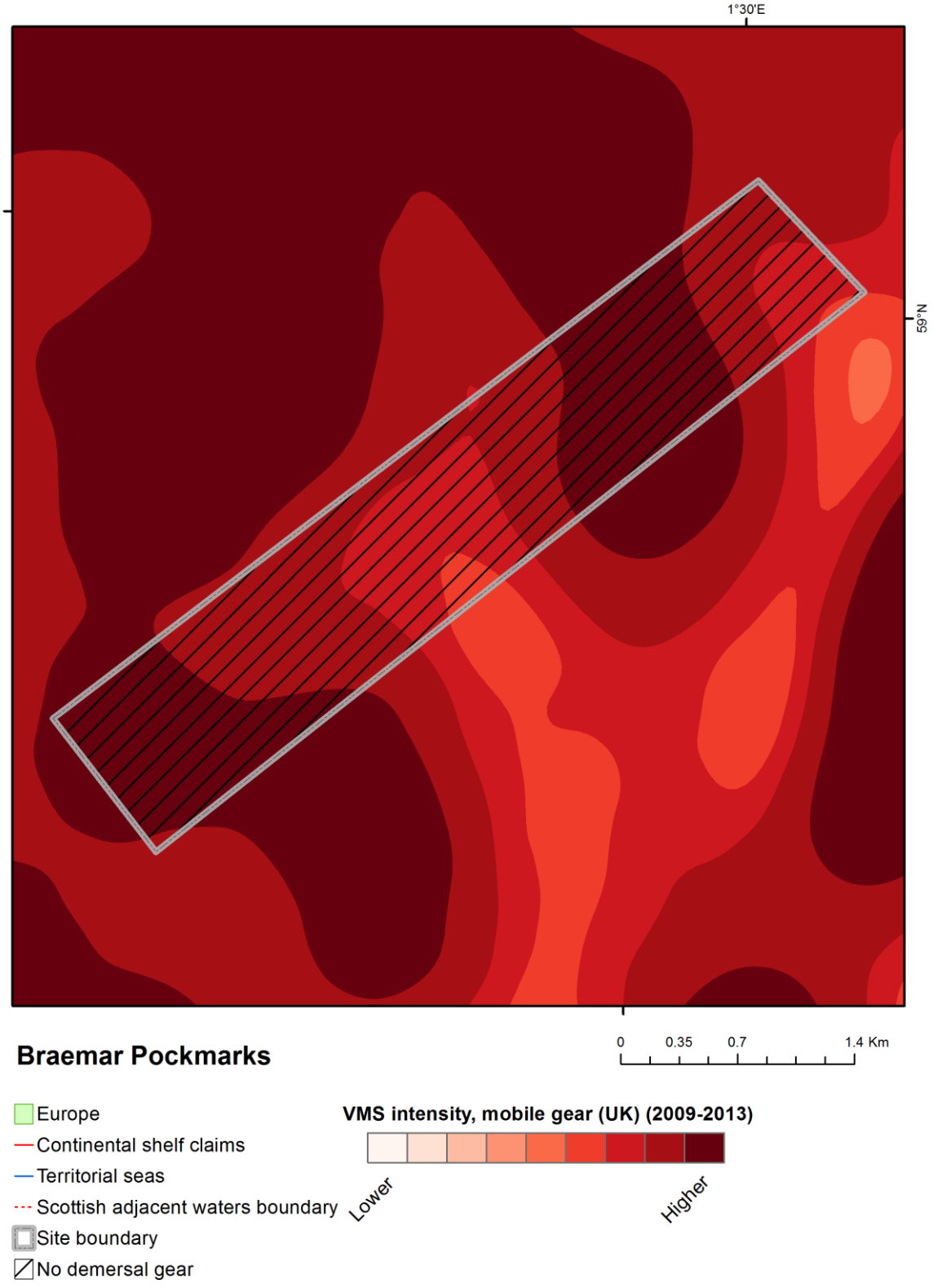

Figure A5: Braemar Pockmarks SAC map of proposed measures with mobile fishing VMS intensity layer for UK vessels 2009-13

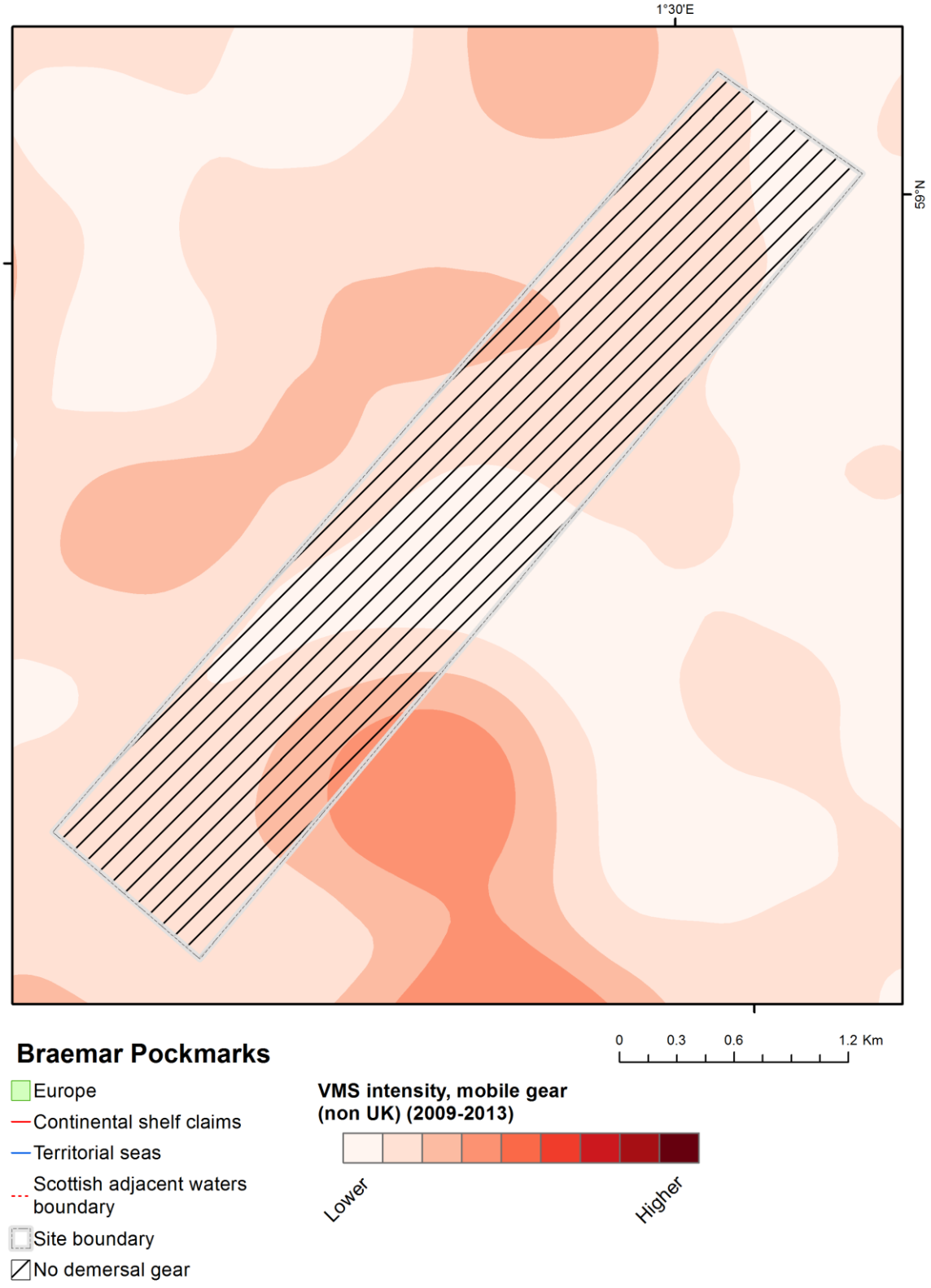

Figure A6: Braemar Pockmarks SAC map of proposed measures with mobile fishing VMS intensity layer for non-UK European Union vessels 2009-13

Section B

17 Central Fladen Marine Protected Area (MPA)

17.1 Site description

The Central Fladen MPA, as shown in Figures 2 and B1, lies within the Fladen Grounds, a large area of mud located in the northern North Sea, covering an area of 925km². The mud habitat within the site is characterised by sea pens, and the burrows made by crustaceans such as mud shrimp *Callianassa subterranea* and the Norway lobster *Nephrops norvegicus*. The burrowing activity of megafauna creates a complex habitat, providing deep oxygen penetration.

The MPA includes the seapens and burrowing megafauna biotope and records of the tall seapen (*Funiculina quadrangularis*). Pictures of these are shown in Figure B2. These components equate to the OSPAR habitat seapens and burrowing megafauna which is considered to be Threatened and/or Declining in OSPAR regions II and III.

The MPA ranges in depth from 100m below sea level to 280m below sea level in the 'Fladen Deeps' sub-glacial tunnel valley that runs through the MPA.

17.2 Why the site was designated

The protected feature was identified as a priority for marine conservation in Scotland's seas and considered appropriate for a spatial management approach. Further detail on the processes followed to identify priority marine features in Scottish offshore waters is publically available (JNCC, 2012b).

The MPA makes a contribution to the OSPAR network for the seapens and burrowing megafauna Threatened and/or Declining habitat in OSPAR region II. The site also includes records of the tall seapen (*Funiculina quadrangularis*) which is rarely found in the northern North Sea. The site also includes an important geodiversity feature.

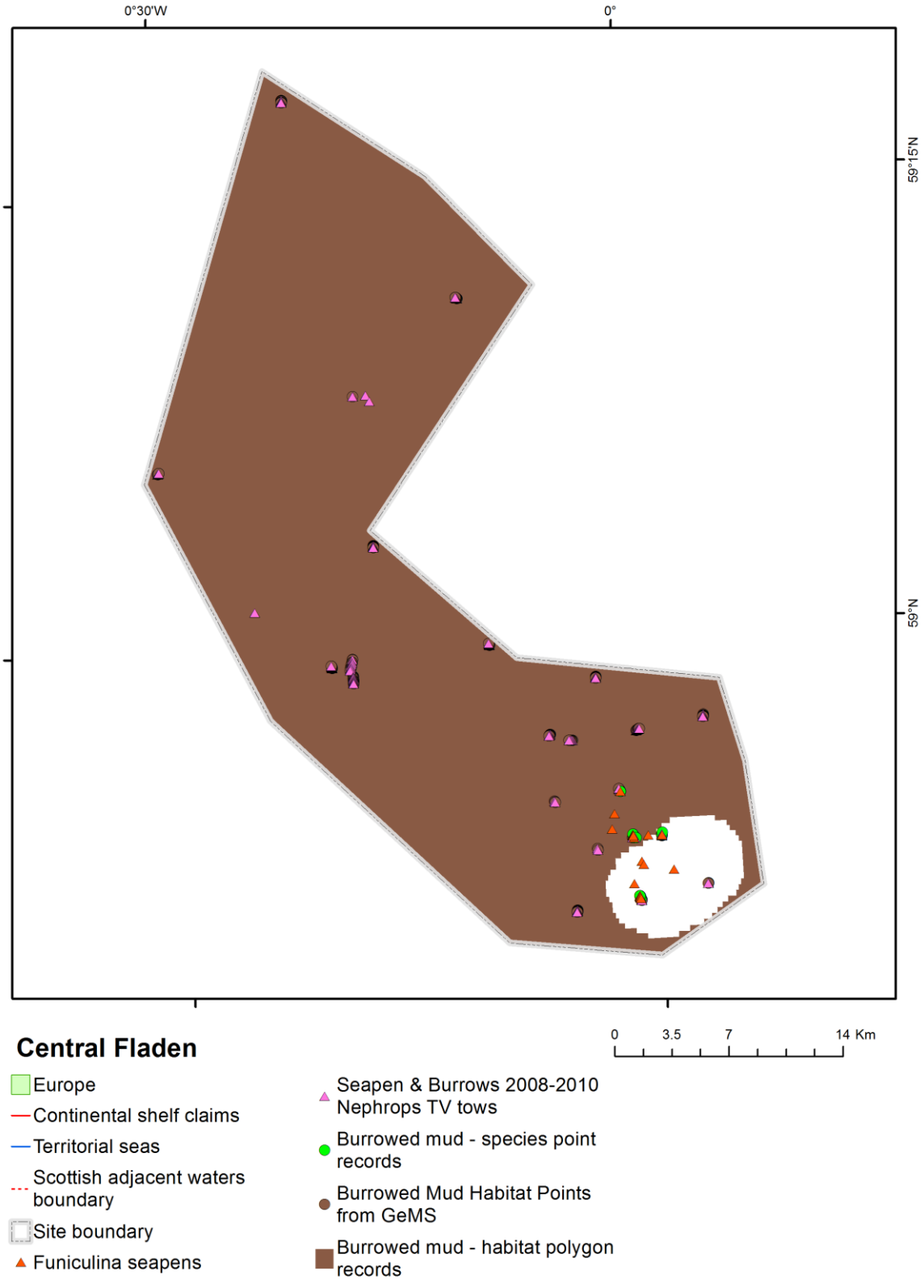

Figure B1: Central Fladen MPA site map including distribution of protected features

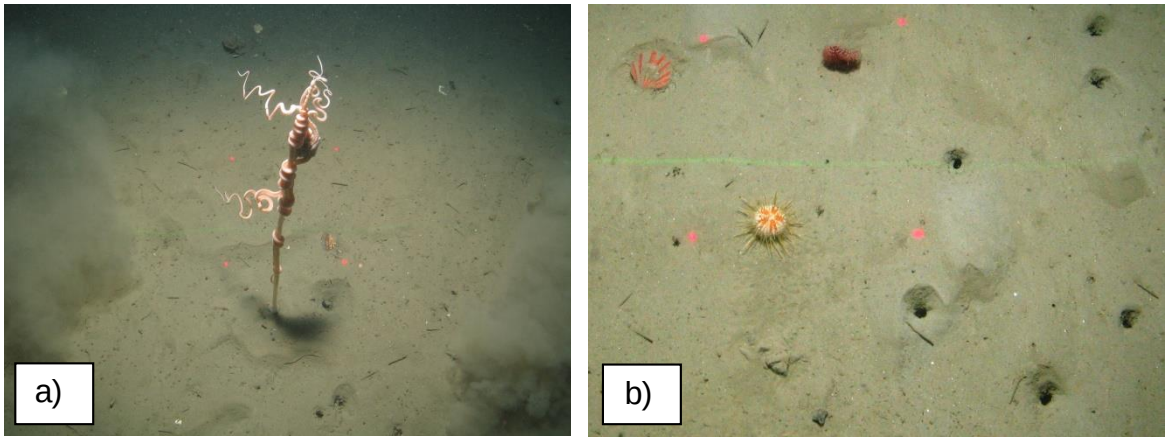

Figure B2 – Feature images from Central Fladen MPA (© Cefas and JNCC, 2013) a)Tall seapen (*Funiculina quadrangularis*) and brittlestar on burrowed mud b) Seapen and burrows

17.3 The site boundary

The boundary of the Central Fladen MPA has been set in accordance with the boundary setting principles outlined in the MPA Selection Guidelines[12].

The boundary was drawn to include survey records of the seapens and burrowing megafauna habitat, mostly including areas where the distribution of the seapen species meet or exceed the average density of seapens from across the wider Fladen Grounds (Greathead et al., 2011). The southern part of the MPA boundary includes one of the few areas where tall seapen have been recorded in Scottish offshore waters; the boundary tracks the predicted distribution of the typical habitat type for this species (muddy sand) (Ager & Wilding, 2009).

The site boundary was also drawn to encapsulate a sub-glacial tunnel-valley geodiversity feature. This is scientifically important as it holds potentially valuable evidence about past changes in the extent and geometry of the last British-Irish Ice Sheet (Brooks et al., 2013).

Confidence in the presence and extent of the protected features has been set out in the Central Fladen MPA Data Confidence Assessment.

[12] http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/mpaguidelines

17.4 Conservation objectives

Subject to natural change, conserve the burrowed mud feature in favourable condition, such that:

- its extent is stable or increasing; and
- its structures and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it is in a condition which is healthy and not deteriorating.

More information regarding the conservation objectives is available in the Designation Order.

18 Anthropogenic pressure

18.1 All demersal mobile gear (including dredge, beam trawl, bottom trawl, and seines)

Studies have shown that areas of burrowed mud subject to mobile fishing activity support a modified biological community with lower diversity, reduction or loss of long-lived filter-feeding species and increased abundance of opportunistic scavengers (Tuck et al., 1998 ; Ball et al., 2000). This effect was greatest in the more heavily fished offshore areas suggesting that impact is related to the intensity of fishing (Ball et al., 2000).

Furthermore, modelling studies suggest that the greatest impact is produced by the first pass of a trawl (Hiddink et al., 2006). The distribution of the seapen *Funiculina quadrangularis* in Scottish waters may have been reduced as a result of Nephrops trawling (Hughes, 1998). Nephrops may be an important component of the benthic community so fisheries that greatly alter its abundance or size composition may have a negative impact.

18.2 All demersal static gear (including gillnets, trammel nets, long lines, pots and traps)

None of the protected features within the site are considered sensitive to static gear activity. Studies on the impacts of pots on seapens have shown limited adverse effect on seapens from a single fishing operation (Eno et al., 1996; Eno et al., 2001; Kinnear et al., 1996). However, the extent of damage and the impacts of repeated exposure to these types of fishing gear at high levels of fishing activity are less well understood (Eno et al., 2001; Adey, 2007).

If fishing activity is low, direct impact on habitat is likely to be minimal and seabed structure is likely to be maintained in a slightly modified state (Adey, 2007). *Nephrops* may be an important component of the benthic community so fisheries that greatly alter its abundance or size composition may be seen to have a negative impact.

18.3 Other human activities

One oil and gas pipeline and one telecommunications cable currently cross through the MPA.

19 Proposed fisheries management measures

This section provides details of how the measures were determined.

19.1 Options considered for fisheries management

Table B1 provides a summary of the management advice set out against the various options that have been considered.

Table B1: Summary of fisheries management advice

Activity	Management options considered
Demersal mobile gear	**No additional management** There is a significant risk of not achieving the conservation objective for the burrowed mud feature.
	Reduce/limit pressures This option would reduce, but not entirely eliminate, the risk of not achieving the conservation objective for the burrowed mud feature. Appropriate management for burrowed mud could include closure of a proportion of the site to damaging gears. Restrictions could be permanent in some cases or temporary/adaptive in others. Restrictions may be proposed for the more sensitive areas such as those supporting the tall sea pen component, and a reduction of effort may also be required to minimise the risk of not achieving the conservation objective for the remaining burrowed mud feature. The location of areas to be covered by management restrictions would be decided in consultation with fishers.
	Remove/avoid pressures This option would reduce the risk of not achieving the conservation objective for burrowed mud to the lowest possible level.
Demersal static gear	**No additional management** This option is considered to be sufficient for bottom contacting static gear to achieve the conservation objectives for burrowed mud. However, if static gear fishing activities were to increase or monitoring showed evidence of detrimental effects, it may be necessary to apply limits in the future.

19.2 Proposed management option and rationale

Table B2 provides details of the chosen management approach and further explanation is provided below.

Table B2: Chosen management approach

Protected feature	Gear type	Option chosen	Approach to management
Burrowed mud	Demersal mobile gear	Reduce / limit pressure	Zonal exclusion of demersal towed gears from two parts of the site amounting to 38% of the MPA.

The management proposal ensures that a proportion of the burrowed mud habitat is protected to further the conservation objectives. The part of the MPA where known records of *Funiculina quadrangularis* are found is fully protected from demersal mobile gears.

20 Measures envisaged for control, enforcement, and compliance

This section describes the measures that are proposed for implementation.

20.1 Vessel Monitoring System

The frequency of data transmissions should remain at least once every 120 minutes.

20.2 Key provisions to include in EC Regulation

Table B3 provides details of the gear types to be prohibited by the measures and Tables B4 and B5 provide co-ordinates of the areas to which the measures should be applied. All of the co-ordinates are provided in WGS84 datum and the last co-ordinate joins back to the first in the table. All co-ordinates are joined by geodesic lines. The measures are shown on the map in figure B3.

Table B3: Demersal fishing gears to be prohibited

Gear types to be prohibited by the proposed measures	Habitat	Gear code Annex XI in EU Regulation No. 404/2011	International standard Classification of Fishing Gears (ISSCFG)
Beam trawl	Burrowed mud	TBB	TBB
Bottom trawl		OTB, OTT, PTB, TBN, TBS, TB	OTB, OTT, OT, PTB, TB
Seines		SDN, SSC, SX, SV	SB, SV, SDN, SSC, SPR, SX
Dredge		DRB , HMD	DRB, DRH

Table B4: Co-ordinates of prohibited area 1 (dredge, beam trawl, bottom trawl, and seines)

Point	Latitude	Longitude
A	59° 11.844' N	000° 20.006' W
B	59° 16.068' N	000° 14.526' W
C	59° 15.309' N	000° 12.478' W
D	59° 11.561' N	000° 06.053' W
E	59° 07.850' N	000° 11.380' W

Table B5: Co-ordinates of prohibited area 2 (dredge, beam trawl, bottom trawl, and seines)

Point	Latitude	Longitude
F	58° 59.248' N	000° 08.373' W
G	58° 58.226' N	000° 04.475' E
H	58° 55.440' N	000° 05.816' E
I	58° 51.311' N	000° 06.539' E
J	58° 49.143' N	000° 00.170' W
K	58° 49.819' N	000° 09.843' W

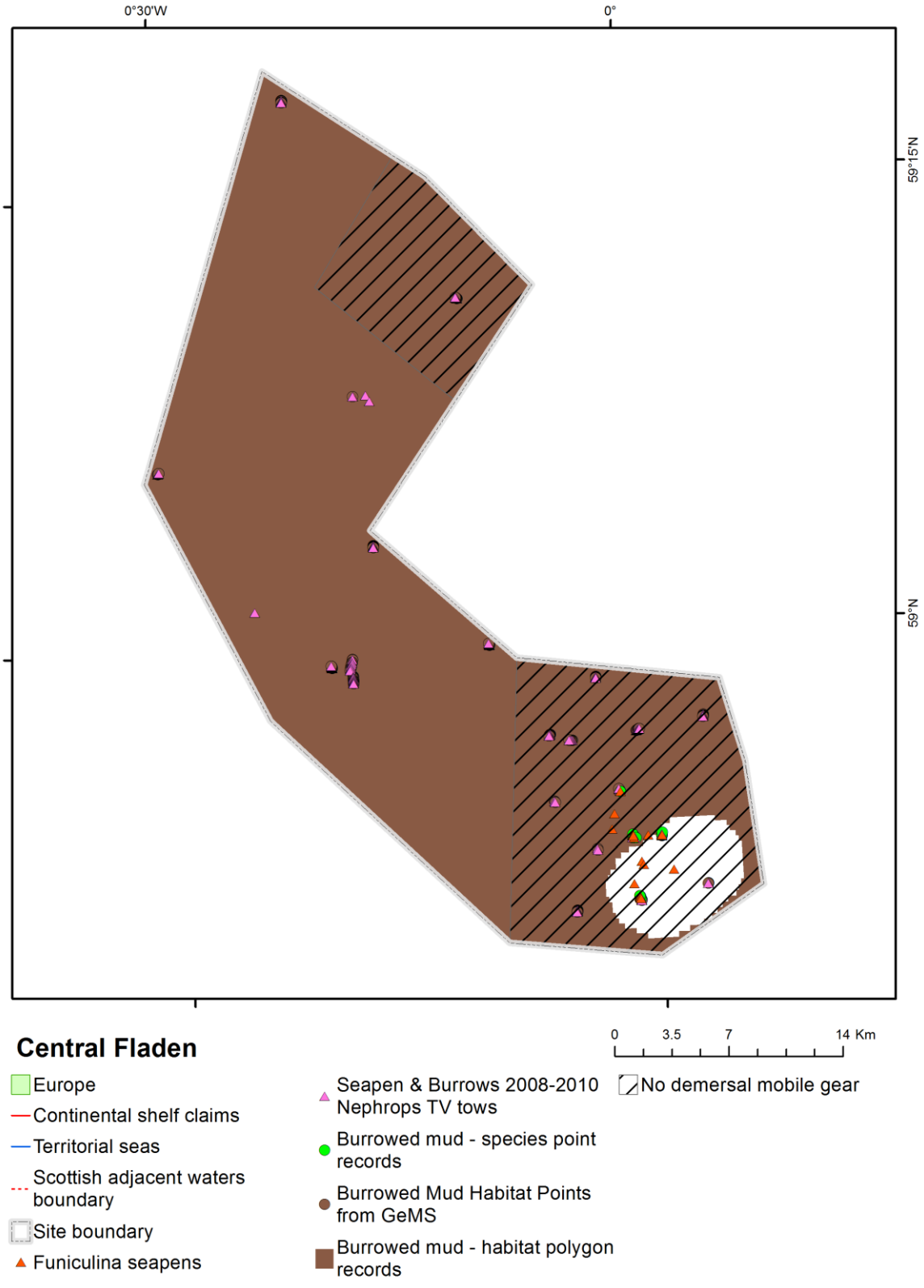

Figure B3: Central Fladen MPA site map detailing proposed measures

21 Fleet activity at Central Fladen MPA

In this section the potential effect of the measures on fishing effort and value is estimated. These estimates are based on data from 2009 to 2013 using the methodology described in section 9.

21.1 Fishing effort

The management measures for this site apply to all demersal mobile gears. Therefore table B6 below amalgamates all of this effort to produce a yearly average.

Table B6: Average yearly effort per ICES rectangle relevant to Central Fladen MPA using demersal mobile gear

Nation	Rectangle	Avg annual hours effort ICES rectangle	Of which avg annual hours effort site	Of which avg annual hours affected by management
DNK	46E9	171	58	24
DNK	46F0	1162	18	18
DNK	47E9	299	147	35
UK	46E9	8086	814	282
UK	46F0	11702	213	213
UK	47E9	7658	2141	306

There is also a modest amount of gill net activity within the MPA but this amounts to only 44 hours per year on average. This method is not affected by the proposed management measures.

21.2 Fishing value

Based upon the economic data provided by member states the value of the site, and the value of the management area can be derived. This is done by taking the proportion of the average for the relevant ICES rectangle based upon the amount of effort expended for each gear type in question. Table B7 show the average values derived for the reference period. This is depicted in Figures B4 to B6 through a kernel density estimation of Vessel Monitoring System data.

Table B7: Estimated economic value of mobile gear fisheries at Central Fladen MPA (average of 2009 – 2013)

Nation	gear	Avg annual value in relevant ICES rectangles (Euro)	Avg annual value in MPA (Euro)	Of which avg value affected by management (Euro)
DNK	Bottom trawl	3,349,001	457,615	158,010
UK	Bottom trawl	11,291,093	1,524,648	351,224
UK	Seines	521,205	29,658	25,542

22 Assessment of potential displacement effects

The amount of displacement is estimated at 3% of the ICES rectangle activity (878 hours out of 29,078). The measures only affect approximately 1% of the Fladen ground. Therefore it is concluded that the effort displaced can be absorbed by other fishing grounds in the relevant ICES rectangles, or on the wider Fladen ground.

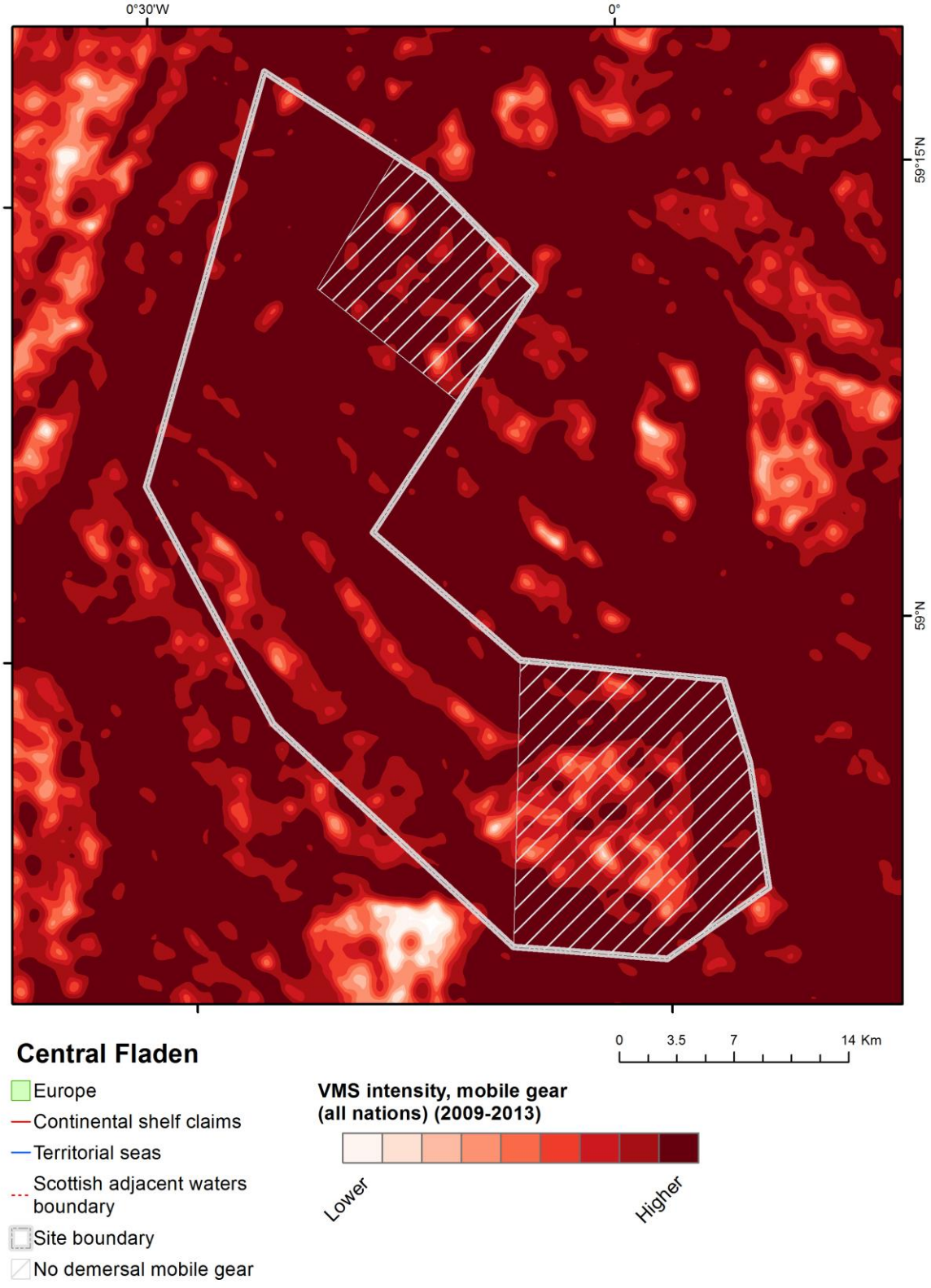

Figure B4: Central Fladen MPA map of proposed measures with mobile fishing VMS intensity layer for all vessels 2009-13

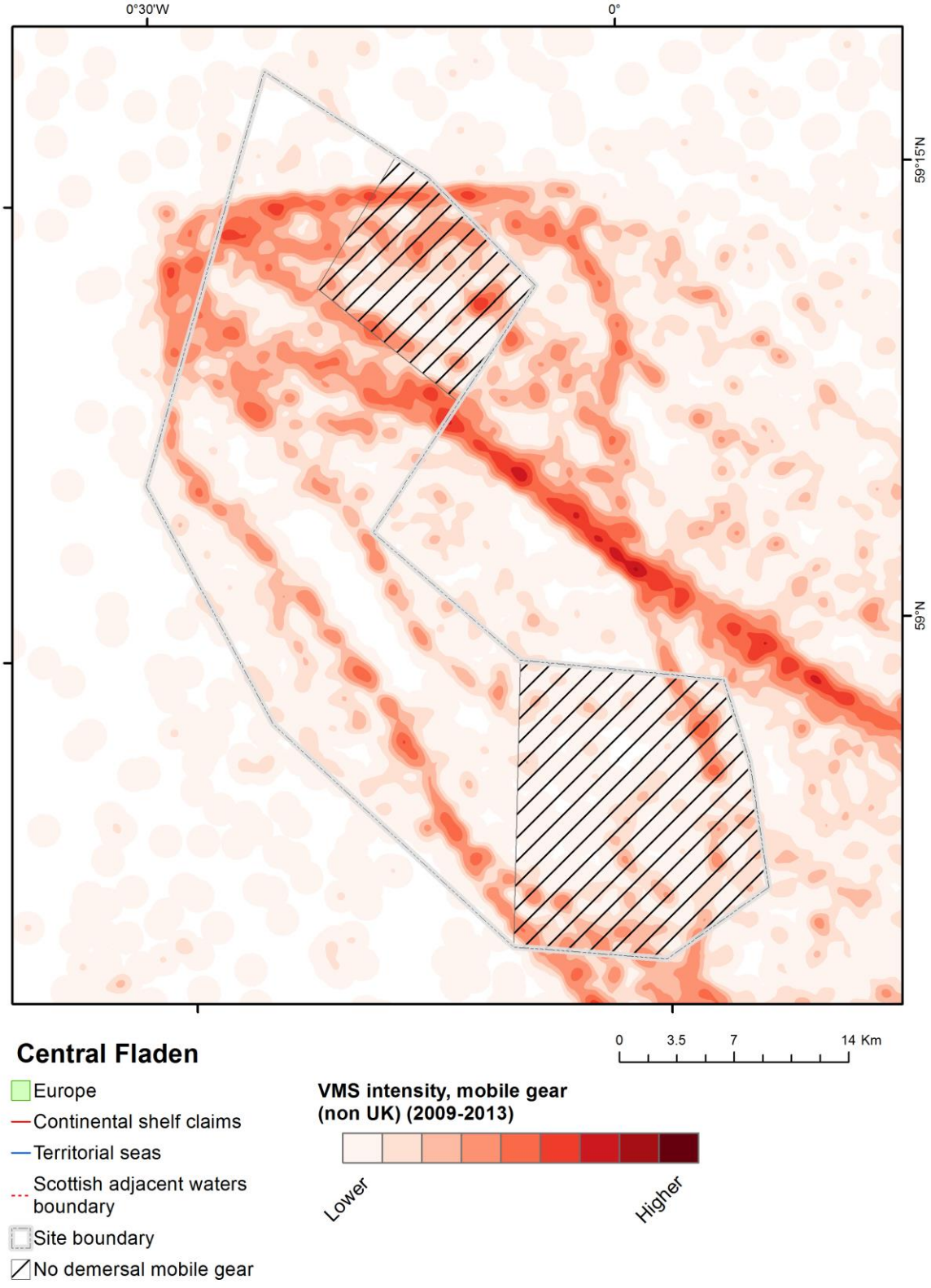

Figure B5: Central Fladen MPA map of proposed measures with mobile fishing VMS intensity layer for non-UK European Union vessels 2009-13

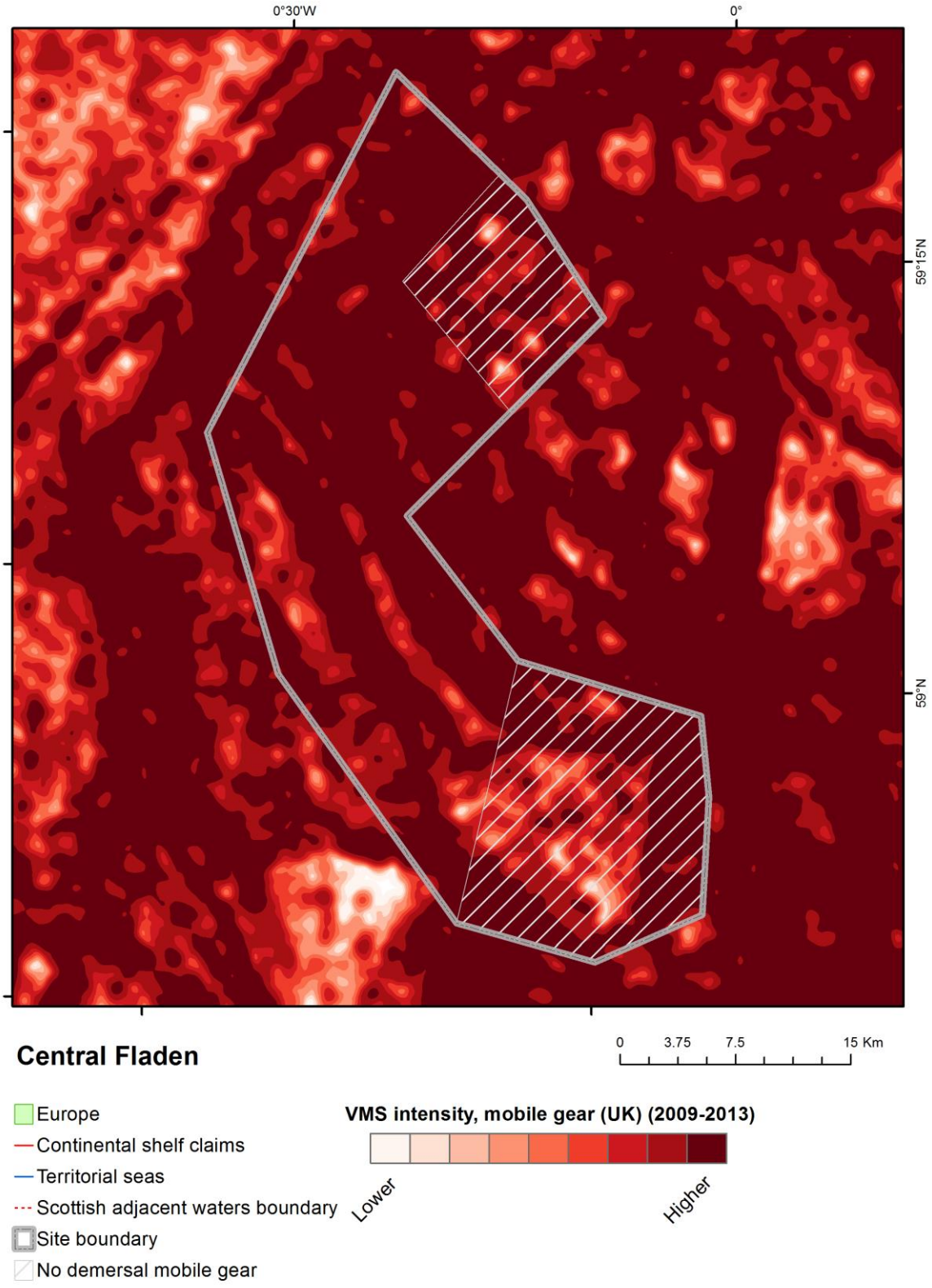

Figure B6: Central Fladen MPA map of proposed measures with mobile fishing VMS intensity layer for UK vessels 2009-13

Section C

23 East of Gannet and Montrose Fields Marine Protected Area (MPA)

23.1 Site description

The East of Gannet and Montrose Fields MPA as shown in figures 2 and C1 lies within a relatively shallow sediment plane comprised mainly of sand and gravel habitats that support a range of benthic species including ocean quahog (*Arctica islandica*). Examples of the protected features shown in Figure C2.

The majority of the seabed within the MPA is dominated by sands and gravels, which are the preferred habitat of the ocean quahog (Witbaard & Bergman, 2003; Sabatini & Pizzolla, 2008). These animals can live for more than 400 years and are one of the longest living creatures on Earth (Ridgway & Richardson, 2011).

The MPA also protects a coherent example of deep sea mud in this area. This is one of the few examples of Atlantic-influenced offshore deep sea mud habitats on the continental shelf in this region. Many types of worm and mollusc live buried in the mud and provide an important food resource for passing fish.

23.2 Why the site was designated

The protected features were identified as a priority for marine conservation in Scotland's seas and considered appropriate for a spatial management approach. Further detail on the processes followed to identify priority marine features in Scottish offshore waters is publically available (JNCC, 2012b). The MPA makes a contribution to the OSPAR network for the protection of Ocean quahog, considered to be Threatened and/or Declining in OSPAR Region II (Greater North Sea).

More information regarding the site selection process for the East of Gannet and Montrose Fields MPA is available in the Detailed assessment against the Scottish MPA Selection Guidelines document.

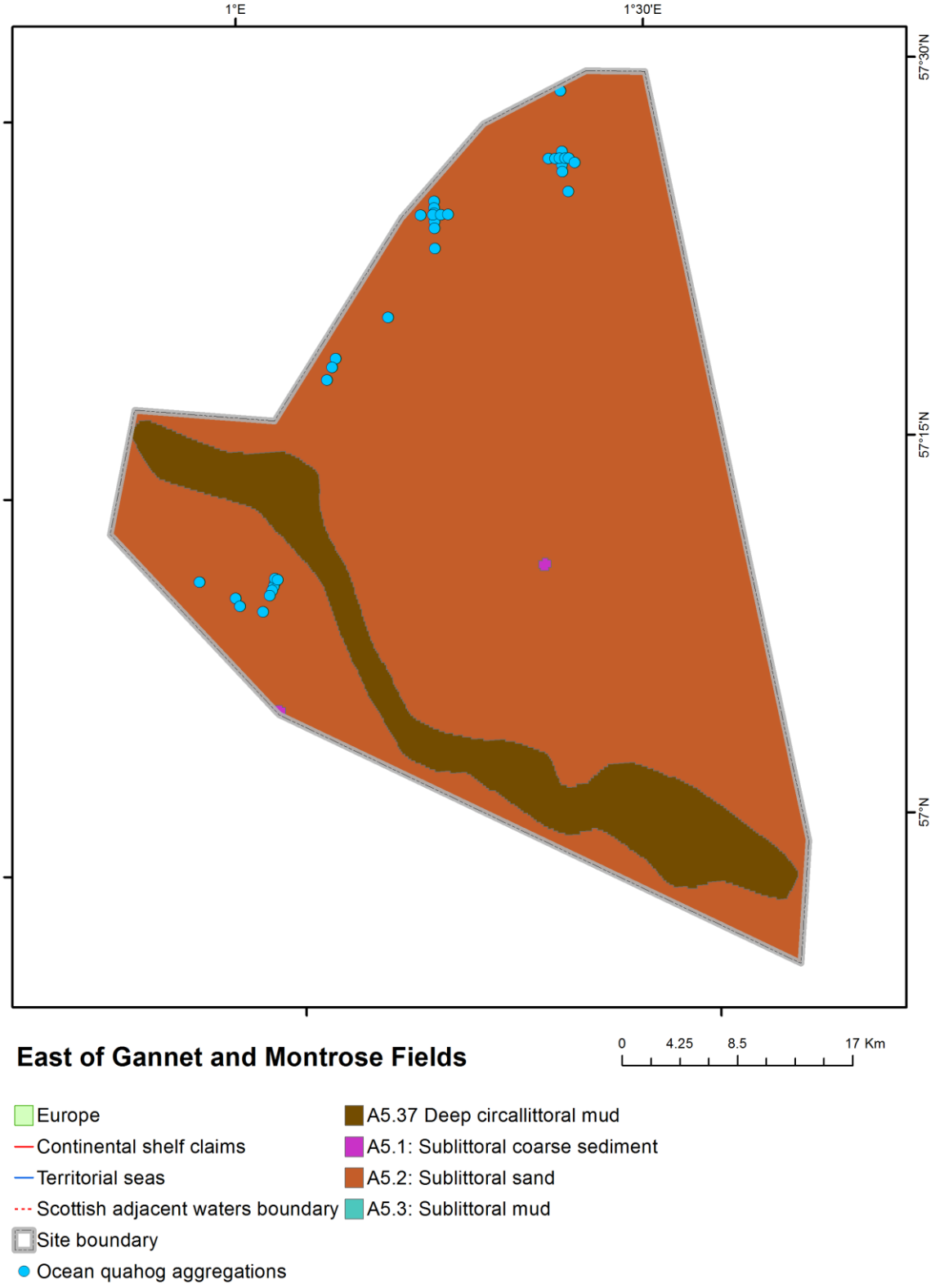

Figure C1: East of Gannet and Montrose Fields MPA including distribution of protected features within the site.

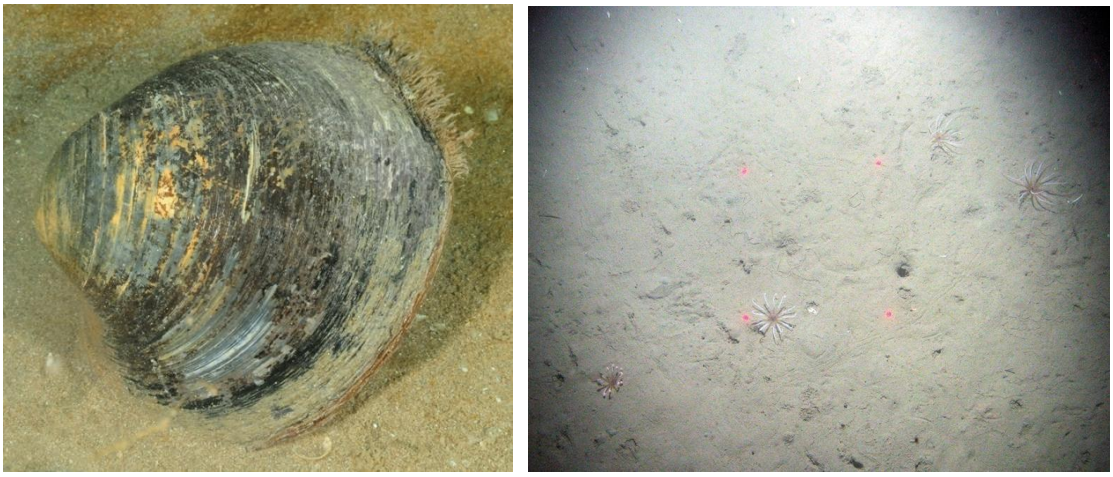

Figure C2 – Example images of the protected features, representative of those within the East of Gannet and Montrose Fields MPA. On the left, Ocean quahog (*Artica islandica*) (©Crown Copyright 2014, image provided by DOENI) and on the right, Northern feather stars (*Leptometra celtica*) on soft sediment (© JNCC and Cefas)

23.3 The site boundary

The boundary of the East of Gannet and Montrose Fields has been set in accordance with the boundary principles outlined in the MPA selection Guidelines[13].

The MPA boundary has been drawn to focus on survey records of ocean quahog and to include areas of sediments considered suitable for ocean quahog colonisation. Ocean quahog are typically found below the surface of medium- to fine-grained sand, sandy mud and silty-sand (Sabatini & Pizzolla, 2008), in water depths from 4 to over 400 m (Witbaard & Bergman, 2003).

The boundary also ensures that the entirety of the deep sea mud habitat is included. In this area it occurs in a 2-7km wide band from the south east to the north west of the MPA, at a depth of approximately 100m.

[13] http://www.gov.scot/Topics/marine/marine-environment/mpanetwork/mpaguidelines

23.4 Conservation objectives

Subject to natural change, conserve offshore deep sea muds in favourable condition, such that:

- its extent is stable or increasing; and
- its structures and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it is in a condition which is healthy and not deteriorating.

Subject to natural change, conserve the ocean quahog aggregations in favourable condition, such that:

- quality and quantity of its habitat is maintained; and
- the composition of its population are such that they ensure that the population is maintained in numbers which enable it to thrive.

More information regarding the conservation objectives is available in the Designation Order.

24 Anthropogenic pressures

24.1 All demersal mobile gears (including dredge, beam trawl, bottom trawl, and seines)

Studies have shown that areas of mud habitats (which includes offshore deep sea mud) subject to mobile fishing activity may support a modified biological community with lower diversity, reduction or loss of long-lived filter-feeding species and increased abundance of opportunistic scavengers (Ball et al., 2000; Tuck et al., 2000). This effect was greatest in the more heavily fished offshore areas suggesting that impact is related to the intensity of fishing (Ball et al., 2000). Furthermore, modelling studies suggest that the greatest impact is produced by the first pass of a trawl (Hiddink et al., 2006).

Evidence suggests that ocean quahog can be caught or damaged by beam trawls (Witbaard and Klein 1994; Klein & Witbaard 1993), with an individual pass of the gear causing around 20% mortality (Bergman and van Santbrink 2000). Population density has been found to be inversely related to beam trawling effort (Craeymeersch et al, 2000). There is insufficient evidence to assess the mortality at a population level caused by otter trawling on ocean quahog. No evidence was found on the effects of shellfish dredging. However, the physical effects of scallop dredging on seabed sediments are similar to those of beam trawls (penetration to depths >5cm) and so the effects on ocean quahog are likely to be similar.

Hydraulic gears penetrate sediments more deeply than other gears and so could be expected to cause a greater mortality, particularly where ocean quahog is the target species (although there is no known direct exploitation of the species in this country).

24.2 All demersal static gear (including gillnets, trammel nets, long lines, pots and traps)

None of the protected features within the site are considered sensitive to static gear activity. Studies on the impacts of pots on seapens have shown limited adverse effect on seapens from a 'single' fishing operation (Eno *et al.,* 1996; Eno *et al.,* 2001; Kinnear *et al.,* 1996). However, the extent of damage and the impacts of repeated exposure to these types of fishing gear at high levels of fishing activity are less well understood (Eno *et al.,* 2001; Adey, 2007).

If static fishing activity is low, direct impact on habitat is likely to be minimal and seabed structure is likely to be maintained in a slightly modified state (Adey, 2007). *Nephrops* may be an important component of the benthic community so fisheries that greatly alter its abundance or size composition may be seen to have a negative impact.

24.3 Other human activities

A considerable number of oil and gas developments overlap with this MPA, including fields, pipelines, wells and associated infrastructure.

25 Proposed fisheries management measures

This section provides details of how the measures were determined.

25.1 Options considered for fisheries management

Table C1 provides a summary of the management advice set out against the various options that have been considered.

Table C1: Summary of fisheries management advice

Activity	Management options considered
Demersal mobile gears	**No additional management:** There is a risk of not achieving the conservation objectives for ocean quahog aggregations and offshore deep sea muds.
	Reduce/limit pressures: This option would reduce, but not entirely eliminate, the risk of not achieving the conservation objectives for offshore deep sea muds and ocean quahog aggregations. Appropriate management for ocean quahog could include restrictions on gears known to impact the species, such as scallop and hydraulic dredging. Appropriate management for offshore deep sea muds could include closure of a proportion of the area where the feature occurs to damaging gears. Restrictions could be permanent in some cases or temporary/adaptive in others. The location of areas to be covered by management restrictions would be decided in consultation with fishers.
	Remove/avoid pressures: This option would reduce the risk of not achieving the conservation objectives for offshore deep sea muds and ocean quahog aggregations to the lowest possible levels.
Demersal static gears	**No additional management:** It is unlikely that any additional management of static gear activities will be required, as the risk of not achieving the conservation objectives for offshore deep sea muds and ocean quahog aggregations associated with these activities is minimal. Static gear activity is not believed to take place within the MPA at the current time; however, if it were to start and monitoring showed evidence of detrimental effects, it may be necessary to apply limits in the future.

25.2 Proposed management option and rationale

Table C2 provides details of the chosen management approach and further explanation is provided below.

Table C2: Chosen management approach

Protected feature	Gear type	Option chosen	Approach to management
Offshore deep-sea muds	Demersal mobile gears	Reduce / limit pressure	Mechanised dredge and beam trawling restricted throughout site. Bottom trawling restricted on a zonal basis. No restriction on seines
Ocean quahog aggregations (including sands and gravels as their supporting habitat)			

A gradient of management is proposed for this MPA. The heaviest gears – beam trawl and dredge – are to be completely excluded. Bottom trawling has a zonal management proposal which allows access to the main fishing ground within the MPA. Seine net and static gear fisheries are unaffected.

26 Measures envisaged for control, enforcement and compliance

This section describes the measures that are proposed for implementation.

26.1 Vessel Monitoring System

The frequency of data transmissions shall remain at least once every 120 minutes.

26.2 Key provisions to include in EC Regulation

Table C3 provides details of the gear types to be prohibited by the measures and Table C4 and C5 provide co-ordinates of the area to which the measures should be applied, and the gear types to be affected. All of the co-ordinates are provided in WGS84 datum and the last co-ordinate joins back to the first in the table. All co-ordinates are joined by geodesic lines. The measures are shown on the map in figure C3.

Table C3: Demersal fishing gears to be prohibited

Gear types to be prohibited by the proposed measures	Habitat/ Species	Gear code Annex XI in EU Regulation No. 404/2011	International standard Classification of Fishing Gears (ISSCFG)
Beam trawl	Offshore deep-sea muds and ocean quahog aggregations	TBB	TBB
Bottom trawl		OTB, OTT, PTB, TBN, TBS, TB	OTB, OTT, OT, PTB, TB
Dredges		DRB , HMD	DRB, DRH

Table C4: Co-ordinates of prohibited area 1 (dredge, beam trawl, and bottom trawl)

Point	Latitude	Longitude
A	57° 13.362' N	000° 48.137' E
B	57° 18.232' N	000° 50.561' E
C	57° 17.433' N	001° 00.735' E
D	57° 25.143' N	001° 11.110' E
E	57° 28.640' N	001° 17.697' E
F	57° 30.452' N	001° 25.523' E
G	57° 30.239' N	001° 29.871' E
H	57° 20.344' N	001° 32.258' E
I	57° 14.415' N	001° 19.038' E
J	56° 59.973' N	001° 18.079' E
K	57° 05.742' N	000° 59.490' E

Table C5: Co-ordinates of prohibited area 2 (dredge and beam trawl)

Point	Latitude	Longitude
L	56° 59.973' N	001° 18.079' E
M	57° 14.415' N	001° 19.038' E
N	57° 20.344' N	001° 32.258' E
O	56° 59.207' N	001° 37.302' E
P	56° 54.341' N	001° 36.000' E

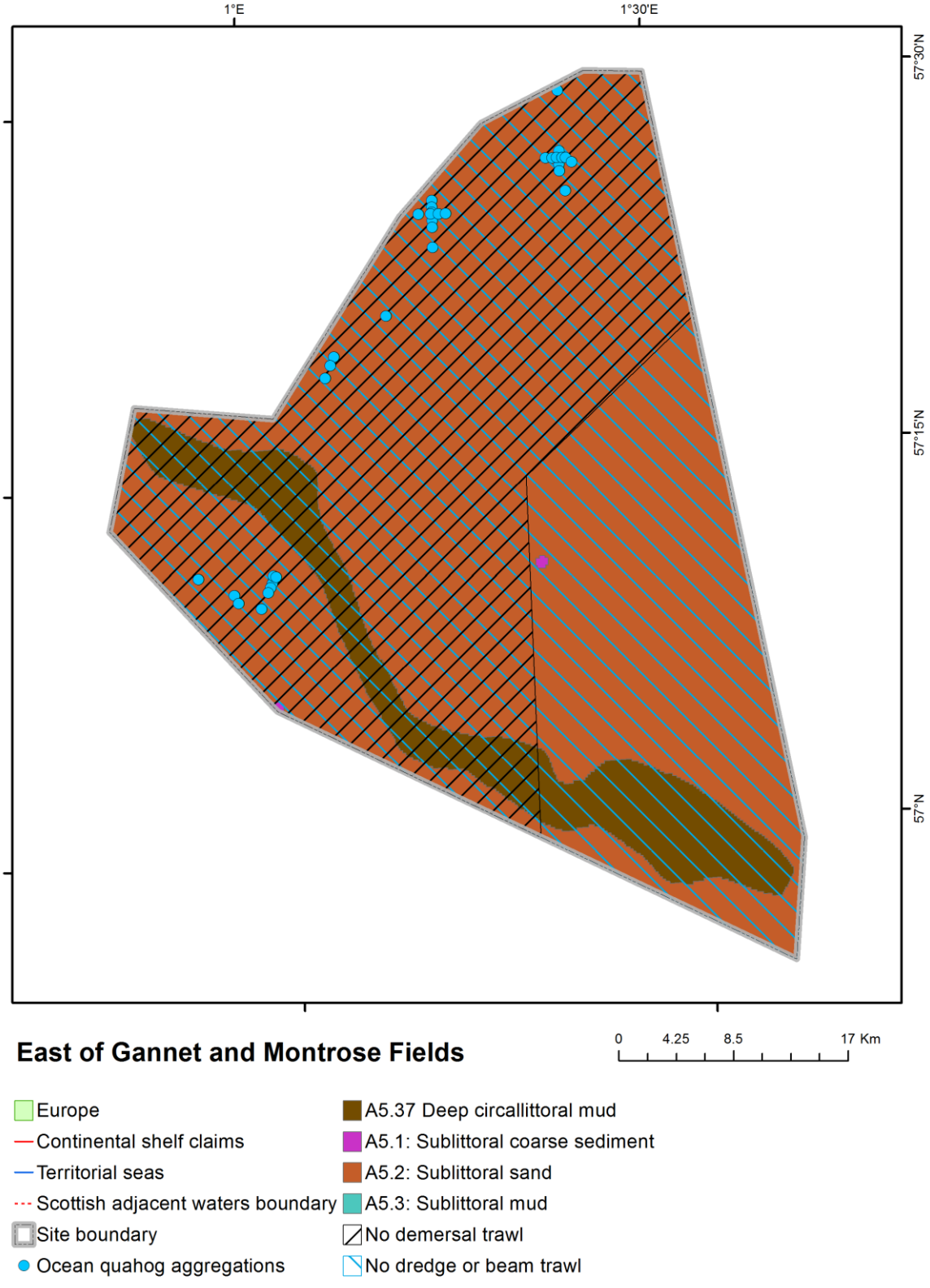

Figure C3: Map of East of Gannet and Montrose Fields MPA with proposed management measures

27 Fleet activity at East of Gannet and Montrose Fields MPA

In this section the potential effect of the measures on fishing effort and value is estimated. These estimates are based on data from 2009 to 2013 using the methodology described in section 9.

27.1 Fishing effort

The management measures for this site apply to all demersal mobile gears except seines. Table C6 below amalgamates all bottom trawl effort to produce a yearly average because this was the only method identified as occurring in the reference period. This is depicted in Figures C4 to C6 through a kernel density estimation of Vessel Monitoring System data.

Table C6: Average yearly effort (2009 – 2013) per ICES rectangle relevant to East of Gannet and Montrose Fields MPA using bottom trawl

Nation	Rectangle	Avg annual hours effort ICES rectangle	Of which avg annual hours effort site	Of which avg annual hours affected by management
DNK	42F1	17	1	0
DNK	43F1	13	11	1
UK	42F1	2306	285	0
UK	43F0	130	1	1
UK	43F1	530	205	5

27.2 Fishing value

Based upon the economic data provided by member states the value of the site, and the value of the management area can be derived. This is done by taking the proportion of the average for the relevant ICES rectangle based upon the amount of effort expended for each gear type in question. Table C7 show the average values derived for the reference period. This is depicted in Figures C4 to C6 through a kernel density estimation of Vessel Monitoring System data.

Table C7: Estimated economic value of mobile gear fisheries at East of Gannet and Montrose Fields MPA (average of 2009 – 2013)

Nation	Gear	Avg annual value in relevant ICES rectangles (Euro)	Avg annual value in MPA (Euro)	Of which avg value affected by management (Euro)
DNK[14]	bottom trawl	243,997	97,599	8,133
UK	bottom trawl	1,642,823	231,630	6,122

28 Assessment of potential displacement effects

The amount of effort estimated to be displaced is 7 hours per year on average. This is unlikely to cause any displacement effects.

[14] Value of fisheries is very high in comparison to the estimated VMS effort

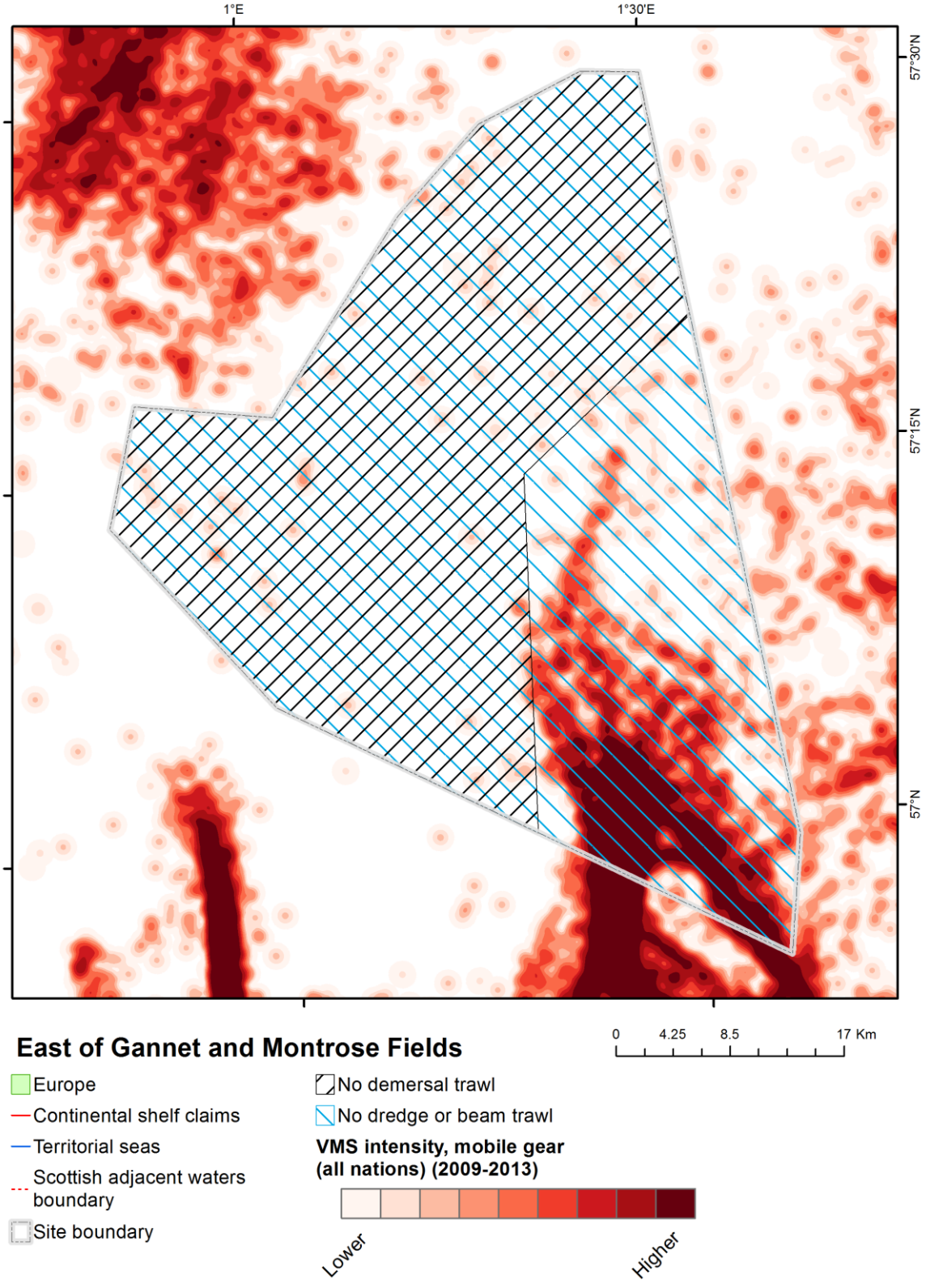

Figure C4: East of Gannet and Montrose Fields MPA map of proposed measures with mobile fishing VMS intensity layer for all vessels 2009-13

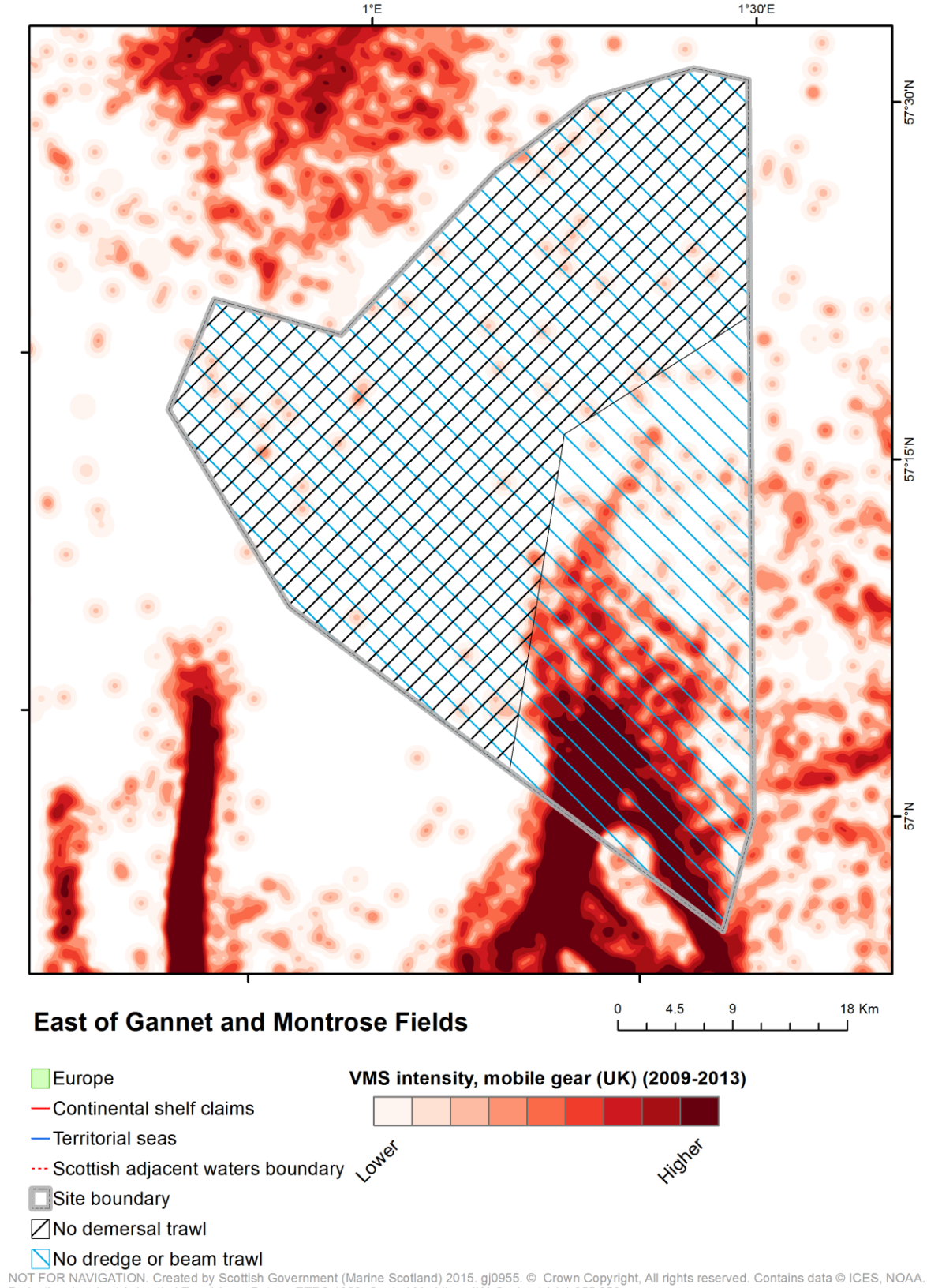

Figure C5: East of Gannet and Montrose Fields MPA map of proposed measures with mobile fishing VMS intensity layer for UK vessels 2009-13

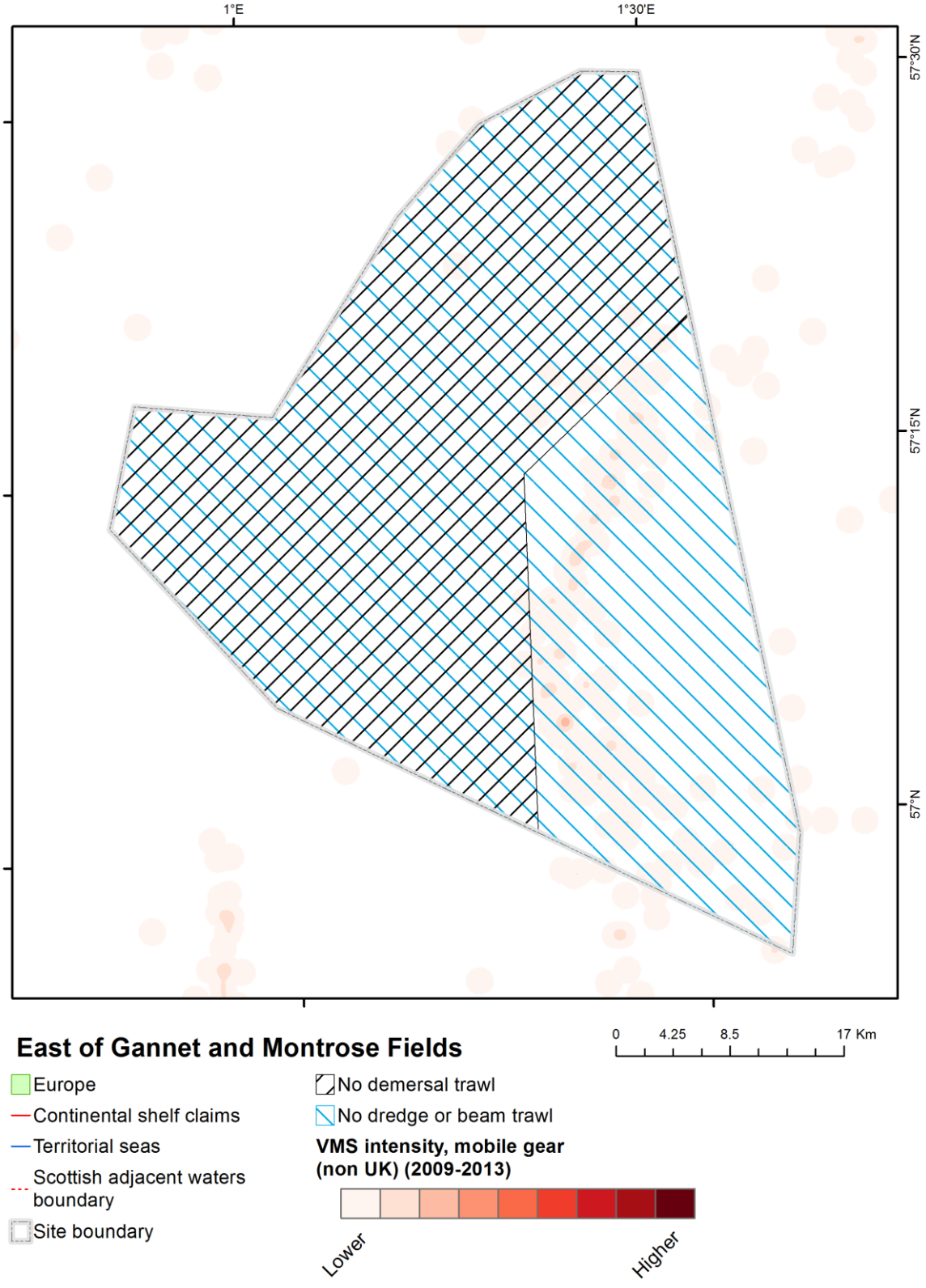

Figure C6: East of Gannet and Montrose Fields MPA map of proposed measures with mobile fishing VMS intensity layer for non-UK European Union vessels 2009-13

Section D

29 Faroe-Shetland Sponge Belt Marine Protected Area (MPA)

29.1 Site description

The Faroe-Shetland Sponge Belt MPA lies to the west of the Shetland Islands as shown in Figures 2 and D1). The site is located in the Faroe-Shetland Channel, a large rift basin that separates the Scottish and Faroese continental shelves. The MPA ranges in depth from 400m – 800m.

Five different water masses meet in the Faroe-Shetland Channel, including water with sub-zero temperatures from the Arctic and relatively warmer waters from the North east Atlantic. These water masses have different temperatures and densities and so layers are created in the water column. The layers interact with the sloping sides of the channel to produce an area of mixing between 350 and 650 m depth, referred to as the intermediate water masses (Sherwin, 1991).

Biodiversity in the MPA is thought to be linked to the intermediate water masses and the peak in benthic diversity and abundance occurs within the same depth range (Bett, 2000; Bett, 2001; Narayanaswamy et al., 2005; Narayanaswamy et al., 2010).

The higher current speeds created by these water masses, along with the presence of cobbles and boulders associated with iceberg ploughmarks, generate ideal conditions for the settlement of sponges (Bett, 2001; Axelsson, 2003). Deep-sea sponge aggregations (Figure D1 a-b) have been recorded in the channel between 400 and 600 m depth (Howell et al., 2007; Henry & Roberts, 2014; Morris et al., 2014).

The type of deep-sea sponge aggregation which occurs within the Faroe-Shetland Sponge Belt MPA is boreal 'ostur' (Howell et al., 2007; Henry & Roberts, 2014). Boreal 'ostur' sponge aggregations typically have a high abundance of species of giant sponge (Demospongia).

There are two distinct sedimentary communities (Figure D2 c-d) within the site representative of offshore subtidal sands and gravels; one is found between 300 and 600 m which are characterised by a greater proportion of cobbles and boulders; and a second below 600 m, which are characterised by finer sands and muddy sands. The two communities are dominated by contrasting families of polychaete worm (Bett, 2012). The sedimentary habitats in the MPA also support ocean quahog (*Arctica islandica*).

29.2 Why the site was designated

The protected features were identified as a priority for marine conservation in Scotland's seas and considered appropriate for a spatial management approach. Further detail on the processes followed to identify priority marine features in Scottish offshore waters is publically available (JNCC, 2012b).

The MPA makes a contribution to the OSPAR network for protection of ocean quahog (an OSPAR Threatened and/or Declining species) in OSPAR region II at the northern extent of its range. It also represents Atlantic and Arctic influenced slope offshore subtidal sands and gravel habitats.

The offshore sand and gravels occur over the entire MPA area of 5,278 km2. The deep sea sponge aggregation habitat occurs between the 400 m and 600 m contours. Large areas of sediment suitable for ocean quahog colonisation exist within the MPA although the exact extent and distribution of quahog aggregations is uncertain.

Deep sea sponges are also listed as an OSPAR Threatened and/or Declining species and are also considered to be a Vulnerable Marine Ecosystem. The records of deep sea sponge aggregations in the MPA conform to the boreal 'ostur' variation of the habitat and have high biological diversity (Howell et al., 2007; Henry & Roberts, 2014). Iceberg ploughmarks present within the site may facilitate the formation of deep sea sponge aggregations by providing a greater number of settlement points relative to the surrounding substrate (Axelsson, 2003).

More information regarding the site selection process for the Faroe-Shetland Sponge Belt MPA is available in the detailed assessment against the Scottish MPA Selection Guidelines document.

29.3 The site boundary

The boundary has been set in accordance with the boundary setting principles outlined in the MPA Selection Guidelines[15].

The offshore sand and gravels occur over the entire MPA area of 5,278 km2. The deep sea sponge aggregation habitat occurs between the 400 m and 600 m contours. Large areas of sediment suitable for ocean quahog colonisation exist within the MPA although the exact extent and distribution of quahog aggregations is uncertain.

The 400-800m depth band was used for the boundary which largely reflects the range of hydrographic conditions within the Faroe-Shetland Channel. The MPA boundary encompasses all verified records of deep sea sponge aggregations in this part of the Faroe-Shetland channel and includes the 400-600 m depth range where the habitat is typically recorded in the wider channel (Axelsson, 2003; Howell et al., 2007).

All records of ocean quahog within this part of the Faroe-Shetland Channel are included within the site boundary, along with viable examples of offshore subtidal sand and gravel habitats that are considered appropriate to support ocean quahog aggregations (Sabatini & Pizzolla, 2008). The boundary also captures the variation in benthic biological diversity in offshore subtidal sand and gravel habitats with depth highlighted by Bett (2012).

Confidence in the presence and extent of the protected features has been set out in the Faroe-Shetland Sponge Belt MPA Data Confidence Assessment.

[15] http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/mpaguidelines

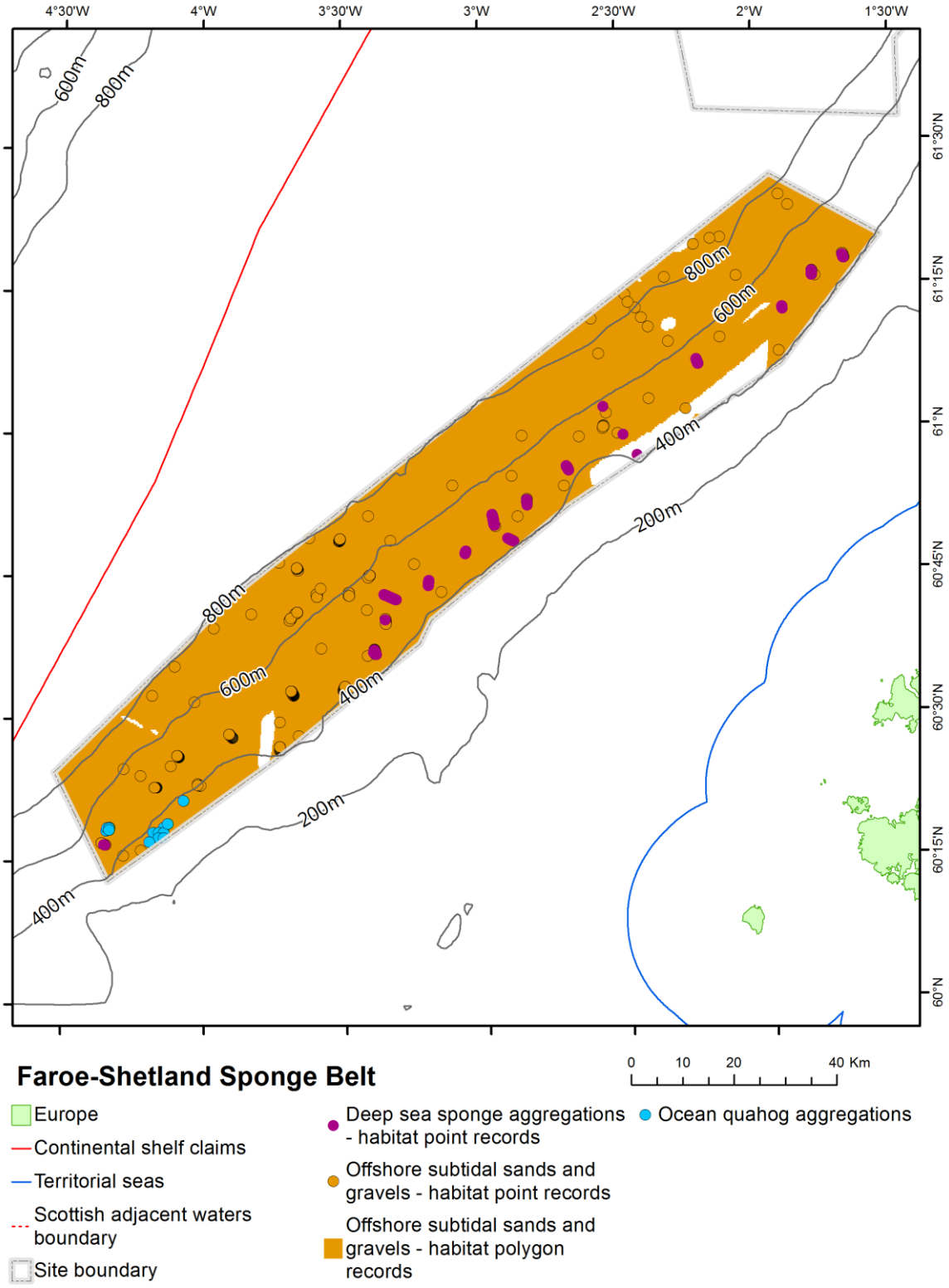

Figure D1: Faeroe-Shetland Sponge Belt MPA map of site with records of protected features

Figure D2 – Feature images from Faroe Shetland Sponge Belt MPA (© JNCC, 2012) Deep sea sponges (a-b). Fish and pencil urchins (c) and burrowing anemone (d) on offshore subtidal sands and gravels

29.4 Conservation objectives

Subject to natural change, conserve the deep-sea sponge aggregations and offshore subtidal sands and gravels features in favourable condition, such that:

- their extent is stable or increasing; and
- their structures and functions, quality, and the composition of their characteristic biological communities are such as to ensure that they are in a condition which is healthy and not deteriorating.

Subject to natural change, conserve the ocean quahog aggregations in favourable condition, such that:

- the quality and extent of associated habitat is stable or increasing; and

- the composition of its population is such that it is maintained in numbers of individuals which enable it to thrive

More information regarding the conservation objectives is available in the Designation Order.

30 Anthropogenic pressures

30.1 All demersal mobile gear (including dredge, beam trawl, bottom trawl, and seines)

Evidence suggests that ocean quahog can be caught or damaged by beam trawls (Klein & Witbaard, 1993; Witbaard & Klein, 1994), with an individual pass of the gear causing around 20% mortality (Bergman & van Santbrink, 2000). This has been suggested as the cause of an observed decline in abundance over the last century in the south-eastern North Sea (Rumohr et al., 1998). A study in Dutch waters showed that quahog population density was inversely related to beam trawling effort (Craymeersch et al., 2000)

There is some evidence that otter trawl doors may impact ocean quahogs by bringing them to the surface (Rumohr & Krost, 1991) however there is insufficient evidence to assess the mortality caused by this gear at a population level. The northern North Sea is primarily fished by otter trawls and the evidence for ocean quahog decline is very limited compared to southern areas.

No evidence was found on the effects of shellfish dredging. However, the physical effects of scallop dredging on seabed sediments are similar to those of beam trawls (penetration to depths >5cm) and so the effects on ocean quahog are likely to be similar. Hydraulic gears penetrate sediments more deeply than other gears and so could be expected to cause a greater mortality, particularly where ocean quahog is the target species (although there is no known direct exploitation of the species in the UK).

Studies on deep-sea sponge aggregations have found that trawling damages, displaces and removes sponges through direct physical impact, as well as from disturbed sediment resettling and causing smothering beyond the path of the trawl itself (ICES, 2007; ICES 2010; OSPAR, 2010). Deep-sea sponges have some capacity for recovery from mild damage, but significant disturbance, damage or smothering may result in sponges being unlikely to survive (ICES, 2007; ICES 2010).

In general, the impact of mobile bottom contact gear on sand and gravel sediments is relatively well understood.

In high energy locations (i.e. of wave and/or tide exposed) the associated fauna tend to be well adapted to disturbance and as a result are more tolerant of fishing-related disturbance (Dernie et al., 2003; Hiddink et al., 2006).

In lower energy locations, such as muddy sands and sand in deep water, sediments tend to be more stable and their associated fauna less tolerant of disturbance (Hiddink et al., 2006; Kaiser et al., 2006). Stable gravels often support a 'turf' of fragile species which are easily damaged by trawling and recover slowly (Collie et al., 2005; Foden et al., 2010). Trawling and dredging tends to cause increased mortality of fragile and long lived species and favour opportunistic, disturbance-tolerant species (Eleftheriou & Robertson, 1992; Bergman & van Santbrink, 2000). Some particularly sensitive species may disappear entirely (Bergman & van Santbrink, 2000). The net result is benthic communities modified to varying degrees relative to the un-impacted state (Bergman & van Santbrink, 2000; Kaiser et al., 2006).

30.2 All demersal static gear (including gillnets, trammel nets, long lines, pots and traps)

Static gears do not generally create the type of pressures to which ocean quahog aggregations are sensitive (sub-surface abrasion) and so they are unlikely to have any effect. Offshore subtidal sands and gravels are not considered sensitive to static gear activity.

The deep-sea sponge aggregation feature is considered to be sensitive to static gear activity, notably because sponges may become caught or entangled in static gears and damaged on the seabed or brought to the surface. Such by-catch by longliners of hexactinellid and demospongid sponges has been documented within the North-east Atlantic (Muñoz et al., 2011) and in the Antarctic (Bowden, 2010). While the extent of damage caused by individual static gear fishing events is likely to be lower than that for trawling, the effect of cumulative damage may be significant.

30.3 Other human activities

Two telecommunications cables pass through the site.

Oil and gas activity takes place across the MPA, with wells located in the central and southwest regions, and platforms and associated infrastructure located in the south-west. A small section of pipeline crosses over the south-east boundary of the MPA.

31 Proposed fisheries management measures

This section provides details of how the measures were determined.

31.1 Options considered for fisheries management

Table D1 provides a summary of the management advice set out against the various options that have been considered.

Table D1: Summary of fisheries management advice

Activity	Management options considered
Demersal mobile gears	**No additional management:** There is a risk of not achieving the conservation objectives for offshore subtidal sands and gravels and ocean quahog aggregations. The conservation objective would not be achieved for deep-sea sponge aggregations and JNCC recommend that this option should not be applied in areas where deep-sea sponge aggregations occur (depths between 400 and 600m).
	Reduce/limit pressures: This option would reduce, but not entirely eliminate, the risk of not achieving the conservation objectives for ocean quahog aggregations and offshore subtidal sands and gravels. Appropriate management for ocean quahog could include restrictions on those gears considered to impact the

Activity	Management options considered
	species, such as scallop and hydraulic dredging. Appropriate management for offshore subtidal sands and gravels could include a zoned approach where management measures are introduced to protect specific depth corridors representative of the range of sedimentary communities on the continental slope. There may be a greater requirement for restrictions on gears that penetrate deeply into the sediment. Restrictions could be permanent in some cases or temporary/adaptive in others. The location of areas to be covered by management restrictions would be decided in consultation with fishers. The conservation objective would not be achieved for deep-sea sponge aggregations and JNCC recommend that this option should not be applied in areas where deep-sea sponge aggregations occur.
	Remove/avoid pressures: This option would reduce the risk of not achieving the conservation objectives for ocean quahog aggregations and offshore subtidal sands and gravels to the lowest possible levels. This is the only option that would allow the conservation objective to be achieved for deep-sea sponge aggregations and JNCC recommend this option is applied to those areas where deep-sea sponge aggregations occur.
Demersal static gear	**No additional management**: This option for bottom contacting static gear is considered to be sufficient to achieve the conservation objectives for ocean quahog aggregations and offshore subtidal sands and gravels. The conservation objective would not be achieved for deep-sea sponge aggregations and JNCC recommend that this option should not be applied in areas where deep-sea sponge aggregations occur.
	Remove/avoid pressure: This is the only option that would achieve the conservation objective for deep-sea sponge aggregations and JNCC recommend that this option is applied in those areas where deep-sea sponge aggregations occur.

31.2 Proposed management option and rationale

Table D2 provides details of the chosen management approach and further explanation is provided below.

Table D2: Chosen management approach

Protected feature	Gear type	Option chosen	Approach to management
Deep-sea sponge aggregations	Demersal mobile and static gears	Remove / avoid pressure	Use of demersal gears to be prohibited in the part of the site where known records of Deep-sea sponge aggregations are found.
Offshore subtidal sands and gravels	Demersal mobile gears	Reduce / limit pressure	A proportion of this feature will be protected due to measures imposed for deep-sea sponge and ocean quahog features. To represent all components of the sands and gravels feature within the site, an additional restriction area is also proposed in deeper water.
Ocean quahog aggregations		Remove / avoid pressure	Available Ocean Quahog records overlap with those for deep-sea sponges within the site and as such protection is provided by the measures proposed.

Deep-sea sponge aggregations are considered to be a Vulnerable Marine Ecosystem[16]. They are sensitive to impact from all demersal fishing types. Therefore there is no alternative to excluding all of these fishing methods from that part of the MPA. This approach also protects the ocean quahog aggregations.

To ensure representation of communities associated with offshore subtidal sand and gravel in deeper waters within the site, the advice is to reduce or limit pressure. As there is no significant activity in this area currently, the preference is to prevent pressure being exerted in the future. Crucially, from a fisheries perspective, this approach enables demersal trawl gear to still be used in a relatively small but productive part of the MPA while also reducing the risk to the protected features.

[16] http://www.fao.org/in-action/vulnerable-marine-ecosystems/background/en/

32 Measures envisaged for control, enforcement and compliance

This section describes the measures that are proposed for implementation.

32.1 Vessel Monitoring System

The frequency of data transmissions shall be of at least once every 60 minutes when a vessel is within the MPA, whether in a prohibited or permitted area.

32.2 Key provisions to include in EC Regulation

Table D3 provides details of the gear types to be prohibited by the measures and Table D4 and D5 provide co-ordinates of the area to which the measures should be applied, and the gear types to be affected. All of the co-ordinates are provided in WGS84 datum and the last co-ordinate joins back to the first in the table. All co-ordinates are joined by geodesic lines. The measures are shown on the map in figure D3.

Table D3: Demersal fishing gears to be prohibited

Gear types to be prohibited by the proposed measures	Protected habitats / species	Gear code Annex XI in EU Regulation No. 404/2011	International standard Classification of Fishing Gears (ISSCFG)
Beam trawl	Deep-sea sponge aggregations, offshore subtidal sands and gravels and ocean quahog aggregations	TBB	TBB
Bottom trawl		OTB, OTT, PTB, TBN, TBS, TB	OTB, OTT, OT, PTB, TB
Seines		SDN, SSC, SX, SV	SB, SV, SDN, SSC, SPR, SX
Dredges		DRB , HMD	DRB, DRH
Gillnets and entangling nets	Deep-sea sponge aggregations	GN, GNC, GND, GNS, GTN, GTR	GEN, GN, GNC, GND, GNS, GTN, GTR
Hooks and lines		LHM, LHP, LL, LLD, LLS, LTL, LX	LHM, LHP, LLS, LLD, LL, LTL, LX
Pots and traps		FIX, FPO	FIX, FPO, FYK

Table D4: Co-ordinates of prohibited area 1 (all demersal fishing gears)

Point	Latitude	Longitude
A	60° 16.396' N	004° 23.690' W
B	60° 21.079' N	004° 18.360' W
C	60° 30.797' N	003° 51.611' W
D	60° 32.533' N	003° 41.545' W
E	60° 40.907' N	003° 23.031' W
F	60° 43.397' N	003° 22.587' W
G	61° 00.672' N	002° 34.128' W
H	61° 03.712' N	002° 40.200' W
I	61° 11.294' N	002° 17.185' W
J	61° 08.249' N	002° 10.653' W
K	61° 21.772' N	001° 39.371' W
L	61° 20.020' N	001° 33.175' W
M	61° 06.643' N	001° 55.292' W
N	60° 52.056' N	002° 41.964' W
O	60° 40.251' N	003° 11.470' W
P	60° 37.807' N	003° 13.955' W
Q	60° 25.881' N	003° 44.228' W
R	60° 12.909' N	004° 20.247' W

Table D5: Co-ordinates of prohibited area 2 (dredge, beam trawl, bottom trawl, and seine net)

Point	Latitude	Longitude
S	60° 24.426' N	004° 31.659' W
T	60° 43.173' N	003° 53.264' W
U	61° 02.025' N	003° 04.216' W
V	61° 26.677' N	001° 56.827' W
W	61° 23.977' N	001° 47.190' W
X	61° 15.916' N	002° 02.986' W
Y	61° 11.294' N	002° 17.185' W
Z	61° 03.712' N	002° 40.200' W
AA	60° 41.281' N	003° 46.257' W
AB	60° 21.654' N	004° 28.903' W

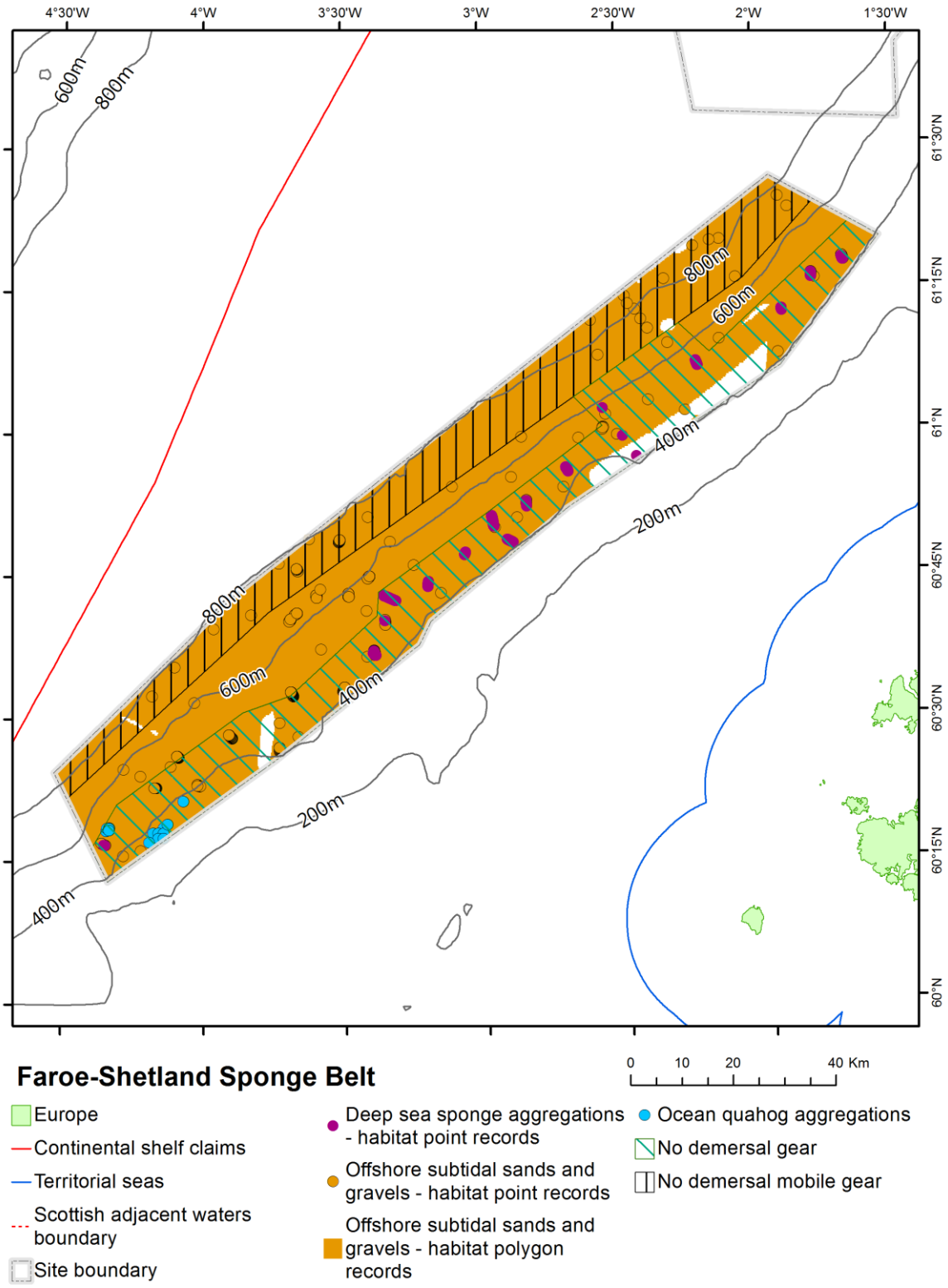

Figure D3: Faroe-Shetland Sponge Belt MPA map of proposed measures

33 Fleet activity at Faeroe-Shetland Sponge Belt MPA

In this section the potential effect of the measures on fishing effort and value is estimated. These estimates are based on data from 2009 to 2013 using the methodology described in section 9.

33.1 Fishing effort

The management measures for this site apply to all demersal mobile gears. Therefore table D6 to D8 below amalgamate bottom trawl, gill net, and long line effort respectively to produce a yearly average.

Table D6: Average yearly effort (2009 – 2013) per ICES rectangle relevant to Faeroe-Shetland Sponge Belt MPA using bottom trawl

Nation	Rectangle	Avg annual hours effort ICES rectangle	Of which avg annual hours effort site	Of which avg annual hours affected by management
FRA	49E5	334	13	0
FRA	49E6	492	3	2
FRA	50E6	135	12	9
FRA	50E7	671	2	2
FRA	51E8	354	0	0
UK	49E5	2835	160	9
UK	49E6	4280	8	5
UK	50E6	325	276	46
UK	50E7	2121	34	9
UK	51E7	26	26	25
UK	51E8	2016	5	4

Table D7: Average yearly effort (2009 – 2013) per ICES rectangle relevant to Faeroe-Shetland Sponge Belt MPA using gill net

Nation	Rectangle	Avg annual hours effort ICES rectangle	Of which avg annual hours effort site	Of which avg annual hours affected by management
DEU	49E6	74	1	1
DEU	50E6	63	0	0
DEU	51E8	232	10	10
FRA	49E5	89	0	0
UK	49E5	54	10	10
UK	49E6	1058	10	10
UK	50E6	158	17	17
UK	50E7	1558	29	29
UK	51E7	71	17	16
UK	51E8	1525	64	64

Table D8: Average yearly effort (2009 – 2013) per ICES rectangle relevant to Faeroe-Shetland Sponge Belt MPA using long lines

Nation	Rectangle	Avg annual hours effort ICES rectangle	Of which avg annual hours effort site	Of which avg annual hours affected by management
DEU	49E5	25	2	2
DEU	49E6	52	2	2
DEU	50E6	102	18	18
DEU	50E7	9	3	3
DEU	51E7	2	2	2
DEU	51E8	34	9	9
ESP	49E5	368	1	1
FRA	49E5	17	0	0
FRA	50E6	27	0	0
FRA	51E8	80	0	0
IRL	50E6	5	5	1
IRL	50E7	7	7	1
IRL	51E7	13	12	6
IRL	51E8	0	0	0
UK	49E5	863	3	3
UK	49E6	1743	2	2
UK	50E6	93	0	0
UK	50E7	251	1	1
UK	51E7	5	0	0
UK	51E8	718	4	3

33.2 Fishing value

Based upon the economic data provided by member states the value of the site, and the value of the management area can be derived. This is done by taking the proportion of the average for the relevant ICES rectangle based upon the amount of effort expended for each gear type in question. Table D9 show the average values derived for the reference period. This is depicted in Figures D4 to D6 through a kernel density estimation of Vessel Monitoring System (VMS) data for demersal mobile gears, and in Figures D7 to D9 for demersal static gears.

Table D9: Estimated economic value of demersal fisheries at Faeroe-Shetland Sponge Belt MPA (average of 2009 – 2013)

Nation	Gear	Avg annual value in relevant ICES rectangles (Euro)	Avg annual value in MPA (Euro)	Of which avg value affected by management (Euro)
FRA	bottom trawl	4,670,271	70,548	30,571
DEU	Gill net	154,304	12,230	12,230
FRA	Gill net	139,580	0	0
FRA	long lines	324,733	0	0
UK	bottom trawl	9,893,892	388,179	90,509
UK	Gill net	2,231,520	80,277	79,229
UK	Long lines	4,467,708	9,233	8,688

34 Assessment of potential displacement effects

The amount of displacement is estimated at less than 1% of the ICES rectangle bottom trawl activity (111 hours out of 13,589). For gill nets it is 3.2% of ICES rectangle activity (157 hours out of 4882). For long lines it is 1.2% of ICES rectangle activity (54 hours out of 4414). Therefore it is concluded that the effort displaced can be absorbed by other fishing grounds in the relevant ICES rectangles.

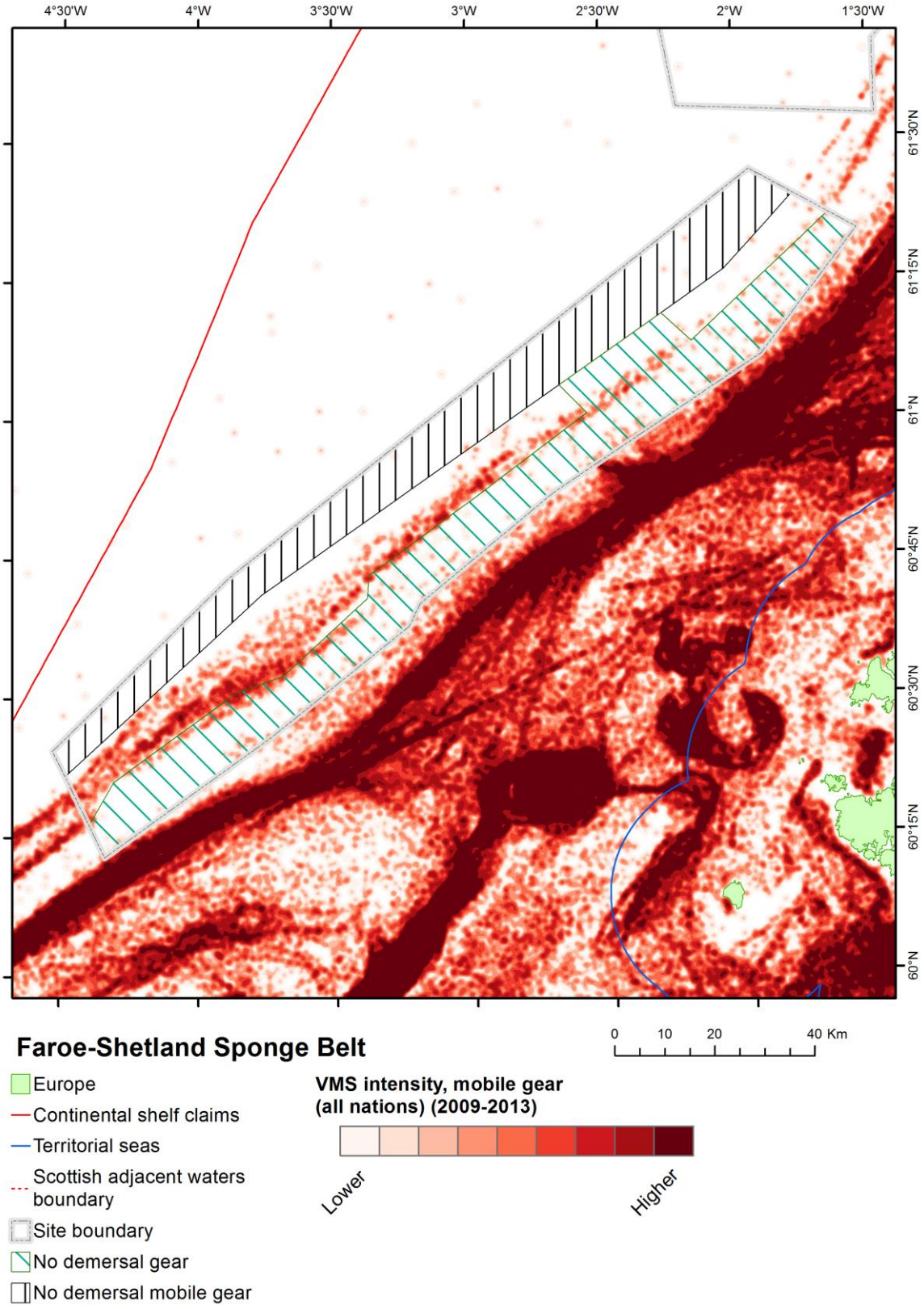

Figure D4: Faroe-Shetland Sponge Belt MPA map of proposed measures with mobile fishing VMS intensity layer for all vessels 2009-13

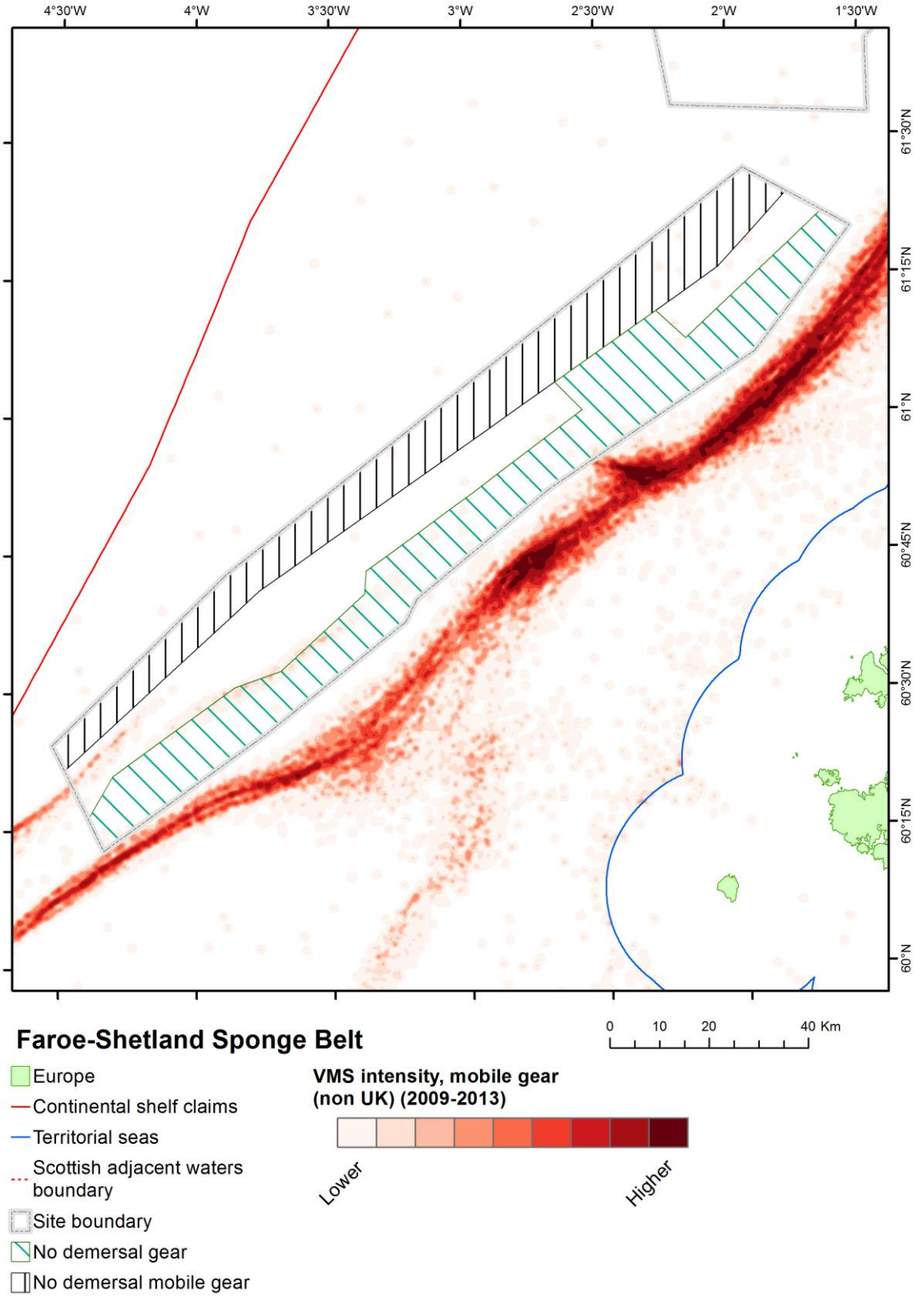

Figure D5: Faroe-Shetland Sponge Belt MPA map of proposed measures with mobile fishing VMS intensity layer for non UK European Union vessels 2009-13

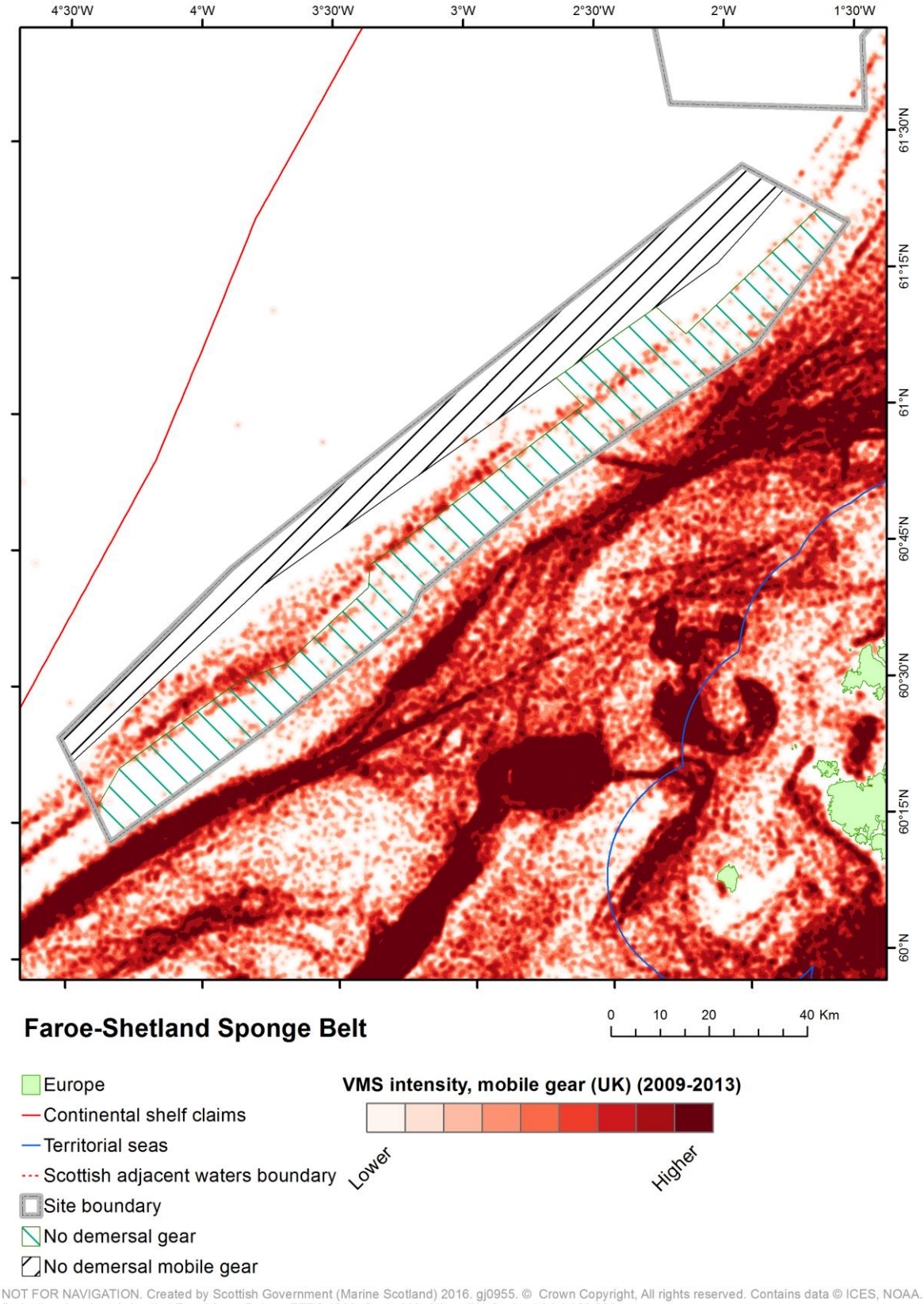

Figure D6: Faroe–Shetland Sponge Belt MPA map of proposed measures with mobile fishing VMS intensity layer for UK vessels 2009-13.

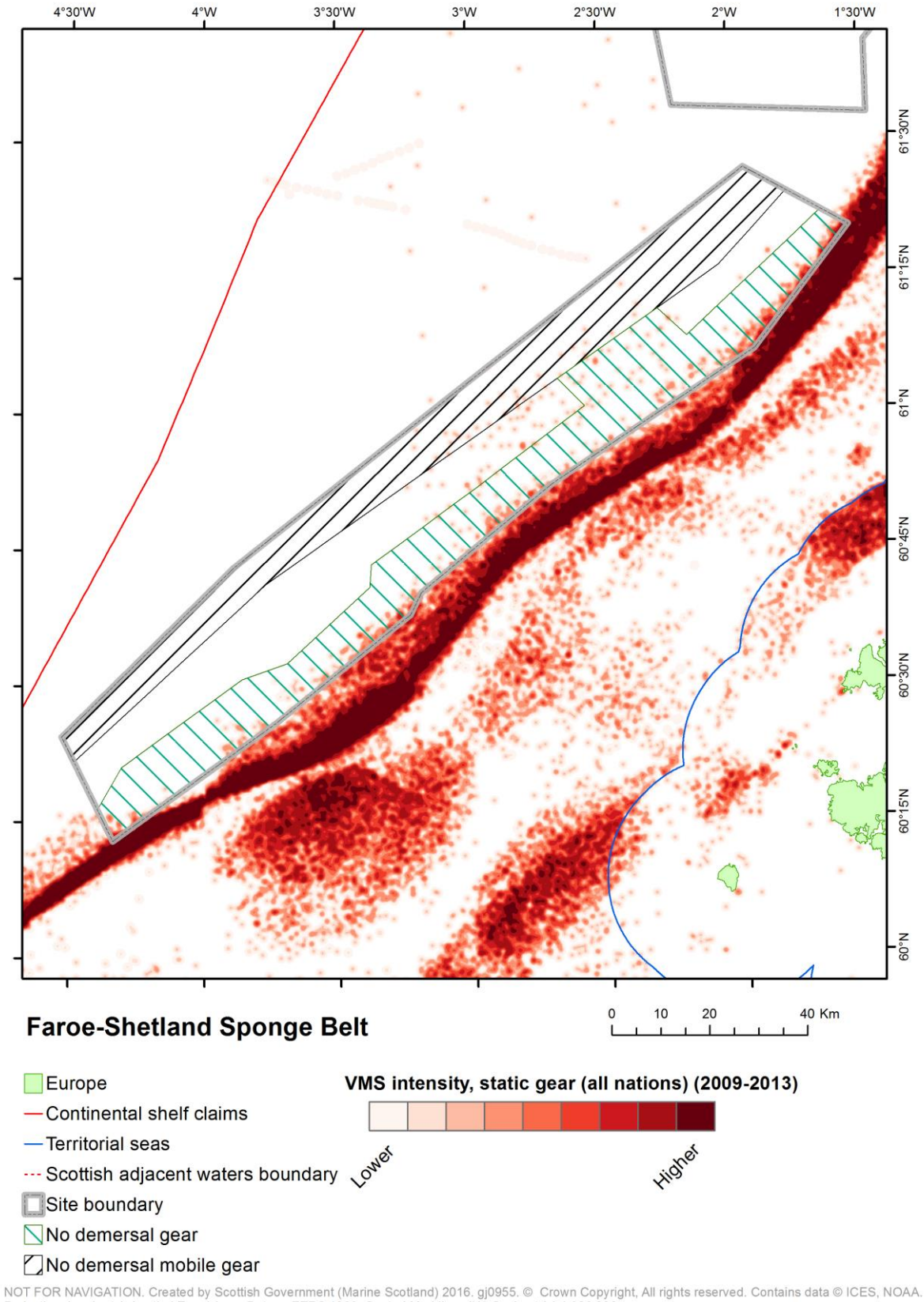

Figure D7: Faroe–Shetland Sponge Belt MPA map of proposed measures with static fishing VMS intensity layer for all vessels 2009-13.

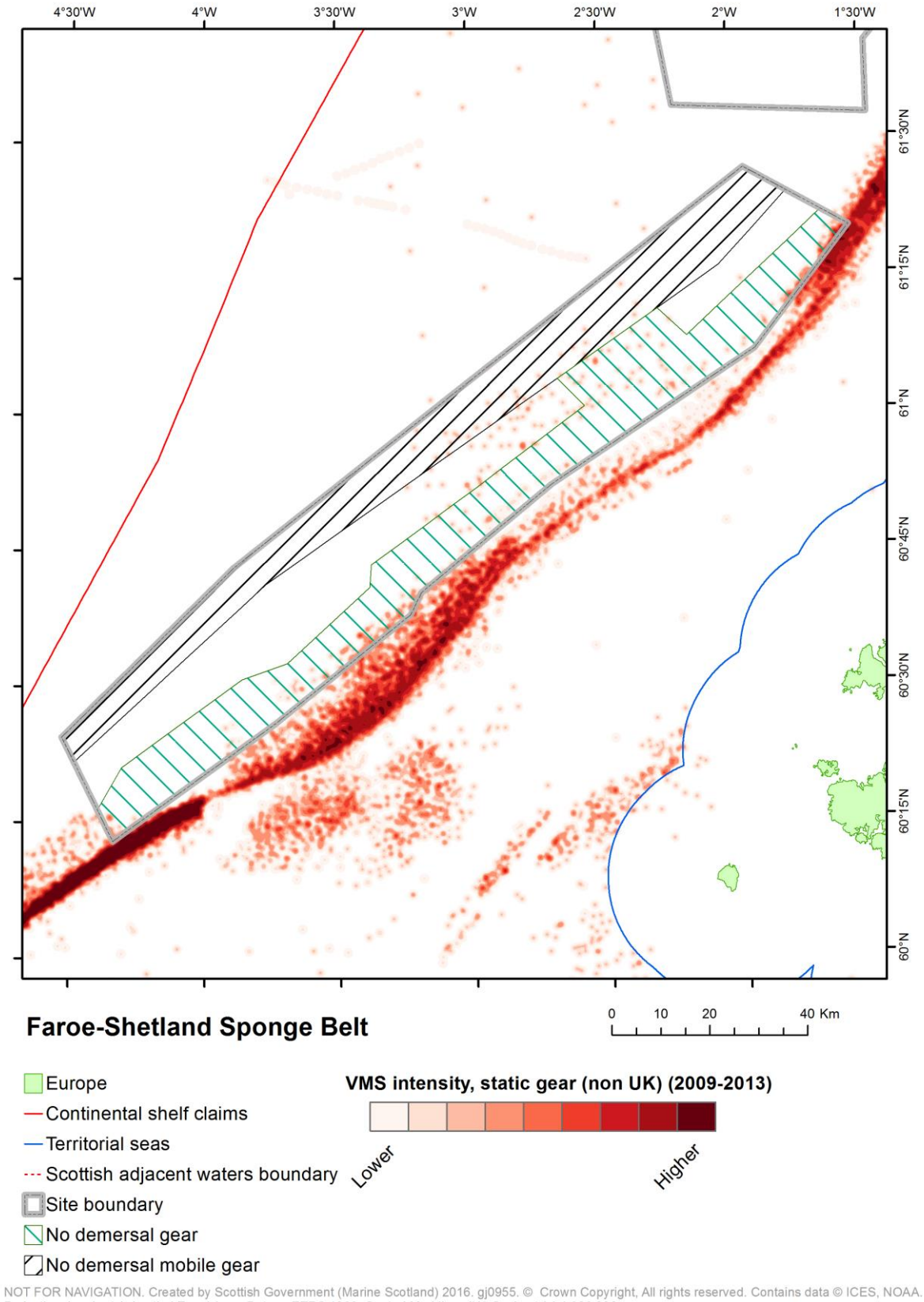

Figure D8: Faroe–Shetland Sponge Belt MPA map of proposed measures with static fishing VMS intensity layer for non UK European Union vessels 2009-13

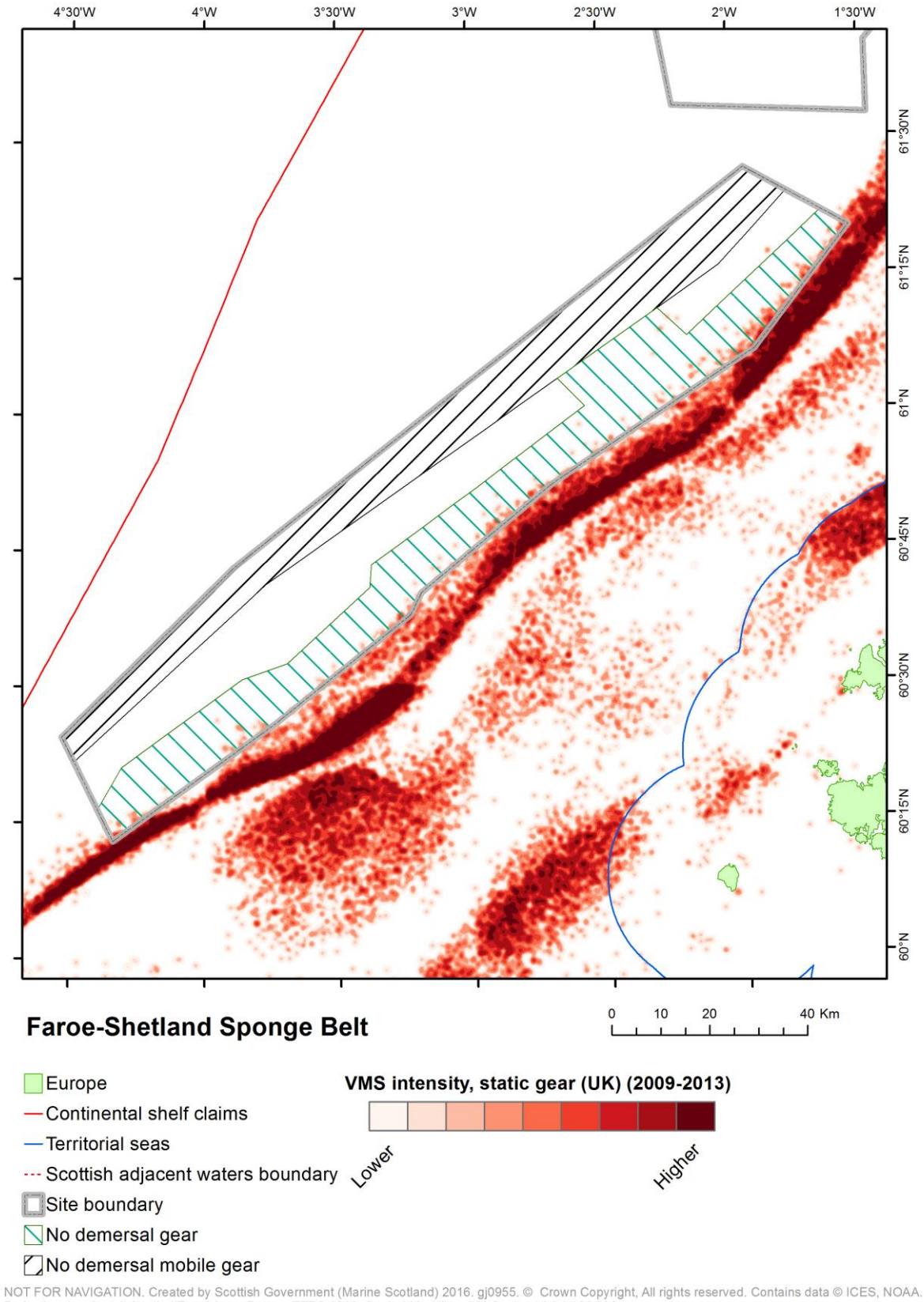

Figure D9: Faroe–Shetland Sponge Belt map of proposed measures with static fishing VMS intensity layer for UK vessels 2009-13

Section E

35 Firth of Forth Banks Complex Marine Protected Area (MPA)

35.1 Site description

The Firth of Forth Banks Complex MPA is located to the east of Scotland in the outer Firth of Forth, as shown in Figures 2 and E1). The MPA is a composite site made up of three components; the Berwick, Scalp and Montrose Banks and the Wee Bankie. The MPA covers an area of 2,130 km2 and is composed of a series of underwater banks and mounds which are overlaid with a mix of sands and gravels (Figure E2).

Strongly influenced by water currents, the conditions create a mosaic of different habitat types. This mosaic is driven by the interaction between the bank features and oceanic currents, resulting in varying sedimentary deposition rates and a patchwork of different sediment types. The predominant seabed habitats are sands and coarse sediments within the circalittoral and deep circalittoral biological zones across the MPA.

The eastern area has seabed habitats comprising of offshore deep circalittoral sands with areas of raised bathymetry and small banks of offshore deep circalittoral coarse sediment. As the seabed shallows toward the Wee Bankie area, the raised banks remain of a coarse sedimentary nature but change in their biological zone to become more reflective of shallower inshore sedimentary habitats. This pattern remains the case over the raised areas of this region, with the troughs and deeper channels holding circalittoral muddy sands and deep circalittoral sands (Sotheran & Crawford-Avis, 2014a & b).

The mosaic of sands and gravels support a variety of species, including the ocean quahog (*Arctica islandica*) which can be found living buried in the sandier sediments. Ocean quahog are typically found below the surface of medium- to fine-grained sand, sandy mud and silty-sand (Sabatini & Pizzolla, 2008) and in water depths of 4 to over 400m (Witbaard & Bergman, 2003). Survey data from the MPA confirm that ocean quahog are present within the depth range and sediment types in which they are expected to occur.

35.2 Why the site was designated

The protected features were identified as a priority for marine conservation in Scotland's seas and considered appropriate for a spatial management approach. Further detail on the processes followed to identify priority marine features in Scottish offshore waters is publically available (JNCC, 2012b).

Ocean quahog aggregations are considered to be Threatened and/or Declining in OSPAR region II (Greater North Sea). The Wee Bankie and Berwick Bank are also considered to have wider functional significance to the overall health and biodiversity of Scotland's seas; Wee Bankie for foraging seabirds (Daunt et al., 2008; Camphuysen et al., 2011) and grey seals (McConnell et al., 1999, Jones et al., 2013), and Berwick Bank for foraging grey seals (Prime and Hammond, 1990; McConnell et al., 1999; Jones et al., 2013) and as a spawning ground for plaice, the larvae of which may be important source of recruits for the wider region(Lockwood & Lucassen, 1984).

The MPA also represents a wide range of different types of offshore subtidal sand and gravel habitats on the continental shelf and is considered to be a relatively isolated system and localised hydrodynamics has a positive effect on productivity in the area (Scott et al., 2010).

More information regarding the site selection process for the Firth of Forth Banks Complex MPA is available in the Detailed assessment against the Scottish MPA Selection Guidelines document.

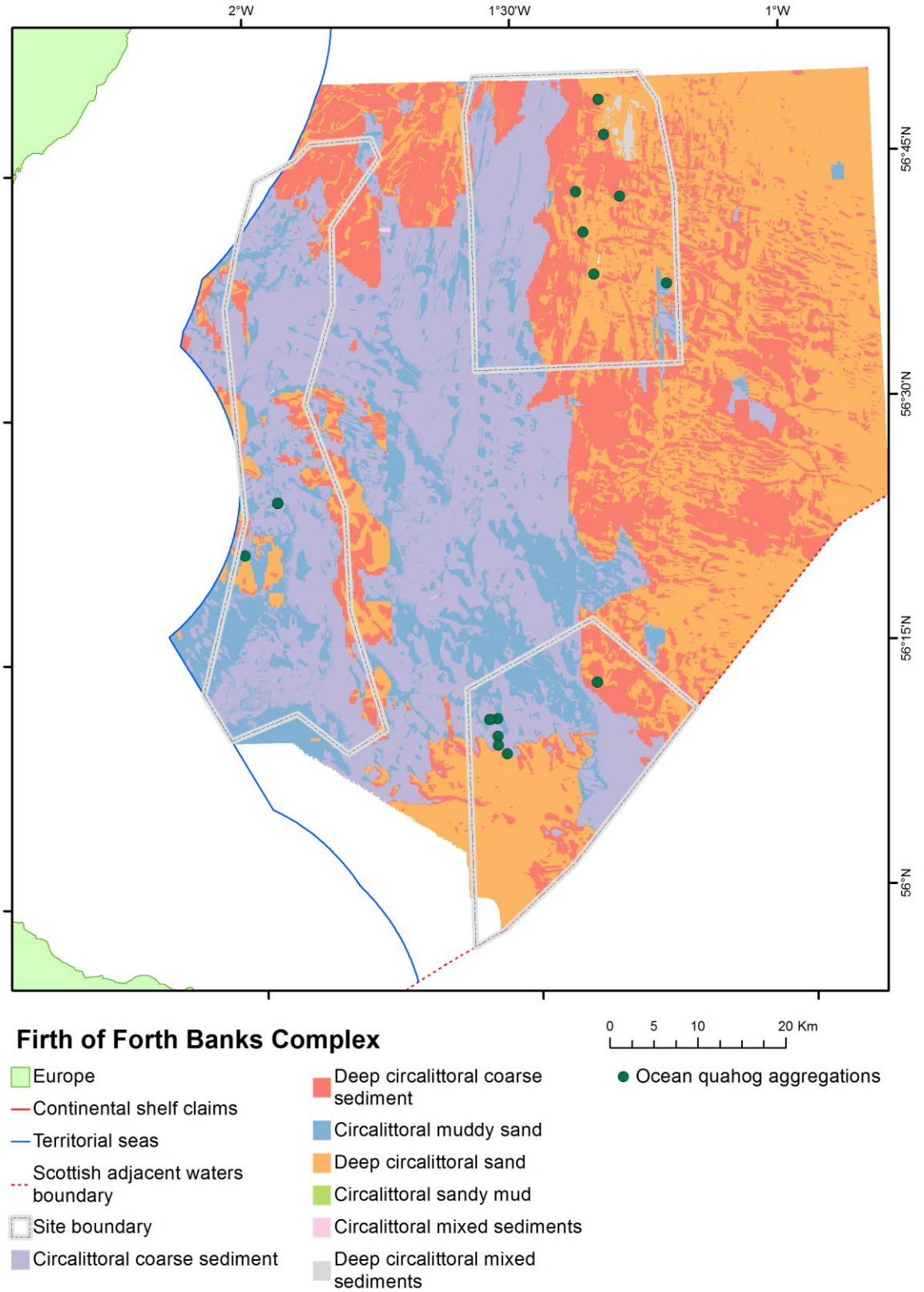

Figure E1: Firth of Forth Banks Complex MPA site map including distribution of protected features

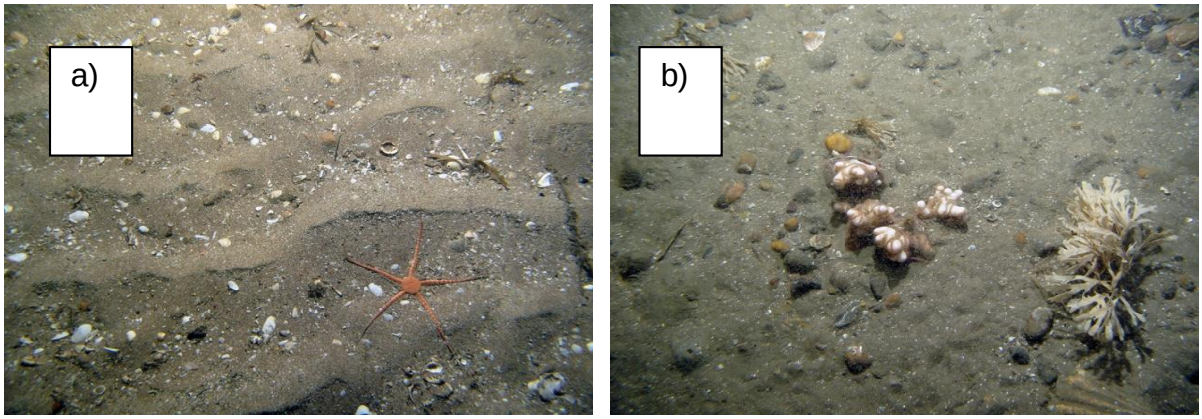

Figure E2. Example images of offshore subtidal sands and gravels feature from Firth of Forth Banks Complex MPA (© JNCC/Marine Scotland Science/Cefas/NLB). a) Brittle star (*Ophiuroidea*) on rippled sand; b) Dead man's fingers (*Alcyonium digitatum*), brittle stars (*Ophiophrix fragilis*) and horn wrack (*Flustra foliacea*) on gravel and pebbles

35.3 The site boundary

The boundary has been set in accordance with the boundary setting principles outlined in the MPA Selection Guidelines[17].

The MPA is a composite site composed of three components that have been drawn to reflect the distribution and extent of the features for which the MPA was designated. This has included survey records of ocean quahog, and includes areas of sediments considered suitable for ocean quahog colonisation (Sabatini & Pizzolla, 2008). The boundary also encompasses examples of as many different types of offshore sand and gravel habitats as possible that are considered representative of the wider Firth of Forth Banks area. This decision is supported by full coverage seabed habitat mapping (Sotheran & Crawford-Avis, 2014a & b), EUSeaMap and biotope assignment from photographic image and grab samples (Axelsson et al., 2014; Goudge & Morris, 2014; Pearce et al., 2014).

Confidence in the presence and extent of the protected features has been set out in the Firth of Forth Banks Complex MPA Data Confidence Assessment.

[17] http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/mpaguidelines

35.4 Conservation objectives

Subject to natural change, conserve the subtidal sands and gravels feature in favourable condition, such that:

- its extent is stable or increasing; and
- its structures and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it is in a condition which is healthy and not deteriorating.

Subject to natural change, conserve the ocean quahog feature in favourable condition, such that:

- quality and quantity of its habitat is maintained
- the composition of the population is maintained such that it is enabled to thrive.

More information regarding the conservation objectives is available in the Designation Order.

36 Anthropogenic pressures

36.1 All demersal mobile gear (including dredge, beam trawl, bottom trawl, and seines)

In general, the impact of towed gear on sand and gravel sediments is relatively well understood. Trawling and dredging tends to cause increased mortality of fragile and long lived species and favour opportunistic, disturbance-tolerant species, however, the tolerance to disturbance is linked to the energy levels of the area. In higher energy locations, fauna tend to be more adapted to disturbance and as a result tend to be more tolerant of fisheries related disturbance than lower energy locations (Dernie et al., 2003; Hiddink et al., 2006; Kaiser et al., 2006). Stable gravels often support a 'turf' of fragile species which are easily damaged by trawling and recover slowly (Collie et al., 2005; Foden et al., 2010).

Evidence suggests that ocean quahog can be caught or damaged by beam trawls (Klein & Witbaard 1993; Witbaard & Klein 1994), and population density has been found to be inversely related to beam trawling effort (Craymeersch et al., 2000). There is insufficient evidence to assess the mortality at a population level caused by otter trawling on ocean quahog. No evidence was found on the effects of shellfish dredging. However, the physical effects of scallop dredging on seabed sediments are similar to those of beam trawls (penetration to depths >5cm) and so the effects on ocean quahog are likely to be similar. Hydraulic gears penetrate sediments more deeply than other gears and so could be expected to cause a greater mortality, particularly where ocean quahog is the target species (although there is no known direct exploitation of the species in this country).

36.2 All demersal static gear (including gillnets, trammel nets, long lines, pots and traps)

The protected features within the site are not considered to be sensitive to static gear activity. The individual impact of a single fishing operation may be slight but cumulative damage may be significant (Eno et al., 2001; Foden et al., 2010). Sensitivity to low intensity potting is considered low (Hall et al., 2008).

36.3 Other human activities

Part of the MPA has been identified as being potentially suitable for offshore wind development. Any future proposal would be considered through the licensed activities requirements for assessment of the potential impacts on the MPA before being consented.

37 Proposed fisheries management measures

This section provides details of how the measures were determined.

37.1 Options considered for fisheries management

Table E1 provides a summary of the management advice set out against the various options that have been considered.

Table E1: Summary of fisheries management advice

Activity	Management options considered
Demersal mobile gear	**No additional management:** There is a risk of not achieving the conservation objectives for ocean quahog aggregations and offshore subtidal sands and gravels.
	Reduce/limit pressures: This option would reduce, but not entirely eliminate, the risk of not achieving the conservation objectives for ocean quahog aggregations and offshore subtidal sands and gravels. Appropriate management for ocean quahog could include restrictions on gears known to impact the species, such as scallop and hydraulic dredging. Appropriate management for offshore subtidal sands and gravels could include a zoned approach, where management measures that apply to damaging gears are introduced to protect a proportion of the feature representing the full diversity of sand and gravel habitats across the complex. There may be a greater requirement for restrictions on gears that penetrate deeply into the sediment. The location of areas to be covered by management restrictions would be decided in consultation with fishers. Restrictions could be permanent in some cases or temporary/adaptive in others.
	Remove/avoid pressures: This option would minimise the risk of not achieving the conservation objectives for ocean quahog aggregations and offshore subtidal sands and gravels to the lowest possible levels. This is likely to include restrictions on gears that could impact the features, such as otter trawling, scallop and hydraulic dredging.
Demersal static gear	**No additional management**: It is unlikely that any additional management of creeling and potting activities will be required, as the risk of not achieving the conservation objectives for ocean quahog aggregations and offshore subtidal sands and gravels associated with these activities is likely to be minimal. However, if static gear fishing intensity increased or monitoring showed evidence of detrimental effects, it may be necessary to apply limits in the future.

37.2 Proposed management option and rationale

Table A2 provides details of the chosen management approach and further explanation is provided below.

Table E2: Chosen management approach

Protected feature	Gear type	Option chosen	Approach to management
Ocean quahog aggregations	Demersal mobile gears	Remove / avoid pressure	Management of trawl and dredge fisheries to protect the entirety of the area in which the feature has been identified.
Offshore subtidal sands and gravels	Demersal mobile gears	Reduce/ limit pressure	Zonal management to ensure a proportion of each component biotope is protected from trawl and dredge fisheries

The management zones have been focused around the distribution of ocean quahog aggregations. In doing so a proportion of each offshore subtidal sand and gravel biotope has been included in the management zone. It was very clear from the stakeholder workshop that seine net operations would have little or no effect on the habitats and therefore no management is proposed for that gear type. The same is true for static gears.

37.3 Other fisheries measures which may apply to the MPA

Commercial sandeel fishing has been prohibited since 2000 (EC No 850/98 as amended by EU No 227/2013). If this restriction was not in place, and sandeel stocks were healthy, then there would probably be considerably more demersal mobile fishing pressure within the MPA. Therefore this existing measures is furthering the conservation objectives.

38 Measures envisaged for control, enforcement and compliance

38.1 Vessel Monitoring System

The frequency of data transmissions shall remain at least once every 120 minutes when within the MPA boundary.

38.2 Key provisions to include in EC Regulation

Table E3 provides details of the gear types to be prohibited by the measures and Tables E4, E5 and E6 provide co-ordinates of the areas to which the measures should be applied. All of the co-ordinates are provided in WGS84 datum and the last co-ordinate joins back to the first in the table. All co-ordinates are joined by geodesic lines. The measures are shown on the map in figure E3.

Table E3: Demersal fishing gears to be prohibited

Gear types to be prohibited by the proposed measures	Habitat / Species	Gear code Annex XI in EU Regulation No. 404/2011	International standard Classification of Fishing Gears (ISSCFG)
Beam trawl	Ocean quahog aggregations and offshore subtidal sands and gravels	TBB	TBB
Bottom trawl		OTB, OTT, PTB, TBN, TBS, TB	OTB, OTT, OT, PTB, TB
Dredges		DRB	DRB, DRH

Table E4: Co-ordinates of prohibited area 1 (dredge, beam trawl, and bottom trawl)

Point	Latitude	Longitude
A	56° 25.230' N	002° 01.297' W
B	56° 25.233' N	001° 50.661' W
C	56° 24.276' N	001° 50.054' W
D	56° 17.838' N	001° 49.805' W
E	56° 10.510' N	001° 46.254' W
F	56° 09.128' N	001° 50.512' W
G	56° 11.657' N	001° 55.965' W
H	56° 10.081' N	002° 03.258' W
I	56° 12.929' N	002° 06.162' W
J	56° 23.619' N	002° 01.090' W

Table E5: Co-ordinates of prohibited area 2 (dredge, beam trawl, and bottom trawl)

Point	Latitude	Longitude
K	56° 50.416' N	001° 24.298' W
L	56° 50.401' N	001° 15.849' W
M	56° 48.599' N	001° 13.768' W
N	56° 43.225' N	001° 12.266' W
O	56° 32.432' N	001° 12.330' W
P	56° 32.393' N	001° 28.064' W

Table E6: Co-ordinates of prohibited area 3 (dredge, beam trawl, and bottom trawl)

Point	Latitude	Longitude
Q	56° 12.854' N	001° 37.201' W
R	56° 16.934' N	001° 23.128' W
S	56° 11.260' N	001° 12.065' W
T	56° 01.898' N	001° 26.133' W
U	56° 06.315' N	001° 33.618' W
V	56° 05.490' N	001° 37.211' W

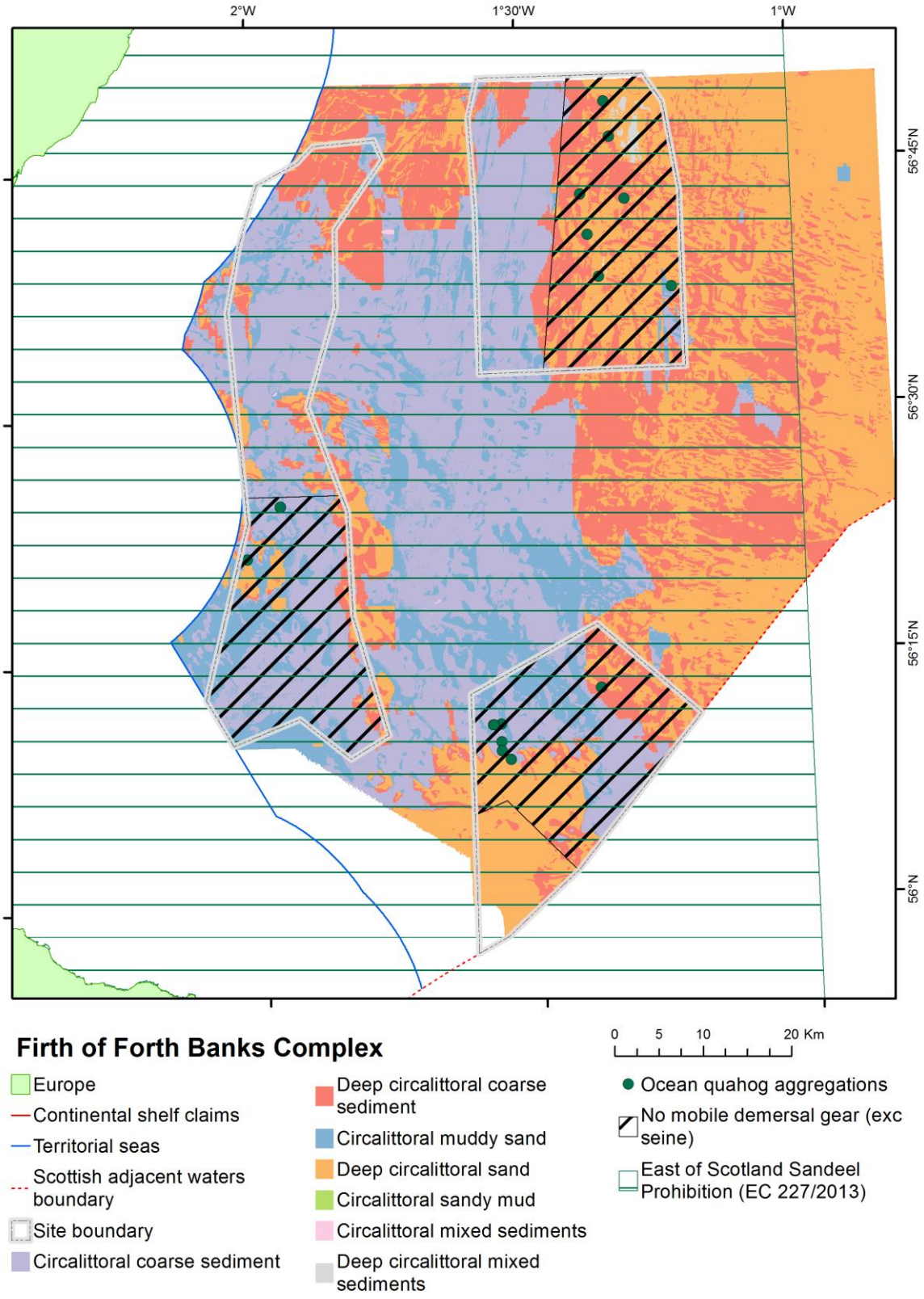

Figure E3: Map of Firth of Forth complex MPA with proposed management measures

39 Fleet activity at Firth of Forth Banks Complex MPA

In this section the potential effect of the measures on fishing effort and value is estimated. These estimates are based on data from 2009 to 2013 using the methodology described in section 9.

39.1 Fishing effort

The management measures for this site apply to all demersal mobile gears except seines. Therefore table E7 below amalgamates all of this effort to produce a yearly average for bottom trawl, and Table E8 for dredge activity. Other than 11 hours of seine net activity there was no other mobile gear used in the reference period. In addition there is an average of 24 hours per year gill net activity across the relevant ICES rectangles in the reference period.

Table E7: Average yearly effort (2009 – 2013) per ICES rectangle relevant to Firth of Forth Complex MPA using bottom trawl

Nation	Rectangle	Avg annual hours effort ICES rectangle	Of which avg annual hours effort site	Of which avg annual hours affected by management
DNK	41E8	23	8	7
UK	40E8	512	3	0
UK	41E7	2512	7	5
UK	41E8	307	149	109
UK	42E7	753	12	0
UK	42E8	168	129	4

Table E8: Average yearly effort (2009 – 2013) per ICES rectangle relevant to Firth of Forth Banks Complex MPA using dredge

Nation	Rectangle	Avg annual hours effort ICES rectangle	Of which avg annual hours effort site	Of which avg annual hours affected by management
NLD	42E7	1	0	0
NLD	42E8	4	1	0
UK	41E7	1209	57	50
UK	41E8	515	328	256
UK	42E7	1373	65	0
UK	42E8	2791	987	4

39.2 Fishing value

Based upon the economic data provided by member states the value of the site, and the value of the management area can be derived. This is done by taking the proportion of the average for the relevant ICES rectangle based upon the amount of effort expended for each gear type in question. Table E9 show the average values derived for the reference period. This is depicted in Figures E4 to E6 through a kernel density estimation of Vessel Monitoring System data..

Table E9: Estimated economic value of mobile gear fisheries affected by management measures at Firth of Forth Banks Complex MPA (average of 2009 – 2013)

Nation	Rectangle	Avg annual value in relevant ICES rectangles (Euro)	Avg annual value in MPA (Euro)	Of which avg value affected by management (Euro)
DNK	bottom trawl	121,976	42,426	37,123
NLD[18]	dredge	0		
UK	bottom trawl	5,116,178	293,361	110,404
UK	dredge	2,056,723	442,762	111,651
UK	seines	13,000	0	0

[18] No economic value in the data provided by the Netherlands

40 Assessment of potential displacement effects

The amount of displacement is estimated at 2.8% of the ICES rectangle bottom trawl activity (118 hours out of 4,252). For dredges it is 5.3% of ICES rectangle activity (310 hours out of 4,888). Therefore it is concluded that the effort displaced can be absorbed by other fishing grounds in the relevant ICES rectangles.

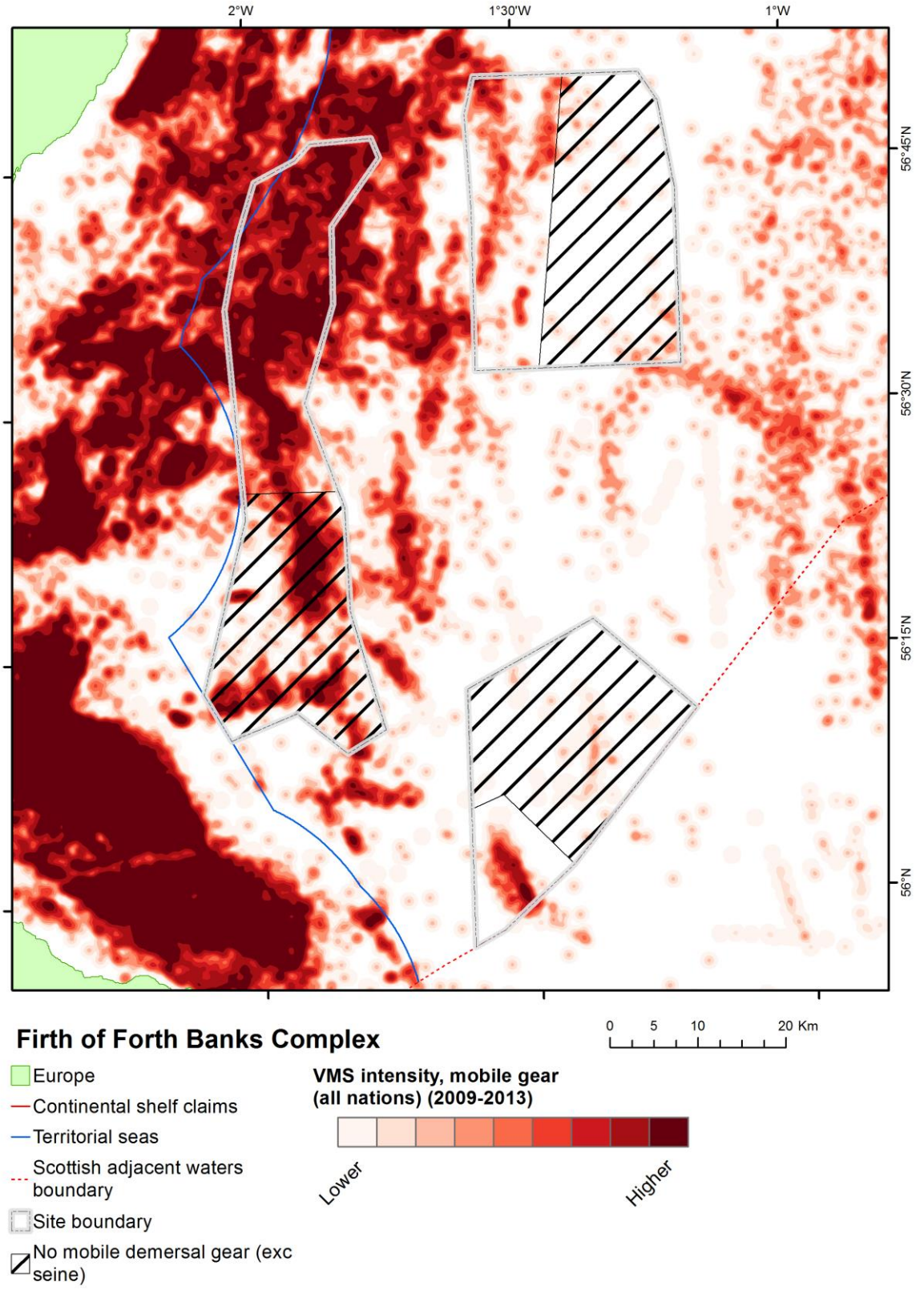

Figure E4: Firth of Forth Banks Complex MPA map of proposed measures with mobile fishing VMS intensity layer for all vessels 2009-13

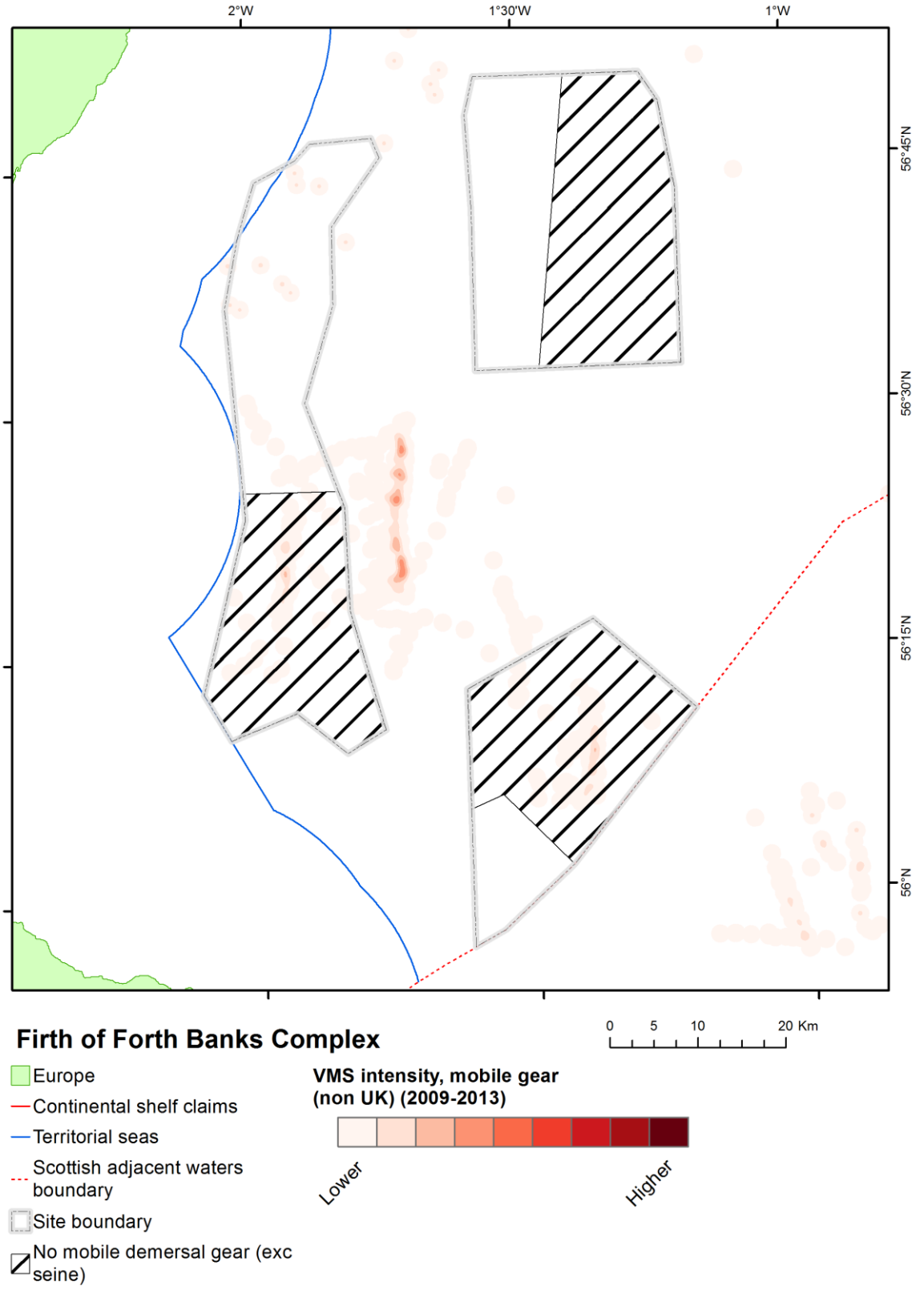

Figure E5: Firth of Forth Banks Complex MPA map of proposed measures with mobile fishing VMS intensity layer for non UK European Union vessels 2009-13

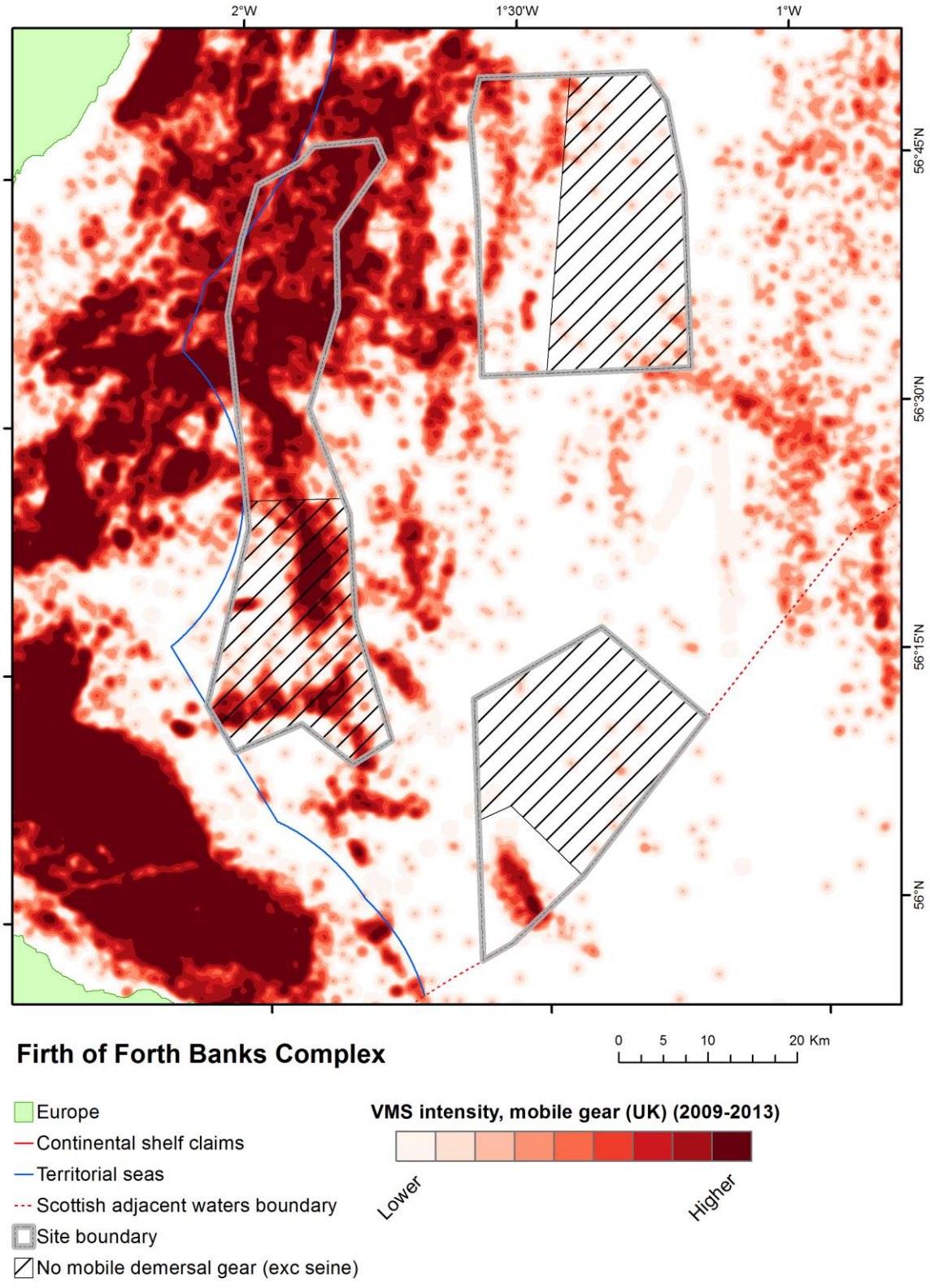

Figure E6: Firth of Forth Banks Complex MPA map of proposed measures with mobile fishing VMS intensity layer for UK vessels 2009-13

Section F

41 North-East Faeroe-Shetland Channel Marine Protected Area (MPA)

41.1 Site description

Located to the far north-east of Scottish waters this MPA covers over 23,000 Km^2 of the north-eastern reaches of the Faroe-Shetland Channel, as shown in Figures 2 and F1. Example images of protected features within the site are shown in Figure F2

The MPA has a depth range of 330m – 2420m extending from the edge of the Faroe-Shetland channel continental slope down into cooler Arctic influenced waters. The habitats present are strongly influenced by the significant range of environmental conditions in the region, from the upper continental slope to the depths of the channel, and include a dynamic mixing zone where warmer Atlantic waters flow over cooler Arctic waters.

At depths of 400-600m, the combination of seabed type and plentiful supply of nutrients are ideal for the establishment of deep-sea sponges. Up to 50 sponge species can be found within the sponge fields, many of which are different to those found in the surrounding areas.

The type of deep-sea sponge aggregation which occurs within the North-east Faroe-Shetland Channel MPA is boreal 'ostur' (Howell et al., 2007; Henry & Roberts, 2014). Boreal 'ostur' sponge aggregations typically have a high abundance of species of giant sponge (Demospongia). Below 800m, the muddy seabed is home to species tolerant of the cold Arctic-influenced waters.

Sedimentary features within the site are representative of offshore subtidal sands and gravels with sediment type and associated biological communities, typically varying with depth. These habitats range from cobbles and boulders in shallower areas of the slope to finer-grained sands and muds in deeper areas down the slope and in the channel itself (Bett, 2000).

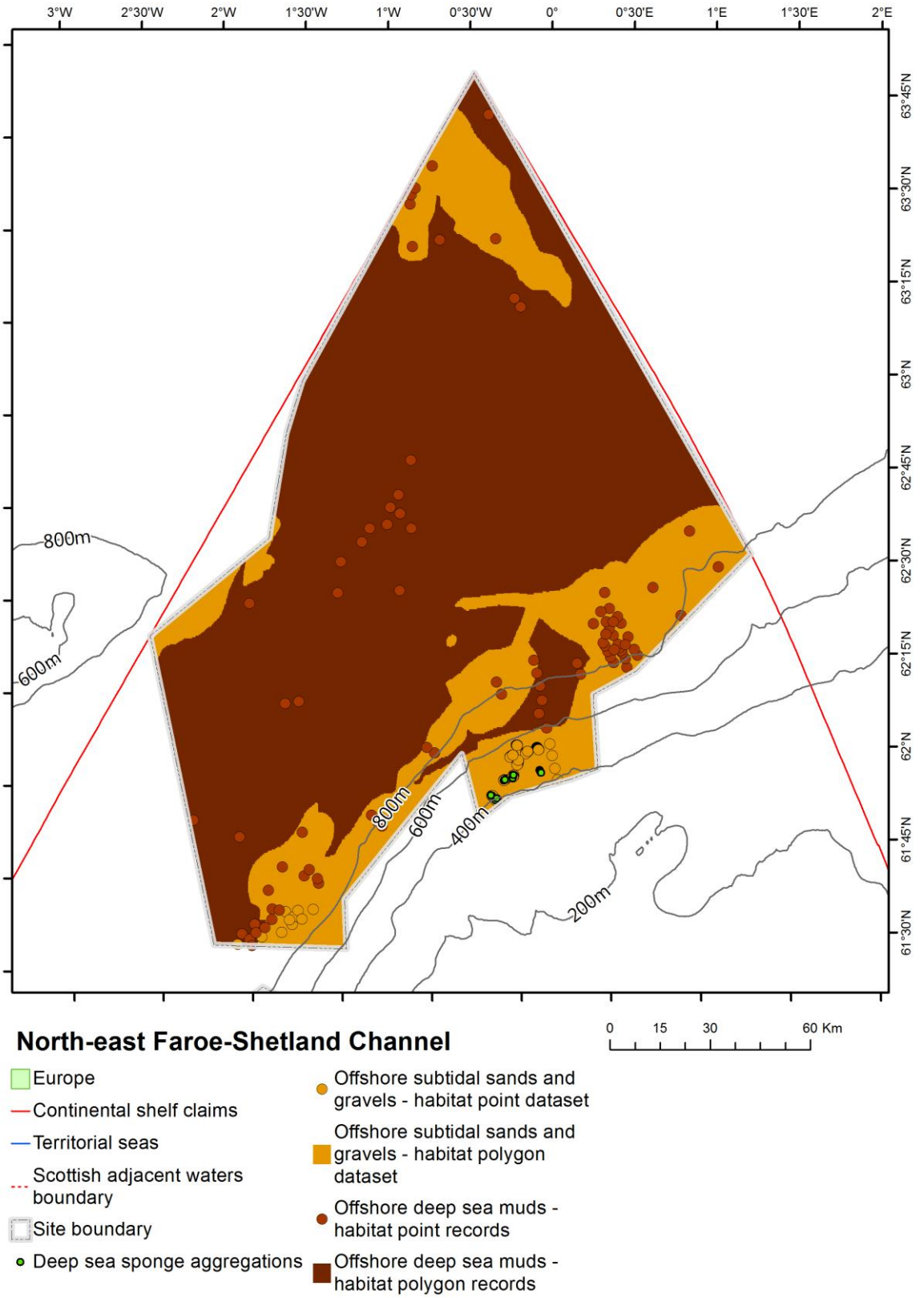

Figure F1: North-east Faroe-Shetland Channel MPA site map including distribution of protected features

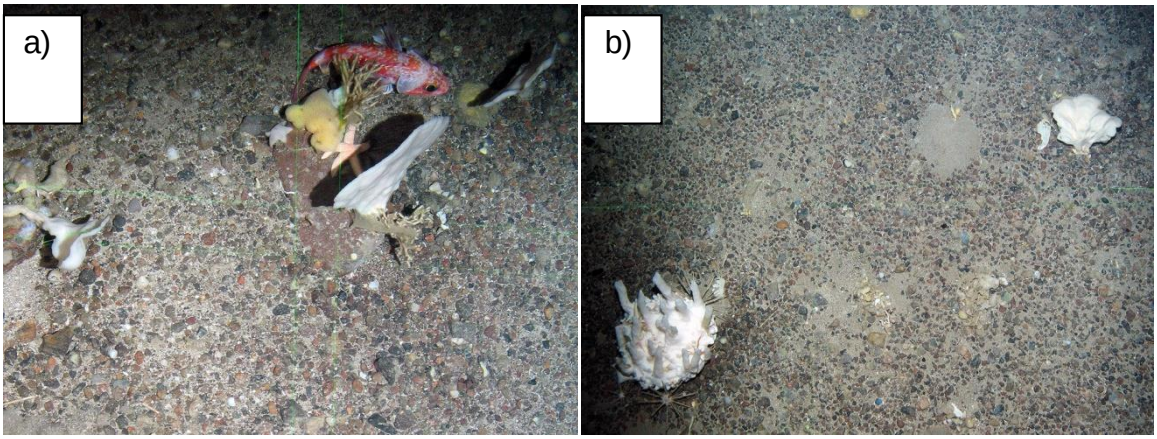

Figure F2: Examples images representative of some of the features within the North-east Faroe-Shetland Channel MPA (© JNCC): a) Rockfish and sponges on offshore subtidal sands and gravels and b) Cathedral sponge with pencil urchins on offshore subtidal sands and gravels

41.2 Why the site was designated

The protected features were identified as a priority for marine conservation in Scotland's seas and considered appropriate for a spatial management approach. Further detail on the processes followed to identify priority marine features in Scottish offshore waters is publically available (JNCC, 2012b).

The boreal ostur variant of deep-sea sponge aggregations has only been recorded in the North Sea in Scottish waters. The deep-sea sponge aggregations conform to the OSPAR definition of this Threatened and / or Declining habitat (OSPAR, 2010). They are also classed as a Vulnerable Marine Ecosystem (VME) according to FAO international guidelines (FA), 2009). Therefore, this MPA makes a contribution to international commitments (OSPAR) to protect the feature.

More information regarding the site selection process for the North-east Faroe-Shetland Channel MPA is available in the Detailed assessment against the Scottish MPA Selection Guidelines document.

41.3 The site boundary

The boundary has been set in accordance with the boundary setting principles outlined in the MPA Selection Guidelines[19].

It has been drawn to encompass all ground-truthed records of deep-sea sponge aggregations in this part of the Faroe-Shetland Channel that have been verified with high or medium confidence (Henry & Roberts, 2014). The isobaths used to draw the MPA boundary encompass the 400-600m depth band where deep-sea sponge aggregations are recorded in the Faroe-Shetland Channel (Axelsson, 2003; Howell et al., 2007). This concurs with the ICES recommendation for a fisheries closure over the sponge records identified as VMEs (ICES, 2013).

The boundary also captures the range of as many different types of Arctic influenced sediments as possible, and captures variation in benthic biological diversity with depth as highlighted by Bett (2012). The 400-1500m depth band was used to help define the boundary, and aims to include the full range of environmental conditions within the Faroe-Shetland Channel, from the highly dynamic and varied water masses at 300-600m, to the Arctic waters where temperatures can be sub-zero at >600m (Bett, 2012). The MPA also includes the benthic diversity and abundance maxima present in the intermediate water masses between 400 and 700m (Bett, 2000; Bett, 2001; Narayanaswamy et al., 2005; Narayanaswamy et al., 2010).

Confidence in the presence and extent of the protected features has been set out in the North-east Faroe-Shetland Channel MPA Data Confidence Assessment.

[19] http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/mpaguidelines

41.4 Conservation Objectives

Subject to natural change, conserve the deep-sea sponge aggregations, offshore deep-sea muds and offshore subtidal sands and gravels in favourable condition, such that:

- their extent is stable or increasing;
- their structure and functioning, quality and the composition of their characteristic biological communities are such as to ensure that they are in a condition that is healthy and not deteriorating

More information regarding conservation objectives is available in the Designation Order.

42 Anthropogenic pressures

42.1 All demersal mobile gear (including dredge, beam trawl, bottom trawl, and seines)

Studies on deep-sea sponge aggregations have found that trawling damages, displaces and removes sponges through direct physical impact as well as from disturbed sediment resettling and causing smothering beyond the path of the trawl itself (OSPAR, 2010; ICES, 2007; ICES, 2010). Deep-sea sponges have some capacity for recovery from mild damage, but significant disturbance, damage or smothering may result in sponges being unlikely to survive (ICES, 2007; ICES, 2010).

In general, the impact of mobile bottom contact gear on offshore subtidal sands and gravels is relatively well understood. In high energy locations (i.e. of wave and/or tide exposed) the associated fauna tend to be well adapted to disturbance and as a result are more tolerant of fishing-related disturbance (Dernie et al., 2003; Hiddink et al., 2006). In lower energy locations, such as muddy sands and sand in deep water, sediments tend to be more stable and their associated fauna less tolerant of disturbance (Hiddink et al., 2006; Kaiser et al., 2006). Stable gravels often support a 'turf' of fragile species which are easily damaged by trawling and recover slowly (Collie et al., 2005; Foden et al., 2010). Trawling and dredging tends to cause increased mortality of fragile and long lived species and favour opportunistic, disturbance-tolerant species (Eleftheriou & Robertson, 1992; Bergman & van Santbrink, 2000). Some particularly sensitive species may disappear entirely (Bergman & van Santbrink, 2000). There is a possibility that exposure to mobile bottom contacting gears may result in some degree of modification relative to the un-impacted state (Bergman & van Santbrink, 2000; Kaiser et al., 2006).

Studies have shown that areas of offshore deep-sea mud habitats subject to mobile fishing activity support a modified biological community with lower diversity, reduction or loss of long-lived filter-feeding species and increased abundance of opportunistic scavengers (Tuck et al., 1998; Ball et al., 2000). This effect was greatest in the more heavily fished offshore areas suggesting that impact is related to the intensity of fishing (Ball et al., 2000). Furthermore, modelling studies suggest that the greatest impact is produced by the first pass of a trawl (Hiddink et al., 2006). As with the sands and gravel feature, there is a possibility that exposure to mobile bottom contacting gears may result in some degree of modification.

42.2 All demersal static gear (including gillnets, trammel nets, long lines, pots and traps)

Deep-sea sponge aggregations are considered to be sensitive to static gear activity. Sponges may become caught or entangled in static gears and damaged on the seabed, or brought to the surface. By-catch by longliners of hexactinellid and demospongid sponges has been documented within the North-east Atlantic (Muñoz et al., 2011) and in the Antarctic (Bowden, 2010). While the extent of damage caused by individual static gear fishing events is likely to be lower than that for trawling, the effect of cumulative damage may be significant.

The offshore subtidal sands and gravels are not considered to be sensitive to the level of abrasion caused by static demersal gears (Hall et al., 2008; Tyler-Walters et al., 2009; Tillin et al., 2010). The extent of direct impact on the faunal community is expected to be minimal and seabed structure will be maintained.

Evidence regarding the impacts of static gear fishing on offshore deep-sea mud habitats is largely derived from studies on the effects of such activity on burrowed mud habitats. In general, the available research suggests that if fishing activity is low the direct impact on mud habitat is likely to be minimal and seabed structure is likely to be maintained in a slightly modified state (Eno et al., 1996; Kinnear et al., 1996; Eno et al., 2001; Adey, 2007). The impacts of repeated exposure to these types of fishing gear at high levels of fishing activity are less well understood (Eno et al., 2001; Adey, 2007).

42.3 Other human activities

There are telecommunications cables passing through the site

There is one oil & gas well in the south-east of the MPA. Activity is currently suspended.

43 Proposed fisheries management measures

This section provides details of how the measures were determined.

43.1 Options considered for fisheries management

Table F1 provides a summary of the management advice set out against the various options that have been considered.

Table F1: Summary of fisheries management advice

Activity	Management options considered
Demersal mobile gears	**No additional management:** There is a risk of not achieving the conservation objectives for offshore subtidal sands and gravels and offshore deep-sea muds. The conservation objective would not be achieved for deep-sea sponge aggregations and JNCC recommend that this option should not be applied in areas where deep-sea sponge aggregations occur (depths between 400 and 600m).
	Reduce/limit pressures: This option would reduce, but not entirely eliminate, the risk of not achieving the conservation objectives for offshore deep-sea muds and offshore subtidal sands and gravels. Appropriate management could include a zoned approach where management measures are introduced to protect specific depth corridors representative of the range of sedimentary communities on the continental slope. The depth corridors selected would need to take into consideration any management proposed within the other MPAs on the continental slope, to ensure that the depth-based variation of sedimentary communities are adequately represented within managed zones. There may be a greater requirement for restrictions on gears that penetrate deeply into the sediment. The location of areas to be covered by management restrictions would be decided in consultation with fishers. Restrictions could be permanent in some cases or temporary/adaptive in others. The conservation objective for deep-sea sponge aggregations would not be achieved and JNCC recommend that this option should not be applied in areas where deep sea sponge aggregations occur (depths between 400 and 600m).
	Remove/avoid pressures: This option would reduce the risk of not achieving the conservation objectives for offshore deep-sea muds and offshore subtidal sands and gravels to the lowest possible levels. This is the only option that would allow the conservation objective to be achieved for deep-sea sponge aggregations and JNCC recommend that this option should be applied in areas where deep-sea sponge aggregations occur (depths between 400 and 600m).

Activity	Management options considered
Demersal static gears	**No additional management**: This option is considered to be sufficient for bottom contacting static gear, to achieve the conservation objectives for offshore deep sea muds and offshore subtidal sands and gravels. However, the conservation objective would not be achieved for deep-sea sponge aggregations and JNCC recommend that this option should not be applied in areas where deep-sea sponge aggregations occur (depths between 400 and 600m).
	Remove/avoid pressure: This is the only option that would achieve the conservation objective for deep-sea sponge aggregations and JNCC recommend that this option should be applied in areas where deep-sea sponge aggregations occur (depths between 400 and 600m).

43.2 Proposed management option and rationale

Table F2 provides details of the chosen management approach and further explanation is provided below.

Table F2: chosen management approach

Protected feature	Gear type	Option chosen	Approach to management
Deep-sea sponge aggregations	All demersal gears	Remove / avoid pressure	Zonal exclusion of all demersal gears from where records of deep-sea sponge aggregations have been found.
Offshore sands and gravels, Deep sea muds	Demersal mobile gears	Reduce / limit pressure	Zonal exclusion of demersal towed gears from depths greater than approximately 700m.

Deep-sea sponge aggregations are considered to be a Vulnerable Marine Ecosystem (FAO, 2009). They are sensitive to impact from all demersal fishing types. Therefore there is no alternative to excluding all of these fishing methods from that part of the MPA.

For the deeper part of the site the accepted advice is to reduce or limit pressure. Currently there is no significant activity in this area. Therefore the conclusion is to prevent pressure being exerted in the future.

Crucially from a fisheries perspective this approach enables demersal trawl gear to still be used in a small but productive part of the MPA, without detriment to the known distribution of the protected features.

44 Measures envisaged for control, enforcement and compliance

This section describes the measures that are proposed for implementation.

44.1 Vessel Monitoring System

The frequency of data transmissions shall be of at least once every 60 minutes when a vessel is within a permitted or prohibited area.

44.2 Key provisions to include in EU Regulation

Table F3 provides details of the gear types to be prohibited by the measures and Tables F4 and F5 provide co-ordinates of the areas to which the measures should be applied. All of the co-ordinates are provided in WGS84 datum and the last co-ordinate joins back to the first in the table. All co-ordinates are joined by geodesic lines. The measures are shown on the map in figure F3.

Table F3: Demersal fishing gears to be prohibited

Gear types to be prohibited by the proposed measures	Habitat / Species	Gear code Annex XI in EU Regulation No. 404/2011	International standard Classification of Fishing Gears (ISSCFG)
Beam trawl	Deep-sea sponge aggregations, offshore subtidal sands and gravels and offshore deep-sea muds	TBB	TBB
Bottom trawl		OTB, OTT, PTB, TBN, TBS, TB	OTB, OTT, OT, PTB, TB
Seines		SDN, SSC, SX, SV	SB, SV, SDN, SSC, SPR, SX
Dredges		DRB , HMD	DRB, DRH
Gillnets and entangling nets	Deep-sea sponge aggregations	GN, GNC, GND, GNS, GTN, GTR	GEN, GN, GNC, GND, GNS, GTN, GTR
Hooks and lines		LHM, LHP, LL, LLD, LLS, LTL, LX	LHM, LHP, LLS, LLD, LL, LTL, LX
Pots and traps		FIX, FPO	FIX, FPO, FYK

Table F4: Co-ordinates of prohibited area (all demersal fishing gears)

Point	Latitude	Longitude
A	61° 56.529' N	000° 43.371' W
B	61° 59.395' N	000° 34.470' W
C	62° 02.077' N	000° 16.574' W
D	62° 03.534' N	000° 00.025' E
E	61° 59.561' N	000° 00.025' E
F	61° 58.189' N	000° 09.007' W
G	61° 55.933' N	000° 30.223' W
H	61° 52.218' N	000° 41.512' W

Table F5: Co-ordinates of prohibited area (dredge, beam trawl, bottom trawl, and seines)

Point	Latitude	Longitude
I	62° 23.949' N	002° 31.952' W
J	62° 39.314' N	001° 49.693' W
K	62° 56.192' N	001° 42.448' W
L	63° 04.544' N	001° 36.109' W
M	63° 40.649' N	000° 47.736' W
N	63° 53.224' N	000° 29.444' W
O	62° 32.762' N	000° 57.697' E
P	62° 15.018' N	000° 15.243' E
Q	62° 11.627' N	000° 00.025' E
R	62° 03.117' N	000° 46.213' W
S	61° 40.380' N	001° 28.200' W
T	61° 32.388' N	001° 28.194' W
U	61° 33.657' N	002° 12.753' W

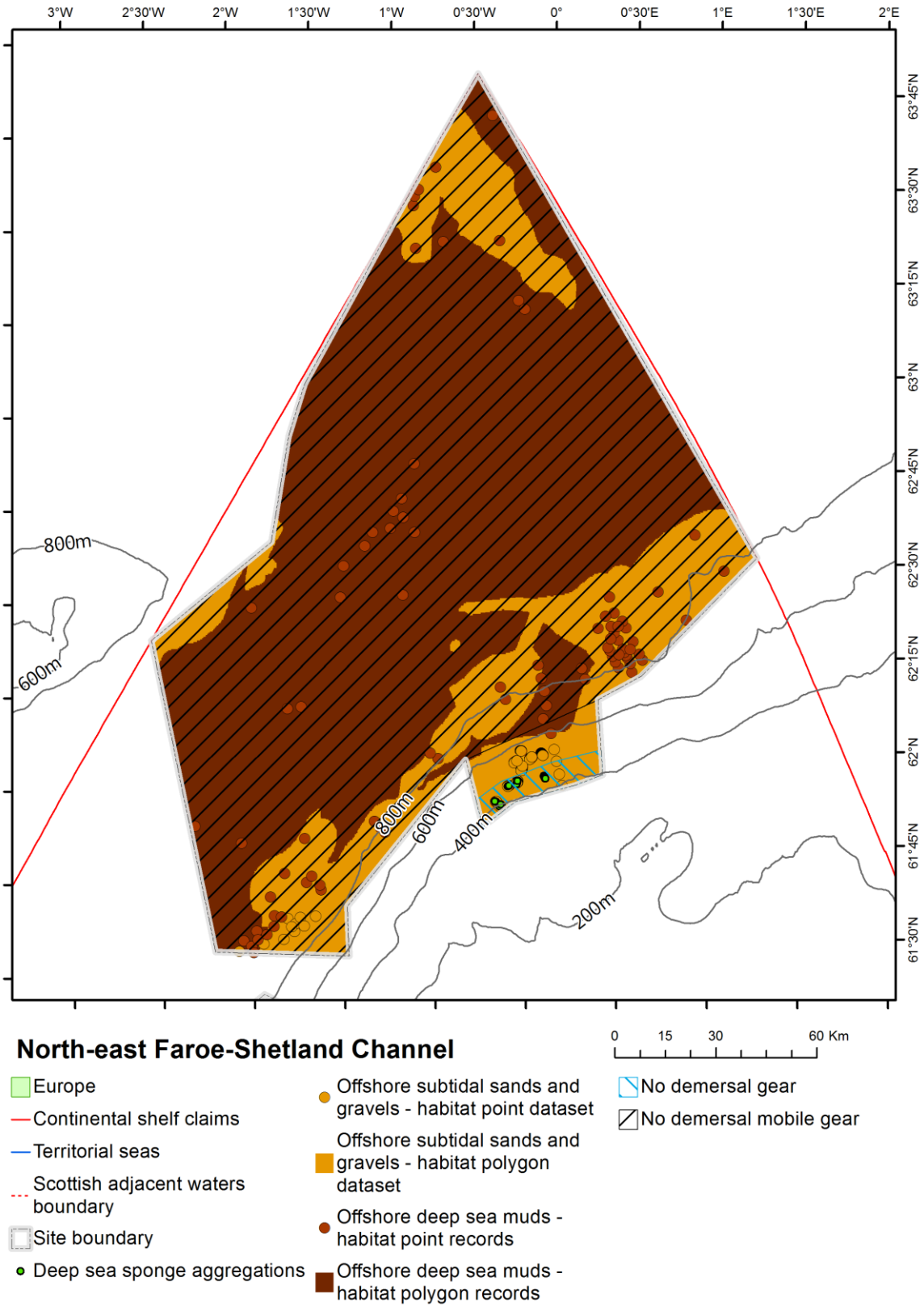

Figure F3: North-east Faroe-Shetland Channel MPA site map detailing the proposed management measures

45 Fleet activity at North-East Faeroe-Shetland Channel MPA

In this section the potential effect of the measures on fishing effort and value is estimated. These estimates are based on data from 2009 to 2013 using the methodology described in section 9.

45.1 Fishing effort

The management measures for this site apply to all demersal gears in various extents. Therefore tables F6 – F8 estimates the level of fishing effort on going in the relevant ICES rectangles and the amount that would be affected by the proposed measures.

Table F6: Average yearly effort (2009 – 2013) per ICES rectangle relevant to North-East Faeroe-Shetland Channel MPA using bottom trawl

Nation	Rectangle	Avg annual hours effort ICES rectangle	Of which avg annual hours effort site	Of which avg annual hours affected by management
FRA	52E9	956	2	1
FRA	53E9	16	15	5
UK	52E8	132	4	4
UK	52E9	465	54	22
UK	53E9	190	189	50

Table F7: Average yearly effort (2009 – 2013) per ICES rectangle relevant to North-East Faeroe-Shetland Channel MPA using gill net

Nation	Rectangle	Avg annual hours effort ICES rectangle	Of which avg annual hours effort site	Of which avg annual hours affected by management
DEU	52E8	70	0	0
UK	52E9	858	10	10

Table F8: Average yearly effort (2009 – 2013) per ICES rectangle relevant to North-East Faeroe-Shetland Channel MPA using long lines

Nation	Rectangle	Avg annual hours effort ICES rectangle	Of which avg annual hours effort site	Of which avg annual hours affected by management
DEU	52E9	191	3	3
DEU	53E9	1	1	1

45.2 Fishing value

Based upon the economic data provided by member states the value of the site, and the value of the management area can be derived. This is done by taking the proportion of the average for the relevant ICES rectangle based upon the amount of effort expended for each gear type in question. Table F9 show the average values derived for the reference period. This is depicted in Figures F4 to F6 through a kernel density estimation of Vessel Monitoring System data for demersal mobile gear, and F7 to F9 for demersal static gear.

Table F10: Estimated economic value of demersal fisheries at North-East Faeroe-Shetland Channel MPA (average of 2009 – 2013)

Nation	gear	Avg annual value in relevant ICES rectangles (Euro)	Avg annual value in MPA (Euro)	Of which avg value affected by management (Euro)
FRA	Bottom trawl	3,734,384	65,313	23,052
DEU	Gill net	211,810	3,234	3,234
DEU[20]	Bottom trawl	513,280		
UK	Bottom trawl	440,739	132,246	41,184
UK	Gill net	366,173	4,267	4,267

[20] There was no corresponding VMS identified for this catch value

46 Assessment of potential displacement effects

The amount of displacement is estimated at less than 4.7% of the ICES rectangle bottom trawl activity (82 hours out of 1,759). For gill nets it is 1.1% of ICES rectangle activity (10 hours out of 928). For long lines it is 2.1% of ICES rectangle activity (4 hours out of 192). Therefore it is concluded that the effort displaced can be absorbed by other fishing grounds in the relevant ICES rectangles.

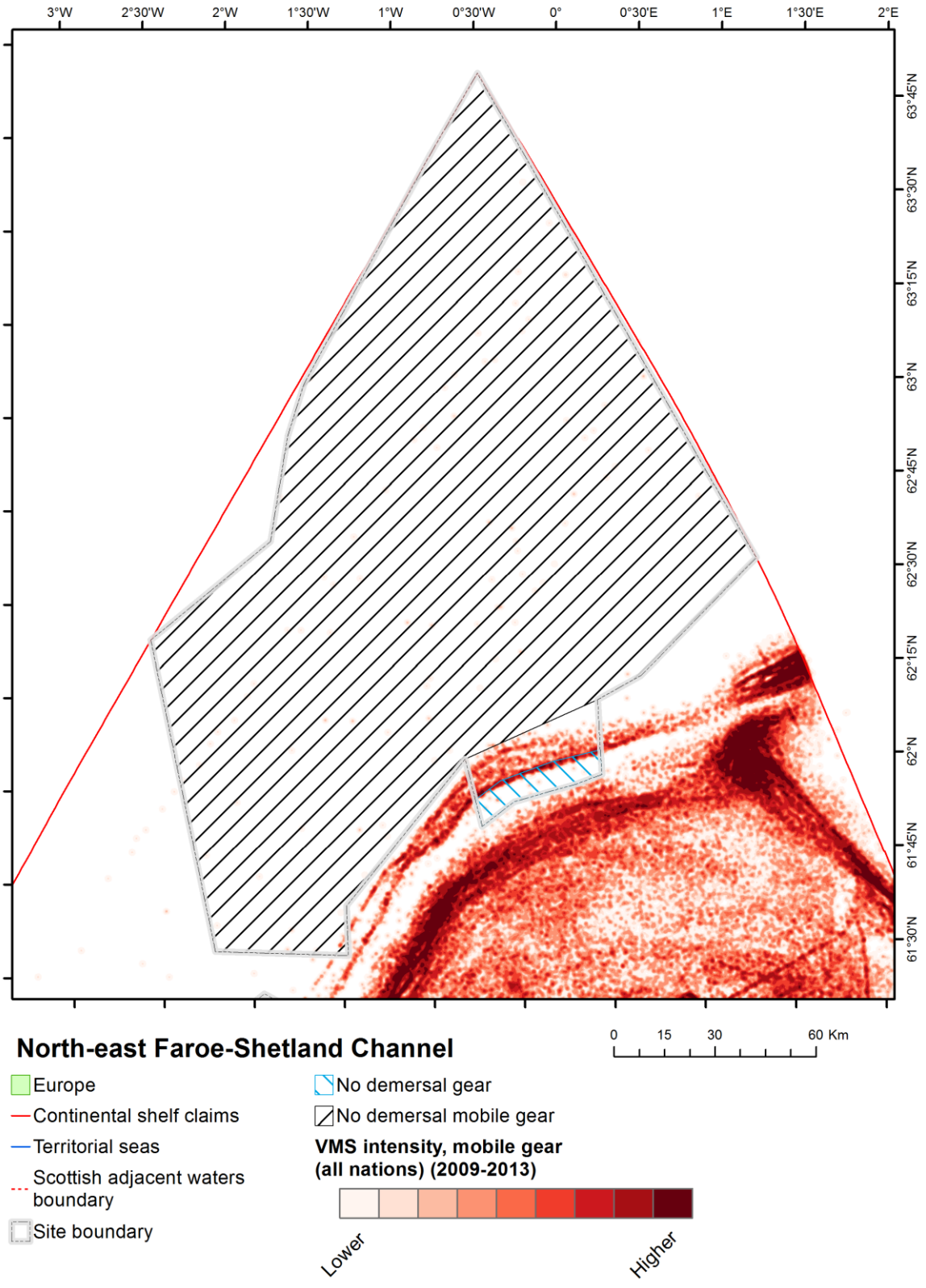

Figure F4: North-east Faroe-Shetland Channel MPA map of proposed measures with mobile fishing VMS intensity layer for all vessels 2009-13

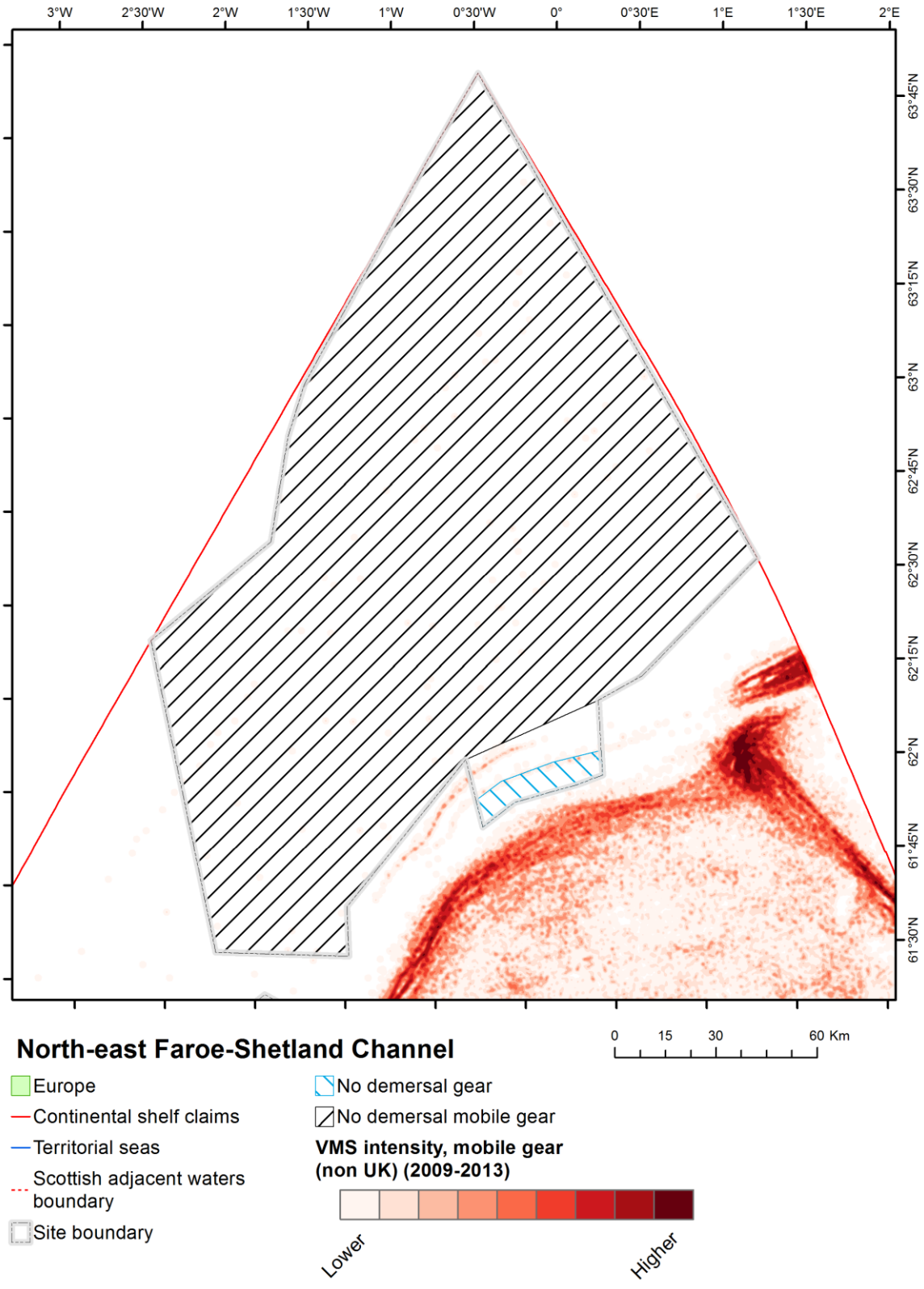

Figure F5: North-east Faroe-Shetland Channel MPA map of proposed measures with mobile fishing VMS intensity layer for non-UK European Union vessels 2009-13

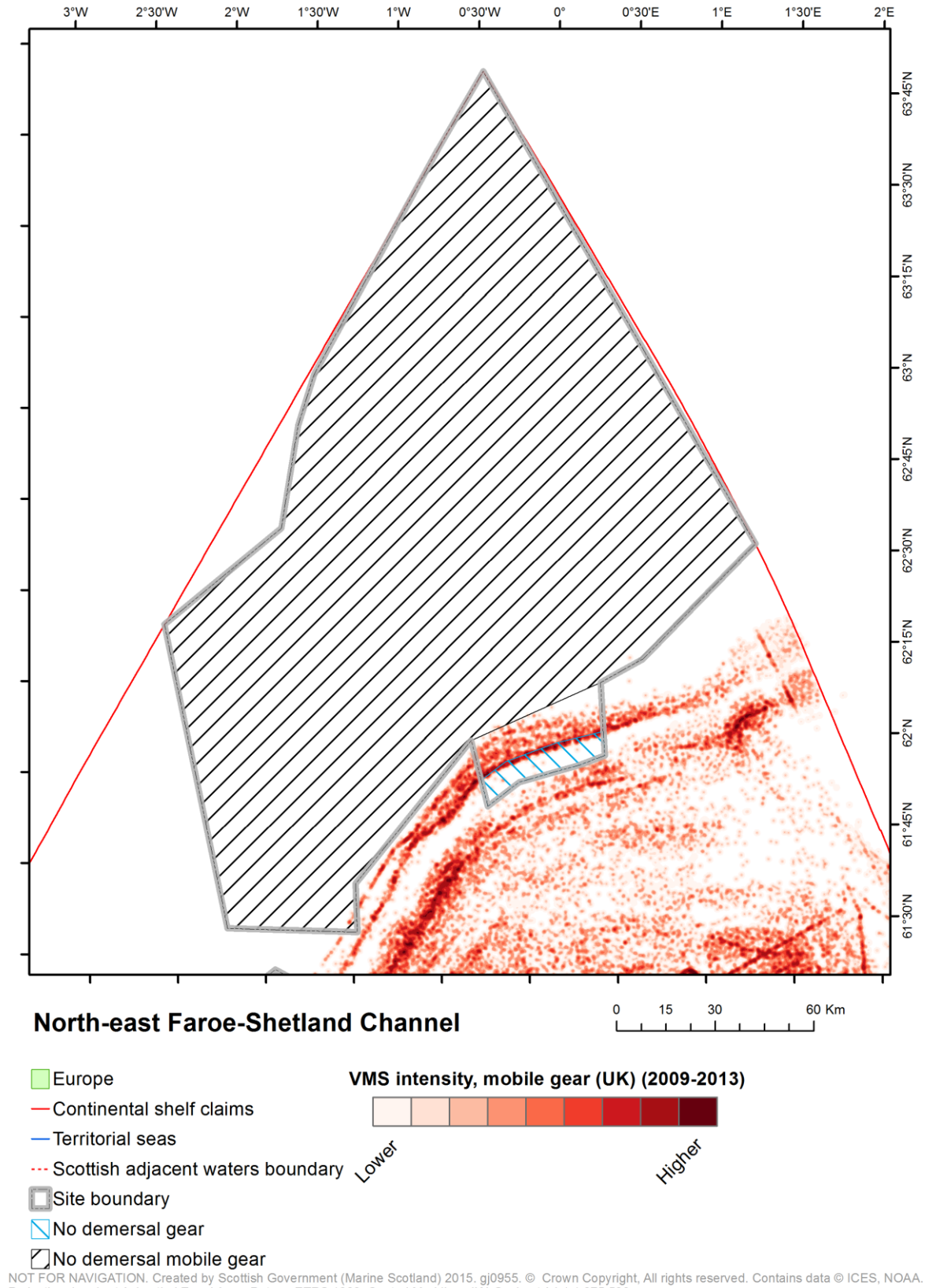

Figure F6: North-east Faroe-Shetland Channel map of proposed measures with mobile fishing VMS intensity layer for UK vessels 2009-13

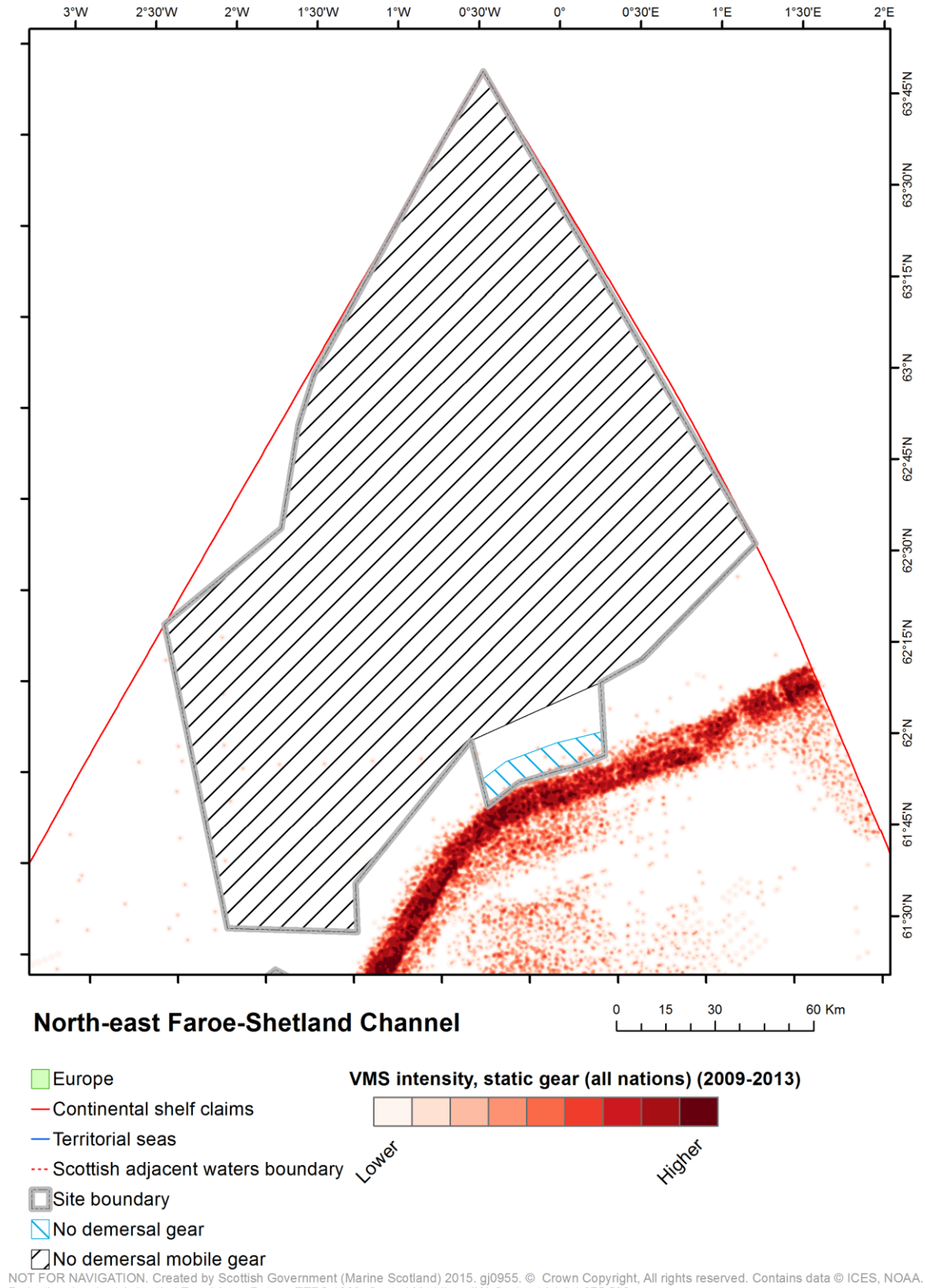

Figure F7: North-east Faroe-Shetland Channel map of proposed measures with static fishing VMS intensity layer for all vessels 2009-13

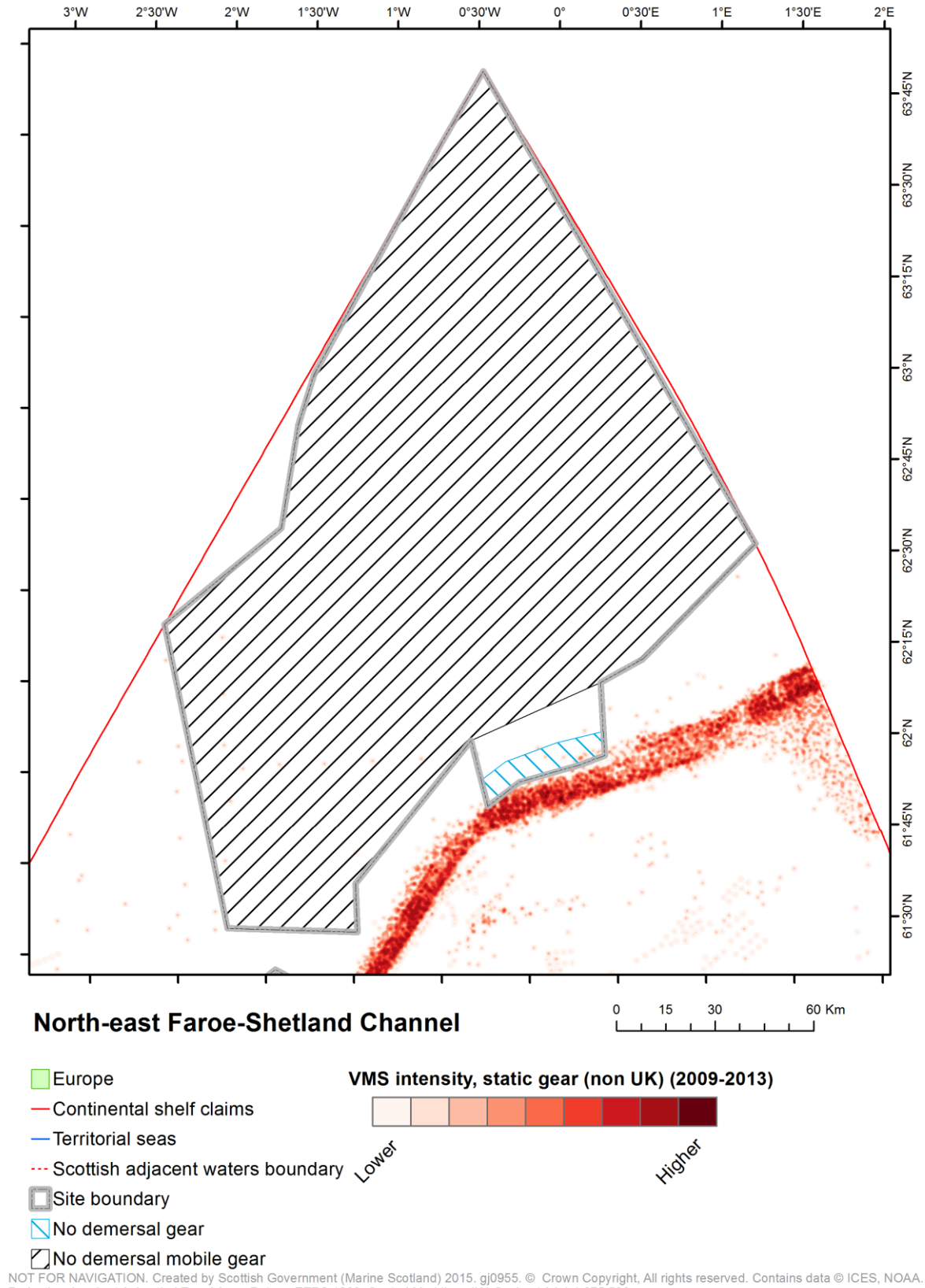

Figure F8: North-east Faroe-Shetland Channel map of proposed measures with static fishing VMS intensity layer for non-UK vessels 2009-13

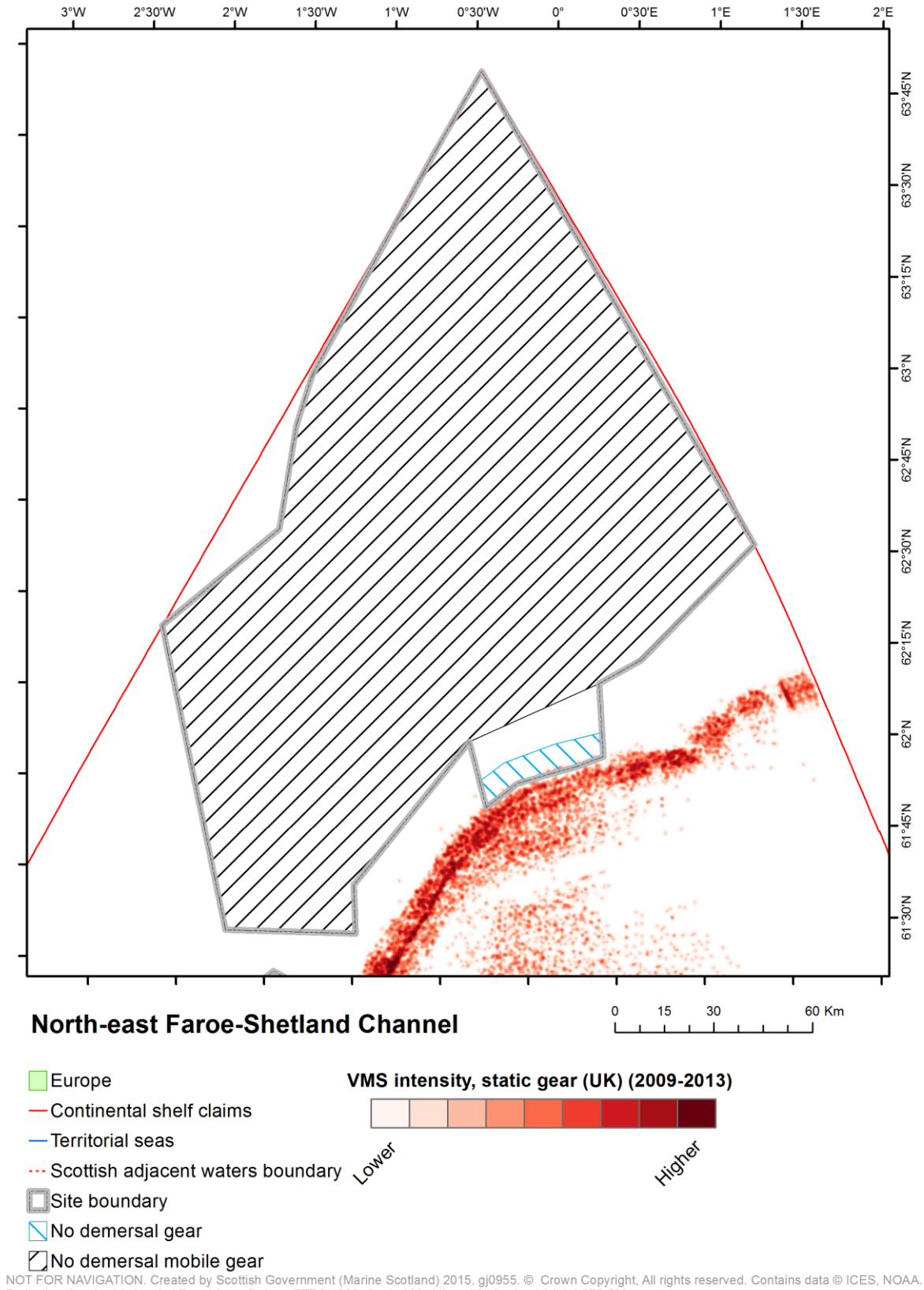

Figure F9: North-east Faroe-Shetland Channel map of proposed measures with static fishing VMS intensity layer for UK vessels 2009-13

Section G

53 Norwegian Boundary Sediment Plain Marine Protected Area (MPA)

53.1 Site description

The Norwegian Boundary Sediment Plain MPA, as shown in Figures 2 and G2 is home to a range of animals that live both in and on the sand and gravel habitats such as starfish, crabs, and the long-lived ocean quahog (*Arctica islandica*), see Figure G1 for example images. The MPA covers an area of 164 km^2.

Ocean quahog are typically found in medium to fine grained sands, sandy mud and silty sand in water depths of 4-400m. Survey data records from the MPA have confirmed the presence of ocean quahog within the depth range and sediment types in which they are expected to occur.

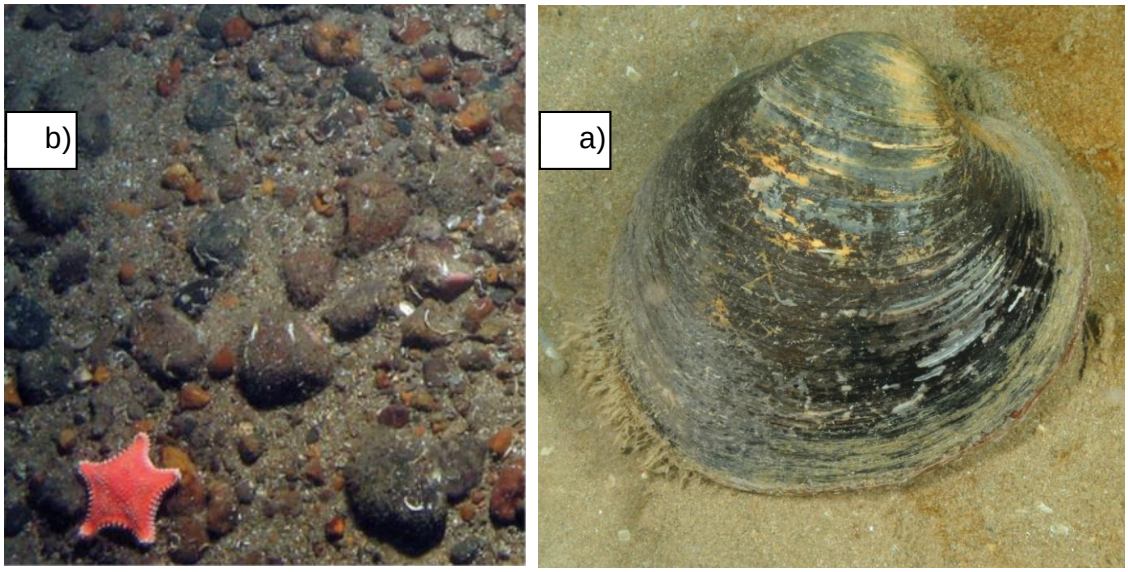

Figure G1 – Examples of the protected features within the Norwegian Boundary Sediment Plain NCMPA. a) sand and gravel habitats (© JNCC and Cefas) and b) Ocean quahog (*Artica islandica*) (© Crown Copyright 2014, image provided by DEONI)

53.2 Why the site was designated

Ocean quahog aggregations are considered to be a priority for marine conservation in Scotland's seas and considered appropriate for a spatial management approach. Further detail on the processes followed to identify priority marine features in Scottish offshore waters is publically available (JNCC, 2012b).

The MPA makes a contribution to the OSPAR network for the protection of Ocean quahog, considered to be Threatened and/or Declining in OSPAR Region II (Greater North Sea).

More information regarding the site selection process is available in the Detailed assessment against the Scottish MPA Selection Guidelines document.

53.3 The site boundary

The boundary has been set in accordance with the boundary setting principles outlined in the MPA Selection Guidelines[21]. It includes both the survey records of ocean quahog and areas of sediments considered suitable for ocean quahog colonisation (Sabatini & Pizzolla, 2008).

Confidence in the presence and extent of the protected features has been set out in the Norwegian Boundary Sediment Plain MPA Data Confidence Assessment.

53.4 Conservation objectives

Subject to natural change, conserve the ocean quahog aggregations in favourable condition, such that:

- the quality and quantity of associated habitat is maintained; and
- the composition of its population is such that it maintains sufficient numbers which enable it to thrive.

More information regarding the conservation objectives is available in the Designation Order.

[21] http://www.gov.scot/Topics/marine/marine-environment/mpanetwork/mpaguidelines

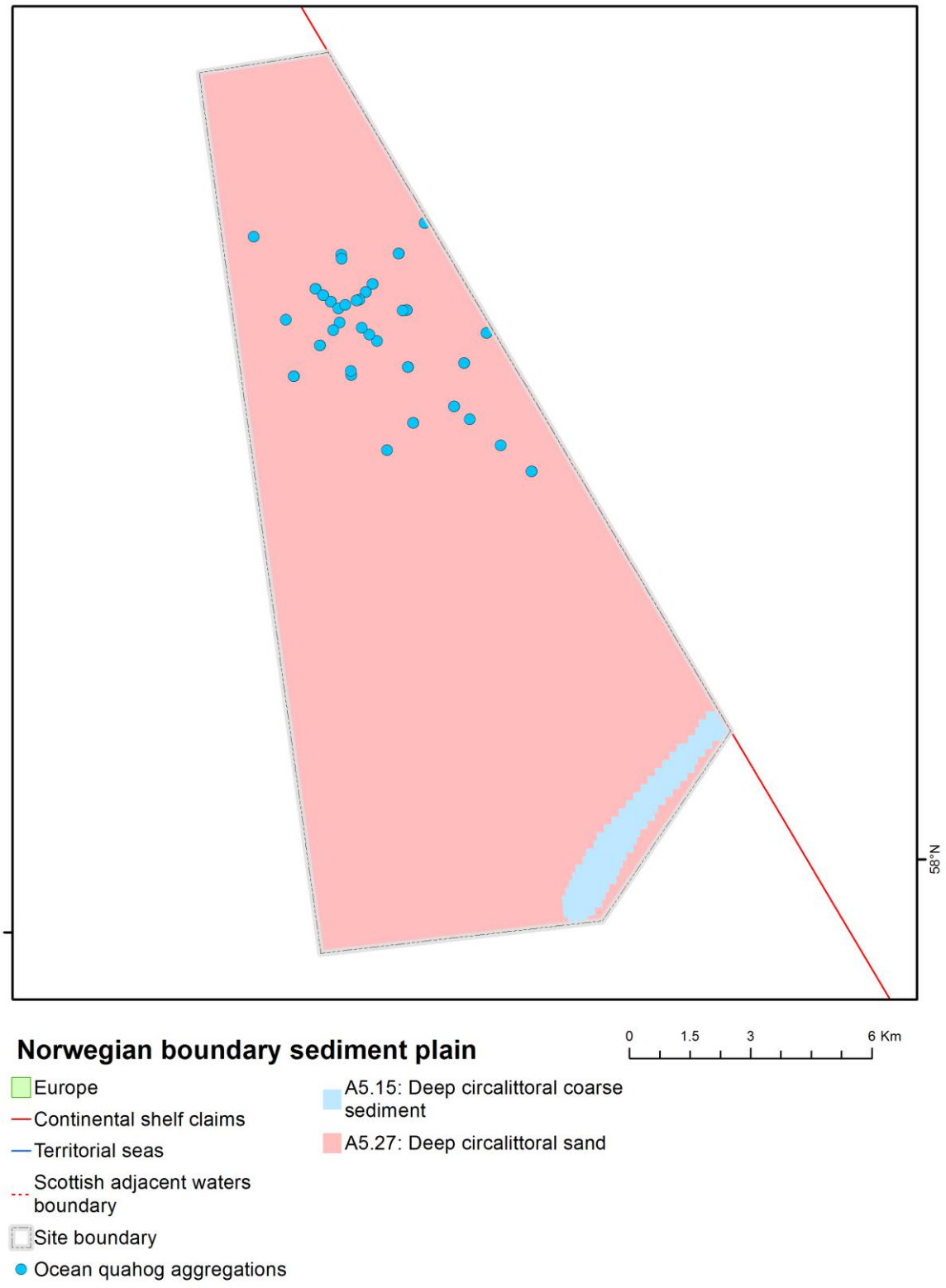

Figure G2: Norwegian Boundary Sediment Plain MPA including distribution of protected features within the site.

54 Anthropogenic pressures

54.1 All demersal mobile gear (including dredge, beam trawl, demersal otter trawl, and seines)

*Arctica island*ica are caught or damaged by beam trawls (Klein & Witbaard 1993; Witbaard & Klein, 1994) with an individual pass of the gear causing around 20% mortality (Bergman & v an Santbrink, 2000). This has been suggested as the cause of an observed decline in abundance over the last century in the south-eastern North Sea. A study in Dutch waters showed that quahog population density was inversely related to beam trawling effort. (Craymeersch et al., 2000)

There is some evidence that otter trawl doors may impact ocean quahogs by bringing them to the surface (Rumohr & Krost, 1991) however there is insufficient evidence to assess the mortality caused by this gear at a population level. The northern North Sea is primarily fished by otter trawls and ocean quahog do not appear to have declined to the same extent as seen in southern areas.

No evidence was found on the effects of shellfish dredging. However, the physical effects of scallop dredging on seabed sediments are similar to those of beam trawls (penetration to depths >5cm) and so the effects on ocean quahog are likely to be similar. Hydraulic gears penetrate sediments more deeply than other gears and so could be expected to cause a greater mortality, particularly where ocean quahog is the target species (although there is no known direct exploitation of the species in the UK).

54.2 All demersal static gear (including gillnets, trammel nets, long lines, pots and traps)

Ocean quahog aggregations are not considered to be sensitive to static gear activity (Hall et al., 2008), and the activity is not currently taking place within the MPA. However, the individual impact of a single fishing operation may be slight but cumulative damage may be significant (Eno et al., 2001; Foden et al., 2010). Sensitivity to low intensity potting is considered low (Hall et al., 2008).

54.3 Other human activities

A considerable number of oil and gas developments overlap with this MPA, including fields, pipelines, wells and associated infrastructure.

55 Proposed fisheries management measures

This section provides details of how the measures were determined.

55.1 Options considered for fisheries management

Table G1 provides a summary of the management advice set out against the various options that have been considered.

Table G1: Summary of fisheries management advice

Activity	Management options considered
Demersal mobile gears	**No additional management:** There is a risk of not achieving the conservation objective for ocean quahog aggregations.
	Reduce/limit pressures: This option would reduce, but not entirely eliminate, the risk of not achieving the conservation objective for ocean quahog aggregations. Appropriate management could include restrictions on gears known to impact the species, such as scallop and hydraulic dredging. The location of areas to be covered by management restrictions would be decided in consultation with fishers. Restrictions could be permanent in some cases or temporary/adaptive in others.
	Remove/avoid pressures: This option would reduce the risk of not achieving the conservation objective for ocean quahog aggregations to the lowest possible levels. This option could include restrictions on gears that could impact the species, such as otter trawling as well as scallop and hydraulic dredging.
Demersal static gears	**No additional management:** It is unlikely that any additional management of static gear activities will be required, as the risk of not achieving the conservation objectives of ocean quahog aggregations associated with these activities is minimal. Currently, no static gear activity is taking place within the MPA, however, if it were to start a monitoring showed evidence of detrimental effects, it may be necessary to apply limits in the future.

55.2 Proposed management option and rationale

Table G2 provides details of the chosen management approach and further explanation is provided below.

Table G2: Chosen management approach

Protected feature	Gear type	Option chosen	Approach to management
Ocean quahog aggregations (including sands and gravels as their supporting habitat)	Demersal mobile gear	Reduce / limit pressure	Prohibit the use of dredges, beam trawls, and other demersal trawls from the whole MPA. Zonal management of demersal seines.

The Norwegian Boundary Sediment Plain MPA contains an area which is considered to be least damaged more natural. It was agreed at the stakeholder workshop that this area in the northern part of the MPA should be given a high level of protection to maintain that status.

In the southern part there has been little or no activity in recent years which means prohibiting activity is the only feasible means of limiting pressure.

In recognition of the lower impact of seine net fishing it will still be permitted in the southern part of the MPA.

56 Measures envisaged for control, enforcement and compliance

56.1 Vessel Monitoring System

The frequency of data transmissions shall remain at least once every 2 hours.

56.2 Key provisions to include in EC Regulation

Table G3 provides details of the gear types to be prohibited by the measures and Tables G4 and G5 provides co-ordinates of the area to which the measures should be applied. All of the co-ordinates are provided in WGS84 datum and the last co-ordinate joins back to the first in the table. All co-ordinates are joined by geodesic lines. The measures are shown on the map in figure G3.

Table G3: Demersal fishing gears to be prohibited

Gear types to be prohibited by the proposed measures	Habitat/ Species	Gear code Annex XI in EU Regulation No. 404/2011	International standard Classification of Fishing Gears (ISSCFG)
Beam trawl	Ocean quahog aggregations	TBB	TBB
Bottom trawl		OTB, OTT, PTB, TBN, TBS, TB	OTB, OTT, OT, PTB, TB
Seines		SDN, SSC, SX, SV	SB, SV, SDN, SSC, SPR, SX
Dredges		DRB , HMD	DRB, DRH

Table G4: Co-ordinates of prohibited area 1 (dredge, beam trawl, bottom trawl, and seines)

Point	Latitude	Longitude
A	58° 11.254' N	001° 38.916' E
B	58° 11.392' N	001° 42.209' E
C	58° 05.044' N	001° 48.019' E
D	58° 05.003' N	001° 39.557' E

Table G5: Co-ordinates of prohibited area 2 (dredge, beam trawl, and bottom trawl)

Point	Latitude	Longitude
E	58° 05.003' N	001° 39.557' E
F	58° 05.044' N	001° 48.019' E
G	58° 01.916' N	001° 50.872' E
H	57° 59.522' N	001° 47.252' E
I	57° 59.389' N	001° 40.134' E

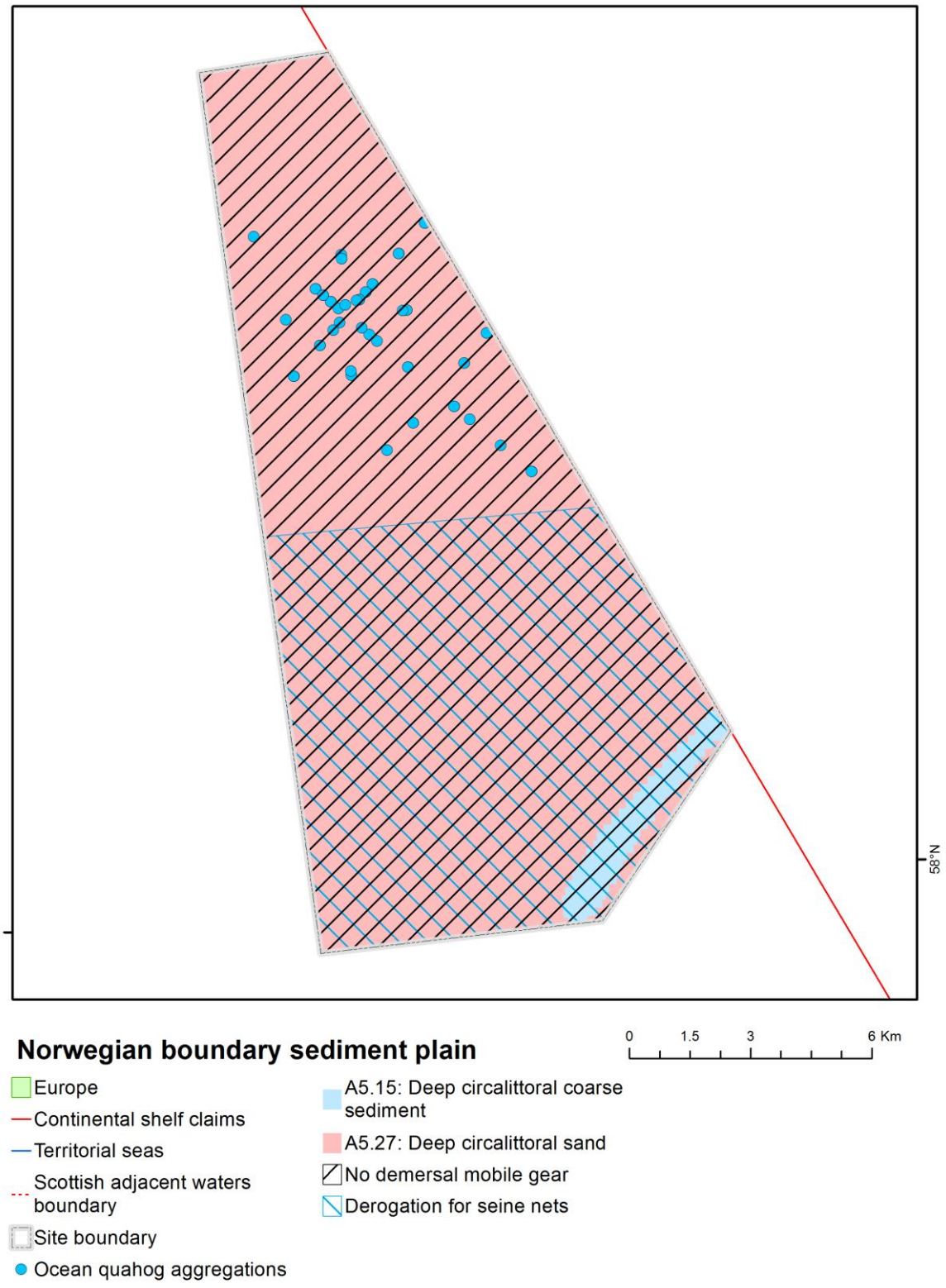

Figure G3: The Norwegian Boundary Sediment Plain MPA with proposed management measures

57 Fleet activity in the Norwegian Boundary Sediment Plain MPA

In this section the potential effect of the measures on fishing effort and value is estimated. These estimates are based on data from 2009 to 2013 using the methodology described in section 9.

57.1 Fishing effort

The management measures for this site apply to all demersal mobile gears. Table G6 shows effort in the relevant ICES rectangles for bottom trawl. This is the only demersal mobile gear type that has been in use in the reference period.

Table G6: Average yearly effort (2009 – 2013) per ICES rectangle relevant to Norwegian Boundary Sediment Plain MPA using bottom trawl

Nation	Rectangle	Avg annual hours effort ICES rectangle	Of which avg annual hours effort site	Of which avg annual hours affected by management
DEU	44F1	3	0	0
DEU	45F1	7	1	1
DNK	44F1	22	0	0
DNK	45F1	197	1	1
UK	45F1	2769	5	5

57.2 Fishing value

Given the very low amount of fishing effort affected by the proposed measures no attempt has been made to valorise this.

58 Assessment of potential displacement effects

The level of effort that is displaced is so low that there will be no displacement effects.

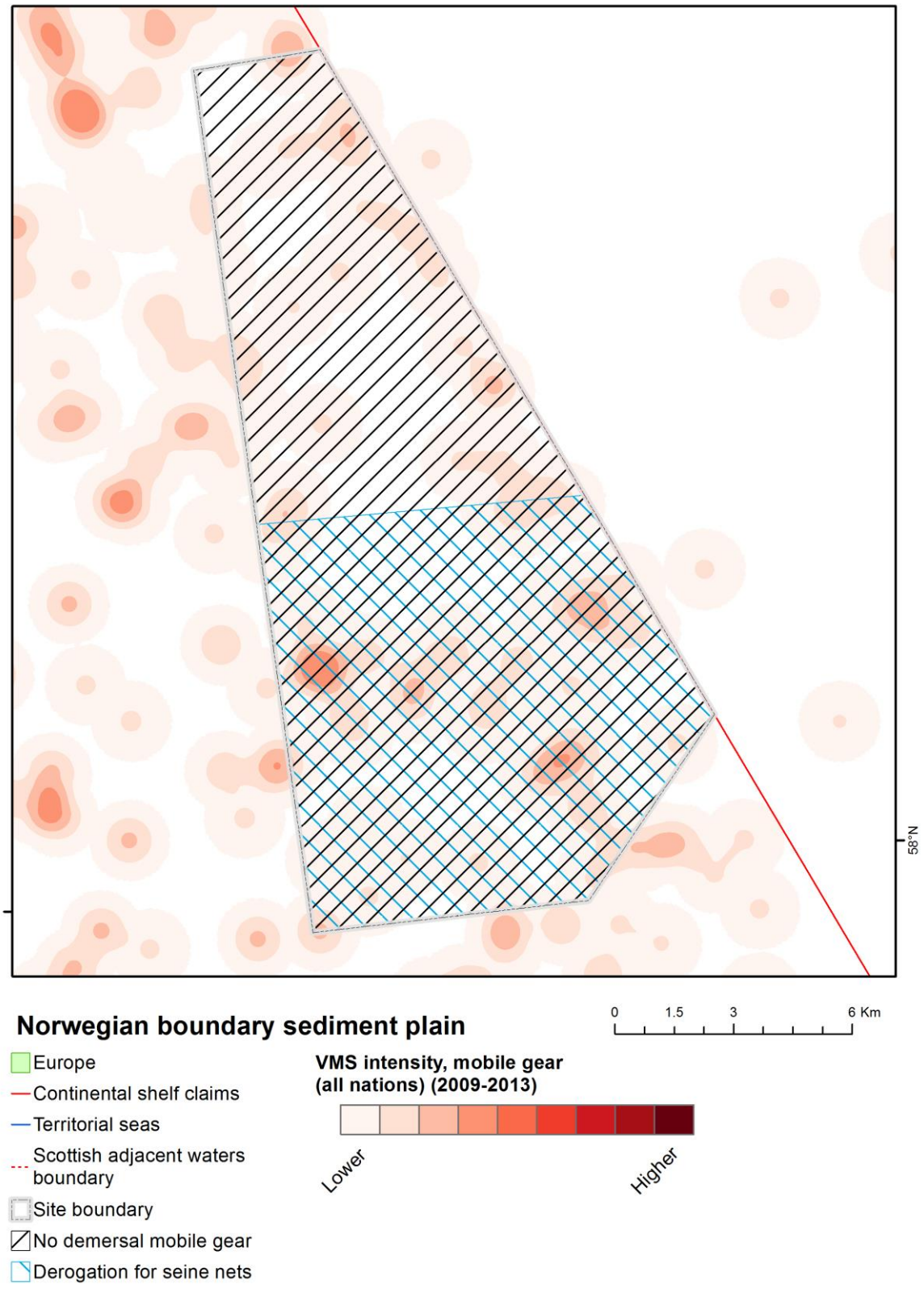

Figure G4: Norwegian Boundary Sediment Plain MPA map of proposed measures with mobile fishing VMS intensity layer for all vessels 2009-13

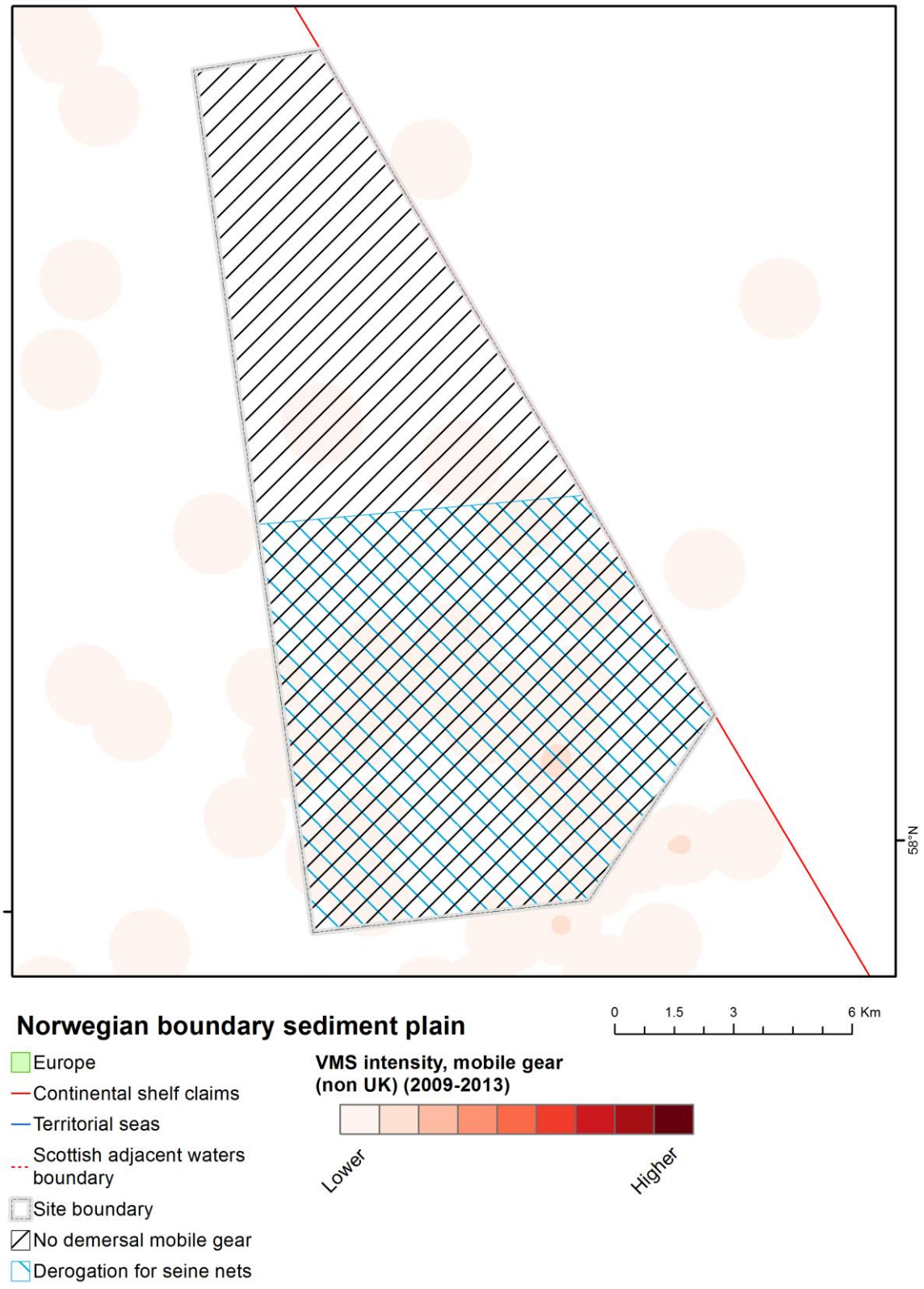

Figure G5: Norwegian Boundary Sediment Plain MPA map of proposed measures with mobile fishing VMS intensity layer for non-UK European Union vessels 2009-13

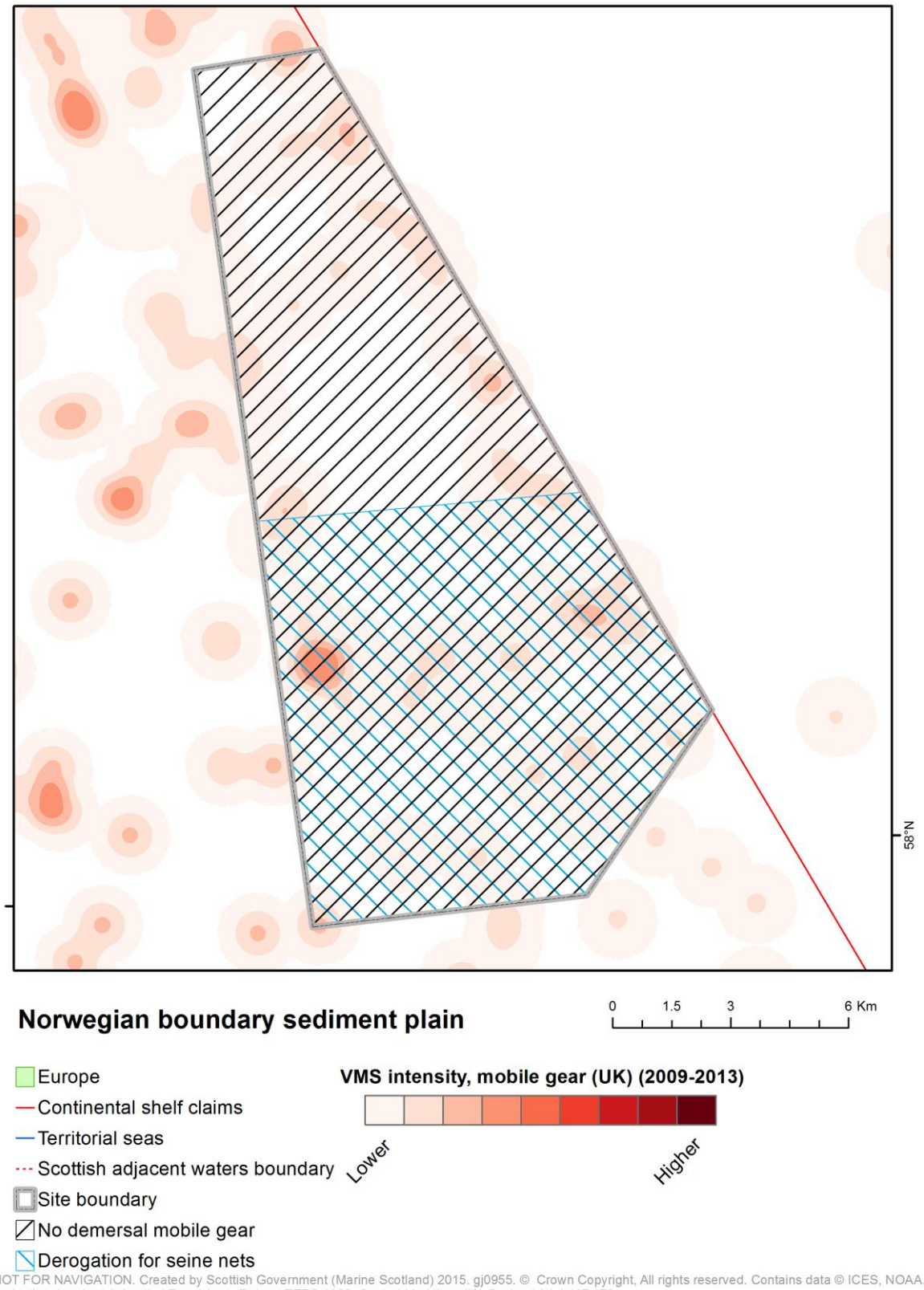

Figure G6: Norwegian Boundary Sediment Plain MPA map of proposed measures with mobile fishing VMS intensity layer for UK vessels 2009-13

Section H

59 Pobie Bank Reef Special Area of Conservation (SAC)

59.1 Site description

Pobie Bank Reef is located in the North Sea, approximately 20km east of Unst, Fetlar and Whalsay in Shetland and is separated from Shetland by the Unst Basin. The SAC as shown in Figures 2 and H1 is approximately 70km long and 21km wide. The depth within the SAC ranges from 70m to over 100m.

The reef is located on a bank of metamorphic and sedimentary rocks covered by a patchy veneer of sediment. Pobie Bank is a topographically complex area where the reef is composed of very large, rugged bedrock outcrops from areas of surrounding sandy sediment. These outcrops are generally surrounded by large boulders and cobbles in a sandy matrix. Towards the north and south of the reef, bedrock outcrops are smoother and integrated with extensive areas of stony reef.

The reef provides a habitat to an extensive community of encrusting and robust sponges and bryozoans. In the shallowest areas the bedrock and boulders also support encrusting coralline algae. Axinellid cup sponges (*Axinella infundibuliformis*) are common on the bedrock and stony reef at depth ranges of 70m to over 100m. The bryozoan *Omalosecosa ramulosa* is also common on these reefs, but this species is rare in inshore sites in this regional sea. In the deepest areas (>100m), low-lying silty bedrock is commonplace, supporting small erect sponges, cup corals (*Caryophyllia smithii*) and the brittlestar *Ophiura albida* (Figure H2).

An overview of the data used to support site identification along with information on confidence in feature presence and extent is available in the JNCC Pobie Bank SAC Site Information Centre.

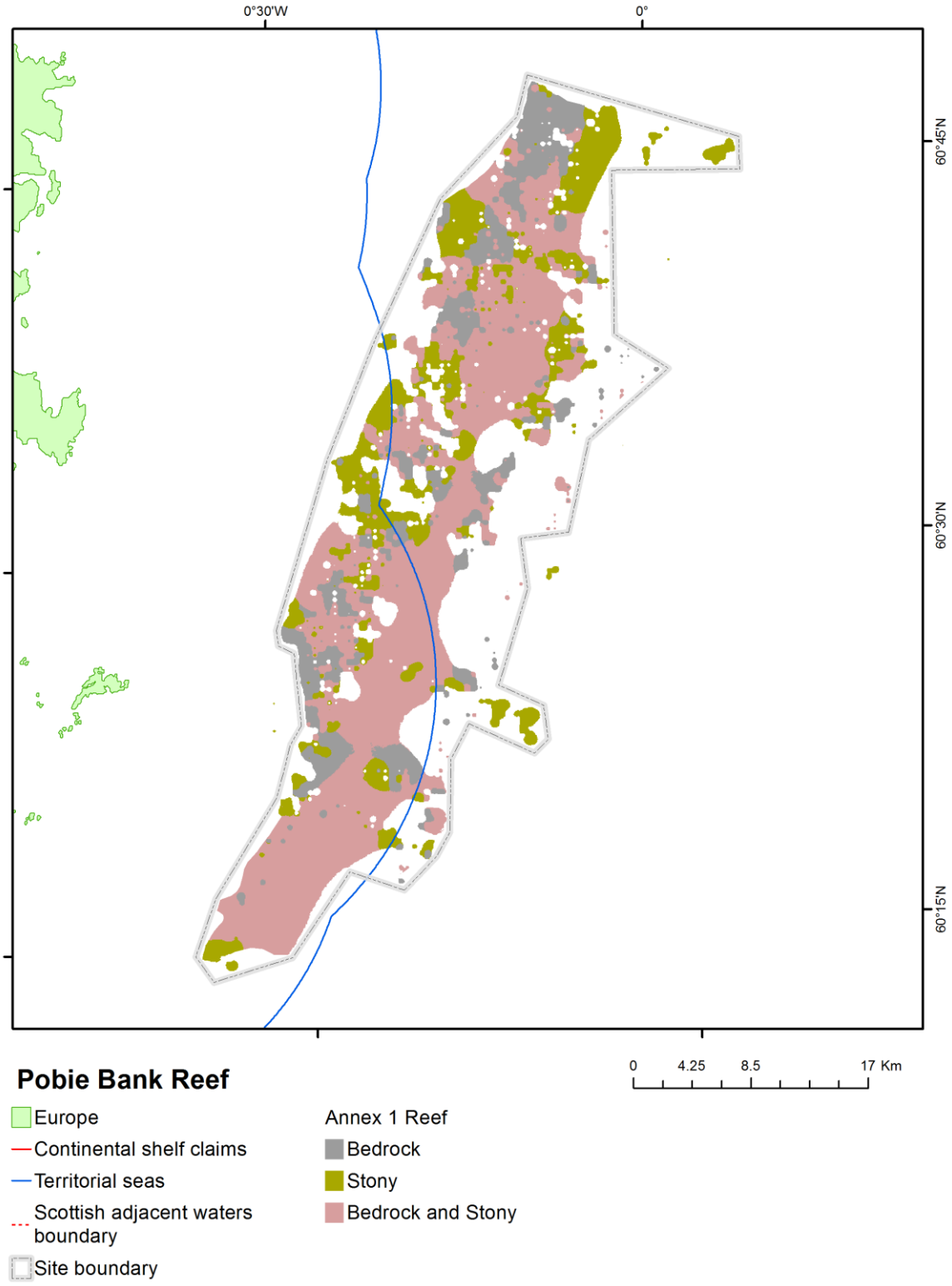

Figure H1: Pobie Bank Reef SAC site map including distribution of the Annex I reef feature for which management measures are being proposed

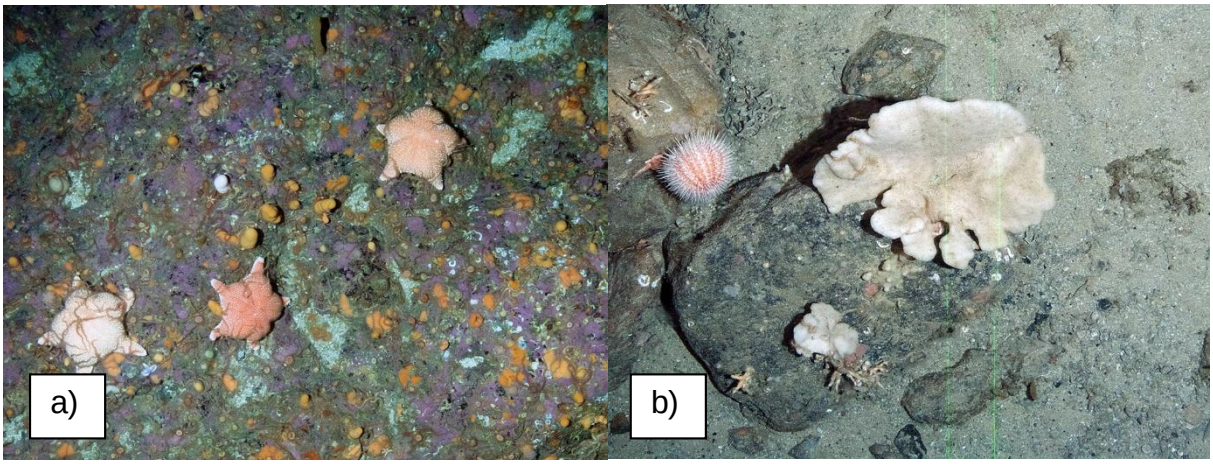

Figure J2: Feature images from Pobie Bank SAC, showing a) cushion stars (*Hippasteria phrygiana*) on bedrock with encrusting coralline algae (*Corallinaceae*), dead man's fingers (*Alcyonium digitatum*) and brittle stars (*Ophiothrix fragilis*), and b) sponge (*Phykellia sp*) and the sea urchin (*Strongylocentrotus droebachiensis*) on a cobble © JNCC/Cefas

59.2 Why the site was designated

Pobie Bank Reef is a contribution to the Natura 2000 network for Annex I reef habitat (Code 1170). It represents an excellent and extensive example of hard bedrock and stony reef of medium to high topographic complexity, in deep circalittoral waters. Designation of this SAC increased the geographic range of representation of this habitat type in the Natura 2000 network.

The SAC has a total area of 966 km^2 and has the following reef components as shown in table H1.

Table H1: Proportion of reef habitats within SAC

Annex I Reef type	**Area of habitat within the SAC (km^2)**
Bedrock	108.546
Bedrock and Stony	347.884
Stony	128.666
Total	**585.096**

59.3 The site boundary

The boundary for Pobie Bank Reef has been defined using the JNCC marine SAC boundary definition guidelines (JNCC, 2012a). It is a relatively simple polygon enclosing the minimum area necessary to ensure protection of the Annex I habitat. The site boundary includes a 300m buffer around the reef habitat which is 3 times the maximum reef depth of 100m.

The Annex I reef feature has been interpreted from acoustic and ground truthing data collected during surveys in 2003 and 2006. Areas of lowest data confidence were excluded from the site.

59.4 Conservation objectives

The conservation objective for the Pobie Bank SAC is to, subject to natural change, maintain or restore the reef in/to favourable condition, such that:

- the natural environmental quality and processes supporting the habitat,
- the extent of the habitat on site, and
- the physical structure, community structure , function, diversity and distribution of the habitat and typical species representative of the reef in the Northern North Sea regional sea are maintained or restored, thereby ensuring the integrity of the site and also making an appropriate contribution to favourable conservation status of the Annex 1 reef habitat.

60 Anthropogenic pressures

60.1 All demersal mobile gear (including dredge, beam trawl, bottom trawl, and seines)

Whilst it is unlikely that demersal towed gear can affect the long-term natural distribution of bedrock and stony reef features, there is evidence to indicate that the use of demersal towed gears can impact the structure and function of the habitat and the long term survival of its associated species.

The use of towed fishing gears is likely to cause damage or death of fragile, erect species, such as sponges and corals (Freese et al., 1999; Løkkeborg, 2005). Other species such as hydroids, anemones, bryozoans, tunicates and echinoderms may also be vulnerable (McConnaughey et al., 2000; Sewell & Hiscock, 2005). Where fragile, slow growing species occur, even low levels of fishing have the potential to change the structure and function of the habitats and may result in the loss of some characteristic species.

60.2 All demersal static gear (including gillnets, trammel nets, long lines, pots and traps)

Mechanical impacts of static gear (e.g. weights and anchors hitting the seabed, hauling gear over seabed, rubbing/entangling effects of ropes) can damage some species (Eno et al., 1996). Other species appear to be resilient to individual fishing operations but the effects of high fishing intensity are unknown (Eno et al., 2001). Recovery will be slow (Foden et al., 2010) resulting in significant reduction or even loss of characteristic species. The individual impact of a single fishing operation may be slight but cumulative damage may be significant (Eno et al., 2001; Foden et al., 2010).

60.3 Other human activities

There are three wrecks within the site, and one pipeline intersecting a very small length of the SAC, running close to (within 1km) the northern boundary.

61 Proposed fisheries management measures

This section provides details of how the measures were determined.

61.1 Options considered for fisheries management

Table H2 provides a summary of the management advice set out against the various options that have been considered.

Table H2: Summary of fisheries management advice

Activity	Management options considered
Demersal mobile gear	**No additional management:** There is a significant risk of not achieving the conservation objectives for the reef features.
	Reduce/limit pressures: This option would reduce the risk of not achieving the conservation objectives for the reef feature. Appropriate management could include exclusion of demersal towed gears over the main areas of bedrock and stony reef, allowing fishing to continue in fishable areas around the features. It is possible that these areas may include some areas where the distribution of reef is unknown or uncertain, and some very small areas of known Annex I reef and there would therefore be a risk of localised damage to the structure and function of reef communities in these areas. The location of areas to be covered by management restrictions would include a buffer zone to reduce any risk of accidental contact with the feature. The location of areas to be covered by management restrictions would be decided in consultation with fishers
	Remove/avoid pressures: This option would reduce the risk not achieving the conservation objectives for the reef feature within the site boundary to the lowest possible levels. Restrictions would be required for all demersal towed gears within the full extent of the site boundary. The site boundary already includes a buffer zone based on a ratio of 3:1 fishing warp length to depth around the known features to reduce any risk of accidental contact with the feature.
Demersal static gear	**No additional management:** This option is considered to be sufficient for demersal static gear to achieve the conservation objectives for the reef feature. However, if monitoring showed evidence of detrimental effects as a result of static gear activity in the future, additional management may be required.
	Reduce/limit pressures: This option would further reduce the risk of not achieving the conservation objectives for the reef feature. If fishing activity were to rise to levels at which damage was occurring, appropriate management could include partial closure of the feature and/or limits on the amount of gear that can be deployed.

61.2 Proposed management option and rationale

Table H3 provides details of the chosen management approach and further explanation is provided below.

Table H3: Chosen management approach

Protected feature	Gear type	Option chosen	Approach to management
Bedrock and Stony reef	Demersal mobile gear	Remove / avoid pressure	Prohibit all demersal towed gear fisheries from 99.41% of the reef habitat.
	Demersal static gear	No additional management	

The management boundary has been drawn closer to the reef feature than the SAC boundary. At the stakeholder workshop it was evident that vessels tow their gear parallel to the reef meaning gear width is the determining metric rather than water depth / warp length. The amount of reef that will be exposed to continued fishing pressure is insignificant when compared to the scale of the habitat within this SAC.

Table J4 demonstrates the management measures proposed will protect more than 99% of the reef habitat within the SAC.

Table J4: Proportion of reef habitat protected

Reef type	Area of habitat within the protected area (km^2)	Area of reef within management area (km^2)	% of reef habitat protected from demersal mobile gear
Bedrock	108.546	107.955	99.46%
Bedrock and Stony	347.884	347.653	99.93%
Stony	128.666	126.027	97.95%
Total	**585.096**	**581.635**	**99.41%**

62 Measures envisaged for control, enforcement and compliance

This section describes the measures that are proposed for implementation.

62.1 Vessel Monitoring System

The frequency of data transmissions shall be at least once every 30 minutes when a vessel is within the SAC boundary.

62.2 Key provisions to include in EC Regulation

Table J5 provides details of the gear types to be prohibited by the measures and Tables J6 and J7 provide co-ordinates of the areas to which the measures should be applied. All of the co-ordinates are provided in WGS84 datum and the last co-ordinate joins back to the first in the table. All co-ordinates are joined by geodesic lines. The measures are shown on the map in figure J2.

Table J5: Demersal fishing gears to be prohibited

Gear types to be prohibited by the proposed measures	Habitat / Species	Gear code Annex XI in EU Regulation No. 404/2011	International standard Classification of Fishing Gears (ISSCFG)
Beam trawl	1170	TBB	TBB
Bottom trawl	1170	OTB, OTT, PTB, TBN, TBS, TB	OTB, OTT, OT, PTB, TB
Seines	1170	SDN, SSC, SX, SV	SB, SV, SDN, SSC, SPR, SX
Dredges	1170	DRB , HMD	DRB, DRH

Table J6: Co-ordinates of prohibited area 1 (dredge, beam trawl, bottom trawl and seines)

Point	Latitude	Longitude
AO	60° 46.128' N	000° 04.261' E
AP	60° 45.626' N	000° 07.143' E
AQ	60° 44.346' N	000° 07.076' E
AR	60° 44.416' N	000° 03.949' E

Table J7: Co-ordinates of prohibited area 2 (dredge, beam trawl, bottom trawl and seines)

Point	Latitude	Longitude
A	60° 14.509' N	000° 39.082' W
B	60° 17.356' N	000° 36.826' W
C	60° 19.510' N	000° 32.790' W
D	60° 23.486' N	000° 30.081' W
E	60° 26.282' N	000° 30.129' W

Point	Latitude	Longitude
F	60° 26.807' N	000° 31.584' W
G	60° 26.807' N	000° 31.584' W
H	60° 28.605' N	000° 30.686' W
I	60° 31.554' N	000° 27.487' W
J	60° 33.559' N	000° 25.782' W
K	60° 35.571' N	000° 25.281' W
L	60° 38.357' N	000° 22.706' W
M	60° 39.990' N	000° 18.473' W
N	60° 43.825' N	000° 16.836' W
O	60° 45.235' N	000° 12.444' W
P	60° 46.867' N	000° 10.410' W
Q	60° 48.492' N	000° 09.390' W
R	60° 47.266' N	000° 02.319' W
S	60° 45.552' N	000° 01.869' W
T	60° 44.569' N	000° 03.119' W
U	60° 38.162' N	000° 03.647' W
V	60° 36.709' N	000° 00.442' E
W	60° 34.197' N	000° 05.927' W
X	60° 34.097' N	000° 06.178' W
Y	60° 30.519' N	000° 08.188' W
Z	60° 30.377' N	000° 11.982' W
AA	60° 28.425' N	000° 11.669' W
AB	60° 24.691' N	000° 14.381' W
AC	60° 23.803' N	000° 10.926' W
AD	60° 22.489' N	000° 10.716' W
AE	60° 21.954' N	000° 11.858' W
AF	60° 23.254' N	000° 16.880' W
AG	60° 21.904' N	000° 18.472' W
AH	60° 19.043' N	000° 18.884' W
AI	60° 18.116' N	000° 20.027' W
AJ	60° 16.869' N	000° 22.670' W
AK	60° 17.055' N	000° 23.613' W
AL	60° 17.699' N	000° 26.872' W
AM	60° 14.438' N	000° 31.703' W
AN	60° 13.618' N	000° 37.952' W

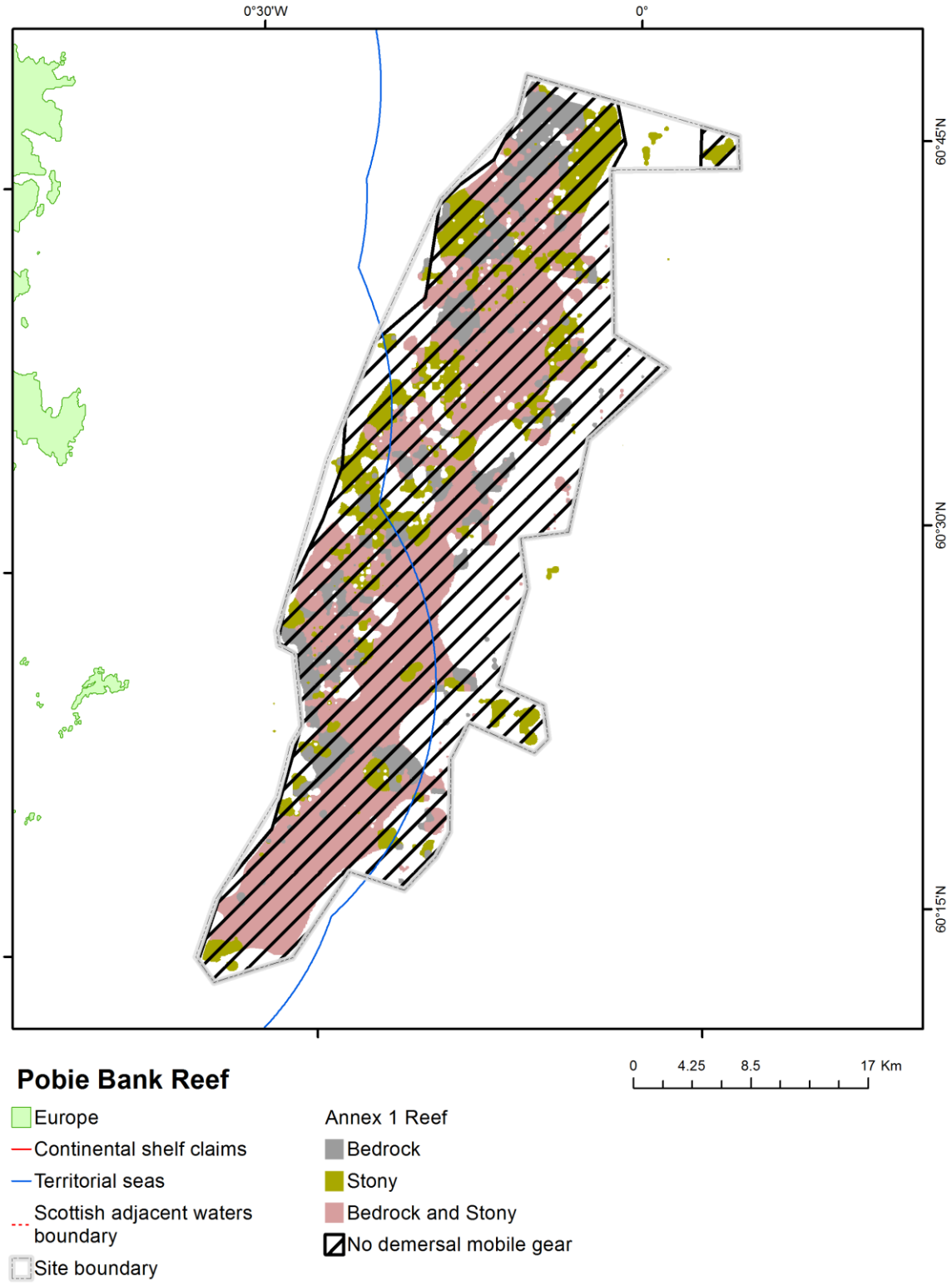

Figure H3: Pobie Bank Reef SAC map with proposed management measures

63 Fleet activity at Pobie Bank Reef SAC

In this section the potential effect of the measures on fishing effort and value is estimated. These estimates are based on data from 2009 to 2013 using the methodology described in section 9.

63.1 Fishing effort

The management measures for this site apply to all demersal mobile gears. Therefore table H8 below amalgamates all of this effort to produce a yearly average.

Table H8: Average yearly effort (2009 – 2013) per ICES rectangle relevant to Pobie Bank SAC using demersal mobile gear

Nation	Rectangle	Avg annual hours effort ICES rectangle	Of which avg annual hours effort site	Of which avg annual hours affected by management
DNK	49E9	14	0	0
DNK	50E9	10	3	2
DNK	50F0	15	0	0
UK	49E9	2891	50	36
UK	50E9	9093	343	222
UK	50F0	6343	43	17

In addition there is some gill net effort within Pobie Bank SAC, although this method is unaffected by the proposed management measures. This effort is shown in table H9 below

Table H9: Average yearly effort (2009 – 2013) per ICES rectangle relevant to Pobie Bank SAC using gill nets

Nation	Rectangle	Avg annual hours effort ICES rectangle	Of which avg annual hours effort site	Of which avg annual hours affected by management
UK	49E9	49	44	0
UK	50E9	485	403	0

63.2 Fishing value

Based upon the economic data provided by member states the value of the site, and the value of the management area can be derived. This is done by taking the proportion of the average for the relevant ICES rectangle based upon the amount of effort expended for each gear type in question. Table H10 show the average values derived for the reference period. This is depicted in Figures H3 to H5 though a kernel density estimation of Vessel Monitoring System data.

Table H10: Estimated economic value of mobile gear fisheries at Pobie Bank SAC (average of 2009 – 2013)

Nation	gear	Avg annual value in relevant ICES rectangles (Euro)	Avg annual value in SAC (Euro)	Of which avg value affected by management (Euro)
DNK	Bottom trawl	308,984	23,768	15,845
UK	Bottom trawl	11,247,188	280,452	178,652
UK	Seines	1,445,445	11,499	9,085

64 Assessment of potential displacement effects

The amount of displacement is estimated to be 1.5% of the ICES rectangle demersal mobile gear activity (277 hours out of 18,366). Therefore it is concluded that the effort displaced can be absorbed by other fishing grounds in the relevant ICES rectangles.

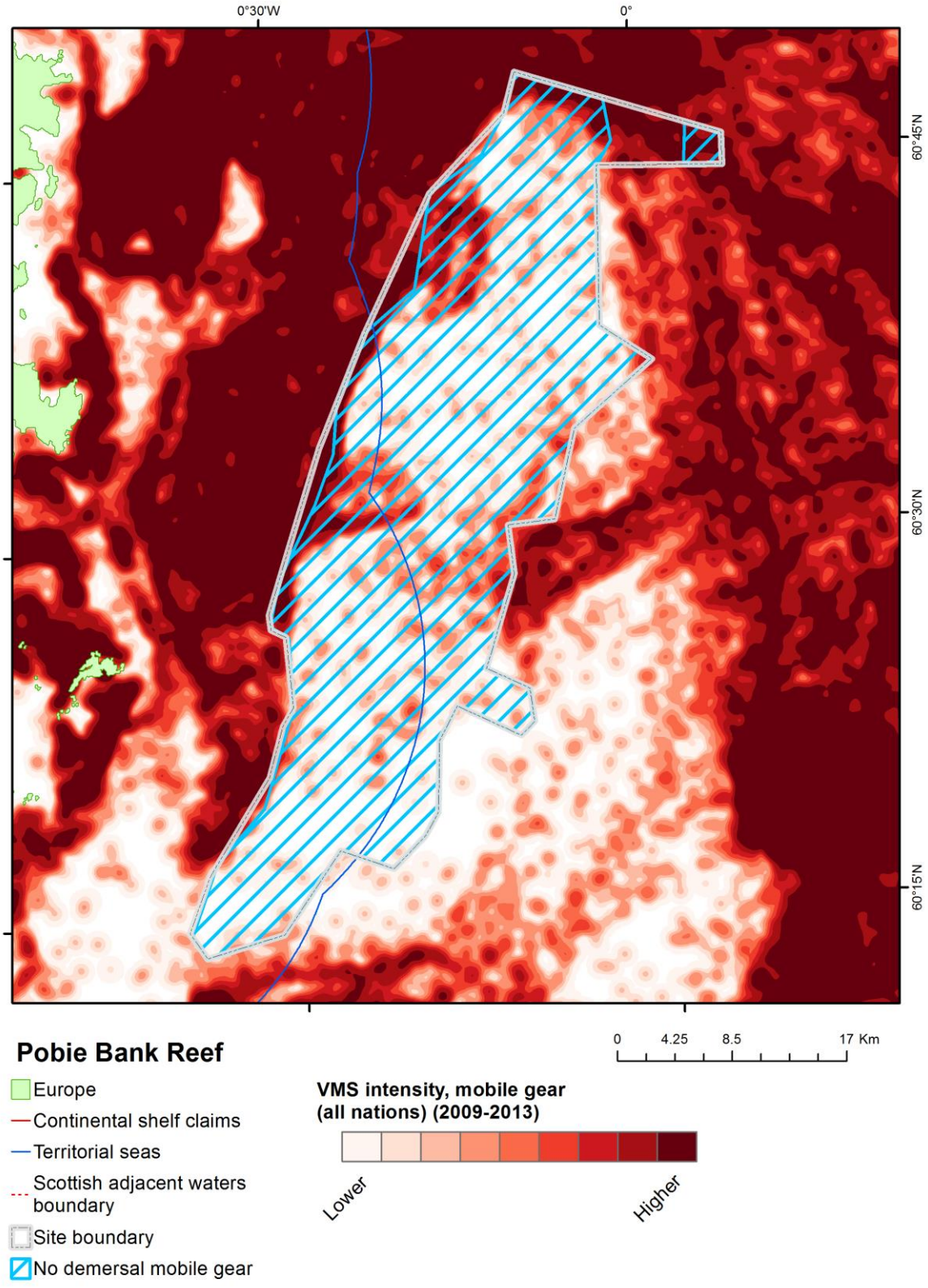

Figure H4: Pobie Bank SAC map of proposed measures with mobile fishing VMS intensity layer for all vessels 2009-13

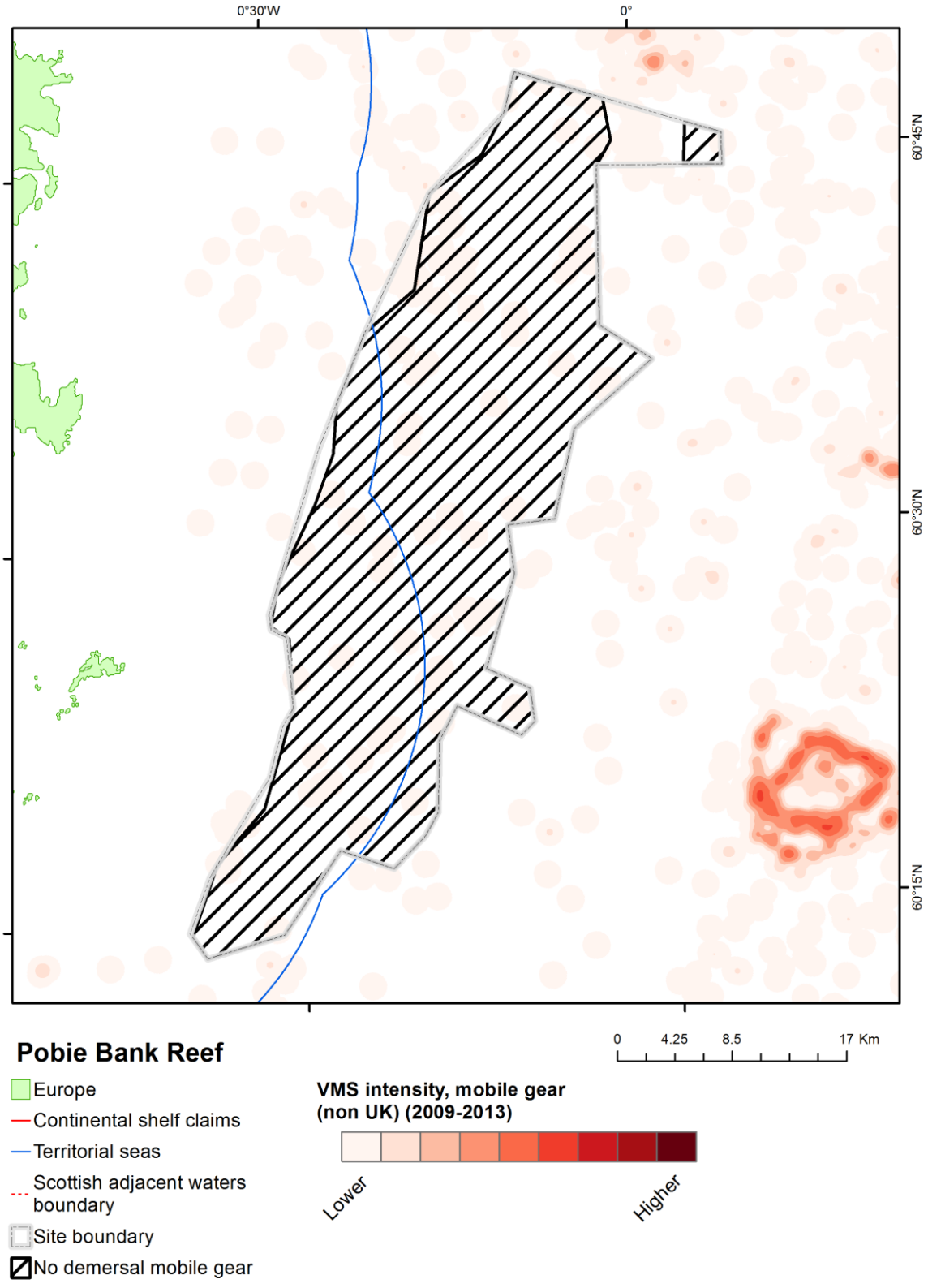

Figure H5: Pobie Bank SAC map of proposed measures with mobile fishing VMS intensity layer for non-UK European Union vessels 2009-13

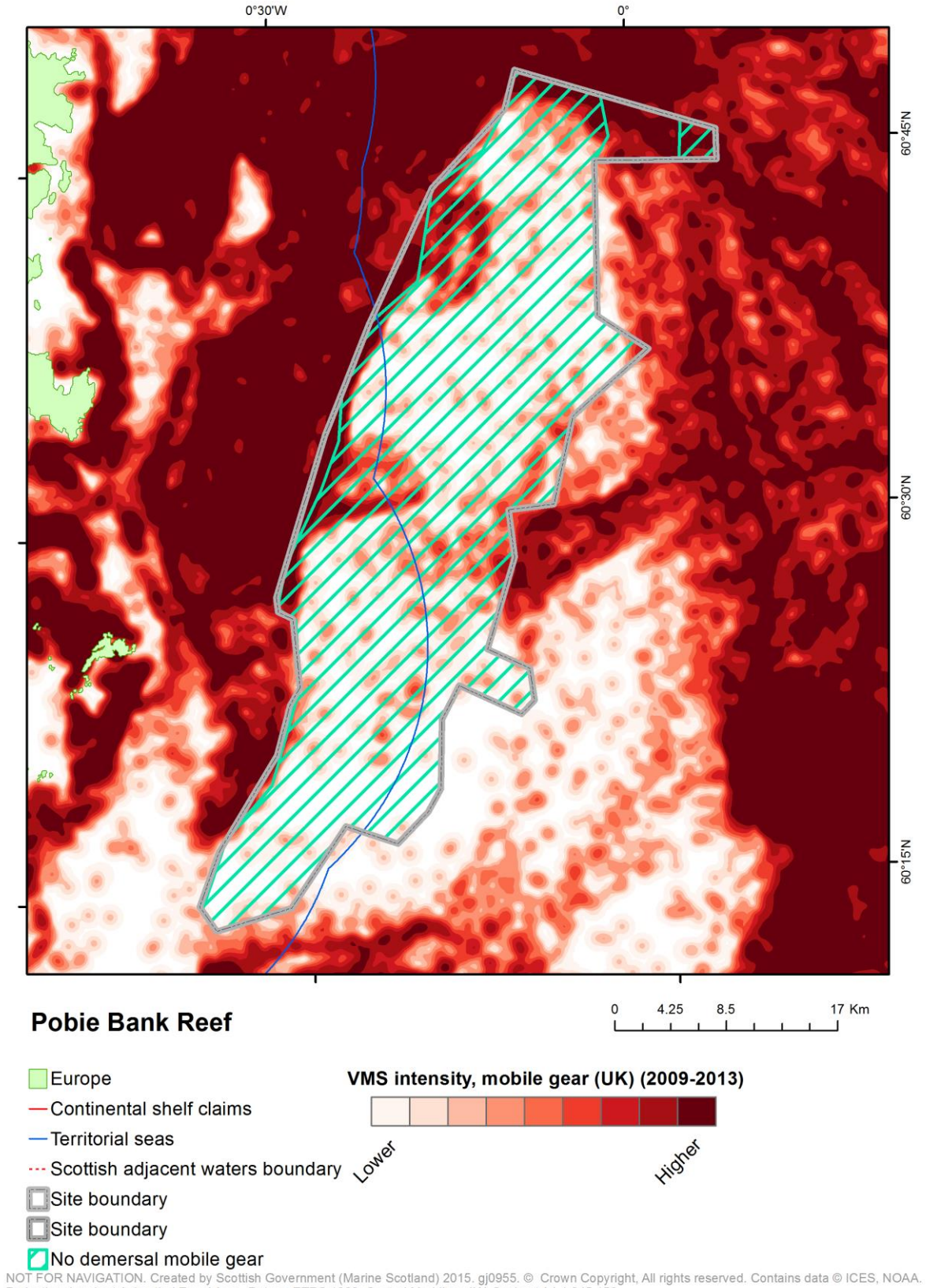

Figure H6: Pobie Bank SAC map of proposed measures with mobile fishing VMS intensity layer for UK vessels 2009-13

65 Appropriate Assessment

The management proposal for this site does not provide 100% protection of the reef habitat. Therefore an Appropriate Assessment in accordance with Article 6(3) of the EU Habitats Directive has been undertaken.

65.1 Fishing activity

This is described in this document at section 63 and in figures H3 to H5.

The management proposal is described in sections 61 and 62, with the proposed management measures shown in Figure H2. Table H4 provides details of the Annex I reef subtypes present with the SAC, and the proportion of each that would be protected by the management measures. In each case this proportion is greater than 99%.

65.2 Requirements of the EU Habitats Directive

Article 6(3) of the Habitats Directive contains the condition that “Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site’s conservation objectives”

Continuation of commercial fishing activity potentially overlapping the Annex I feature of the SAC is not be considered necessary to the management of the site. Therefore there is an obligation to apply the Likely Significant Effect test.

65.3 Test of Likely Significant Effect

A review of available sensitivity information was conducted to assess whether the proposed activities are likely to have a significant effect on the Annex I Reef within the Pobie Bank SAC.

65.3.1 Sensitivity of Pobie Bank SAC habitats to pressures associated with mobile fishing gear

According to JNCC Conservation Objectives and Advice on Operations (JNCC, 2013), the on-going mobile demersal fishing activities (otter trawling) are associated with the following pressures at Pobie Bank:

- Physical damage through physical disturbance or abrasion
- Biological disturbance through the selective extraction of species

65.3.2 Sensitivity assessment for Pobie Bank SAC

JNCC advice on Conservation Objectives and operations provides a generic sensitivity assessment for the features of the Pobie Bank SAC. This assessment has been drawn principally from MarLIN's evaluation of the following biotope:

'Erect sponges, Eunicella verrucosa and Pentapora fascialis on slightly tideswept moderately exposed circalittoral rock CR.HCR.XFa.ByErSp.Eun)'

It should be noted that this biotope is not identical to the habitats present within the SAC, but was considered the closest match for which a MarLIN sensitivity assessment was available and comparable in terms of functionality.

The JNCC overall sensitivity assessment for the pressures associated with the proposed trawling activities is presented below:

Physical damage through physical disturbance or abrasion

Physical abrasion (for example, by mobile fishing gear) can damage the interest feature and its typical species. Physical abrasion is likely to reduce the structural complexity of the feature (for example, by damaging erect epifaunal species such as *Alcyonium digitatum*, *Axinellid* sponges and massive sponges) and reduce biodiversity through the selective removal of large, sessile, long-lived species from the community (Sewell & Hiscock, 2005). Many of the feature's typical species are permanently attached to the substratum and will not re-attach once displaced. Sensitivity to physical disturbance and abrasion is therefore assessed as high.

Biological disturbance through the selective extraction of species

The selective extraction of species by fisheries can include:

- Removal of target species
- Mortality of non-target species

The biological effects of fisheries can include the removal of target species and the mortality of non-target species. Fish associated with the reefs may be targeted by commercial fisheries. Where this occurs, these effects can lead to shifts in community structure (e.g. if predators are removed from the system) which then lead to indirect effects on the food web as a whole. It is important to note that due to the paucity of evidence on the biological sensitivity of the interest feature, our understanding is likely to evolve over time.

In addition to this generic sensitivity assessment, this assessment also considers the impacts of fishing on rock habitat in the Pobie Bank SAC.

65.3.3 Likely Significant Effect test conclusion

Taking the available sensitivity information into account and the potential impact of mobile demersal gears, it is considered that the proposed operations could have a likely significant effect on the Annex I features of the sites. An Appropriate Assessment of the risks that on-going fishing activities may pose to the features of the sites is presented below.

65.4 Appropriate Assessment of risk to Annex I reef habitat

The reef is located on a bank of metamorphic and sedimentary rocks covered by a patchy veneer of sediment, ranging from sandy gravels to slightly gravelly sands. The reef is composed of a combination of stony and bedrock reef which meet the definition of the Annex I habitat type 1170: Reef, under the EU Habitats Directive.

In the central section of the reef, very large, rugged bedrocks outcrop from areas of sand and this represents the most topographically complex area. In most areas these outcrops are surrounded by large boulders and cobbles in a sandy matrix. Towards the north and south of the reef, bedrock outcrops are smoother and integrated with extensive areas of stony reef.

The reef provides a habitat to an extensive community of encrusting and robust sponges and bryozoans, which are found throughout the site. In the shallowest areas the bedrock and boulders also support encrusting coralline algae. Axinellid cup sponges (*Axinella infundibuliformis*) are common on the bedrock and stony reef at depth ranges of 70m to over 100m. The bryozoan *Omalosecosa ramulosa* is also common on these reefs, but this species is rare in inshore sites in this regional sea. In the deepest areas (>100m), low-lying silty bedrock is commonplace, supporting small erect sponges, cup corals (*Caryophyllia smithii*) and the brittlestar *Ophiura albida*.

Physical damage through physical disturbance or abrasion

Rocky habitats can vary in their hardness and therefore resistance to damage from towed demersal gears, however, harder examples of the substrate (e.g. metamorphic rocks) are typically more resistant to damage than softer examples. (e.g. shales and chalk).

Towing fishing gear across rocky substrates is likely to cause damage or death of attached species, and reduce habitat complexity as boulders and cobbles associated with the hard substrate are moved around. Recovery times for impacted habitat are likely to be longer than for softer sediments although the current management proposal for Pobie Bank SCI ensures the protection from mobile demersal gears of 99.4% of the reef feature, therefore the risk of not achieving the conservation objectives is likely to be very low.

Biological disturbance through the selective extraction of species

The biological effects of fisheries can include the removal of target species and the mortality of non-target species. However, the reef feature is typically exposed to a low level of selective extraction of species through demersal fishing as trawling effort is concentrated in the wider area surrounding the site.

65.5 Mitigation measures

No additional mitigation measures are being considered in this assessment.

65.6 Conclusion of site integrity test

Marine Scotland considers that the proposed operations would not represent an adverse effect on the site integrity of Pobie Bank SAC, primarily because;

There is no risk of reduction in reef extent from ongoing fishing activities

The footprint of the activity equates to <1% of the Annex I reef feature within the site

In 2009 to 2013 the parts of the SAC that would remain exposed to potential mobile gear fishing pressure were only fished for an average of 160 hours per year (derived from Table H8). This is the equivalent of less than 1 week of fishing pressure per year.

Continuation of activities may result in a temporary loss of amenity but it is expected that any effects would be reversible and recovery is likely in the longer term (Kaiser et al., 2006)

Section J

66 Scanner Pockmark Special Area of Conservation (SAC)

66.1 Site description

The Scanner Pockmark SAC contains 61 pockmarks of varying sizes. Four of these are unusually large and occur in two pockmark complexes. The SAC itself is just 3km^2 in area, as shown in Figures 2 and J1.

The pockmarks were created by the expulsion of shallow methane gas and have been maintained by active gas seepage. At the base of the pockmarks, blocks of 'methane derived authigenic carbonate' (MDAC) have been recorded. These carbonate rocks, formed by the precipitation of calcium carbonate and cementation of the surrounding sediment, have been identified as the Annex I habitat 'submarine structures made by leaking gases' (Habitats Directive feature H1180).

There is some evidence of chemosynthetic bacteria in the Scanner pockmark, which grow by oxidising sulphur and may support some of the site's other notable fauna. The most important species present from a conservation perspective is the gutless nematode *Astomonema southwardorum*, which may derive some of its nutrition from chemosynthetic bacteria (Austin et al., 1993). Other important species associated with the gas seepage in the pockmark are the bivalves *Thyasira sarsi* and *Lucinoma borealis.*

The presence of carbonate structures formed from leaking gases was confirmed by survey using ROV (remote operated vehicle), but the location and extent of carbonate blocks has not been precisely mapped. The latest survey data indicates the location of all pockmarks within the site and further locations which there could be MDAC or other hard substrates types on the seafloor (Figure J2; Gafeira & Long, 2015).

An overview of the data used to support site identification along with information on confidence in feature presence and extent is available in the JNCC Scanner Pockmark SAC Site Information Centre.

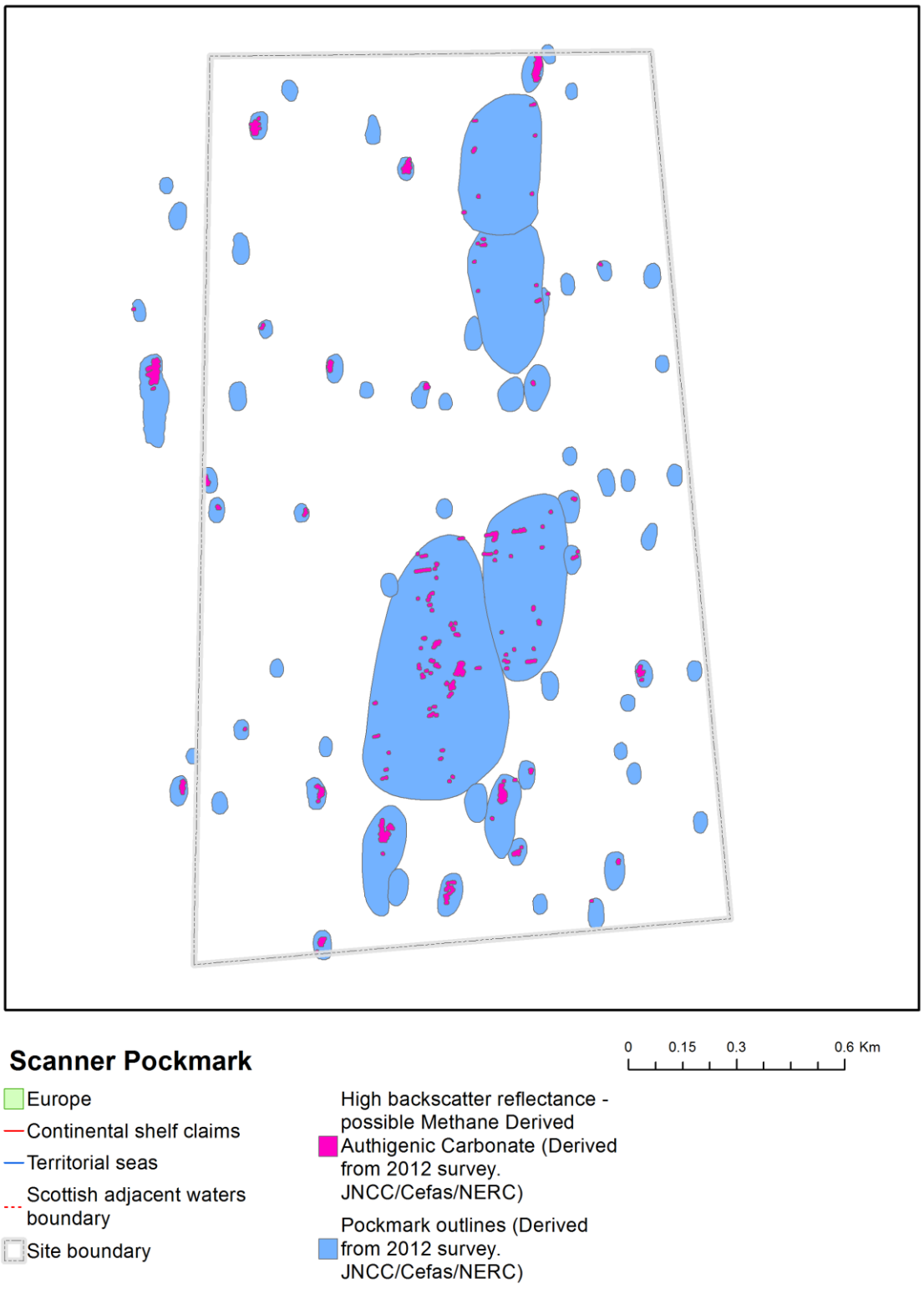

Figure J1: Scanner Pockmark SAC site map including distribution of protected features

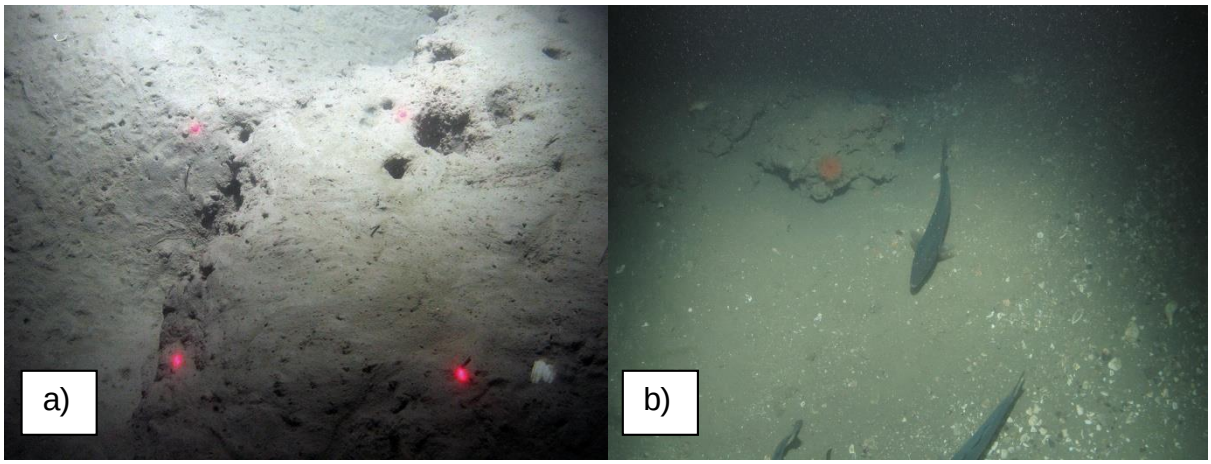

Figure J2: Images representing a) nephrops (*Nephrops norvegicus*) burrows in soft sediment within the Scanner Pockmark SAC ©JNCC/Cefas. Image b) is representative of the submarine structures formed by leaking gases, showing methane derived authogenic carbonate protruding from sediment with a colourful anemone (*urticina*) ©JNCC/Cefas

66.2 Why the site was designated

The Scanner Pockmark site is in the northern North Sea, and represents the Annex I feature Submarine structures made by leaking gases (H1180) in the Natura 2000 network. The faunal communities are representative of those present on submarine structures made by leaking gases, consisting principally of anemones (*Bolocera tuediae, Urticina felina* and *Metridium senile*), as well as chemosynthetic organisms (Dando et al., 1991). However, the morphology of the carbonate structures is not very varied and the habitat is not especially extensive at the base of the pockmark

66.3 The site boundary

The site was defined using the JNCC marine SAC boundary definition guidelines (JNCC, 2012a). The boundary was drawn around the known extent of the pockmarks at the time in a simple polygon. This included a buffer of 375m measured from the edge of the pockmark depression which equates to 3 times the maximum water depth of 125m. This results in the SAC being just 3km^2 in area with "submarine structures made by leaking gases" found throughout in two main complexes.

The Scanner pockmark complex comprises two large pockmarks with a combined area of approximately 320,000m^2 and depths of up to 16.7m below the surrounding sea floor. These pockmarks have a considerably greater volume than more typical pockmarks in the vicinity of the site.

The Scotia pockmark complex is formed by the Northern Scotia pockmark (approximately 76,000m^2 in size with a depth of 12m below the level of the surrounding seabed) and the Southern Scotia pockmark (least 72,400m^2 with a depth of 14.5m). Numerous surveys since the 1990s have found evidence for the active seepage of methane in this complex, but the location and extent of carbonate blocks has not been precisely mapped.

66.4 Conservation objectives

The conservation objective for the Scanner Pockmark SAC is to, subject to natural change, restore the submarine structures made by leaking gases to favourable condition, such that:

- The natural environmental quality is restored;
- The natural environmental processes are maintained; and
- The extent, physical structure, diversity, community structure and typical species representative of the submarine structures made by leaking gases in the Northern North Sea are restored.

67 Anthropogenic pressures

67.1 All demersal mobile gear (including dredge, beam trawl, demersal otter trawl, and seines)

Direct evidence of impacts of towed gears to submarine structures made by leaking gasses is limited. However, the biological communities that develop on exposed structures typically include many of the same species that can be found on subtidal rocky habitats in similar environmental conditions and it is likely that the effects of fishing will be similar.

The use of towed fishing gears is likely to cause damage or death of fragile, erect species, such as sponges and corals (Freese et al., 1999; Løkkeborg, 2005). Other species such as hydroids, anemones, bryozoans, tunicates and echinoderms are vulnerable to mobile fishing gear (McConnaughey et al., 2000; Sewell & Hiscock, 2005). Recovery is likely to be slow (Foden et al., 2010). Where fragile, slow growing species occur, even low levels of fishing have the potential to change the structure and function of the habitats and may result in the loss of some characteristic species.

67.2 All demersal static gear (including gillnets, trammel nets, long lines, pots and traps)

There is no direct evidence from which to determine impacts of static gears on submarine structures made by leaking gases. However, the biological communities that develop on exposed structures typically include many of the same species that can be found on subtidal rocky habitats in similar environmental conditions and it is likely that the effects of fishing will be similar.

Mechanical impacts of static gear (e.g. weights and anchors hitting the seabed, hauling gear over seabed, rubbing/entangling effect of ropes) can damage some species (Eno et al.,1996). Other species appear to be resilient to individual fishing operations but the effects of high fishing intensity are unknown (Eno et al., 2001). Recovery may be slow, resulting in significant reduction or even loss of characteristic species (Foden et al., 2010). The individual impact of a single fishing operation may be slight but cumulative damage may be significant (Eno et al., 2001; Foden et al., 2010).

67.3 Other human activities

Oil and gas industry activities occur within and nearby to the site. The south-east corner of the SCI overlaps with the Blenheim oil field (production ceased) and the site itself contains two abandoned, explorative oil wells.

68 Proposed fisheries management measures

This section provides details of how the measures were determined.

68.1 Options considered for fisheries management

Table J1 provides a summary of the management advice set out against the various options that have been considered.

Table J1: Summary of fisheries management advice

Activity	Management options considered
Demersal mobile gears	**No additional management:** There is a significant risk of not achieving the conservation objectives for the submarine structures caused from leaking gases.
	Reduce/limit pressures: This option would reduce, but not entirely eliminate, the risk of degradation to the submarine structures caused from leaking gases feature as a result of direct impact from fishing activities. Appropriate management could include closure of the known extent of the feature within the site. However, a risk of impact with patches of feature not identified during survey would remain. As current evidence suggests that the feature is not exposed, the risk of damage to the feature is likely to be highest for heavy gear components thus restrictions may be appropriate for these gears. Areas to be covered by management restrictions would include a buffer zone around the known features equal to three times the water depth to reduce any risk of accidental contact with the feature. The location of areas to be covered by management restrictions would be decided in consultation with fishers.
	Remove/avoid pressures: This option would reduce the risk of degradation to any submarine structures made by leaking gases feature within the site boundary to the lowest possible levels. Due to the potential for re-exposure of feature, restrictions would be required for all demersal towed gears within the full extent of the site boundary. The boundary already includes a buffer zone around the known features equal to three times the water depth to reduce any risk of accidental contact with the feature.
Demersal static gears	**No additional management**: The risk of deterioration of the submarine structures made by leaking gases from set netting is considered minimal. This option is considered appropriate for all demersal static gears. However, if static gear fishing were to increase and monitoring showed evidence of detrimental effects, it may be necessary to apply restrictions in the future

68.2 Proposed management option and rationale

Table J2 provides details of the chosen management approach and further explanation is provided below.

Table J2: Chosen management approach

Protected feature	Gear type	Option chosen	Approach to management
Submarine structures made by leaking gases	Demersal mobile and static gears	Remove / avoid pressure	Prohibit all demersal fisheries from the SAC.

Management measures are proposed for demersal towed gears to remove the risk to achieving the conservation objective posed by these gears. In addition, while the risk to achieving the conservation objective posed by demersal static gears is considered minimal, the scale of this site means that control and enforcement of fishing activity within the SAC would be very difficult. Therefore the simplest approach is to prohibit all demersal gears across the whole SAC.

69 Measures envisaged for control, enforcement and compliance

This section describes the measures that are proposed for implementation.

69.1 Vessel Monitoring System

The frequency of data transmissions shall be of at least once every 10 minutes whilst any fishing vessel is within the site boundary.

69.2 Key provisions to include in the EC Regulation

Table J3 provides details of the gear types to be prohibited by the measures and Table J4 provides co-ordinates of the area to which the measures should be applied. All of the co-ordinates are provided in WGS84 datum and the last co-ordinate joins back to the first in the table. All co-ordinates are joined by geodesic lines. The measures are shown on the map in figure J3.

Table J3: Demersal fishing gears to be prohibited

Gear types to be prohibited by the proposed measures	Habitat	Gear code Annex XI in EU Regulation No. 404/2011	International standard Classification of Fishing Gears (ISSCFG)
Beam trawl	1180	TBB	TBB
Bottom trawl		OTB, OTT, PTB, TBN, TBS, TB	OTB, OTT, OT, PTB, TB
Seines		SDN, SSC, SX, SV	SB, SV, SDN, SSC, SPR, SX
Dredges		DRB , HMD	DRB, DRH
Gillnets and entangling nets		GN, GNC, GND, GNS, GTN, GTR	GEN, GN, GNC, GND, GNS, GTN, GTR
Hooks and lines		LHM, LHP, LL, LLD, LLS, LTL, LX	LHM, LHP, LLS, LLD, LL, LTL, LX
Pots and traps		FIX, FPO	FIX, FPO, FYK

Table J4: Co-ordinates of prohibited area

Point	Latitude	Longitude
A	58° 17.816' N	000° 57.701' E
B	58° 17.777' N	000° 58.949' E
C	58° 16.473' N	000° 58.995' E
D	58° 16.460' N	000° 57.468' E

70 Fleet activity in Scanner Pockmark SAC

This SAC is only 3km^2 in area. Therefore, it is not possible to assess fishing activity in the area with high certainty. A kernel density analysis of Vessel Monitoring System data for demersal gears is shown in Figures J4 and J5.

71 Assessment of potential displacement effects

The fishing effort that will be displaced is relatively low and therefore is unlikely to impact on any particular area. The SAC represents less than 0.01% of an ICES rectangle.

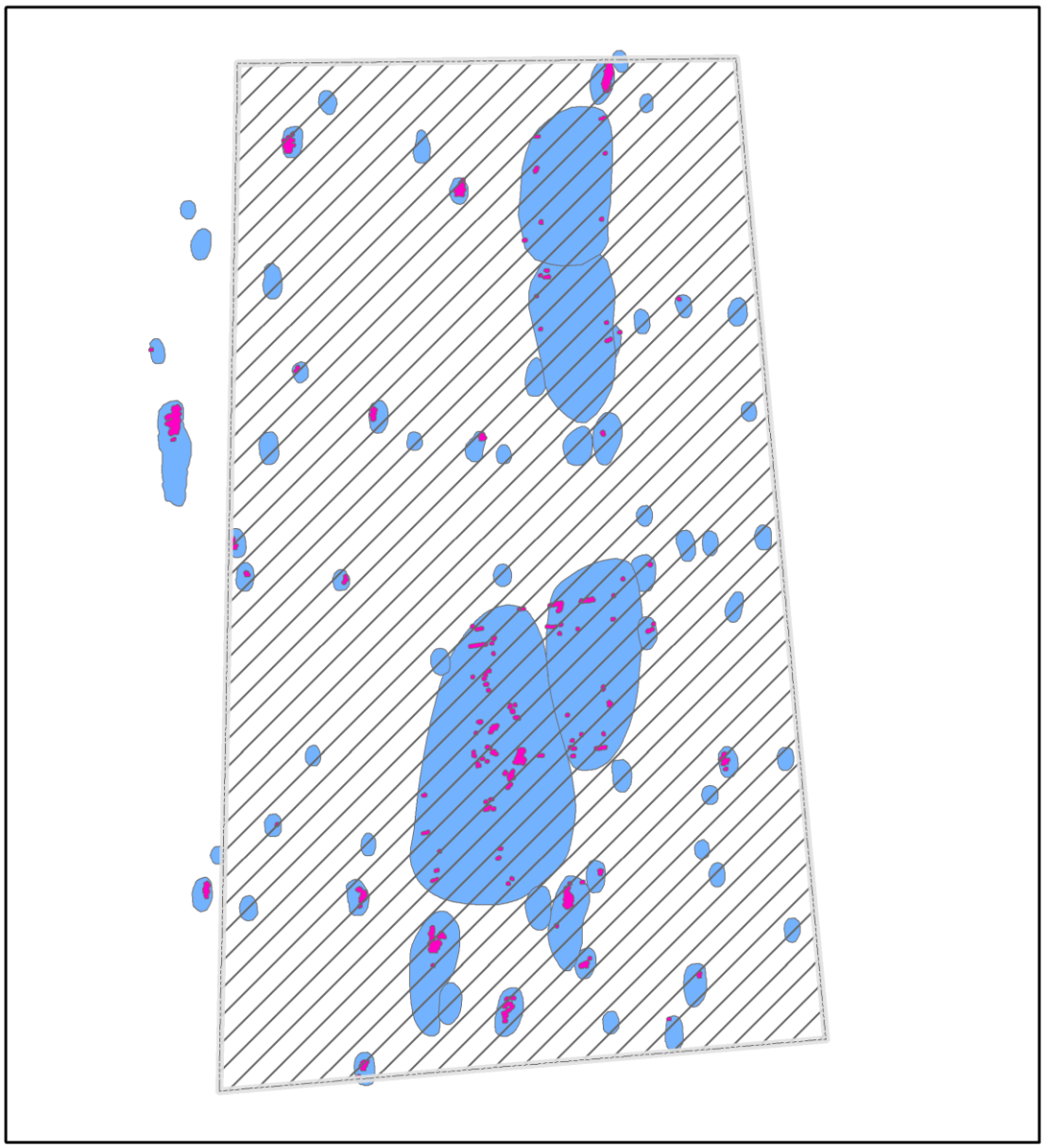

Figure J3: Scanner Pockmark SAC map of proposed measures

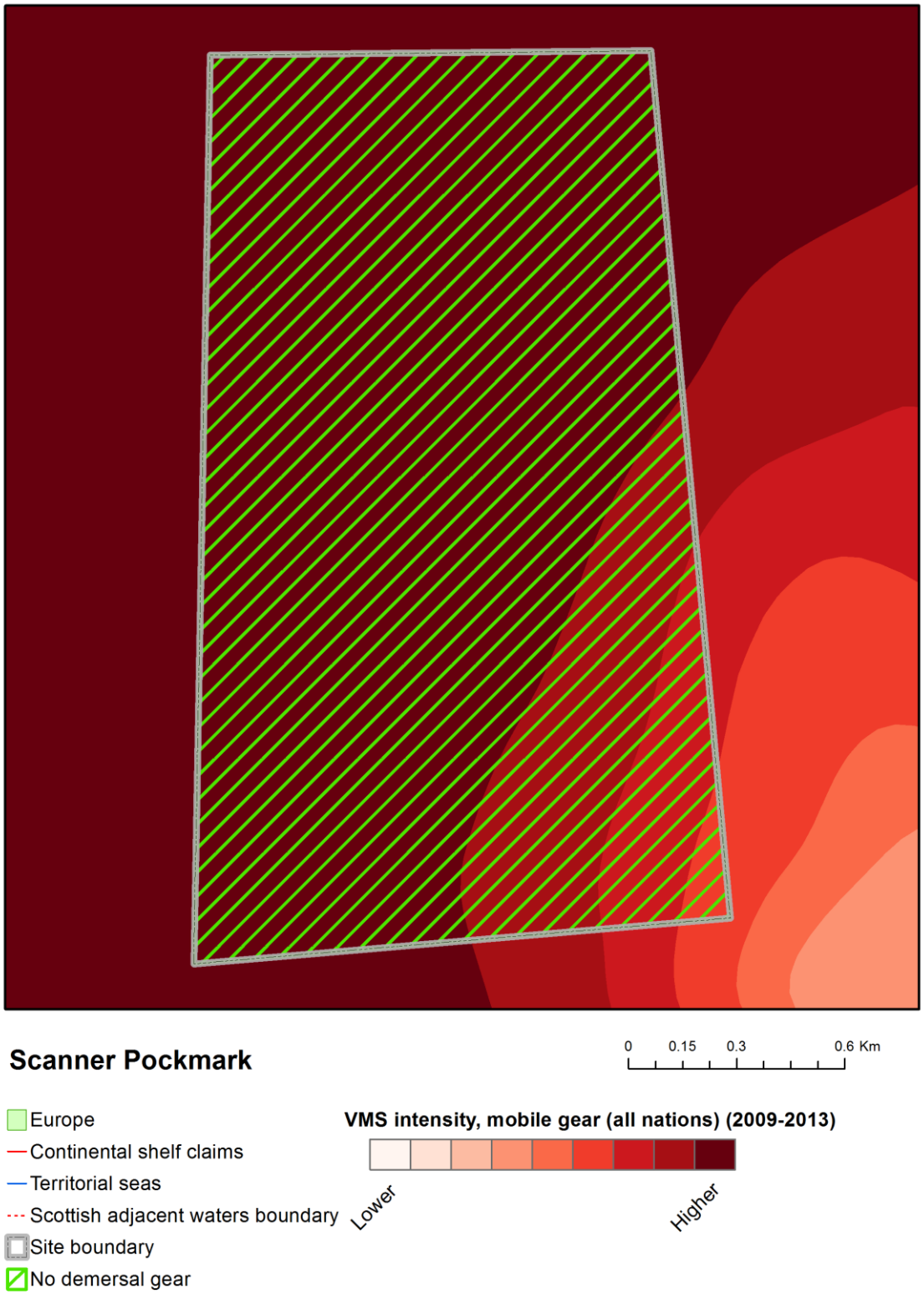

Figure J4: Scanner Pockmarks SAC map of proposed measures with mobile fishing VMS intensity layer for all vessels 2009-13

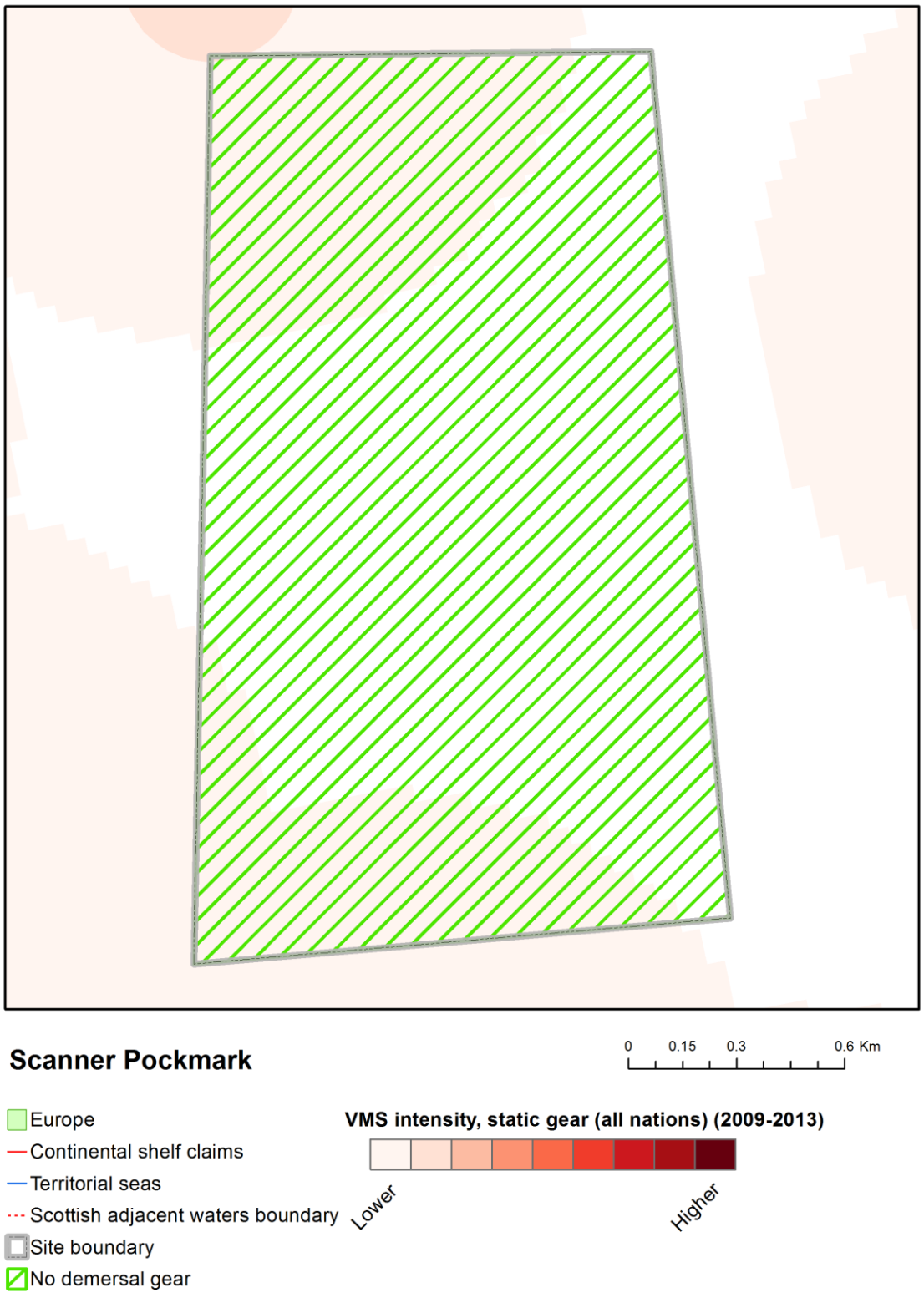

Figure J5: Scanner Pockmarks SAC map of proposed measures with static fishing VMS intensity layer for all vessels 2009-13

Section K

72 Turbot Bank MPA

72.1 Site description

This MPA for sandeels is located 44km east of Peterhead in the North Sea as shown in Figures 2 and K1. It forms part of a broader area of sandy sediment also known as 'Turbot Bank'. The MPA covers an area of 251km^2 and ranges in depth from 60m to 80m around the bank's margins.

Turbot Bank is important for sandeels, particularly Raitt's sandeel *Ammodytes marinus,* which is closely associated with sand habitats, living buried in the sand for months at a time. The site contains the type of sandy sediment with low silt and clay components that sandeels prefer (Figure K2; Wright et al., 2000; Holland et al., 2005). Data on sandeel larvae and models of larval transport indicate that the larvae hatching from Turbot Bank may be widely dispersed throughout the north-west North Sea (Proctor et al., 1998; Christensen et al., 2008). The sandeels present at Turbot Bank are one of two key components of ICES sandeel assessment 4 region (the other being the Firth of Forth banks; ICES, 2010).

Sandeels play an important role in the wider North Sea ecosystem, providing a vital source of food for seabirds such as Atlantic puffin *Fratercula arctica* and black-legged kittiwake *Rissa tridactyla*, fish such as plaice *Pleuronectes platessa* and marine mammals such as dolphins.

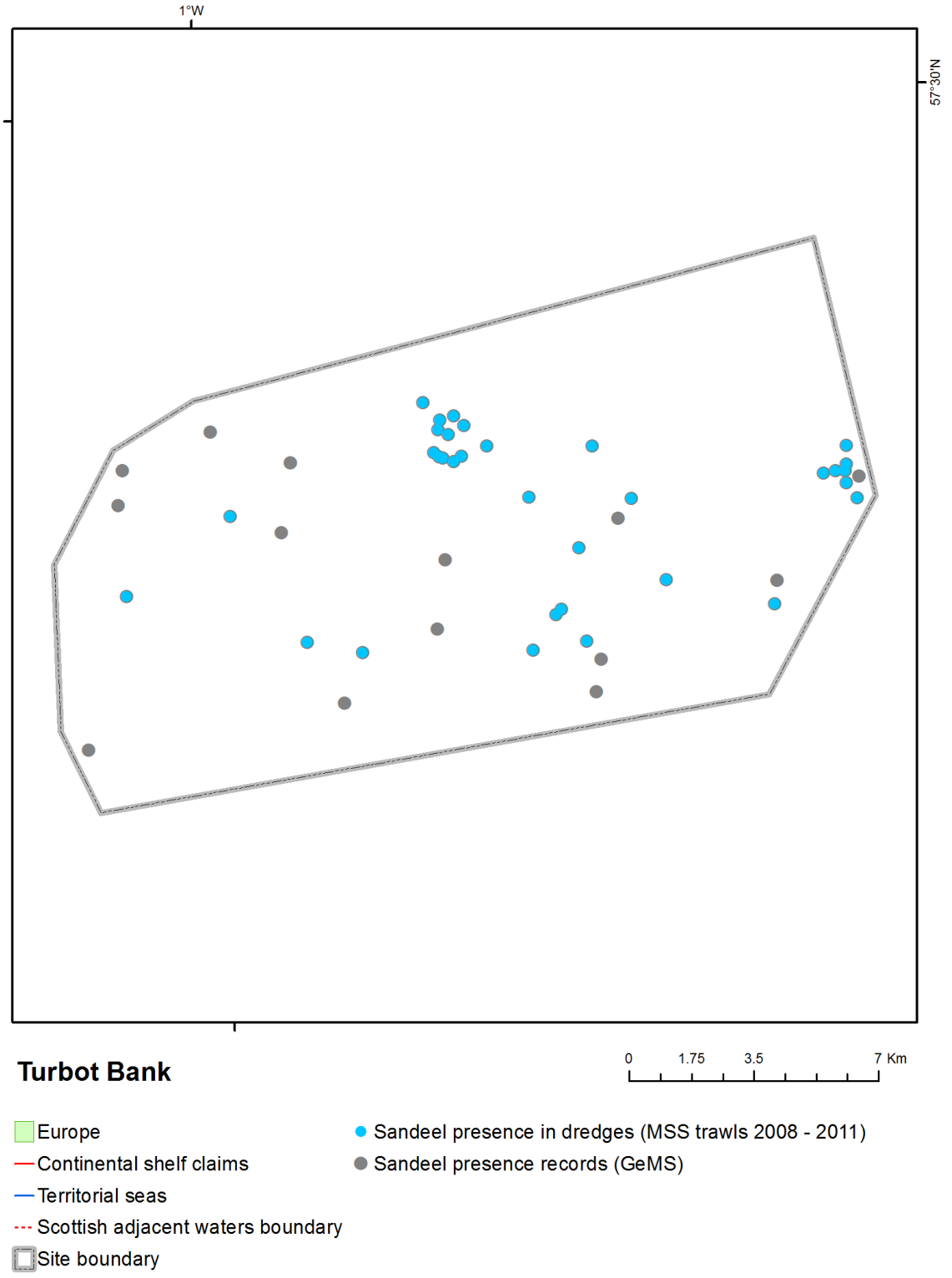

Figure K1: The Turbot Bank MPA site map including information on distribution of sandeels within the site

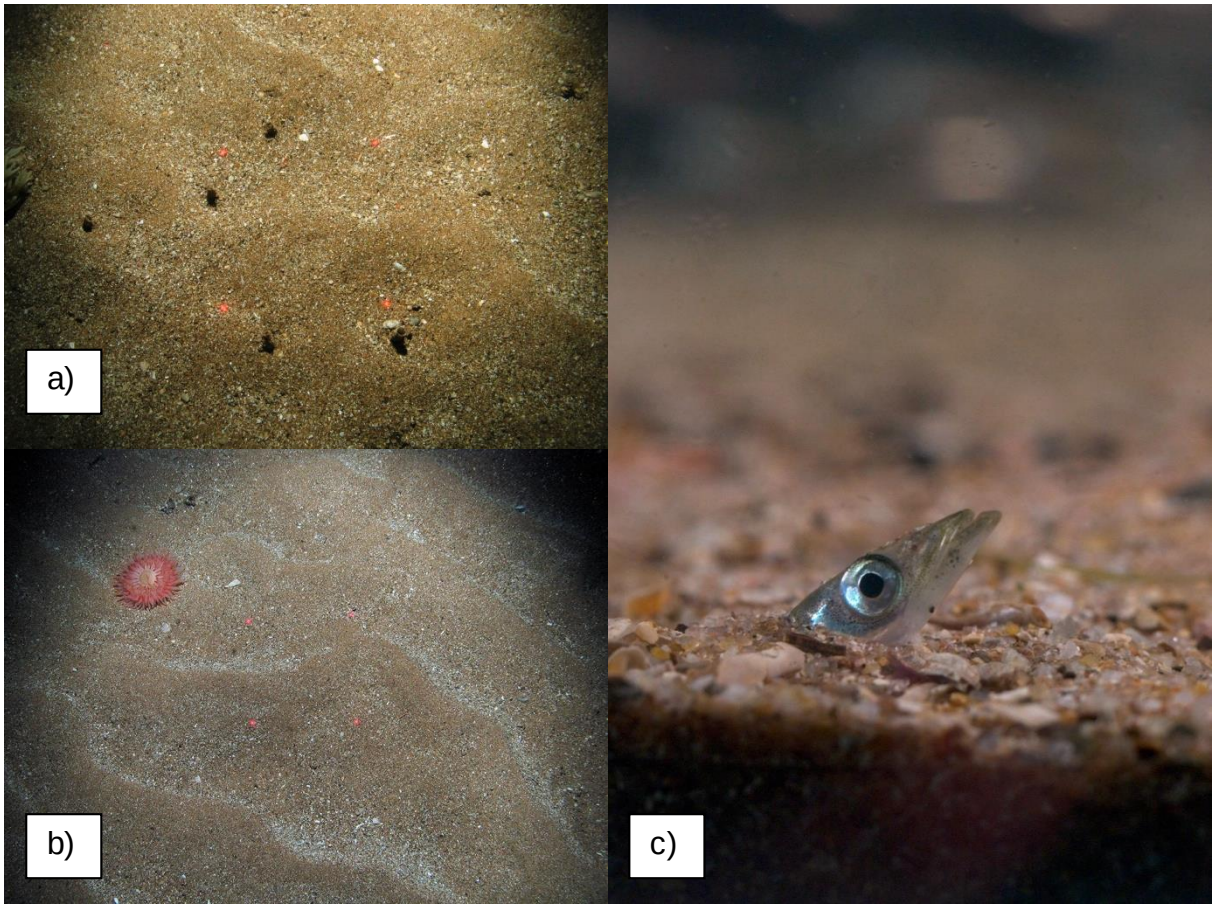

Figure K2: Images representing a) coarse sand and b) rippled sand with an anemone (*Urticina sp.*) within the Turbot Bank MPA - sediments typically associated with sandeels ©JNCC/Cefas. Image c) partially burrowed sandeel ©Keith Mutch, MSS.

72.2 Why the site was designated

Sandeels are considered to be a priority in terms of marine conservation in Scotland's seas and appropriate for spatial management. Further detail on the processes followed to identify priority marine features in Scottish offshore waters is publically available (JNCC, 2012b).

The MPA is considered an important area for the net export of sandeels to support recruitment in grounds to the south and east of Turbot Bank (Marine Scotland Science, 2012). Larvae from Turbot Bank may be widely dispersed throughout ICES sandeel assessment area 4 and occasionally beyond this area (Proctor et al., 1998; Christensen et al., 2008). The association between the sandeels with sediment types within the MPA is typical of that known for the species (Wright et al., 2000).

More information regarding the site selection process for the Turbot Bank MPA is available in the Detailed assessment against the Scottish MPA Selection Guidelines document.

72.3 The site boundary

The boundary has been set in accordance with the boundary setting principles outlined in the MPA Selection Guidelines[22].

It has been drawn to focus on the sample records of relatively high densities of sandeels together with areas of those sediments considered suitable for colonisation by sandeels in the vicinity of Turbot Bank. Population data came from the Marine Scotland Science (MSS) east coast sandeel dredge survey from 2008-2011, and samples collected in 2012 as part of a seabed habitat survey of Turbot Bank (Eggleton et al., 2013). Information on suitable sediments is based on the analysis in Wright et al. (2000) and the seabed habitat mapping (Sotheran & Crawford-Avis, 2014).

The boundary to the west reflects the full extent of the Turbot Bank shelf bank and mound feature based on interpretation of high resolution multibeam and backscatter data. This area is included because sandeels have been reported to aggregate in dense schools at the edge of banks, which may represent areas preferred for feeding (Van der Kooij et al., 2008).

Confidence in the presence and extent of the protected features has been set out in the Turbot Bank MPA Data Confidence Assessment.

[22] http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/mpaguidelines

72.4 Conservation objectives

Subject to natural change, conserve sandeels in favourable condition, such that:

- The species has continued access to resources provided by the MPA for, but not restricted to, feeding, courtship, spawning or use as nursery grounds;
- The extent and distribution of any supporting features upon which the species is dependent is conserved; and
- The structure and function of any supporting features, including any associated processes supporting the species within the MPA, is such as to ensure that the protected feature is in a condition which is healthy and not deteriorating.

More information regarding the conservation objectives is available in the Designation Order.

73 Anthropogenic pressures

73.1 All demersal mobile gear (including dredge, beam trawl, bottom trawl, and seines)

Sandeels are targeted using small-mesh demersal trawl gear. Most of the catch consists of *Ammodytes marinus*, but other sandeel species are caught as well. Industrial trawl fisheries targeting sandeels can cause local depletion and alter the age and size composition of the sandeel population. Depletion of the stocks may lead to reduced recruitment and export of larvae to other areas and reduced availability of prey for predators.

There is little evidence regarding the sensitivity of sandeels to other demersal towed gears. The larger-mesh trawl and seine nets used to catch whitefish and *Nephrops* do not generally catch sandeels and therefore are not expected to have any direct impact. There is some evidence that scallop dredges can kill sandeels buried in the sediment (Eleftheriou & Robertson, 1992), but work from Marine Scotland Science has shown that even when equipped with a fine mesh net to sample sandeels, the efficiency is < 12% (MSS, unpublished data) and not therefore considered to pose a significant risk.

The sensitivity of sandeels to hydraulic methods is likely to pose the greatest risk of all demersal towed gear used in Scotland based on the extent to which they penetrate/disturb the sediment.

73.2 All demersal static gear (including gillnets, trammel nets, long lines, pots and traps)

Sandeels are not caught by static gears and the impact of these gears is therefore considered to be minimal.

73.3 Other human activities

Oil and gas infrastructure occurs nearby to the site but there is currently no infrastructure inside the site itself.

74 Proposed fisheries management measures

This section provides details of how the measures were determined.

74.1 Options considered for fisheries management

Table K1 provides a summary of the management advice set out against the various options that have been considered.

Table K1: Summary of fisheries management advice

Activity	Management options considered
Demersal mobile gears	**No additional management:** JNCC considers this option is adequate to achieve the conservation objective for sandeels. The absence of a targeted sandeel fishery in this site at present means that there is currently a low risk to achieving the conservation objective. If a directed sandeel fishery were to develop in the future within the Turbot Bank MPA, there would be a risk of not achieving the conservation objective for sandeels, and appropriate management would need to be considered.
	Reduce/limit pressures: If a sandeel fishery were to develop in the future, this option would reduce the risk of not achieving the conservation objective for sandeels. Appropriate management could include a limit on catches to avoid localised depletion.
	Remove/avoid pressures: If a directed sandeel fishery (including fishing for scientific investigation) were to develop in the future, this

Activity	Management options considered
	option would reduce the risk of not achieving the conservation objective for sandeels to the lowest possible levels.
Demersal static gears	**No additional management:** It is unlikely that any additional management of static gear activities will be required as the risk of not achieving the conservation objective for sandeels associated with these activities is minimal. However, if static gear fishing activities were to start and monitoring showed evidence of detrimental effect, it may be necessary to apply limits in the future.

74.2 Proposed management option and rationale

Table K2 provides details of the chosen management approach and further explanation is provided below.

Table K2: Chosen management approach

Protected feature	Gear type	Option chosen	Approach to management
Sandeels	No sandeel fishery	Remove / avoid pressure	Prohibit targeted fishing for sandeels within the whole MPA.

The risk analysis shows that fishing with hydraulic gear may pose the greatest threat. However with a minimum depth in the MPA of 60m such activity is unlikely to ever occur. There has been a targeted sandeel fishery in the past, and recommencement of this fishery would hinder the achievement of the conservation objectives. Therefore to prevent this, we propose a prohibition on landing or retaining on board sandeels. This is the same provision that is in place already on the East coast of Scotland.

74.3 Other fisheries measures which apply to the site

The existing East of Scotland sandeel closed area (EC No 850/98 as amended by EU No 227/2013) party overlaps with the MPA in the western part. This will be making a contribution towards achieving the conservation objectives. This overlap can be seen in Figure K3.

75 Measures envisaged for control, enforcement and compliance

This section describes the measures that are proposed for implementation.

75.1 Vessel Monitoring System

The frequency of data transmissions shall remain at least once every 2 hours.

75.2 Key provisions to include in EC Regulation

Within the area described in Table K3 it shall be prohibited to land or retain on board sandeels. Table K3 provides co-ordinates of the area to which the measures should be applied. All of the co-ordinates are provided in WGS84 datum and the last co-ordinate joins back to the first in the table. All co-ordinates are joined by geodesic lines. The measures are shown on the map in figure K3.

Table K3: Co-ordinates of prohibited area

Point	Latitude	Longitude
A	57° 19.480' N	001° 03.500' W
B	57° 20.736' N	001° 04.529' W
C	57° 23.272' N	001° 04.520' W
D	57° 24.967' N	001° 02.725' W
E	57° 25.661' N	001° 00.420' W
F	57° 27.720' N	000° 42.825' W
G	57° 23.780' N	000° 41.426' W
H	57° 20.839' N	000° 44.681' W

76 Fleet activity at Turbot Bank MPA

In the 2009 – 2013 there has been no recorded catches of sandeels from the relevant ICES rectangles. Therefore there is no activity, or economic value being derived from a sandeel fishery in this MPA.

77 Assessment of potential displacement effects

There is currently no sandeel fishing effort in the MPA therefore there will be no displacement as a consequence of these measures.

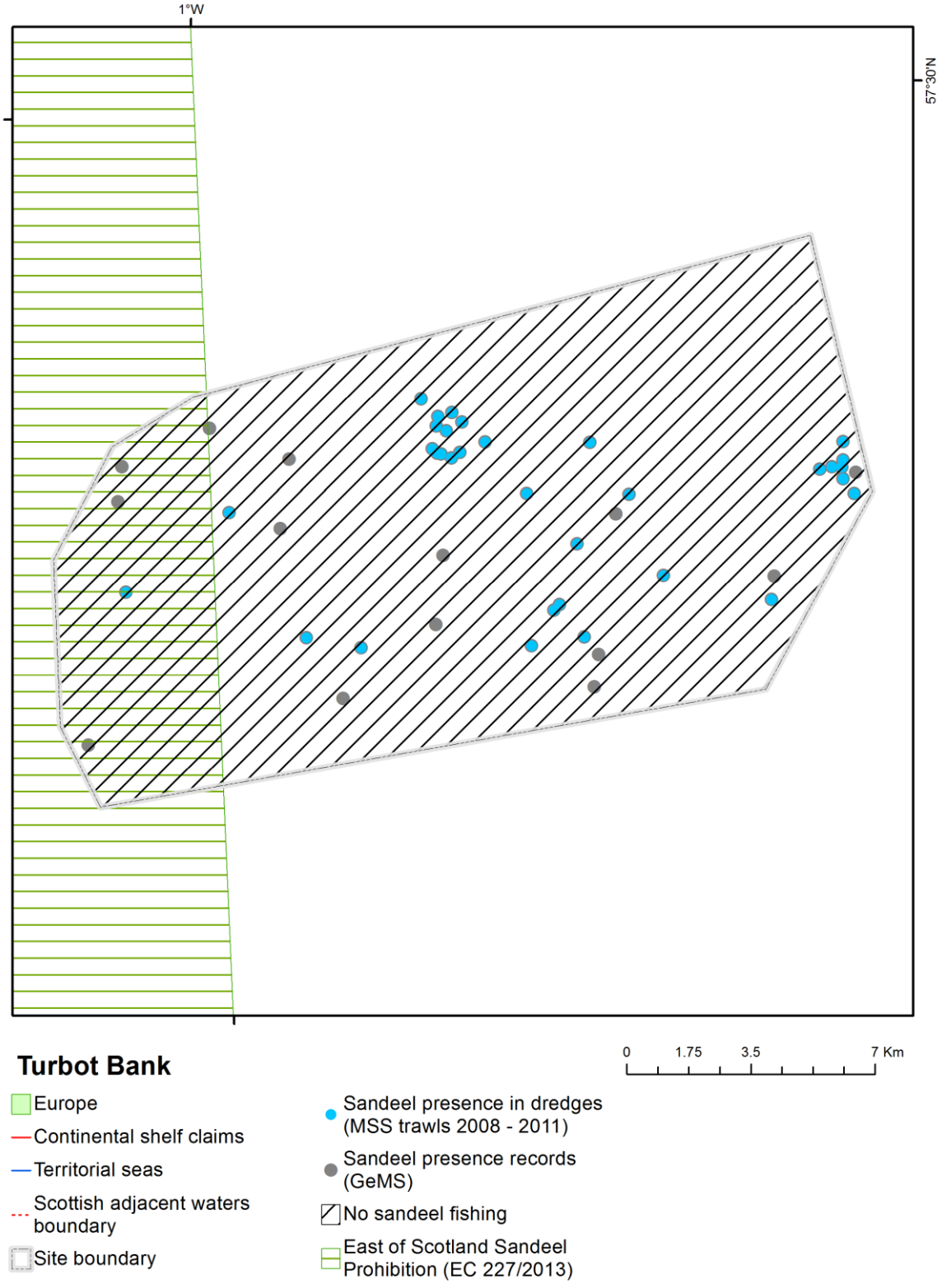

Figure K3: Map of Turbot Bank MPA with proposed management measures

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