



Offshore Special Area of Conservation: Haig Fras

SAC Selection Assessment



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Version 6.0 (30th July 2015)

* Cover photo illustrates *Pentapora foliacea* (now *Pentapora fascialis*) and crinoids at the base of Haig Fras (Image © 2000 Ivor Rees)

Introduction

This document provides detailed information about the Haig Fras site and evaluates its interest features according to the Habitats Directive selection criteria and guiding principles.

The advice contained within this document is produced to fulfil requirements of JNCC under Part 2 of the Offshore Marine Conservation (Natural Habitats, & c.) Regulations 2007 (as amended), relating to the conservation of natural habitat types and habitats of species through identification of Special Areas of Conservation (SACs) in UK offshore waters. Under these Regulations, JNCC has an obligation to provide certain advice to Government to enable Ministers and Competent Authorities to fulfil their obligations under the Regulations.

This document includes information required under Regulation 7 of the Offshore Marine Conservation (Natural Habitats, & c.) Regulations 2007 (as amended), to enable the Secretary of State to transmit to the European Commission the list of sites eligible for designation as Special Areas of Conservation (SACs). JNCC have been asked by Government to provide this information.

Sites eligible for designation as offshore marine SACs are selected on the basis of the criteria set out in Annex III (Stage 1) to the Habitats Directive and relevant scientific information. Sites are considered only if they host a Habitats Directive Annex I habitat or Annex II species. Moreover, sites for Annex II species that are highly mobile must contain a clearly identifiable area that presents physical and biological factors essential to these species' life and reproduction in order to be eligible. Socio-economic factors are not taken into account in the identification of sites to be proposed to the European Commission.¹

In addition to information on the Annex I habitats and/or Annex II species hosted within the site, this document contains i) a chart of the site, ii) its name, location and extent, and iii) the data resulting from application of the criteria specified in Annex III (Stage 1) to the Habitats Directive. This is in line with legal requirements outlined under Regulation 7. JNCC has adhered to the format established by the Commission for providing site information. This format is set out in the 'Natura 2000 Standard data form' (CEC, 2011) (prepared by the European Topic Centre for Biodiversity and Nature Conservation on behalf of the European Commission to collect standardised information on SACs throughout Europe).

¹ Following European Court of Justice 'First Corporate Shipping' judgement [C-371/98](#) (7 November 2000)

Document version control

Version and issue date	Amendments made	Issued to and date
HaigFras_SelectionAssessment_6.0.doc (30 th July 2015)	- Minor text and referencing amendments and update of habitat map legend	Defra (August 2015) and published on JNCC website (August 2015)
HaigFras_SelectionAssessment_5.0.doc (17 th December 2013)	- Site Map and boundary limit altered. References/headers/links updated. SAC sites within regional sea updated. Feature total area added. Appendix added. Data map and biotope map added to include all updated survey information.	MPA Technical Group (May 2014) and Defra (September 2014)
HaigFras_SelectionAssessment_4.0.doc (1 st July 2008)	- Post consultation modifications, including site boundary amendment	Secretary of State (July 2008)
HaigFras_SelectionAssessment_3.1.doc (13 th November 2007)	- Draft SAC changed to possible SAC	Public consultation (December 2007)
HaigFras_SelectionAssessment_3.0.doc (25 th May 2007)	- New introductory text, revised site summary and map layout, heading & text amendments - Additional guiding principles for site selection incorporated under Global Assessment - Conservation Objectives and Advice on Operations moved to separate document	JNCC Committee (June 07) and UK Marine Biodiversity Policy Steering Group (September 07)
HaigFrasDossier_2.0_Draft.doc (26 th August 2006)	- Draft Conservation Objectives and (revised) Advice on Operations added. - Map layout revised	Defra, Devolved Administrations, and other Govt. departments (25 th September 2006)
HF_ProformaForSubmissionToJNCC.doc (15 th December 2004)		Defra (15 th December 2004)
Haig Fras Proforma: JNCC 04 P23 (December 2004)		JNCC Committee (December 2004)

Further information

This document is available as a pdf file on JNCC's website for download if required (jncc.defra.gov.uk).

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Haig Fras: SAC Selection Assessment

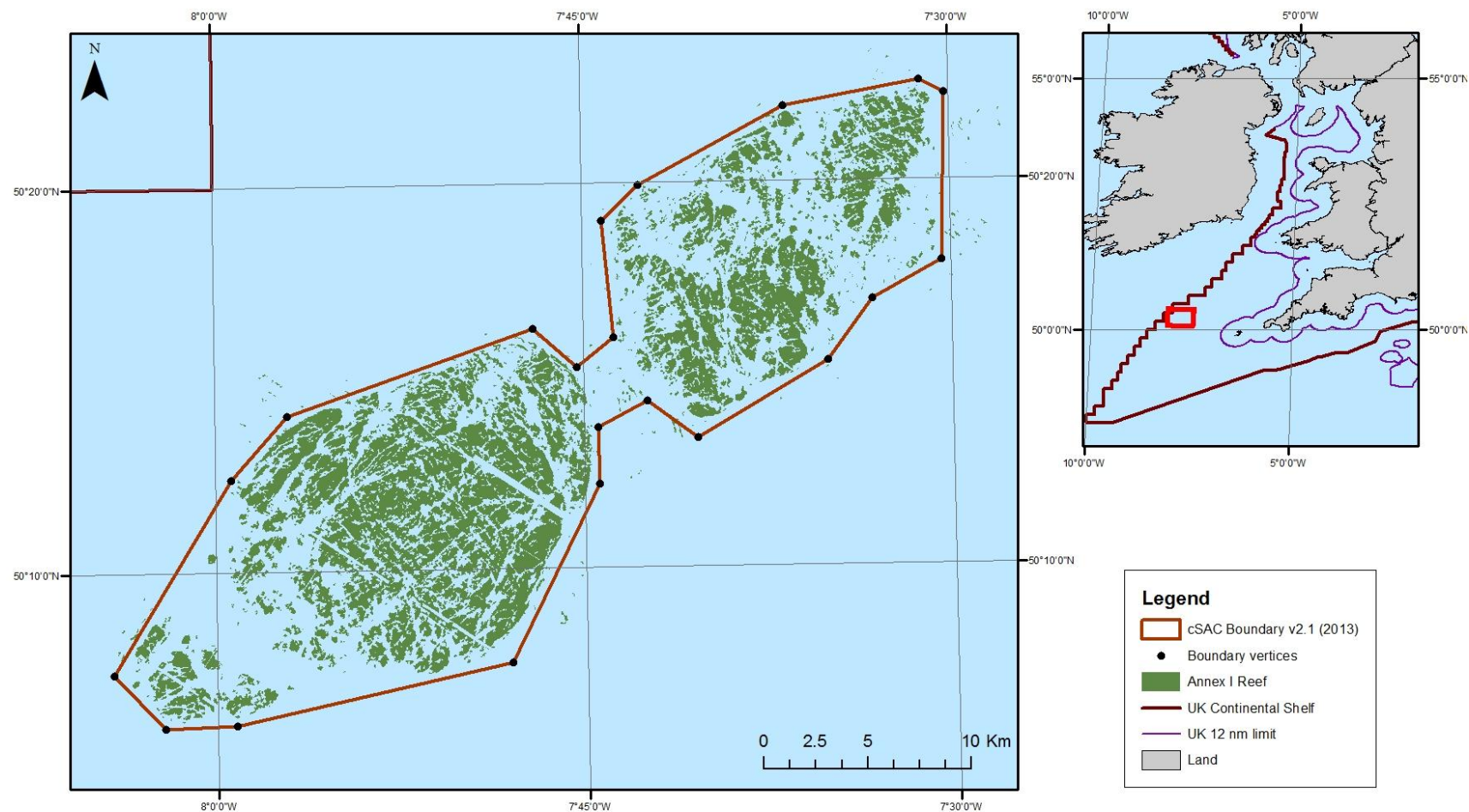
1. Site name Haig Fras	2. Site centre location 50°13'46", -7°46'56 (Datum: WGS 1984)
3. Site surface area 47,569 ha / 476 km ² (Datum: WGS 1984 UTM Zone 29 N, calculated in ArcGIS)	4. Biogeographic region Atlantic

5. Interest feature(s) under the EU Habitats Directive

1170 Reefs

6. Map of site

Offshore Special Area of Conservation Site Map : Haig Fras



World Vector Shoreline © US Defence Mapping Agency. 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). MAP NOT TO BE USED FOR NAVIGATION. © JNCC 2013. Projection WGS84 UTM 29N. DB 12/12/2013

7. Site summary

Haig Fras is an isolated, fully submarine bedrock outcrop located in the Celtic Sea, 95 km north west of the Isles of Scilly. It is the only substantial area of rocky reef in the Celtic Sea beyond the coastal margin. It supports a variety of fauna ranging from jewel anemones and Devonshire cup coral near the peak of the outcrop to encrusting sponges, crinoids and ross coral towards the base of the rock (where boulders surround its edge) (Rees, 2000). There are four main habitat complexes; high energy circalittoral rock, moderate energy circalittoral rock, deep circalittoral coarse sediment and deep circalittoral sand. The total area of reef feature within the site boundary is approximately 175 km². The rock type is granite, mostly smooth with occasional fissures. The rocky outcrop is approximately 45 km long and in one area rises to a peak which lies just 38 m beneath the sea surface (Rees, 2000, Barrio Froján *et al.*, 2015.). The surrounding seabed is approximately 118 m deep, with small dispersed patches of rocky outcropping within circalittoral sand and coarse sediment (Barrio Froján *et al.*, 2015).

This site is situated within the Western English Channel and Celtic Sea Regional Sea (JNCC, 2004; Defra 2004). Listed below are existing SACs within the Western English Channel and Celtic Sea Regional Sea which contain Reefs as a qualifying Annex I habitat. The types of reef present are summarised.

SAC	Notable characteristics of Reef interest feature (JNCC, 2007)
Isles of Scilly complex	Hard bedrock reef, both infralittoral and circalittoral, in some cases extending well beyond 50 m depth. Exposure levels vary at this site: some reefs are very exposed, others sheltered. The surrounding waters are full salinity and the feature is subject to minimal coastal influence (Natural England, pers. comm. 2007). The topographic complexity of the reefs is low. The south-westerly position of the islands leads to a range of warm-water species being present, including sunset cup-coral <i>Leptopsammia pruvoti</i> , pink sea-fans <i>Eunicella verrucosa</i> , and Weymouth carpet-coral <i>Hoplangia durotrix</i> .
Lundy	A granite and slate reef system, exposed to a wide range of wave action and tidal stream strength. Combined with significant topographical variation, this has resulted in a diverse complex of biological communities. The full salinity reefs are both infralittoral and circalittoral (>50 m depth), and are highly influenced by coastal processes (Natural England, pers. comm. 2007). Several communities at their northern limit of distribution occur here. Fragile long-lived species, such as the soft coral <i>Parerythropodium coralloides</i> , sea-fan <i>Eunicella verrucosa</i> and erect branching sponges, are present, as are all five British species of cup-coral.
Plymouth Sound & Estuaries	Intertidal and subtidal low energy reefs, including some composed of limestone. This relatively soft rock is extensively bored by the bivalve <i>Hiatella arctica</i> and the spionid worms <i>Polydora</i> spp., and harbours a rich fauna. In the sublittoral this steep-sided reef is dominated by a dense hydroid and bryozoan turf with anemones

	and ascidians. The sublittoral is of particular importance for its kelp- and animal-dominated habitats. Abundant populations of the slow-growing, long-lived, nationally important pink sea-fan <i>Eunicella verrucosa</i> also occur at this site. The reef feature is in full salinity and subject to strong coastal influence (Natural England, pers. comm. 2007).
Fal and Helford	The hard bedrock reefs at this site are of low to medium topographic complexity and exist as patches of sublittoral rock (an uncommon habitat within marine inlets) (Natural England, pers. comm. 2007). They are subject to strong coastal influence, with parts of the reef experiencing reduced/variable salinity. The energy levels at this site are moderate. Within the marine inlets, deep sheltered bedrock reef is dominated by sponge and seasquirt communities. On the exposed open coast, dense kelp forests occur in shallower water, along with aggregations of jewel anemones, and Devonshire cup corals. In some deeper locations, pink seafans occur. The maximum depth of reef systems in the Fal and Helford is around 30 m

Natural England have also submitted to the European Commission Lands End and Cape Bank SCI, Start Point to Plymouth Sound and Eddystone SCI, and Lyme Bay and Torbay SCI within the Western English Channel and Celtic Sea Regional Sea.

Site	Notable characteristics of Reef interest feature
Lands End and Cape Bank SCI	The Lands End and Cape Bank site lies to the west of the Lands End peninsula and extends to almost 25 km from the coast. The reefs are fully submarine, upstanding features which are composed of almost entirely of granite. The site has two main reef areas, the coastal margin reefs running along the coast and offshore upstanding reef which extends in a broad, arching crescent roughly aligned with the coastline. The inshore reefs are notable for their topographic complexity, which results in high biological and biotope diversity. The reef is dominated by tide-swept kelp forest and kelp parks with dense foliose red algae. The crescent shaped system of offshore upstanding rocky reefs forms the major feature of conservation interest at the site. The reef is characterised by high biodiversity tide-swept communities such as sponges, faunal and algal turfs and crustose communities.
Start Point to Plymouth Sound and Eddystone SCI	The Start Point to Plymouth Sound and Eddystone site lies off the south coast of England. The site comprises a mosaic of two areas containing Annex I “reef” habitat. The reef habitats comprise complex outcropping bedrock, boulders and rocky gullies, fissures, crevices and pinnacles. They support a wide variety of reef fauna and flora commonly showing excellent examples of zonation from the infralittoral down to deeper water communities. The site is known to support some species rarely encountered in south-western waters such as the cushion star <i>Porania pulvillus</i> , the slipper lobster <i>Scyllarus arctus</i> and the sea fan anemone

	<p><i>Amphianthus dohrnii</i>. Furthermore, the presence of relatively large numbers of warm-water species, e.g. <i>Alcyonium glomeratum</i> and <i>Holothuria forskali</i>, in addition to more typical English Channel fauna indicates the area spans across a biogeographical boundary. The site also supports the most extensive and highest density beds of the sea fan <i>Eunicella verrucosa</i> and probably the most extensive and widespread colonies of the nationally rare sunset coral <i>Leptopsammia pruvoti</i>. The Eddystone Reefs area extends down into deep waters and supports good examples of deeper water reef species (such as the starfish <i>Porania pulvillus</i> and the parchment tube worm <i>Phyllochaetopterus anglicus</i>) that may not be so frequent on the more common inshore reefs.</p>
Lyme Bay and Torbay SCI	<p>The Lyme Bay and Torbay site lies off the south coast of England. The site comprised from two areas containing Annex I reef and sea cave habitat. The reefs exhibit a large amount of geological variety, ranging from limestone, cementstone ledges, sandstone outcrops, slates and granites as well as areas of boulder and cobble reef. Biogenic reef features comprising of <i>Mytilus edulis</i> reefs also occur within this site. Many of the bedrock reefs exhibit topographic complexity which adds to the habitats created by the features. The sea caves occur in several different rock types, and at levels from above the high water mark of spring tides down to permanently flooded caves lying in the infralittoral zone.</p>
Lizard Point SCI	<p>Lizard Point is a geologically and topographically complex area consisting of upstanding sublittoral reefs, flat bedrock reefs and rocky shoals, all skirted by a relatively flat basin. The reef is a moderate to high-energy system with the shallowest areas characterised by red algae and small amounts of kelp, the deeper tide swept slopes by anemones, soft corals, hydroids and echinoderms, and the scour tolerant communities at the slope bases. Lizard Point is fairly unique in terms of its underlying geology.</p>

In character, Haig Fras appears most similar to Lundy SAC as both are granite outcrops with similar species occurring in the circalittoral zone. However, due to the isolation of Haig Fras from the coast, and consequently lower nutrient and sediment input, the faunal communities are thought to be less species diverse compared to those on Lundy. However, species present at Lundy have been very well studied over a number of years, unlike those at Haig Fras, so one would expect there to be many more species recorded at Lundy compared to Haig Fras.

8. Site boundary

The boundary for Haig Fras has been defined using JNCC's marine SAC boundary definition guidelines (JNCC, 2012)² and information provided during public consultation on this site in 2007-2008. Following submission to the commission in 2008 with an original boundary as shown in Appendix I, the current boundary has been amended to better reflect improved information for the site. The boundary remains protecting the same feature types as originally

² These were agreed by the Joint Nature Conservation Committee and modified subsequent to public consultation in 2011

stated and is a simple polygon enclosing the minimum area necessary to ensure protection of the Annex I habitat. Coordinate points have been positioned as close to the edge of the interest feature as possible, rather than being located at the nearest whole degree or minute point. The proposed boundary includes a margin to allow for mobile gear on the seabed being at some distance from the location of a vessel at the sea surface. The maximum depth of water around the feature is 110 m; therefore, assuming a ratio of 3:1 fishing warp length to depth, the proposed boundary is defined to include a margin of 330 m from the bedrock reef outcrops.

Joint JNCC / CEFAS surveys conducted during 2011 and 2012 of the area allowed detailed multibeam and backscatter acoustic information to be collected. This data was then used in conjunction with groundtruthing to pinpoint the locations of Annex I reef features. Due to small dispersed patches of rocky reef occurring widely across the Celtic/Irish Seas the boundary was restricted to the three primary features of bedrock reef, laying on subtidal coarse sediments. Areas dropping off in depth from the main raised granite features and laying on sandy sediment away from the main site were excluded. The overall area of the site, and therefore the amount of non-Annex I features included, has been minimised as much as possible whilst maintaining the site integrity. Areas of identified Annex I reef that were seen to be very small in extent, far away / unconnected from the main features, or highly patchy were deemed to be not part of the Haig Fras complex, and so not afforded protection within the site.

The north and south of the central area were characterised as 'subtidal sands and gravels'. The sediment in these locations was thick, being formed into waves and ridges up to ~ 50 cm high. There was no indication of underlying bedrock, but instead an underlying layer of cohesive mud. The middle area of the central region however is raised, and underlaid by rock, with a number of outcropping rocky areas interspersing the surrounding coarse sediment. This area is therefore considered integral to the reef complex and has remained included.

Note that the boundary proposed is for the SAC. Any future management measures which may be required under the Offshore Marine Conservation (Natural Habitats, & c.) Regulations will be determined by Competent Authorities in consultation with JNCC, and may have different boundaries to the SAC site boundary.

9. Assessment of interest feature(s) against selection criteria

9.1 Reefs

Annex III selection criteria (Stage 1A):

a) *Representativity*

Haig Fras is located in the 'Western English Channel and Celtic Sea' Regional Sea, and represents deep circalittoral reef with low topographic complexity in a fully saline environment. Energy levels are moderate at this site. The faunal communities are representative of species colonising aphotic, hard marine substrata as well as a number of peaks showing communities representative of photic environments. Four distinct faunal biotopes were observed by Rees (2000): i) a biotope dominated by jewel anemone *Corynactis viridis* on rock, ii) a biotope dominated by Devonshire cup coral *Caryophyllia smithii* on rock, iii) a biotope characterised by cup sponges and erect branching sponges on rock and iv) a complex community with red encrusting sponge, Devonshire cup coral *Caryophyllia smithii* and featherstars on boulders; the bryozoan *Pentapora foliacea* (now *Pentapora fascialis*³), squat lobster *Munida* sp. and brittlestars are also common. Many of the species identified by Rees (2000) are invertebrate specialists of hard marine substrates. This has since been confirmed by Barrio Froján *et al* (2015), ascribing 4 distinct regions representing biotopes associated with: A4.1 (high energy circalittoral rock), A4.2 (moderate energy circalittoral rock), A5.15 or A5.45 (deep circalittoral coarse or mixed sediment) and A5.27 (deep circalittoral sand) or A5.37 (deep circalittoral mud).

The grade for the feature is A (excellent representativity).

b) *Area of habitat*

The Annex I reef feature within the site is approximately 175 km² / 17,520 hectares. This new value is roughly half the 35,650 hectares estimated by (Graham *et al.*, 2001) as the previous value was derived from a generic flat mapped extent, and so the information we have now is significantly more detailed. An estimate of the entire Annex I reef resource (bedrock, cobble and biogenic reef) in UK waters is 11,522,700 hectares (JNCC 2013) This total extent figure gives the following thresholds for the grades of this criterion (CEC, 1995):

A – extents between 11,522,700 and 1,728,405 ha (15-100% of total resource)

B – extents between 1,728,405 and 230,454 ha (2-15% of total resource)

C – extents less than 230,454 ha (0-2% of total resource)

This site's feature therefore falls within the '0-2%' bracket for Area of Habitat and is graded C.

³ The most recent nomenclature according to Hayward & Ryland (1999)

c) Conservation of structure and functions

Degree of conservation of structure:

Available evidence indicates demersal fishing activity, particularly static gear types such as gillnets and tangle nets, occurs within the site (CNP MEM, 2008; MFA, 2008; NFFO, 2008). It is possible the biological structure of the reef has been impacted by this activity but further research would be required to verify this (JNCC, 2014). Evidence of static fishing was also further observed in a number of locations on the northern regions of both main outcrop areas, as well as indication of mobile fishing activity through the central region (Barrio Froján *et al.*, 2015). However, as the interest feature at Haig Fras is largely intact (Rees, 2000), the grading is II: structure well conserved

Degree of conservation of functions:

The prospects of this feature to maintain its structure in the future (taking into account unfavourable influences and reasonable conservation effort) are good, since the basic physical structure is resilient to mechanical impacts and the reef is isolated from terrestrial sources of pollution. A mechanism is available through the European Commission's Common Fisheries Policy regulations to modify fishing activity in the area if this is deemed to be necessary. The laying of submarine cables and pipelines in and adjacent to SACs also requires regulatory consent. The grading is I: excellent prospects.

Restoration possibilities:

Restoration of the biological communities at Haig Fras would be possible accepting that restoration methods in the offshore area focus on the removal of impacts, which should allow recovery where the habitat has not been removed. It is likely that a similar community to that present now would develop if activities causing damage were removed. The grade is II: restoration possible with average effort.

Overall grade: Due to the second sub-criterion of this criterion being graded I: excellent prospects, the overall grading is A: excellent conservation (regardless of the other two sub-criteria).

d) Global assessment

The suggested grades for Stage 1A criteria a)-c) are A, C and A respectively. Given these gradings, and that the feature is unique in the south west area of UK offshore waters, the Global Assessment grade is A ('excellent conservation value').

Summary of scores for Stage 1a criteria

Area of Habitat	Representativity (a)	Relative surface (b)	Structure and function (c)	Global assessment (d)
Haig Fras	A	C	A	A

9.2 Harbour porpoise (*Phocoena phocoena*) - Annex III selection criteria (Stage 1B)

a) Size and density of the population of the species present on the site

Harbour porpoise (*Phocoena phocoena*) is found throughout the majority of UK continental shelf waters, with very few sightings beyond the continental shelf area (Reid *et al.* 2003; SCANS-II, 2008). Harbour porpoise occur within Haig Fras area (Reid *et al.* 2003; SCANS-II, 2008) and are therefore listed as a feature of the site. There is no evidence that the site is any different from any other area of the SW English continental shelf and therefore it is listed as a non-significant feature.

There is no evidence of use of the site by other Annex II marine mammal species and therefore, none are listed.

10. Sites to which this site is related

None

11. Supporting scientific documentation

Jones *et al.*, (1988) and Smith *et al.*, (1965) provide background information on the geology of Haig Fras. Survey of the feature by towed sledge provides biological information and is documented in Rees (2000). Barrio Froján *et al.*, (2015) documents the findings of a joint JNCC / CEFAS survey during 2011 of Haig Fras cSAC which collected full-coverage multibeam bathymetric and backscatter data and associated ground-truthing data (video, stills, grab-sampling) shown in Figure 1. Following this a further survey was conducted in July 2012 to collect further data for the area in between the central and North-East granite exposures that was previously missed (Barrio Froján *et al.*, 2015). Acoustic and groundtruthing data was collected, including multibeam bathymetry, backscatter, drop-down video tows and benthic grab sampling (Figure 1)

Object-based image analysis (OBIA) was used to determine the extent of Annex I reef and map broadscale (EUNIS) habitats in conjunction with acoustic and groundtruthed data (as described in Barrio Froján *et al.* (2015) and shown in Figure 2). Image objects with low backscatter (< -24 dB) were classified as 'Deep circalittoral sand' (A5.27) or Deep circalittoral mud (A5.37). Of the remaining image objects (backscatter ≥ -24 dB), those with flat seabed were classed as 'Deep circalittoral coarse sediment (A5.15) or Deep circalittoral mixed sediments (A5.45)'. Note that it was not possible to separate coarse sediment from mixed sediments as both had similar characteristics in terms of their acoustic signal. Hence, these two habitats were mapped as one class. The remaining image objects were classed as 'Circalittoral rock' (A4). A threshold of -67 m water depth was chosen to differentiate between 'High energy circalittoral rock' (A4.1) and 'Moderate energy circalittoral rock' (A4.2), tentatively derived from camera footage (Barrio Froján *et al.*, 2015).

The mapped circalittoral rock habitats (A4) shown in Figure 2, satisfy the conditions for defining Annex I reefs according to the Interpretation Manual of EU Habitats (European Commission, 2007). Video imagery has shown that the

bedrock substrate is colonised by epifauna typical of geogenic reefs such as *Devonshire cup coral* (*Caryophyllia smithii*), a brachiopod (*Novocrania anomala*) and *the jewel anemone* (*Corynactis viridis*) (Barrio Froján *et al.*, 2015).

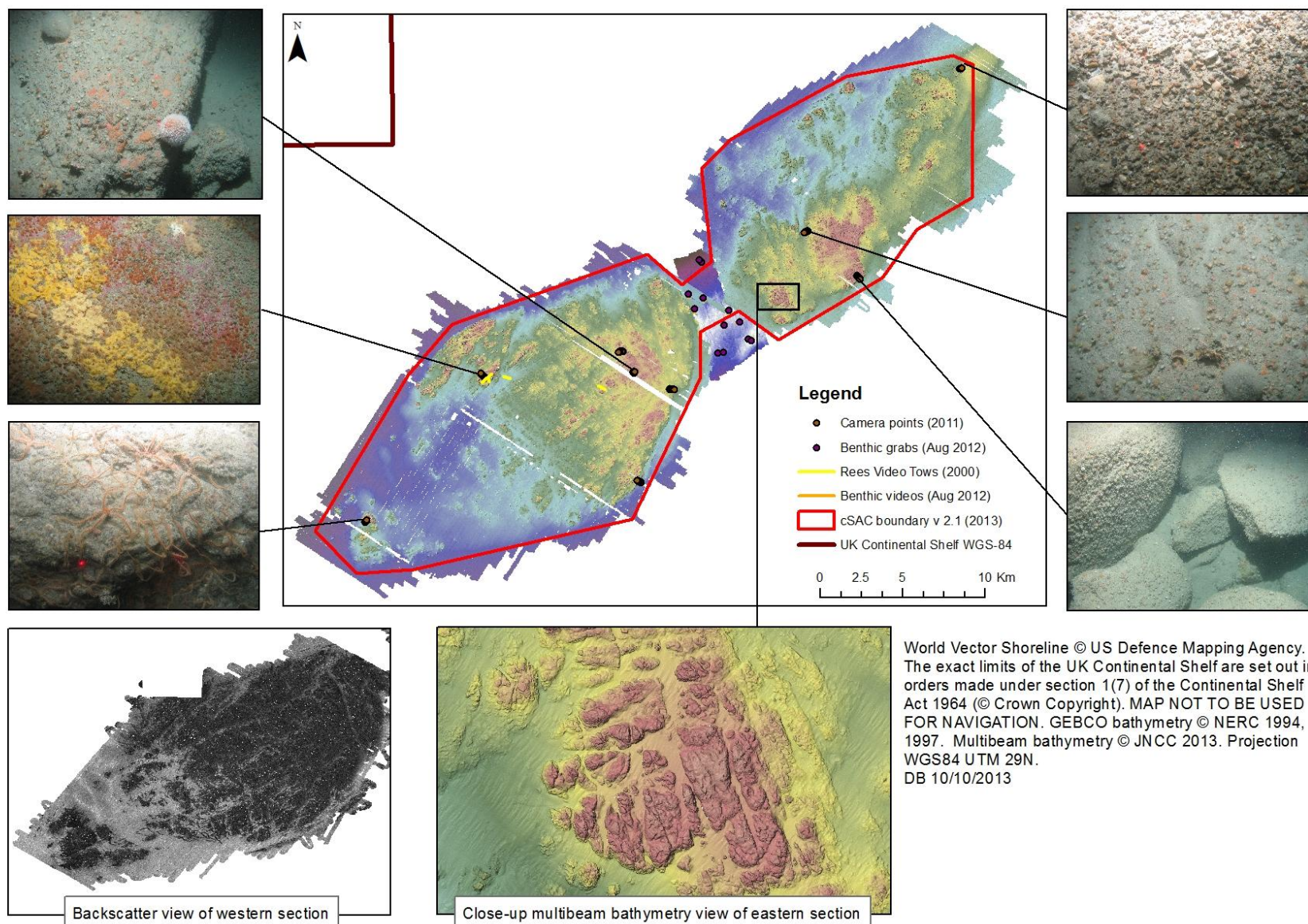


Figure 1: Map showing acoustic data from the 2011 survey showing imagery of the seabed, along with camera stills of areas around the site.

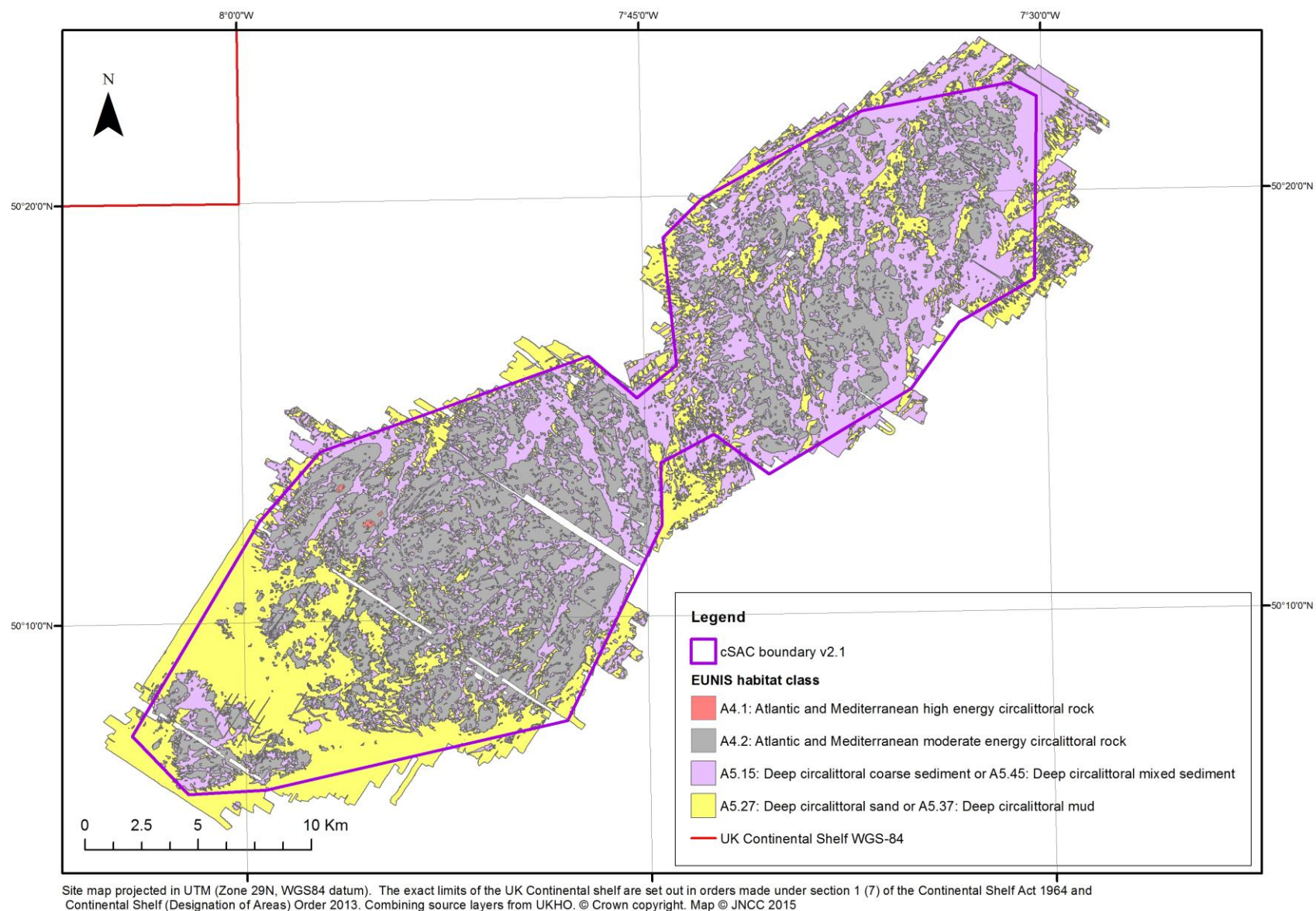


Figure 2: Map showing the level 3 and 4 EUNIS classifications of the Haig Fras rock complex and surrounding seabed.

12. Site overview and conservation interest

The granite exposure known as Haig Fras measures about 45 km by 15 km and protrudes above the surrounding sediment as a rock platform. The main shoal pinnacle arises to within 38 m of the sea surface and measures less than 1 km across. Surveys undertaken by Rees in 2000 and JNCC/Cefas in 2011/12 over the platform area as well as the shoal showed that distinct biotopes were associated with both the rock habitat and the sediment 'pockets' which occur on the platform area. Around the base of the shoal, boulders and cobbles partially embedded in sediment provide a complex habitat.

Most of the rocky reef throughout the complex is observed to be made up of the A4.212 biotope, being dominated by *Caryophyllia smithii* and sponges, in an apparently low to moderate energy environment. The brachiopod *Novocrania anomala* was also present, sometimes in very high densities (Barrio Froján *et al.* 2015). On the uppermost parts of the Haig Fras shoal, the exposed bedrock in this higher energy environment is dominated by the jewel anemone *Corynactis viridis*. This region also supports encrusting sponges and bryozoans, as well as mobile fauna such as the sea urchin *Echinus esculentus* and gastropod mollusc *Calliostoma* spp. (see Plate 1). At the shallow depths ~50 m, small patches of encrusting pink coralline algae were observed, indicating that the peak of the shoal protrudes into the photic zone (Rees, 2000). There were also species observed characteristic of biotope A4.132, such as *Corynactis viridis* and a mixed turf of crisiids, *Bugula*, *Scrupocellaria*, and *Cellaria* on moderately tide-swept exposed circalittoral rock (Barrio Froján *et al.* 2015). At depths of between 60 m and 70 m, the shoal bedrock is slightly covered in silt and is not widely colonised except by cup corals *Caryophyllia smithii* (which are abundant) and a few mobile species such as the urchin *Echinus esculentus*, *Calliostoma* spp. and crinoids (*Antedon* spp.) (see Plate 2). High numbers of cup corals were also seen on parts of the rock platform away from the shoal (Rees, 2000). At the base of the shoal, the rock was covered with a thin layer of fine calcareous sand and mud and supported cup sponges, erect branching sponges, *Caryophyllia smithii* (although in lower numbers than shallower parts of the shoal) and crinoids (Rees, 2000). The boulders and cobbles around the base of the shoal supported encrusting sponge, *Caryophyllia smithii* and crinoids in low numbers; brittlestars, squat lobster (*Munida* spp.) and the ross coral *Pentapora foliacea* (now *Pentapora fascialis*) were also present (see Plate 3) (Rees, 2000).

Analysis by Cefas suggest that the rocky reef bedrock feature of the central and North West sections of Haig Fras complex extends weakly into the ~ 3 km wide area between them, where some minor exposures of bedrock of low elevation (<30 cm) were seen. Most of the rock habitat here comprises cobble and boulder reef which appears to be subject to a degree of scour and was dusted with a fine layer of silt, surrounded by coarse sediment mosaic. Some sponges are found amongst the boulders, but not present in sufficient density to be considered as 'deep-sea sponge aggregations' or 'fragile sponge and anthozoan communities'. The mixed sediment that characterised surficial sediments in the central area appear to have a relatively high mud content and are considered to form a (~ < 1 m thick) veneer over underlying bedrock.

Plates 1-5 illustrate typical species and substrate from around the Haig Fras site.
Plate 1: *Corynactis* (jewel anemone) dominated zone with *Echinus esculentus* (sea urchin) in upper part of Haig Fras (Image © 2000 Ivor Rees)



Plate 2: *Caryophyllia smithii* (Devonshire cup coral) dominated zone at mid-depths on Haig Fras (Image © 2000 Ivor Rees)



Plate 3: Ross coral *Pentapora foliacea* (now *Pentapora fascialis*) and crinoids at the base of Haig Fras (Image © 2000 Ivor Rees)



Plate 4: A dense covering of jewel anemones (*Corynactis viridis*) and encrusting sponges.

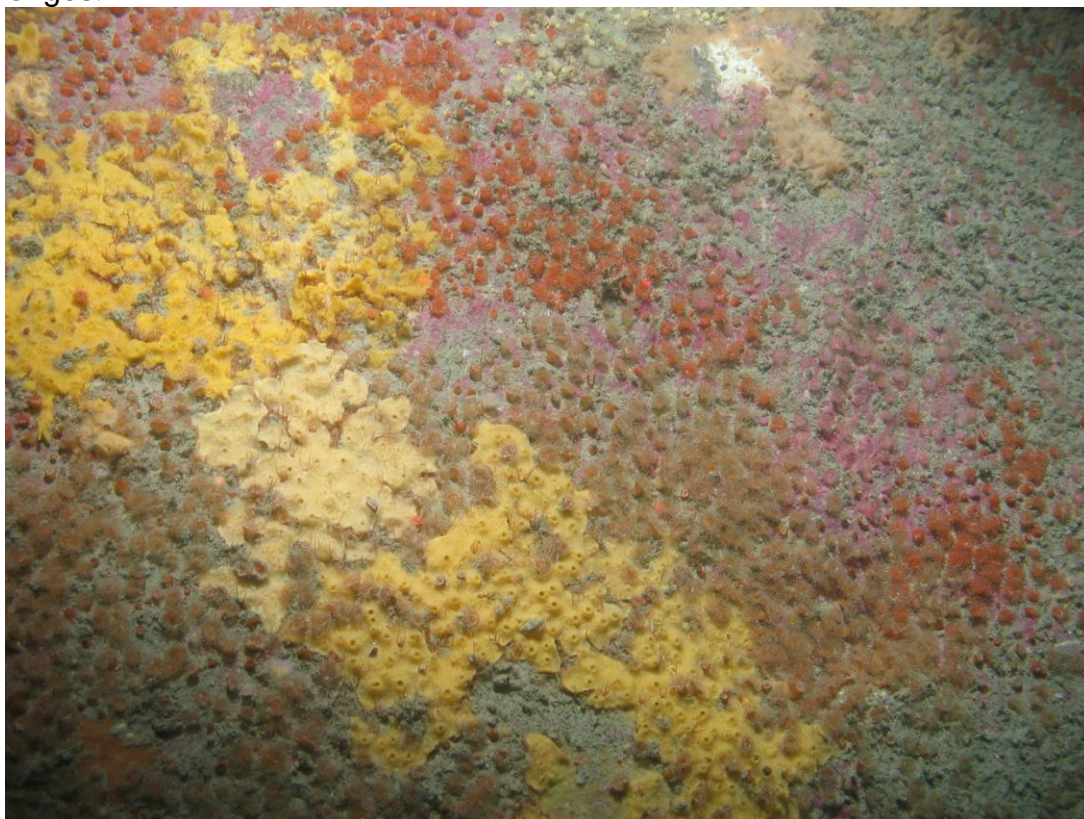


Plate 5: An aggregation of brittlestars on the bedrock of Haig Fras.



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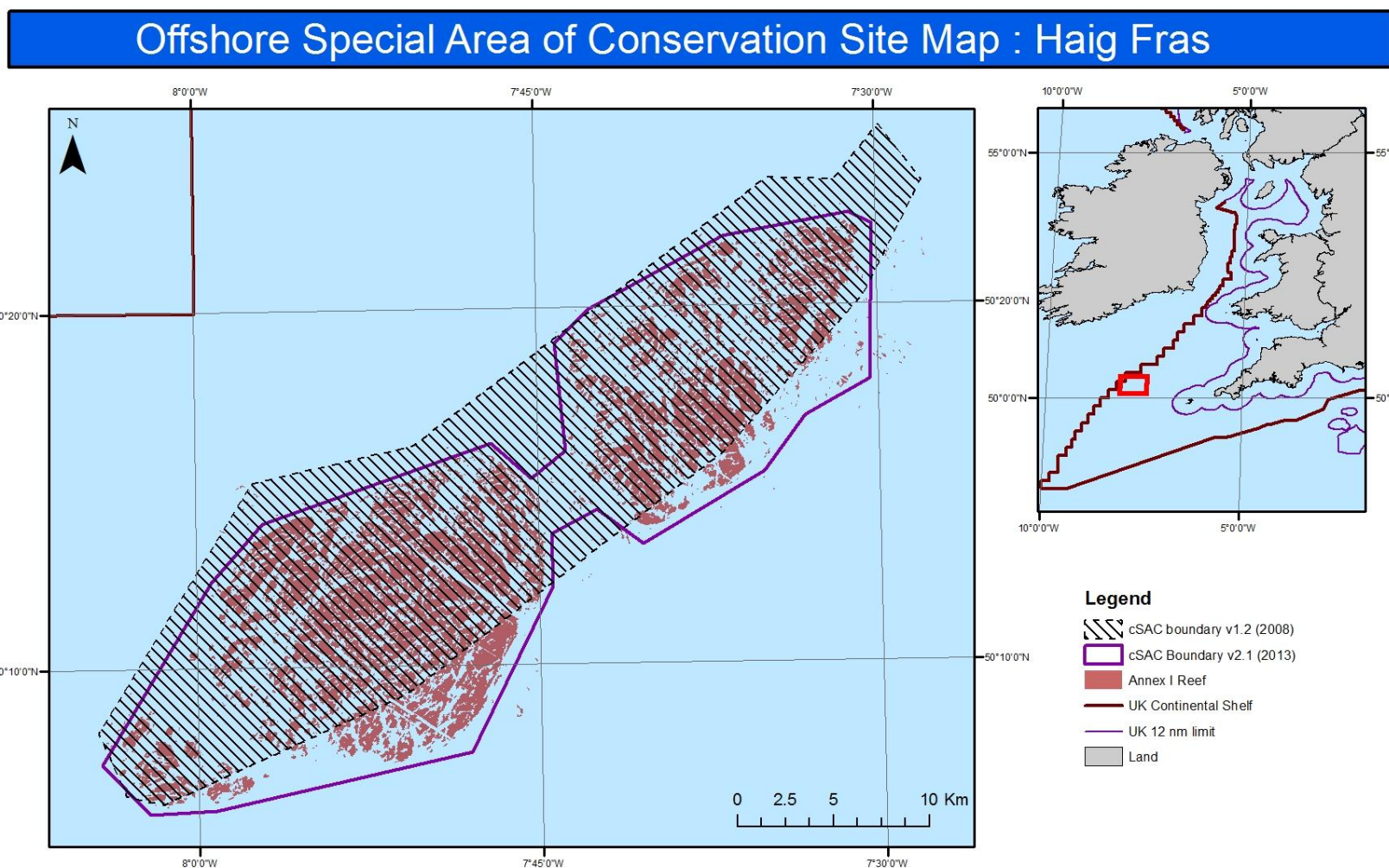
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Appendix 1



World Vector Shoreline © US Defence Mapping Agency. 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). Bathymetry Defra Astrium 2012. MAP NOT TO BE USED FOR NAVIGATION. © JNCC 2013. Projection WGS84 UTM 29N. DB 10/10/2013