

Offshore Special Area of Conservation: Scanner Pockmark

SAC Selection Assessment



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Version 4.0 (1st July 2008)

* Cover photo illustrates anemone species (*Urticina felina*) characteristic of the Scanner Pockmark. No high-quality photos of the site were available at the time of writing

Introduction

This document provides detailed information about the Scanner Pockmark 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, 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 Defra to enable the Secretary of State to fulfil his obligations under the Regulations, and to Competent Authorities to enable them 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 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 Defra to provide this information to Government.

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 must contain a clearly identifiable area representing physical and biological factors essential to these species' life and reproduction to be eligible. Socio-economic factors are not taken into account in the identification of sites to be proposed to the European Commission¹.

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, 1995) (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
ScannerPockmark_SelectionAssessment_4.0.doc (1 st July 2008)	- Post consultation modifications, including site boundary amendment	Secretary of State (July 2008)
ScannerPockmark_SelectionAssessment_3.1.doc (13 th November 2007)	- Draft SAC changed to possible SAC	Public consultation (December 2007)
ScannerPockmark_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)
ScannerPockmarkDossier_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)
SP_ProformaForSubmissionToJNCC.doc (15 th December 2004)		Defra (15 th December 2004)
Scanner Pockmark 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 (www.jncc.gov.uk)

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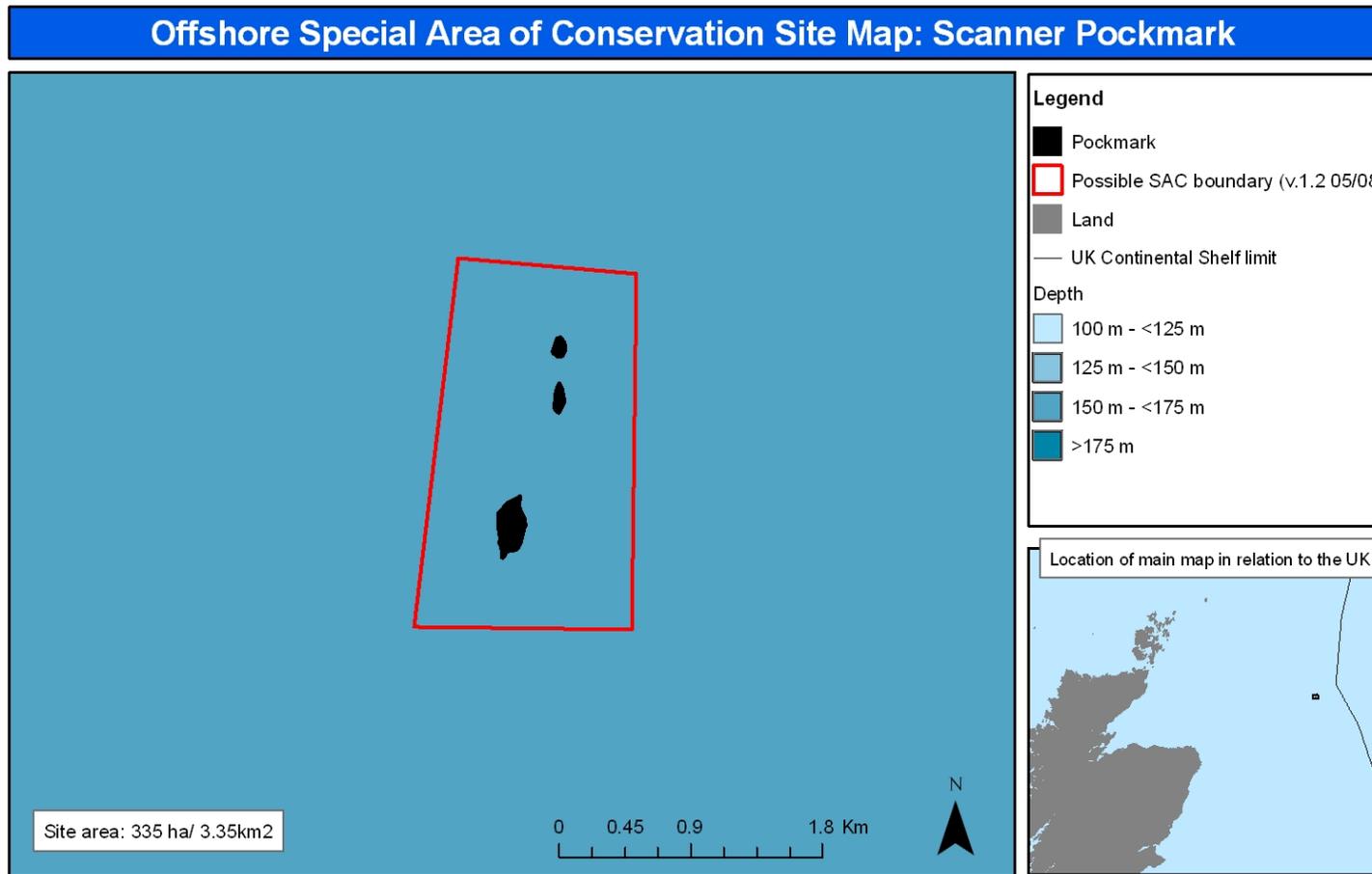
Scanner Pockmark: SAC Selection Assessment

1. Site name Scanner Pockmark	2. Site centre location 58°17'7", 0°58'16" (Datum: WGS 1984)
3. Site surface area 335 ha/ 3.35km ² (Datum: WGS 1984 UTM Zone 31 North, calculated in ArcGIS)	4. Biogeographic region Atlantic

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

1180 Submarine structures made by leaking gases

6. Map of site



Boundary coordinates:

1) 58°16'28", 0°57'28" 2) 58°17'49", 0°57'42" 3) 58°17'47", 0°58'57" 4) 58°16'28", 0°58'60" □

Map version number 16 (22/05/08)

Site map projected in UTM (Zone 31N, WGS84 datum). Seabed habitat derived from BGS 1:250,000 seabed sediment maps © NERC and SeaZone bathymetry. Bathymetry © British Crown and SeaZone Solutions Limited. All rights reserved. Products Licence No. PGA042006.003. 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). 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). Map copyright JNCC 2008.

7. Site summary

Scanner pockmark is a large seabed depression in the northern North Sea which contains large blocks of the Annex I habitat “Submarine structures made by leaking gases”. The blocks lie in the base of the pockmark and support fauna more typically associated with rocky reef. These carbonate structures are notably colonised by large numbers of anemones (*Urticina felina* and *Metridium senile*) and squat lobsters (Dando *et al.*, 2001). These features also appear to support micro-organisms known as ‘chemosynthesizers’ which utilise the discharged methane and its by-product, hydrogen sulphide (Judd, 2001). The gutless nematode *Astomonema southwardorum*, which may have a symbiotic relationship with chemosynthetic bacteria, is unique to this site (Austen *et al.*, 1993). Fish (hagfish, haddock, wolf-fish and small redfish) also appear to be using the pockmark depressions and the carbonate structures for shelter (Dando, 2001).

Scanner Pockmark is situated approximately 185km off the north east coast of Scotland near the centre of the Witch Ground Basin, in waters of approximately 150 m depth. The pockmark contains two deep areas, though overall is roughly oval in shape and measures approximately 900 m by 450 m across with a depth of around 22 m below the surrounding sea floor (Hovland and Judd, 2007). This site also contains the Scotia pockmark complex in the north, a composite feature composed of two deeper sections with active methane seeps (Dando, 2001). The volumes of these pockmarks (Scanner: approximately 1 million m³) are considerably greater than the normal pockmarks in the area.

Scanner pockmark is located in the Northern North Sea Regional Sea (JNCC, 2004a; Defra, 2004) There are currently no Special Areas of Conservation in the northern North Sea for which ‘Submarine structures made by leaking gases’ are a qualifying interest feature of the site. However one other area has been recommended to Defra by JNCC for this feature in this region and is shown below with its characteristic features.

Possible SAC	Notable characteristics of interest feature (Hartley, 2005)
Braemar Pockmarks	Large blocks, pavements slabs and smaller fragments of methane derived authigenic carbonate are present in two pockmarks and on the seabed nearby. These submarine structures made by leaking gases provide a habitat for marine fauna usually associated with rocky reef as well as very specific chemosynthetic organisms which utilise the methane seeping from beneath the sea floor (and its by-product, hydrogen sulphide). Larger blocks of carbonate also provide shelter for large fish species such as wolf-fish and cod.

In character, the interest features of the Scanner Pockmark site are similar to those found at the Braemar Pockmarks site; however, the submarine structures made by leaking gases at Braemar appear to be characterised by slightly different species assemblages and have a wider variety of morphology.

8. Site boundary

The proposed boundary for the Scanner Pockmark site has been defined using JNCC’s marine SAC boundary definition guidelines (JNCC, 2004b) and information provided during public consultation on this site in 2007-2008. The proposed boundary 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. As bottom trawling is a significant threat to the interest feature, the proposed boundary includes a margin to allow for mobile gear on the seabed being at some distance from the location of the vessel at the sea surface. The maximum depth of water around the feature is 150m; therefore, assuming a ratio of 3:1 fishing warp length to depth, the proposed boundary is defined to include a margin of 450m from the submarine structures. The pockmarks containing the habitat are drawn from interpolated data from British Geological Survey (Graham *et al.*, 2001). The presence of carbonate structures formed from leaking gases was confirmed by survey using both ROV (remote operated vehicle) and submersible (see section 11 below).

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 Submarine structures made by leaking gases

Annex III selection criteria (Stage 1A):

a) *Representativity*

This Scanner Pockmark site occurs in the northern North Sea Regional Sea, and represents the Annex I feature Submarine structures made by leaking gases in this sea area. 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. Therefore, the grade is B.

b. *Area of habitat*

An evaluation of the area of the site covered by submarine structures made by leaking gases in relation to the total area covered by this interest feature in UK waters is not possible, since all occurrences of this habitat are not known. However, evidence from known occurrences of the habitat shows that the extent at each occurrence is very small (2,500 m² at the most). The grades for this criterion are Grade A (site contains '15-100%' of total resource of Annex I habitat), Grade B (site contains '2-15%' of total resource of Annex I habitat) and Grade C (site contains '0-2%' of total resource of Annex I habitat) (CEC, 1995). It is likely that the Annex I habitat at the Scanner Pockmark site comprises between 15 and 100% of the total extent of submarine structures made by leaking gases; therefore, the grade for this criterion is A.

c) *Conservation of structure and functions*

Degree of conservation of structure

The biological and physical structure of the habitat at the Scanner pockmark site is intact on the available evidence but may have been impacted by bottom trawling for Norway lobster (*Nephrops norvegicus*) (the main commercial

demersal stock in the Witch Ground). *N. norvegicus* burrows were observed in soft sediment lying on top of some of the carbonate structures. Vessel Monitoring System (VMS) data for 2005-2007 provided by the Scottish Fishermen's Federation in 2008 also confirms that this area is likely to be subject to demersal fishing activities. Bottom trawling could have modified the structure of the pockmark, causing burial of some of the submarine structures, as well as breaking and displacement of carbonate pieces. Some fishing nets were observed caught on the structures. However, the feature appears to be largely undamaged. The grade is therefore 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. Regulations are in place to regulate oil and gas activity in and around SACs in the UK Continental Shelf Designated Area and 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 also requires regulatory consent. The feature is distant from terrestrial sources of pollution. The grade is I: excellent prospects.

Restoration possibilities

Restoration methods in the offshore area focus on the removal of impacts which should allow recovery where the habitat has not been removed. Restoration of biological communities at the Scanner Pockmark site may be possible where the submarine structures have not been destroyed. However where damage has occurred, the restoration potential is unknown. This is because the methane derived authigenic carbonate is accreted naturally (and over long time periods) and further accretion is dependent on sufficient gas seepage as well as the presence of specific chemosynthetic micro-organisms. Therefore, the grade is III: restoration difficult or impossible.

Overall grade

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

d) *Global assessment*

There are currently no other SACs with this habitat as a qualifying feature in UK waters; as such, this site makes a particularly important contribution to maintaining this Annex I habitat at favourable conservation status within its natural range.

The total extent of 'Submarine structures made by leaking gases' in the UK is unknown, though present information suggests that this habitat probably covers less than 1,000 ha. As such, this habitat may be considered rare.

The suggested grades for Stage 1A criteria a)- c) are B, A and A respectively. The rarity of this habitat in UK waters adds weight to the significance of this feature despite the sparse epifauna. The Global Assessment grade is therefore 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)
Scanner pockmark	B	A	A	A

10. Sites to which this site is related

None

11. Supporting scientific documentation

Scanner pockmark was discovered in 1983 during a routine environmental survey in UK Petroleum block 15/25b. Sampling of the pockmark (including transects across the carbonate blocks) was undertaken with an Agassiz trawl and box corer in 1989 and box corers in 1990. These and further surveys in 1991 and 2001 have described the carbonate blocks within the pockmark, the epifauna associated with the feature, surrounding infauna, mapped the pockmark and confirmed the successive presence of active methane seepage. This work has been published in Hovland & Sommerville (1985), Dando *et al.* (1991), Judd *et al.* (1994), Judd (2001) Dando (2001) and Hovland and Judd (2007).

12. Site overview and conservation interest

The Scanner pockmark measures approximately 900 m by 450 m across with a depth of around 22 m below the surrounding sea floor (Hovland and Judd, 2007). The pockmark was created by the expulsion of shallow methane gas and has been maintained by active seepage. At the base of the pockmark, large 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 Annex I 'Submarine structures made by leaking gases'.

As well as providing a potentially favourable, sheltered habitat for a variety of marine organisms, pockmarks which have active gas seeps and associated structures may be of ecological significance because i) of the utilisation of methane and its by-product, hydrogen sulphide, by 'chemosynthesisers' and ii) MDAC provides a hard substrate suitable for colonisation by certain benthic organisms (Judd, 2001).

There is some evidence of chemosynthetic activity at the Scanner Pockmark site. The most important species found in the pockmark was the gutless nematode *Astomonema southwardorum* which may derive some of its nutrition from chemosynthetic bacteria. The Scanner pockmark is the type locality and the only known locality for this species to date (Austen *et al.*, 1993). The meiofauna of the structures was not studied but it is likely that this nematode is associated with the gas channels in the carbonates. Another important species associated with the seepage in the pockmark is the bivalve *Thyasira sarsi*, for which the pockmark is the only known native habitat in the Fladen Ground area (Oliver & Killeen, 2002). This is a key species for regenerating sulphide-rich sediments, including drill-cuttings piles (Dando *et al.*, 2004; Dando & Southward, 1986; Dando & Spiro, 1993). This bivalve is largely dependent on endosymbiotic sulphur-oxidising bacteria for nutrition. Another lucinacean, with similar endosymbiotic bacteria, *Lucinoma borealis* (Dando *et al.*, 1986), was found cemented in a living position into some of the carbonate.

The structures and pockmark depression have also attracted a range of fish species. Fish noted in the pockmark were *Myxine glutinosa* (hagfish), *Rhinonemus cimbricus* (fourbeard rockling), a single *Melanogrammus aeglefinus* (haddock) and *Sebastes viviparus* (small redfish) on top of the carbonates and *Anarhichas lupus* (wolf-fish) lying in cavities under the rocks. These fish appear to be using the pockmark depressions and the carbonate structures for shelter, since no large fish were seen outside the pockmark (Dando, 2001).

The most conspicuous invertebrates at the Scanner Pockmark site were the Anthozoa, including *Pennatula phosphorea*, *Virgularia mirabilis* and *Cerianthus lloydii* in the sediments of the pockmark and the sea anemones *Bolocera tuediae*, *Urticina felina* and *Metridium senile* on the carbonate structures. Among other species, the whelk, *Buccinum undatum*, and an egg mass were observed. Hermit crabs (*Pagurus* sp.), large echinoderms (*Astropecten irregularis*) and squat lobsters were also found on the site (Dando *et al*, 2001). A total of 282 taxa were recorded from surveys in 1989 and 1990; however, most of these species are known from this area of the North Sea at low densities (Basford *et al*, 1990).

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