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# **Proposed amendment to the boundary of the Braemar Pockmarks Special Area of Conservation (SAC)**

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## Background

The UK submitted the Braemar Pockmarks candidate Special Area of Conservation (cSAC) to the European Commission in 2008 for the protection of the Annex I habitat 'Submarine structures made by leaking gases'; the European Commission confirmed the site as a Site of Community Importance (SCI) in 2009 and the site was subsequently designated a SAC in 2015. The site area was 5.18km<sup>2</sup> when designated and comprised a simple polygon to encompass known records of Submarine structures made by leaking gases in the vicinity (Figure 1).

Previous surveys identified the presence of pockmarks at the site to be shallow, ovoid, seabed depressions several metres across, which were probably formed by the venting of biogenic/petrogenic fluids or gases into the water column (Hovland & Judd 1988). Judd (2001) concluded that large blocks, pavements slabs and smaller fragments of methane-derived authigenic<sup>1</sup> carbonate (MDAC) have been deposited in this location through a process of precipitation during the oxidation of methane gas (Judd 2001).

## New evidence

JNCC commissioned the British Geological Survey (BGS) to compare survey data from 2012 (Rance *et al* 2017) with earlier geological data to assess changes in pockmark morphology and condition (Gafeira & Long 2015). Forty-nine pockmarks were identified, mapped and characterised by this study. Twenty-seven lie within the Braemar Pockmarks SAC boundary, a further 21 lie up to 1km away and one is over 1 km away from the original SAC boundary. Fourteen of the pockmarks mapped outside of the existing site boundary show strong acoustic reflections that are indicative of the Annex I habitat type Submarine structures made by leaking gases; one pockmark has verified evidence for the presence of the Annex I habitat Submarine structures made by leaking gases. There are five pockmarks with verified records of Submarine structures made by leaking gases recorded within the existing SAC boundary (Figure 2).

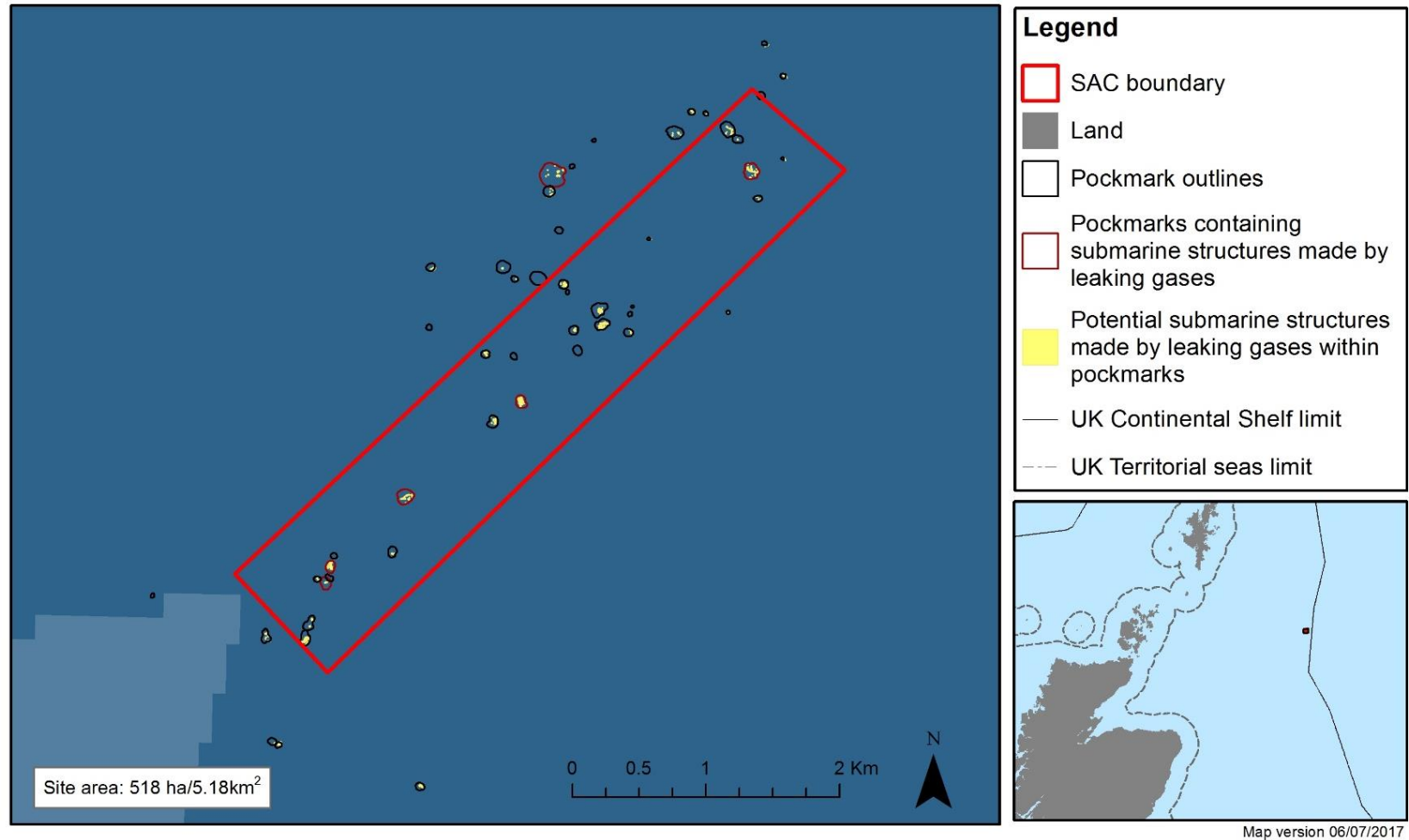
JNCC reviewed these new data and concluded the pockmarks outside the site represent examples of the Annex I feature Submarine structures made by leaking gases and meet the criteria to be included within a SAC.

## Proposed amendment to site boundary

The proposed amendment (Figure 2) extends the existing site boundary to the North East and South East to encompass all potential and verified records of the Annex I habitat Submarine structures made by leaking gases recorded in the area, based on evidence presented within Gafeira & Long (2015). Following JNCC's guidance (2012) on defining boundaries for marine SACs for Annex I habitat sites fully detached from the coast – a 3:1 ratio of distance from feature to water depth was applied to create a buffer on a precautionary basis around the pockmarks to determine the new boundary for the site. Maximum water depth in the site is 124m therefore a buffer of 372m has been applied around all potential and verified records of the feature.

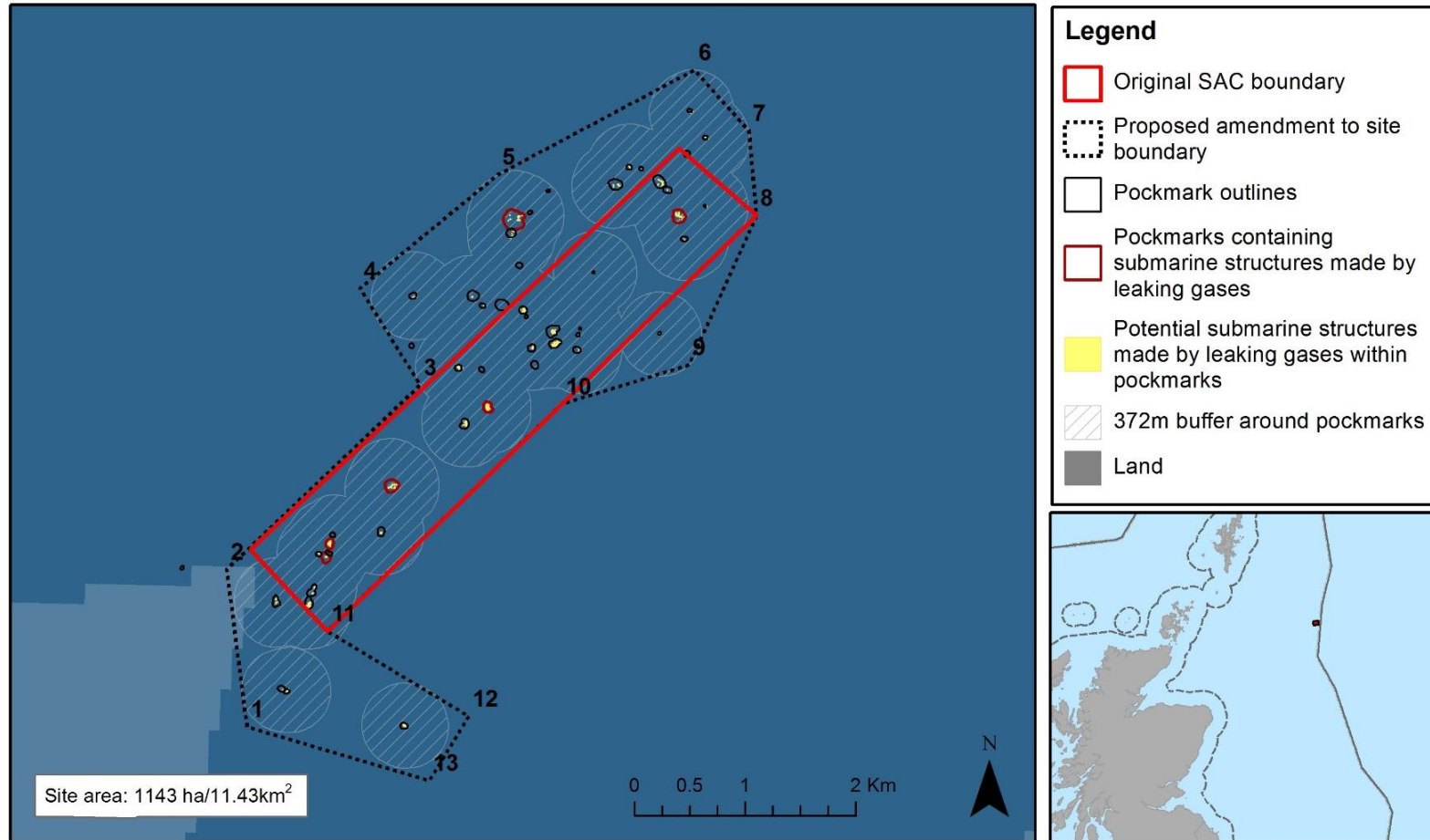
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<sup>1</sup> An authigenic sedimentary rock deposit is one that was generated where it is found or observed. Sedimentary authigenic minerals include calcium carbonate.



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 Copyright. All rights reserved. Permission Number Defra012012.002. 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). Map copyright JNCC 2017.

**Figure 1: Original boundary of Braemar Pockmarks SAC.**



Boundary coordinates:

- 1) 58° 57' 31", 1° 26' 15" 2) 58° 58' 17", 1° 26' 2" 3) 58° 59' 12", 1° 27' 49" 4) 58° 59' 40", 1° 27' 13" 5) 59° 0' 14", 1° 28' 30"  
 6) 59° 0' 46", 1° 30' 20" 7) 59° 0' 29", 1° 30' 51" 8) 59° 0' 4", 1° 30' 57" 9) 58° 59' 20", 1° 30' 21" 10) 58° 59' 8", 1° 29' 9"  
 11) 58° 57' 60", 1° 26' 60" 12) 58° 57' 36", 1° 28' 21" 13) 58° 57' 17", 1° 27' 59"

Map version 06/07/2017

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 Copyright. All rights reserved. Permission Number Defra012012.002. 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 Stationary 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). Map copyright JNCC 2017.

**Figure 2: Proposed amendment to the site boundary of Braemar Pockmarks SAC based on the distribution of potential and verified Annex I Submarine structures made by leaking gases as derived from Gafeira & Long (2015).**

## References

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