

**Natura 2000**  
**Fisheries management options paper**

**CROKER CARBONATE SLABS SPECIAL AREA OF CONSERVATION**

MAY 2014

This is a working draft which has been produced to support early discussions with stakeholders about management.

## 1. Management Options Summary

Fishing Activity	Management options
<b>Mobile bottom contact gears</b>	<p><b>No additional management:</b> There is a significant risk of not achieving the conservation objectives for the <b>submarine structures made by leaking gases</b>.</p> <p><b>Reduce/limit pressures:</b> This option would reduce the risk of not achieving the conservation objectives for the <b>submarine structures made by leaking gases</b>. Appropriate management could include closure of the known extent of the feature within and possibly beyond the current site boundary, allowing fishing to continue in fishable areas around the features. However, a risk of impact with patches of feature not identified during survey would remain. There would be a risk of localised damage to the structure of the <b>submarine structures made by leaking gases</b> and associated communities in these areas.</p> <p>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.</p> <p>Areas to be covered by management restrictions would include a buffer zone around the known 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 stakeholders.</p> <p><b>Remove/avoid pressure:</b> This option would reduce the risk of not achieving the conservation objectives for the <b>submarine structures made by leaking gases</b> feature to the lowest possible levels. Restrictions would be required for all bottom contact gears within the full extent of the site boundary and in areas where the feature extends beyond the current site boundary.</p> <p>The site boundary already includes a buffer zone equal to three times the water depth around the known features to reduce any risk of accidental contact with the feature. An equivalent buffer would be required around areas of known feature outside the current site boundary.</p>
<b>Static bottom contact gears</b>	<p><b>No additional management:</b> This option is considered to be sufficient for bottom contacting static gear to achieve the conservation objectives for the <b>submarine</b></p>

	<p><b>structures made by leaking gases.</b> However, if monitoring showed evidence of detrimental effects as a result of static gear activity in the future, additional management may be required.</p> <p><b>Reduce/limit pressures:</b> This option would further reduce the risk of not achieving the conservation objectives for the <b>submarine structures made by leaking gases.</b> 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.</p>
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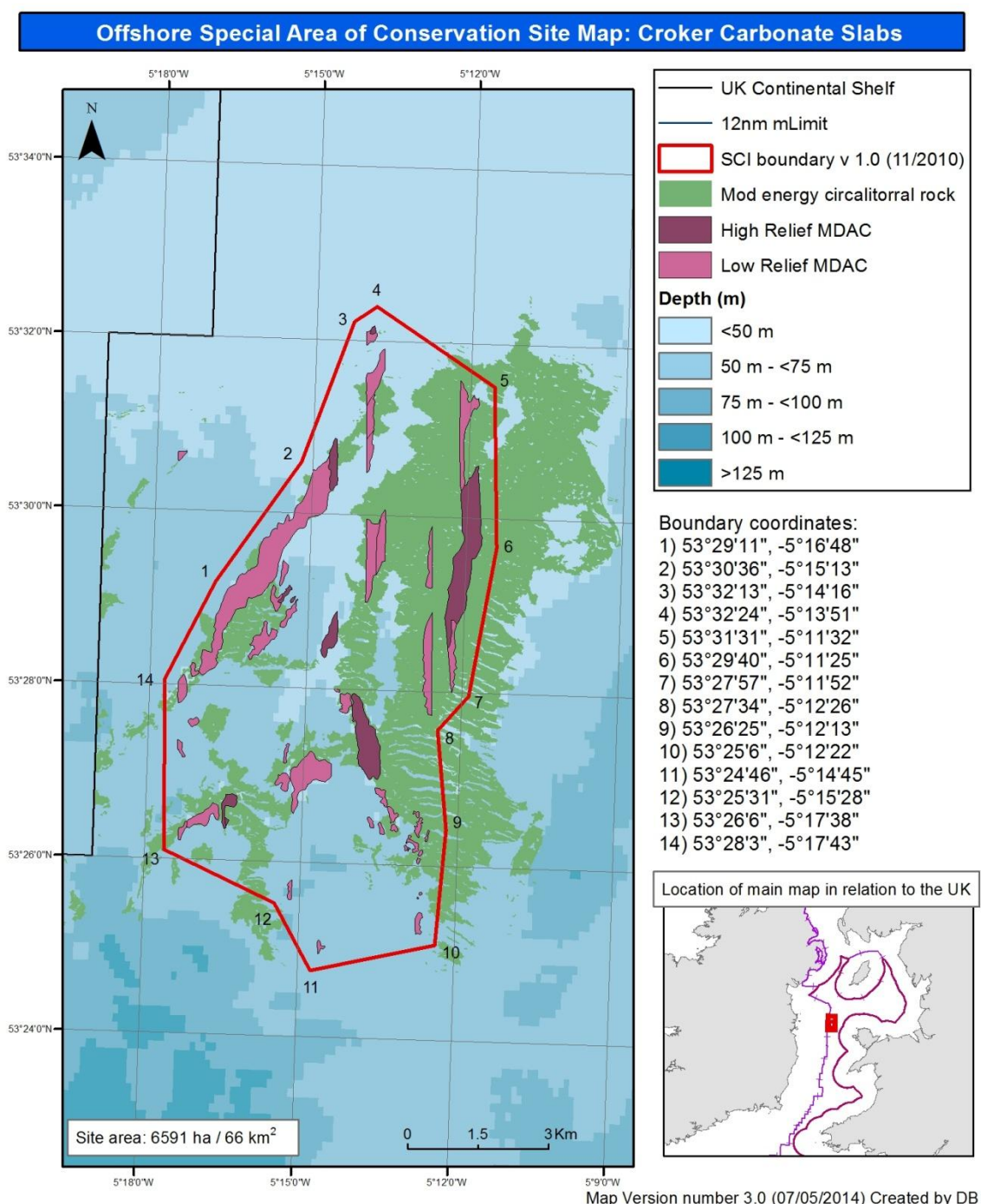
## 2. Introduction

Croker Carbonate Slabs is an area in the Irish Sea regional sea, approximately 30km west of Anglesey, where a total area of over 800ha of the Annex I feature 'submarine structures made by leaking gases' have been identified (see figure 1 for site map). The site lies in 70m water depth in the north descending down to approximately 100m at the south west corner. The seabed surface is composed of extensive areas of exposed methane-derived authigenic carbonate (MDAC), formed by microbial oxidation of methane gas bubbling up from below the seafloor (see figure 2 for images). These MDAC structures range from 'low relief' (elevation of up to 20cm above the surrounding seabed) to 'high relief' (elevation over 20cm above the surrounding sediment, and often up to 2m). A cliff feature up to 8m in elevation and 500m long has also been recorded, created by the action of the surrounding coarse seabed sediments being scoured away by currents at the base of the high relief MDAC (Whomersley et al. 2010; Judd, 2005).

The seabed habitats created by these MDAC structures are distinctive, supporting a diverse range of marine species that are absent from the surrounding seabed characterised by coarse sediment (Judd, 2005). Areas of 'high relief' MDAC support a diverse range of soft corals, erect filter feeders, sponges, tube worms and anemones whilst the 'low relief' MDAC is colonised with scour-resistant hydroids and bryozoans (Whomersley et al. 2010). The surrounding sediment is highly mobile and consists of poorly sorted sand (from fine to coarse grained) with a large proportion of broken shell gravel and whole shells interspersed with rippled sand. A blue-grey clay was also commonly seen towards the southern end of the site.

MDAC is accreted naturally (and over long time periods), with further accretion dependent on sufficient gas seepage as well as the presence of specific chemosynthetic micro-organisms. There is no evidence to suggest that gas seepages in the immediate area are still active (Judd, 2005; Whomersley et al. 2010). If the feature is damaged, for example by human activities, restoration may therefore be difficult or impossible.

**Figure 1.** Croker Carbonate Slabs site map showing high and low relief carbonate slab. The area marked as circalittoral rock was identified in a survey in 2012. JNCC consider it probable that this represents further distribution of carbonate slab but this has not yet been confirmed.



Site map projected in UTM (Zone 30N, WGS84 datum). This product has been derived in part from material obtained from the UK Hydrographic Office with the permission of the Controller of Her Majesty's Stationery Office and UK Hydrographic Office ([www.ukho.gov.uk](http://www.ukho.gov.uk)). NOT TO BE USED FOR NAVIGATION. The exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown Copyright). World Vector Shoreline © US Defense Mapping Agency. Map copyright JNCC 2014.

**Figure 2.** Examples of Annex I habitat 'Submarine structures made by leaking gases' within the Croker Carbonate Slabs SAC boundary (still images taken on the JNCC CEND 11/08 survey (Whomersley et al. 2008))



A slab of MDAC 'pavement' with colonising Hydroids.



High relief MDAC with colonising *Alcyonium digitatum*.

### 3. Supporting survey data

The Croker Carbonate Slabs SAC was designated on the basis of information from a number of sources.

Seismic surveys carried out in the western part of the Irish Sea found extensive acoustic turbidity within the seabed, to the north-west of the site in the Western Irish Sea Mud Belt (Yuan et al. 1992). This was indicative of shallow gas. Seismic data was also gathered during a cable route survey west of Anglesey (Croker, 1995). Again, acoustic turbidity within the sediment was recorded, indicative of shallow gas.

The Strategic Environmental Assessment, Area 6 (SEA6), of the Irish Sea was carried out in 2004. Two areas were surveyed using multibeam echosounder, sidescan sonar, sub-bottom profiling, video and stills imagery, and grab sampling. Analysis of this data showed that carbonate structures were present on the seabed within one of these areas (Texel 11), and that these were formed by MDAC (Judd, 2005).

A more extensive, JNCC commissioned survey of the area was carried out in May 2008, aboard the *RV Cefas Endeavour*. Multibeam echosounder and sidescan sonar data were collected, along with seabed imagery and Hamon grab samples (Whomersley et al. 2010). Initially, corridors of multibeam and sidescan sonar data were gathered across a broad area. Infill lines were then surveyed to obtain 100% coverage in areas where potential MDAC acoustic signatures were detected. Extensive MDAC structures were identified across the site, confirmed following analysis of the acoustic data along with petrographical/x-ray diffraction analysis of the physical samples (Whomersley et al. 2010).

Two surveys were conducted by Cefas/JNCC as part of the Marine Conservation Zone verification work for North St George's Channel (CEND0312 and CEND0513, Whomersley & Vanstaen, 2013). The first cruise collected stratified samples using a Hamon grab and camera over soft sediment areas, as well as opportunistic multibeam. An external contractor collected full multibeam and backscatter for the

site later in 2012. Using this, and previous data, drop camera/video and grab data was collected at focused locations (primarily around Croker Carbonate Slabs). This data was used in Cefas' Object-Based Image Analysis tool, which uses a mixture of known bathymetry and groundtruthing data to predict the extent of habitats across the whole site. This analysis classified rock material as moderate energy circalittoral rock. JNCC will examine this data to determine areas of moderate energy circalittoral rock which are submarine structures made by leaking gases.

See the Croker Carbonate Slabs selection assessment document for further information about supporting data (version 5, JNCC, 2012a).

#### **4. Protected features and conservation objectives**

The Croker Carbonate Slabs SAC contains the Annex I habitat 'Submarine structures made by leaking gases'.

Conservation objectives set out the desired quality of the protected features within each Natura 2000 site. They are a set of site specific objectives to be met in order for a site to maximise its contribution to Favourable Conservation Status under the EU Habitats Directive.

The conservation objectives for the SAC is to, subject to natural change, maintain the submarine structures made by leaking gases in favourable condition, such that:

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

See the Croker Carbonate Slabs conservation objectives and advice on operations for further information (version 5, JNCC, 2012b).

#### **5. Roles**

The role of JNCC is to advise UK Government on management options for the Croker Carbonate Slabs SAC. In doing this, our aim is to ensure the conservation objectives for the protected features are met. Fisheries management in areas outside the UK's 12 nautical mile fisheries limit is an exclusive competence of the EU and management measures can only be implemented through the provisions of the Common Fisheries Policy (CFP). This requires all Member States with a direct management interest to agree proposed management measures. The Marine Management Organisation (MMO) will lead discussions on management with stakeholders. They will consider JNCC's advice and will lead on the development of specific management measures. Defra will be responsible for making recommendations to Ministers on these measures and drafting the fisheries management request to the European Commission with the assistance from the MMO.

Stakeholders can provide additional evidence to support the development of management options, including local knowledge of the environment and activities. Discussions with stakeholders will be one way of highlighting the implications of any management options to JNCC, MMO and Government. This will contribute to the development of well-designed and effective management measures.

## **6. Effects of fishing on the feature**

Direct evidence of impacts of fishing gears on submarine structures made by leaking gases 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.

Demersal towed gears have the potential to effect the long term natural distribution of the features through physical removal of carbonate structures by dragging bottom-fishing gear over the seabed (Sewell and Hiscock, 2005). Demersal trawling at the site may result in dispersal, fragmentation and possibly burial of some carbonate formations. Towed fishing gears can also 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 (Løkkeborg, 2005; Freese et al. 1999). Other species such as hydroids, anemones, bryozoans, tunicates and echinoderms are vulnerable to mobile fishing gear (McConnaughey et al. 2000; Sewell and 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.

Whilst it is unlikely that mobile bottom contact gear can affect the long-term natural distribution of submarine structures made by leaking gases, there is evidence to indicate that the use of bottom contacting mobile gears can impact the structure and function of the habitat and the long term survival of its associated species. 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). Recover 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).

## **7. Development of management options**

Management options are being developed where we consider that some form of management may be necessary to achieve the conservation objectives for the feature. The approach to identifying management options for each activity will be risk-based, i.e. we are focusing on providing advice where we believe there is a risk to achieving the conservation objectives. To do this, we are using existing data and information on protected features and relevant activities, and also our understanding of the relationships between the feature and relevant activities.



We have identified risks to achieving the conservation objectives where there is an overlap between protected features and activities associated with pressures the features are sensitive to. Our identification of the risk has been refined using available information on the interaction between the features and activities where this is available (see section 5). We have recommended management options to manage this risk. The text focuses on interactions in terms of physical overlap but the assessment of risk in future should also take account of the intensity and frequency of activities within the SAC.

Specific details of the recommended management options for mobile bottom contact and static bottom contact gears are provided in Tables 2 and 3.

A gradient of management options has been considered to reduce the feature's exposure to fishing pressures. These have been described under three potential management option categories:

- a) **No additional management** - where there are currently no site specific fisheries management measures in place and these are not deemed necessary at this time to achieve the conservation objectives for the site.
- b) **Additional management to reduce pressures** – where fisheries managers may wish to consider a range of measures that could be used to reduce the risk to features by managing fishing activity. These could include:
  - Area restrictions (permanently closing some or all of the feature's area)
  - Gear restrictions (e.g. restricting use of the more damaging gears)

Ideally, any measures would generally apply only to the parts of the sites where the feature is present. However, there may be some circumstances in which it could be desirable to extend management measures beyond the known area of feature distribution, for example, where conditions are suitable for a feature to exist but there are insufficient data to confirm its presence.

- c) **Additional management to remove pressures** – where fishing activities known to adversely affect the feature would be excluded. Such exclusion would generally apply only to the parts of the sites where the feature is present, although it may occasionally be necessary to apply them to a wider area.

We recognise that stakeholders can provide local environmental knowledge and more detailed information on activities, including distribution and intensity of effort, frequency of activity, and fishing methods employed. This additional information will help us to develop more specific management options, focused on interactions between features and activities



## 8. Overview of activities

**Table 1.** Overview of existing fishing activities believed to take place within or close to Croker Carbonate Slabs SAC

Activities considered capable of affecting the integrity of the SAC	Activities <i>not</i> considered capable of affecting the integrity of the SAC*
<ul style="list-style-type: none"> <li>• Towed dredges</li> <li>• Otter trawls</li> <li>• Beam trawls</li> <li>• Seines nets</li> <li>• Set gillnets</li> <li>• Longlines</li> </ul>	<ul style="list-style-type: none"> <li>• Pelagic trawls</li> <li>• Encircling gillnets</li> <li>• Driftnets</li> <li>• Purse seine</li> </ul>

\*Only the specific examples of activities listed in the table have been excluded, rather than the broad activity types.

*Nationalities fishing in the relevant ICES rectangles:*

- UK
- Ireland
- Belgium

VMS data shows evidence of use of mobile gears by non-UK vessels over the features of the site (see Annex One for figures showing non-UK mobile demersal fishing activity over the Croker Carbonate Slabs for 2009-2012). There is negligible evidence of mobile or static fishing activity for UK vessels >15m, or static fishing activity by non-UK vessels >15m.

## 9. Management options

**Table 2.** Management options for mobile bottom contact gear

Management option	
<b>No additional management:</b>	There is a significant risk of not achieving the conservation objectives for the <b>submarine structures made by leaking gases</b> .
<b>Reduce/limit pressures:</b>	This option would reduce the risk of not achieving the conservation objectives for the <b>submarine structures made by leaking gases</b> . Appropriate management could include closure of the known extent of the feature within and possibly beyond the current site boundary, allowing fishing to continue in fishable areas around the features. However, a risk of impact with patches of feature not identified during survey would remain. There would be a risk of localised damage to the structure of the <b>submarine structures made by leaking gases</b> and associated communities in these areas.

	<p>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.</p> <p>Areas to be covered by management restrictions would include a buffer zone around the known 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 stakeholders.</p>
<b>Remove/avoid pressures:</b>	<p>This option would reduce the risk of not achieving the conservation objectives for the <b>submarine structures made by leaking gases</b> feature to the lowest possible levels. Restrictions would be required for all bottom contact gears within the full extent of the site boundary and in areas where the feature extends beyond the current site boundary.</p> <p>The site boundary already includes a buffer zone equal to three times the water depth around the known features to reduce any risk of accidental contact with the feature. An equivalent buffer would be required around areas of known feature outside the current site boundary.</p>

**Table 3.** *Management options for static bottom contact gear*

<b>Management option</b>	
<b>No additional management:</b>	<p>This option is considered to be sufficient for bottom contacting static gear to achieve the conservation objectives for the <b>submarine structures made by leaking gases</b>. However, if monitoring showed evidence of detrimental effects as a result of static gear activity in the future, additional management may be required.</p>
<b>Reduce/limit pressures:</b>	<p>This option would further reduce the risk of not achieving the conservation objectives for the <b>submarine structures made by leaking gases</b>. 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.</p>

## 10. Conclusions and further recommendations

Fisheries management measures for the Croker Carbonate Slabs SAC will be developed through discussion with stakeholders. Discussions will focus on refining our understanding of the features through input from stakeholders, and the likely risks to the designated features where interactions with fishing activities occur. Based on the options presented here, it is hoped that a preferred set of management options will be recommended. This will form the basis of management measure proposals to be submitted to the European Commission under the Common Fisheries Policy.

## 11. Further information

The following documents about the Croker Carbonate Slabs SAC are available from the JNCC website:

[Croker Carbonate Slabs SAC Selection Assessment Document, Version 5.0 \(September 2012\)](#). This document contains detailed information about the site's features, how the boundary was developed, an assessment of the features against SAC selection criteria, and information on what survey data was used to designate the site.

[Croker Carbonate Slabs Conservation Objectives and Advice on Operations, Version 5.0 \(December 2012\)](#). This document contains the conservation objectives for the Croker Carbonate Slabs SAC, and information on the sensitivity and exposure of the features to physical, chemical and biological pressures associated with human activity. This information was used to indicate which activities may require management to achieve the conservation objectives.

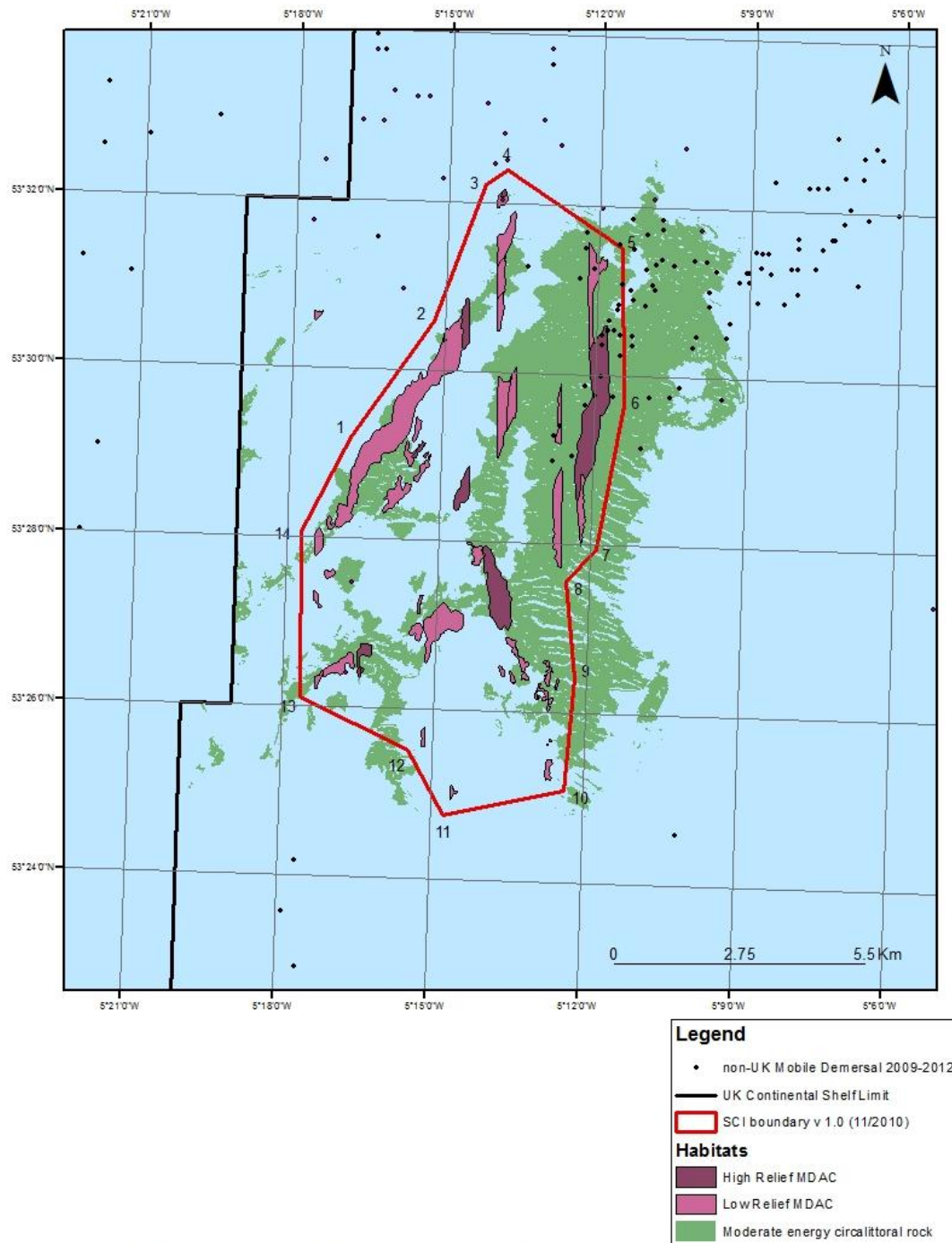
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## Annex One

**Figure 3.** Croker Carbonate Slabs boundary and Annex I submarine structures made by leaking gases feature map with associated VMS data for >15m non-UK-registered mobile demersal fishing vessel for the years 2009-2012



Site map projected in UTM (Zone 30N, WGS84 datum). This product has been derived in part from material obtained from the UK Hydrographic Office with the permission of the Controller of Her Majesty's Stationery Office and UK Hydrographic Office ([www.ukho.gov.uk](http://www.ukho.gov.uk)). NOT TO BE USED FOR NAVIGATION. The exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown Copyright). World Vector Shoreline © US Defense Mapping Agency. Map copyright JNCC 2014.