Scottish Natural Heritage
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Scottish MPA Programme

Data confidence assessment

SHIANT EAST BANK POSSIBLE MPA

JUNE 2019

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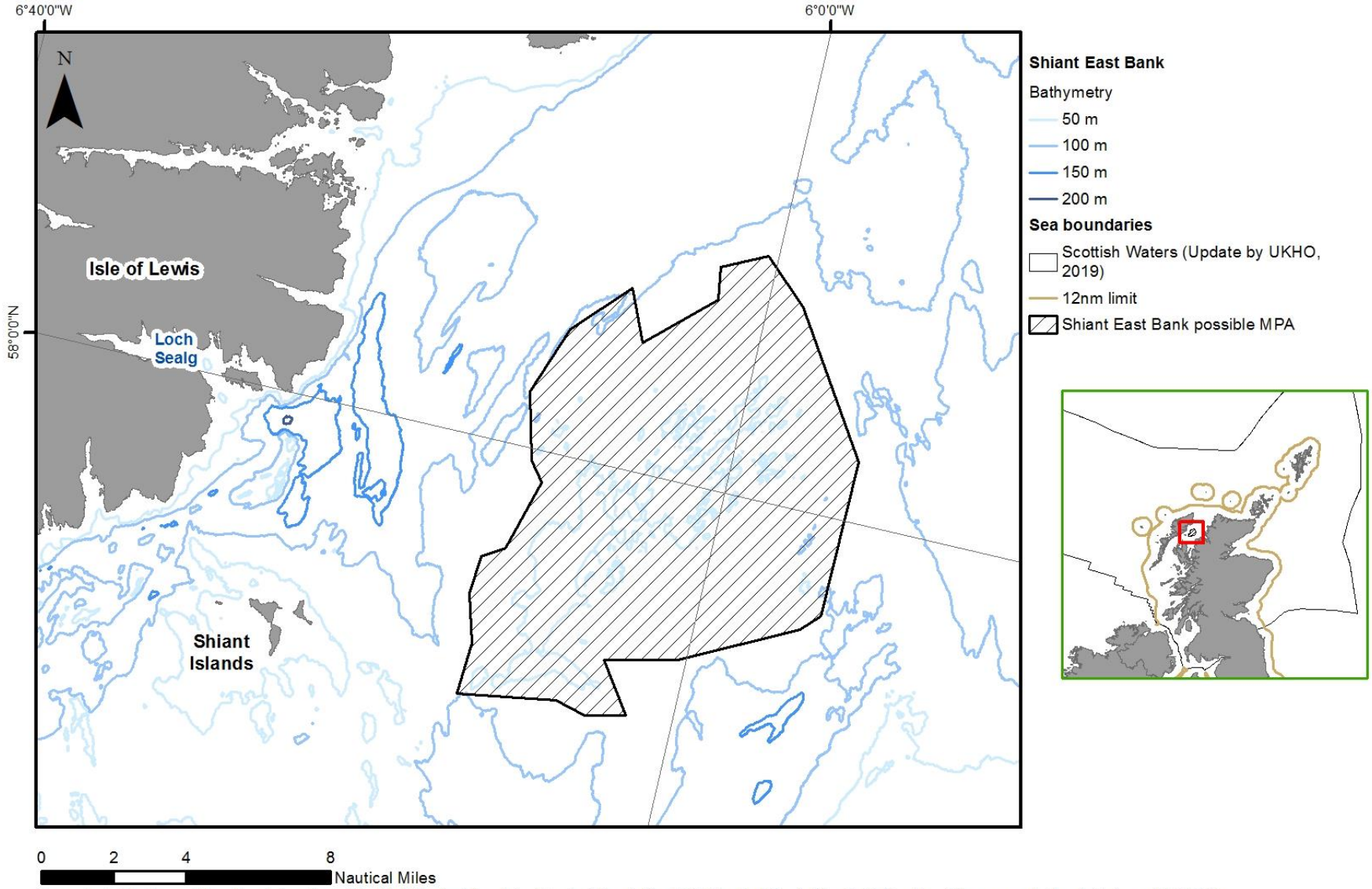
Document version control			
Version	**Date**	**Author**	**Reason / Comments**
Version 1	29/01/2014	Laura Clark	Revised MPA proposal format, updating MPA search location version (ver. 7 - 29/11/2012).
Version 2-14	28/02/2014 – 18/03/2015	Various	Refinements and document development.
Version 15	06/04/2015	John Baxter	QA review.
Version 16	09/04/2015	Ben James, Katie Gillham & Graham Epstein	Refinements in response to initial QA review. Finalisation for SNH Scientific Advisory Committee.
Version 17	18/09/2018	Sam Black & Katie Gillham	Review and Update.
Version 18	21/09/2018	Ben James	QA review.
Version 19	24/09/2018	Sam Black	Refinements in response to initial QA review. Finalisation for SNH Scientific Advisory Committee.
Version 20	17/10/2018	Sam Black and Katie Gillham	Address comments from SNH Scientific Advisory Committee.
Version 21	17/10/2018	Ben James	QA review.
Version 22	18/10/2018	Sam Black and Katie Gillham	Finalisation for SNH Senior Leadership Team review.
Version 23	02/11/2018	Sam Black	Finalisation for SNH Protected Areas Committee.

Distribution list			
Format	**Version**	**Issue date**	**Issued to**
Electronic	SL7	14/12/2012	SNH web publication [B1149402 / 17(#41)].
Electronic	10	14/04/2014	SNH SAC MPA Sub-group.
Electronic	12	23/07/2014	Marine Scotland officials.
Electronic	13	24/07/2014	SNH web publication [A1122372 / 29(#33)].
Electronic	16	13/04/2015	SNH SAC MPA Sub-group.
Electronic	16	16/11/2015	SNH web publication [A1568049 / 24(#32)].
Electronic	8	20/09/2018	Ben James
Electronic	19	25/09/2018	Sally Thomas
Electronic	19	28/09/2018	SNH Scientific Advisory Committee
Electronic	19	18/10/2018	Sally Thomas (SLT)
Electronic	20	02/11/2018	SNH Protected Areas Committee
Electronic	21	05/04/2019	Marine Scotland officials

SHIANT EAST BANK POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Figure 1 Shiant East Bank possible MPA



Map projected in Europe Albers Equal Area Conic (Modified Standard Parallels - Standard Parallel 1 = 50.2; Standard Parallel 2 = 58.5). Coastline ©Crown copyright and database right [2019].
All rights reserved. Ordnance Survey Licence number 100017908. 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).
Landmass Ordnance Survey © Crown Copyright and database right 2019. All rights reserved. Scotland (Adjacent waters) Updated by the Law of the Sea Division, United Kingdom Hydrographic Office 2019.
Biological data from Geodatabase of Marine features in Scotland (GeMS) in part from Defra MB0102 ©Crown Copyright. Bathymetry © Crown Copyright 2018. All rights reserved. License No. EK001-201310001.
Not to be used for navigation. Copyright and database right 2019. pMPAs ©SNH 2019. 21.03.2019

Name of possible MPA	Shiant East Bank	**Assessor(s)**	LC; BJ; KG; GE; KF; SB

Shiant East Bank possible MPA shown in Figure 1 encompasses an area of shelf banks and mounds in the North Minch. Shaped by successive glaciations over at least the last 500,000 years, the sea bed consists of a patchwork of mobile sediments, bedrock and sediment-influenced rock in water depths of 40 - 70 m. The bank sediments support characteristic communities dominated by polychaete worms, bivalve molluscs and mobile crustaceans. The bedrock outcrops and frequent cobbles and boulders interspersed amongst the coarse sandy substrates across the bank support northern sea fans and diverse sponge communities. The mixed seabed sediments are considered representative of Scotland's marine environment. Shelf banks and mounds such as the Shiant East Bank are important areas, linked to primary and secondary production and frequented by top marine predators.

The geodiversity interests within the possible MPA represent the Quaternary of Scotland feature, lying within the Summer Isles to Sula Sgeir Fan key geodiversity area (Brooks *et al.,* 2013; Gordon *et al*., 2013). The outstanding range of glacial interests present here coupled with the exceptional detail of the record make this region of international geological importance (Bradwell and Stoker, 2015).

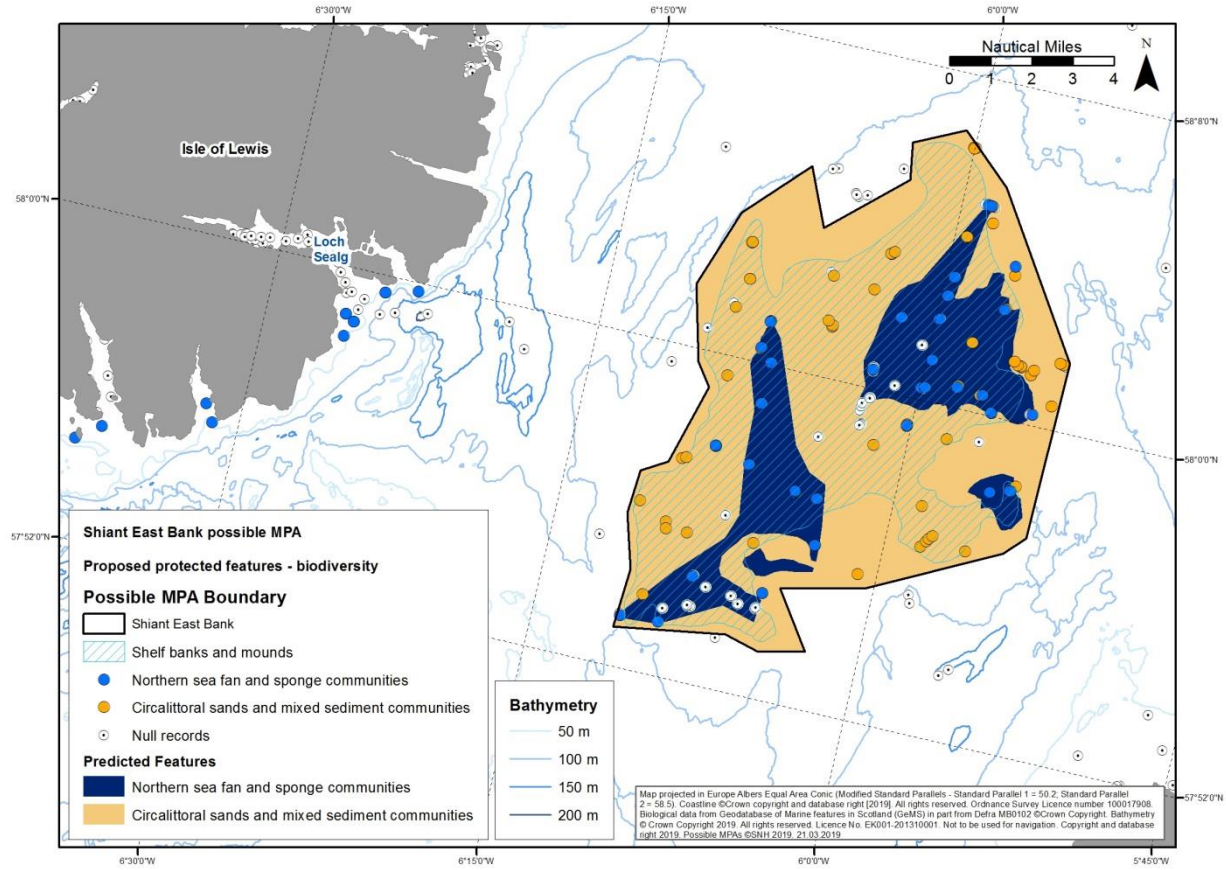
Proposed protected features			
Biodiversity	*Circalittoral sands and mixed sediment communities*[1] *(CMC)* *Northern sea fan and sponge communities (NS)* *Shelf banks and mounds (SM)*	**Geodiversity**	*Quaternary of Scotland - drumlinoid forms, glacial lineations, iceberg ploughmarks, streamlined bedrock (GEO)*

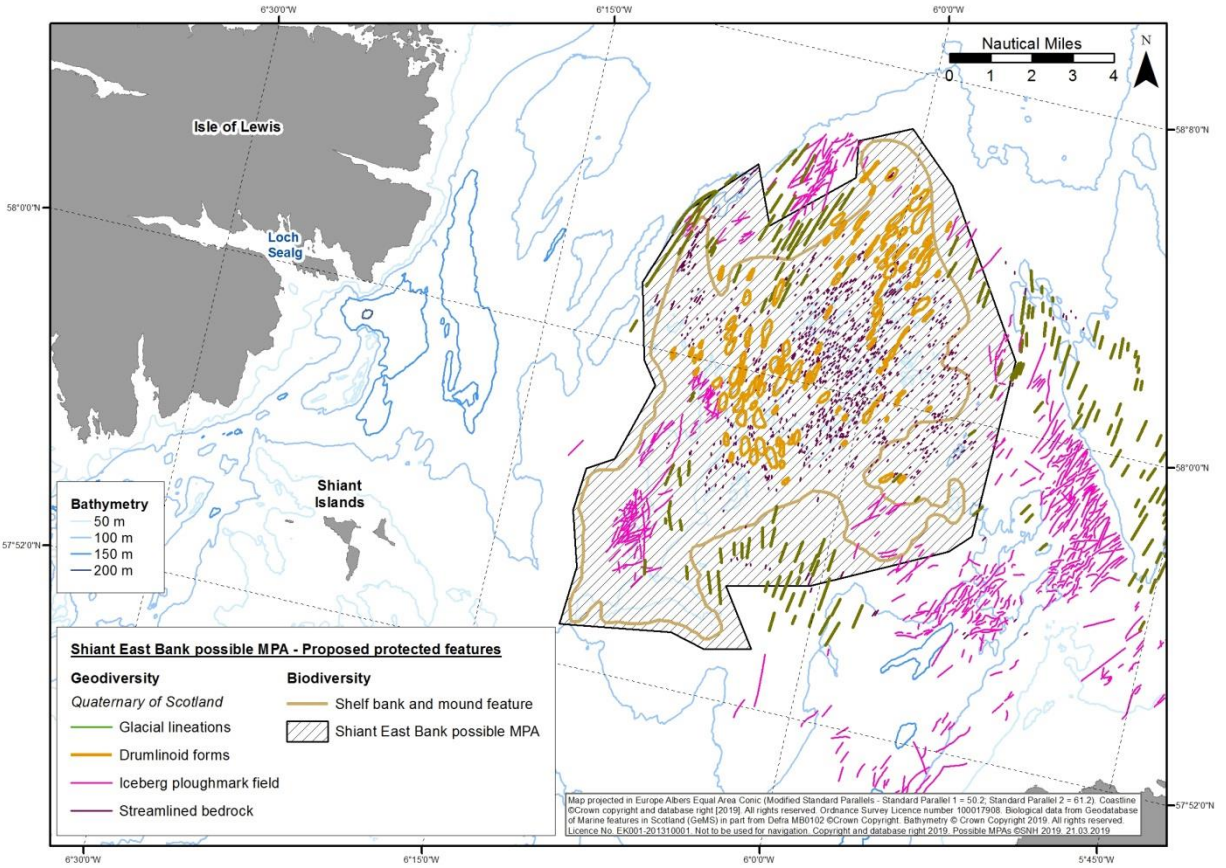
Data used in assessment			
Version of GeMS database	*Ver.7*	**Other datasets used in feature map** (specify) -	• *Contextual mapping (coastline; bathymetry; MPA boundaries; other protected areas).* • *MSS 2008-10* Nephrops *database (null records on Map A - Allen* et al*., 2012).* • *Marine Recorder data (null records on Map A) [ver. 250315].* • *Geodiversity features (Map 2ii - adapted from Bradwell and Stoker, 2015)*. • *Civil Hydrography Programme (CHP) multibeam bathymetry data (Map D - CHP, 2011).*

Summary of data confidence assessment (see detailed assessment on following pages)							
Confident in underpinning data		**Yes**	✓	**Partial**		**No**	
Confident in presence of identified features?	✓	**Data suitable to define extent of individual proposed protected features**		✓	**Partial**		✖
				SM;GEO	CMC;NS		
Summary	*We have high confidence in the biodiversity and geodiversity data and in the presence of the proposed protected features within the possible MPA. Analysis of 2005 and 2011 multibeam data and additional survey work in 2011 and 2013 has improved our understanding of the true shape and structure of the Shiant East Bank and its associated seabed habitats. This includes the distribution of northern sea fan and sponge communities and circalittoral sands and mixed sediment communities (Axelsson* et al*., 2012; Moore, 2012, 2014; Moore and Atkinson, 2012; Allen, 2015). The potential wider distribution of these features across the MPA was modelled in 2017 (Miller* et al*., 2017). Recent work focusing on the geology of the area has defined key components of interest including drumlinoid forms, glacial lineations, iceberg ploughmarks and streamlined bedrock, features which represent unique geological traces of the British-Irish Ice Sheet (Bradwell and Stoker, 2015; Bradwell and Stoker, 2016).*						

[1] Comprising 'Offshore circalittoral sand' (**SS.SSa.OSa** - A5.27), 'Circalittoral mixed sediment' (**SS.SMx.CMx** - A5.44) and 'Offshore circalittoral mixed sediment' (**SS.SMx.OMx** - A5.45).

Figures 2i and ii *The known distribution of proposed protected features within Shiant East Bank possible MPA*





SHIANT EAST BANK POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Data confidence assessment	Our assessment of data confidence is based on consideration of the age and source of the data, sampling methods used and overall coverage across the possible MPA (see also Maps A - D). Existing protected areas are shown on Map E. Maps F and G show evidence relating to the functional importance of the shelf bank and mound feature.

Age of proposed protected feature data (Map A)					
Number of records collected within last 6 years	**Many** *CMC;NS;SM*	**Number of records collected 6-12 years ago**	**Some** *SM*	**Number of records >12 years old**	**Some** *Geo*
Comments	*The data relating to the proposed biodiversity protected features within this possible MPA were collected in 2011 (Axelsson* et al.*, 2012; Moore, 2012; Moore and Atkinson, 2012) and 2013 (Moore, 2014; Allen, 2015). The acoustic multibeam and 2D seismic profile data relating to the shelf banks and mounds feature and geodiversity features were collected by BGS in 2005 and the Maritime & Coastguard Agency (MCA) in 2011 (CHP, 2011) . These data were processed in 2013 by the British Geological Survey (BGS) (Bradwell and Stoker, 2015). Predictive mapping of seabed features within the possible MPA was carried out in 2017 (Miller* et al.*, 2017).*				

Source of proposed protected feature data (Map B)					
Targeted data collection for nature conservation purposes	✓	**Statutory monitoring (marine licensing etc.)**		**Fisheries survey work**	
Data collection associated with development proposals (EIA etc.)		**Recreational / volunteer data collection**		**Other** (specify) - MCA under the Civil Hydrography Programme	✓
Comments	*The proposed biodiversity protected feature records were collected as part of targeted nature conservation surveys undertaken by the National Oceanography Centre[2] (opportunistic sampling during research cruise JC060, a 34-day expedition to study seabed habitats in the North-East Atlantic Ocean - the three samples collected in the North Minch during a period of adverse weather, were analysed and reported in Moore and Atkinson, 2012), and Marine Scotland (Axelsson* et al.*, 2012; Moore, 2012, 2014; Allen, 2015). The acoustic multibeam data used to define the shelf banks and mounds feature were collected by the MCA under the Civil Hydrography Programme (ongoing work to update the UK's nautical charts and publications and ensure navigational safety - 'other' above)(CHP, 2011). The Quaternary of Scotland geodiversity feature and the associated key area were derived through a Defra-led data collation exercise (Brooks* et al.*, 2009) and a subsequent SNH and JNCC commissioned review (Brooks* et al.*, 2013). Available multibeam data were analysed by BGS to define the component geodiversity interests (Bradwell and Stoker[3], 2015). Predictive mapping of biodiversity features within the possible MPA was undertaken by Natural Power Consultants Ltd in 2017 (Miller* et al.*, 2017), who used of the same MCA multibeam bathymetry datasets.*				

[2] SNH is grateful to the National Oceanography Centre for providing access to survey data collected around the Shiant East Bank in May 2011.

[3] SNH is grateful to and to Tom Bradwell, Martyn Stoker and BGS for providing access to the geodiversity feature data presented in Bradwell and Stoker (2015).

SHIANT EAST BANK POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Sampling methods / resolution							
Feature	**Modelled**	**Acoustic / remote sensing**	**Remote video / camera**	**Infaunal - grab / core**	**Sediment**	**Diving**	**Visual census**
CMC	✓		✓	✓	✓		
NS	✓		✓				
SM	✓	✓			✓		
GEO	✓	✓					
Comments	*A number of sampling methods have been used to collect information on the proposed protected features. Remote video / camera techniques were used during the 2011 and 2013 field surveys. A remotely operated vehicle (ROV) was used on the three video transects completed by the National Oceanography Centre on the north-east flanks of the bank in 2011 (Moore and Atkinson, 2012); and a towed camera sledge was used during the Marine Scotland surveys in 2011 and 2013 (Moore, 2012, 2014). Grab samples were also collected during the Marine Scotland surveys for infaunal community and sediment particle size analyses (Axelsson* et al.*, 2012; Allen, 2015). High resolution bathymetric multibeam data (CHP, 2011) were used to identify and delineate the drumlinoid forms, glacial lineations, iceberg ploughmarks and streamlined bedrock geodiversity interests (Bradwell and Stoker, 2015). Predictive habitat mapping within the possible MPA used the same high-resolution MCA multibeam bathymetry datasets. The predictive mapping of biodiversity features had a low associated confidence due to the large number of polygons created solely via statistical modelling with inadequate ground truth sample data or acoustic or aerial imagery to help verify their extent (Miller* et al.*, 2017).*						

Proposed protected feature data coverage (Maps A - D)							
Across the possible MPA							
Large numbers of proposed protected feature records distributed across the possible MPA	✓	**Numerous proposed protected feature records scattered across the possible MPA with some clumping**		**Numerous proposed protected feature records possibly with some clumping. Boundary not defined solely by recorded feature distribution**		**Few or isolated proposed protected feature records - possibly clumped**	
For individual features							
Multiple records of individual proposed protected features providing an indication of extent and distribution throughout the possible MPA	✓	**Few or scattered records of specific proposed protected features making extent and broad distribution assessment difficult**		**Few or isolated records of specific proposed protected features**			
Are acoustic remote sensing data available to facilitate the development of a full coverage predictive seabed habitat map?	*Yes. Acoustic multibeam data covering most of the possible MPA (see Map D for details) were collected in 2005 and 2011 (CHP, 2011; Bradwell and Stoker, 2015). These data were also used in the development of a predictive seabed habitat map (Miller* et al.*, 2017).*						

SHIANT EAST BANK POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Proposed protected feature data coverage (Maps A - D)	
Comments	*Available protected feature records are scattered across the possible MPA. Multibeam data covering much of the area were collected in 2005 and 2011 (CHP, 2011; Bradwell and Stoker, 2015). These data were acquired through a Pan-Government agreement*[4] *on the access and use of bathymetric data and processed by the British Geological Survey to more accurately reflect the overall shape of the Shiant East Bank and the distribution of the geodiversity components (Bradwell and Stoker, 2015) (Figure 2ii). The processed multibeam data was also used to predict the wider distribution and extent of the seabed habitat proposed protected features (Miller* et al*., 2017). Information of the coverage of geodiversity features within the MPA network is provided in Gordon* et al*. (2013).*

Data sources and bibliography

Year	Title	Survey (Map B)	Features covered
2017	Miller, F., McCallum, S., White, A., Azzarello, J. & Caryl, F. (2017). Predictive mapping of seabed features within selected Special Areas of Conservation and Nature Conservation MPAs in Scottish territorial waters using available datasets. *Scottish Natural Heritage Commissioned Report No. 980*. Available from <https://www.nature.scot/snh-commissioned-report-980-predictive-mapping-seabed-features-within-selected-special-areas>		CMC; NS
2016	Bradwell, T. and Stoker, M.S. (2016). Glacial sediment and landform record offshore NW Scotland: a fjord-shelf-slope transect through a mid-latitude ice stream system. From: Dowdeswell, J.A., Canals, M., Jakonbsson, M., Todd, B.J., Dowdeswell, E.K. and Hogan, K.A. (eds). Atlas of Submarine Glacial Landforms: Modern, Quaternary and Ancient. Geological Society, London, Memoirs, 46, 1-2. © The Geological Society of London, 2015. Available from <http://www.submarineglacialatlas.com/>		GEO; SM
2015	Allen, J.H. (2015). Infaunal and PSA analyses of grab samples collected from the Shiant East Bank and Wester Ross in September 2013. *Scottish Natural Heritage Commissioned Report No. 693*. Available from <https://www.nature.scot/snh-commissioned-report-693-infaunal-and-psa-analyses-grab-samples-collected-shiant-east-bank-and>	2013 Marine Scotland Shiant East Bank benthic infauna survey	CMC
2015	Bradwell, T. and Stoker, M. S. (2015). Submarine sediment and landform record of a palaeo-ice stream within the British-Irish Ice Sheet. *Boreas*. 10.1111/bor.12111. ISSN 0300-9483. Available from <http://onlinelibrary.wiley.com/doi/10.1111/bor.12111/epdf>		GEO; SM
2014	Moore, C.G. (2014). Biological analyses of underwater video from proposed marine protected areas, renewable energy sites and spoil grounds around Scotland. *Scottish Natural Heritage Commissioned Report No. 746*. Available from <https://www.nls.uk/e-monographs/2014/746.pdf>	2013 Marine Scotland Shiant East Bank benthic camera survey	CMC; NS

[4] See - https://www.gov.uk/share-hydrographic-data-with-maritime-and-coastguard-agency-mca

SHIANT EAST BANK POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Data sources and bibliography			
Year	**Title**	**Survey (Map B)**	**Features covered**
2014	Paxton, C.G.M., Scott-Hayward, L.A.S. and Rexstad, E. (2014a). Statistical approaches to aid the identification of Marine Protected Areas for minke whale, Risso's dolphin, white-beaked dolphin and basking shark. *Scottish Natural Heritage Commissioned Report No. 594*. Available from <https://www.nature.scot/snh-commissioned-report-594-statistical-approaches-aid-identification-marine-protected-areas-minke>		
2014	Paxton, C.G.M., Scott-Hayward, L.A.S. and Rexstad, E. (2014b). Review of available statistical approaches to help identify Marine Protected Areas for cetaceans and basking shark. *Scottish Natural Heritage Commissioned Report No. 573.* Available from <https://www.nature.scot/snh-commissioned-report-573-review-available-statistical-approaches-help-identify-marine-protected>		
2013	Brooks, A.J., Kenyon, N.H., Leslie, A., Long, D. and Gordon, J.E. (2013). Characterising Scotland's marine environment to define search locations for new Marine Protected Areas. Part 2: The identification of key geodiversity areas in Scottish waters (final report). *Scottish Natural Heritage Commissioned Report No. 432*. Available from <http://www.nls.uk/e-monographs/2013/432.pdf>		GEO
2013	Gordon, J.E., Brooks, A.J., Rennie, A.G., James, B.D., Chaniotis, P.D., Kenyon, N.H., Leslie, A.B. and Long, D. (2013). The selection of Nature Conservation Marine Protected Areas (MPAs) in Scotland - assessment of geodiversity interests. *Scottish Natural Heritage Commissioned Report No. 633*. Available from <https://www.nature.scot/snh-commissioned-report-633-selection-nature-conservation-mpas-scotland-assessment-geodiversity>		GEO
2012	Allan, L., Demain, D., Weetman, A., Dobby, H. and McLay, A. (2012). Data mining of the *Nephrops* survey database to support the Scottish MPA Project. *Scottish Marine and Freshwater Science* B(9). ISSN: 2043-7722. Available from <http://www.scotland.gov.uk/Resource/0041/00410486.pdf>		[a number of non-protected feature 'Null' records (Map A)]
2012	Axelsson, M., Allen, C. and Dewey, S. (2012). Infaunal analysis of grab samples collected from the North Minch area, 2011. *Scottish Natural Heritage Commissioned Report No. 503*. Available from <https://www.nature.scot/snh-commissioned-report-503-infaunal-analysis-grab-samples-collected-north-minch-area-2011>	2011 Marine Scotland N. Minch benthic infaunal survey	CMC; SM
2012	Moore, C.G. (2012). An assessment of the conservation importance of benthic epifaunal species and habitats identified during a series of research cruises around NW Scotland and Shetland in 2011. *Scottish Natural Heritage Commissioned Report No. 507*. Available from <https://www.nature.scot/snh-commissioned-report-507-assessment-conservation-importance-benthic-epifaunal-species-and>	2011 Marine Scotland N. Minch benthic camera survey	CMC; NS; SM

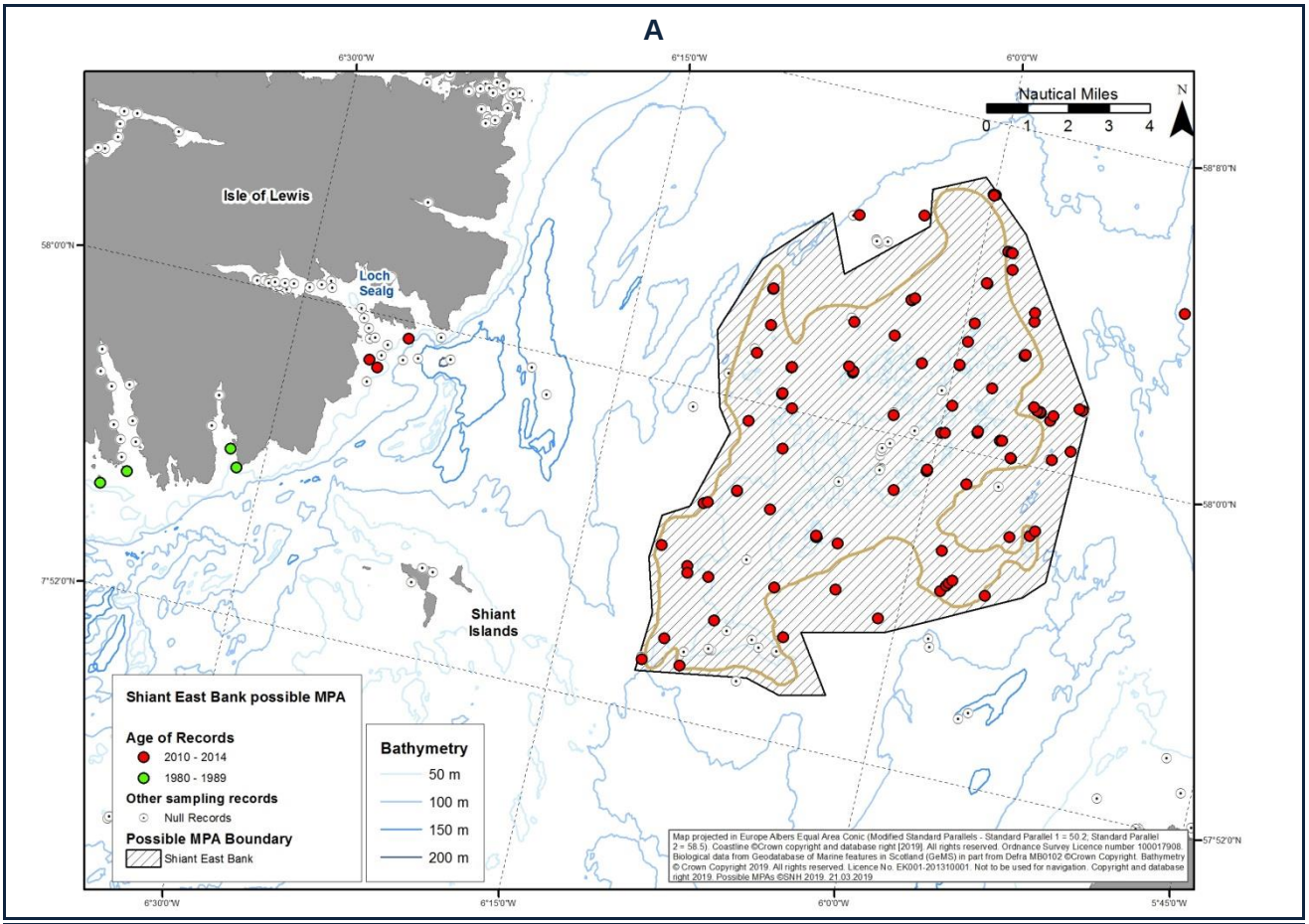
SHIANT EAST BANK POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Data sources and bibliography			
Year	**Title**	**Survey (Map B)**	**Features covered**
2012	Moore, C.G. and Atkinson, R.J.A. (2012). Biological analyses of underwater video from research cruises in the Clyde Sea, Loch Torridon and the Inner Sound, the North Minch, Loch Eriboll and off Orkney. *Scottish Natural Heritage Commissioned Report No. 536*. Available from <https://www.nature.scot/snh-commissioned-report-536-biological-analyses-underwater-video-research-cruises-clyde-sea-loch>	2011 NOC / JNCC North Minch James Cook survey	CMC; NS; SM
2011	CHP. (2011). *Civil Hydrography Programme Data. North Minch Survey HI1352.* Accessed March 2014.		GEO
2009	Brooks, A.J., Roberts, H., Kenyon, N.H. and Houghton, A.J. (2009). *Accessing and developing the required biophysical datasets and datalayers for Marine Protected Areas network planning and wider marine spatial planning purposes. Report No 8: Task 2A. Mapping of Geological and Geomorphological Features*. ABP Marine Environmental Research Ltd. Available from <http://randd.defra.gov.uk/Document.aspx?Document=mb0102_8589_TRP.pdf>		GEO

SHIANT EAST BANK POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

THE EVIDENCE-BASE

A



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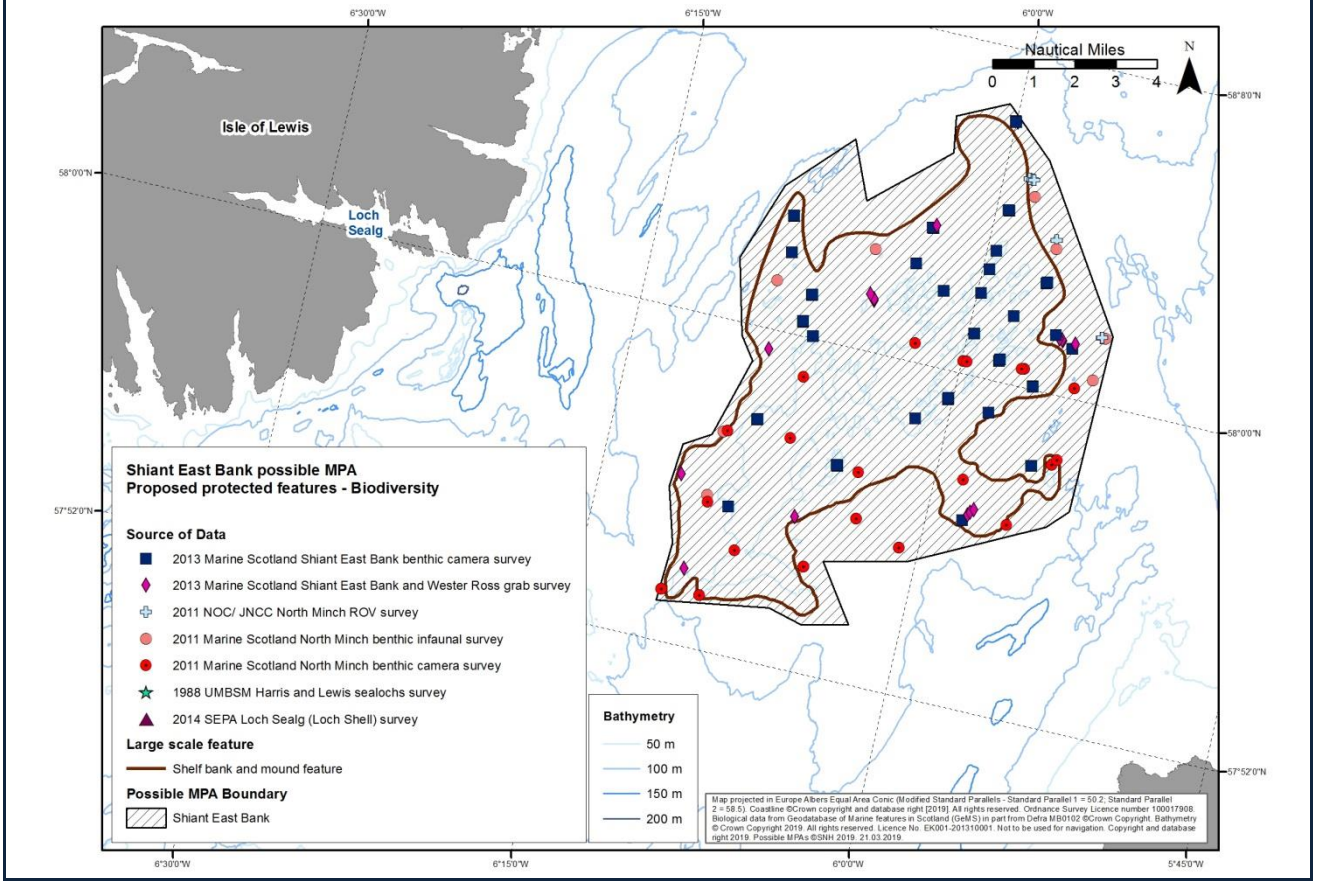
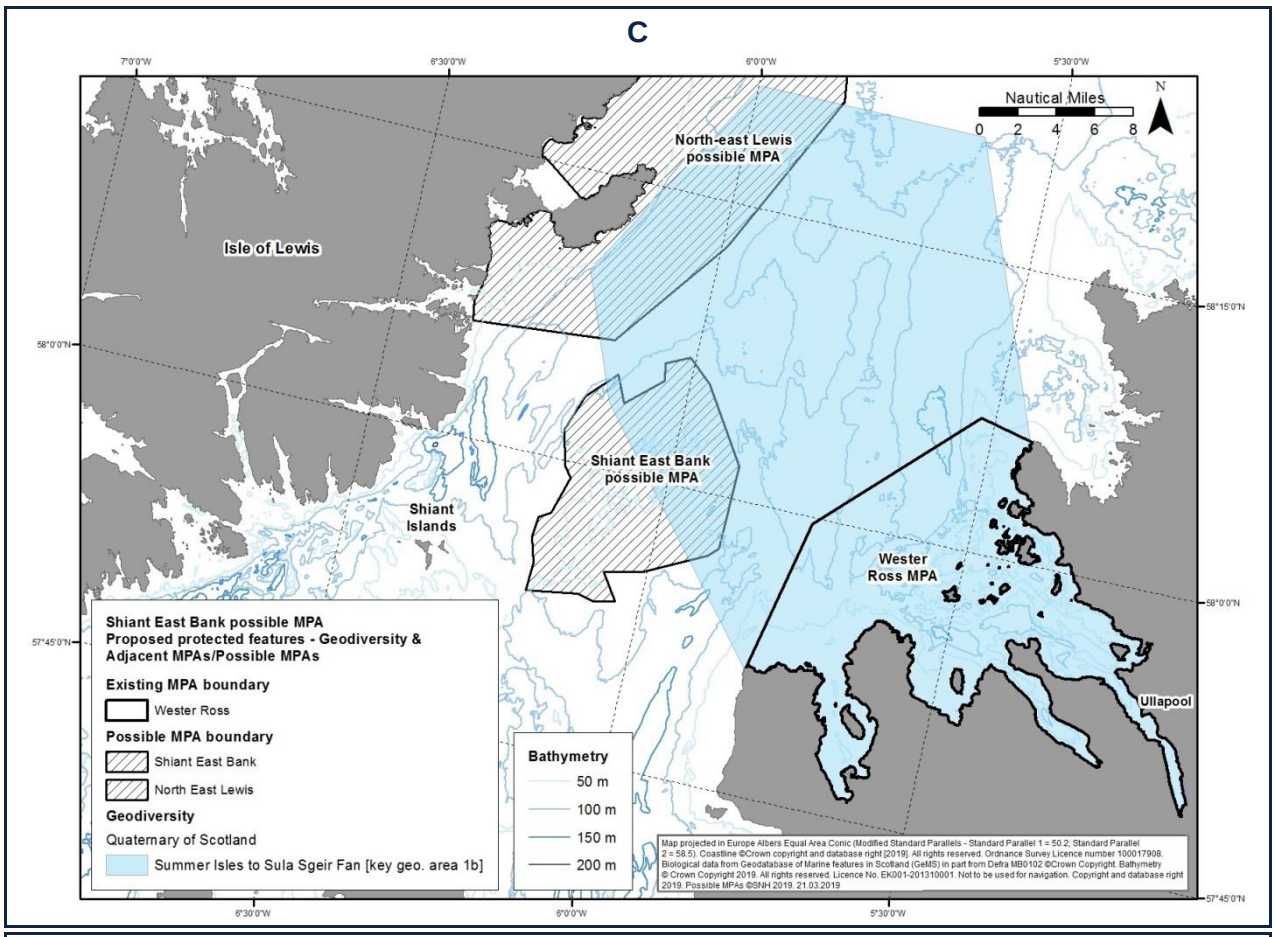


SHIANT EAST BANK POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

C



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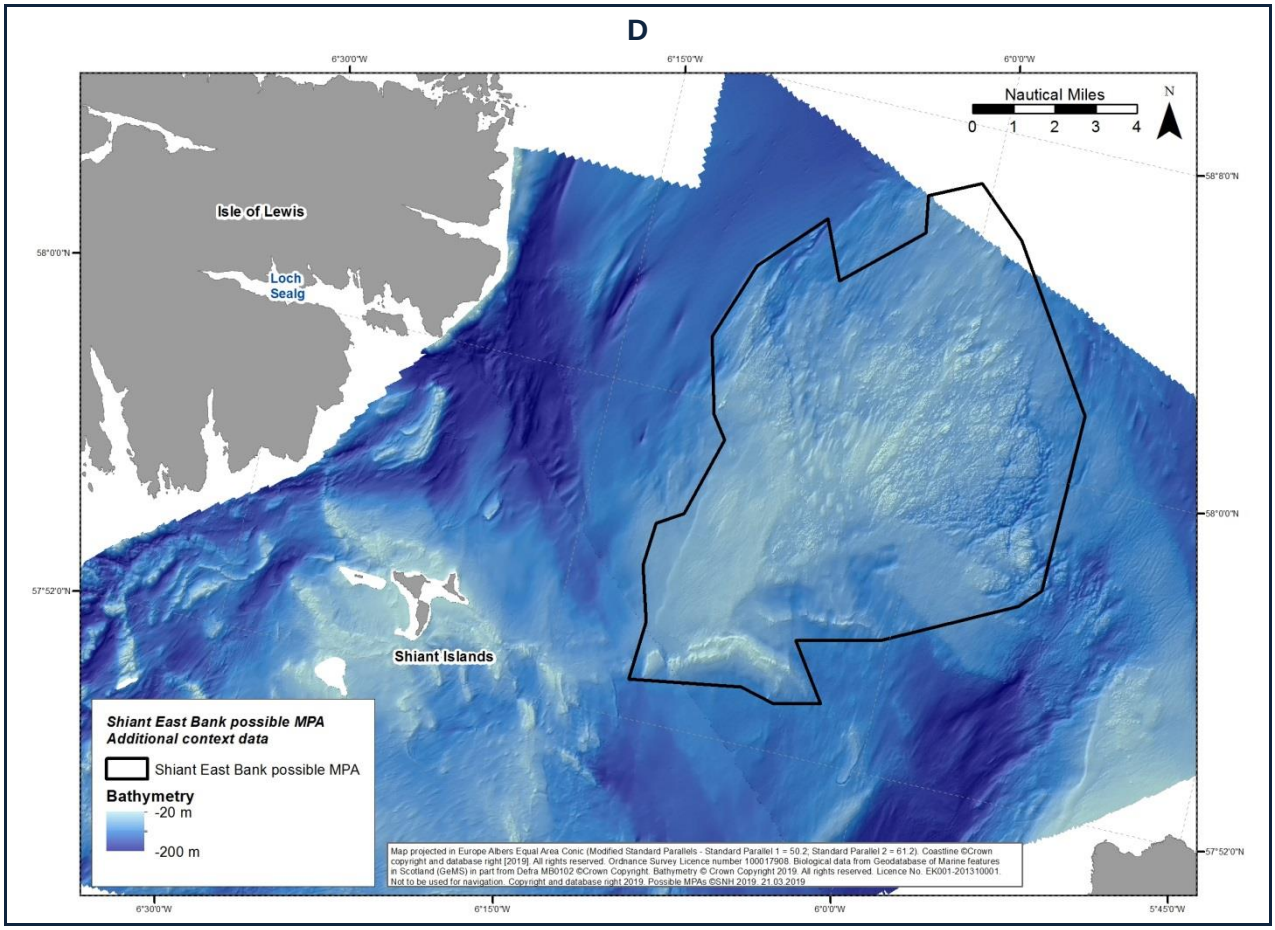

SHIANT EAST BANK POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

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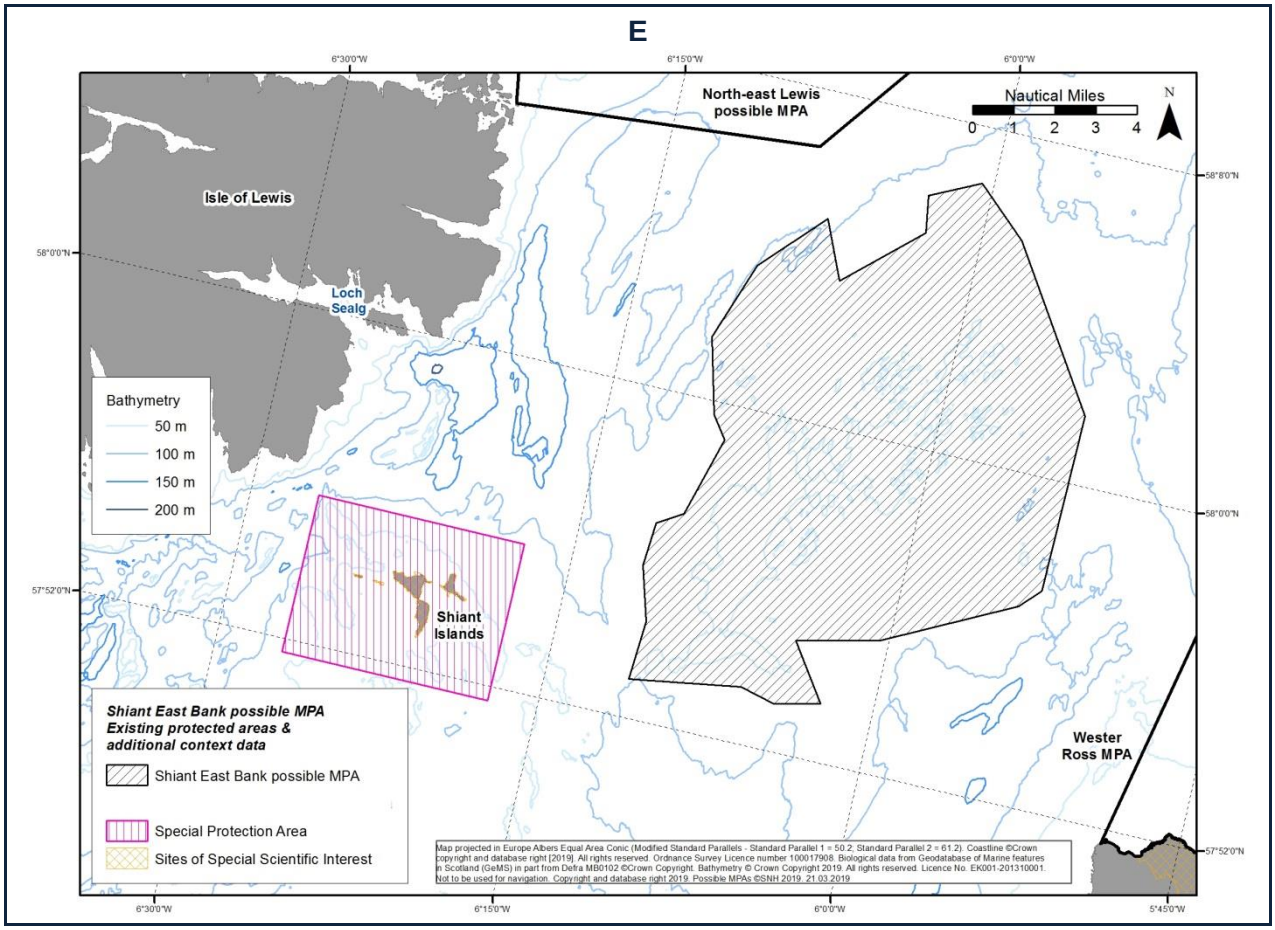

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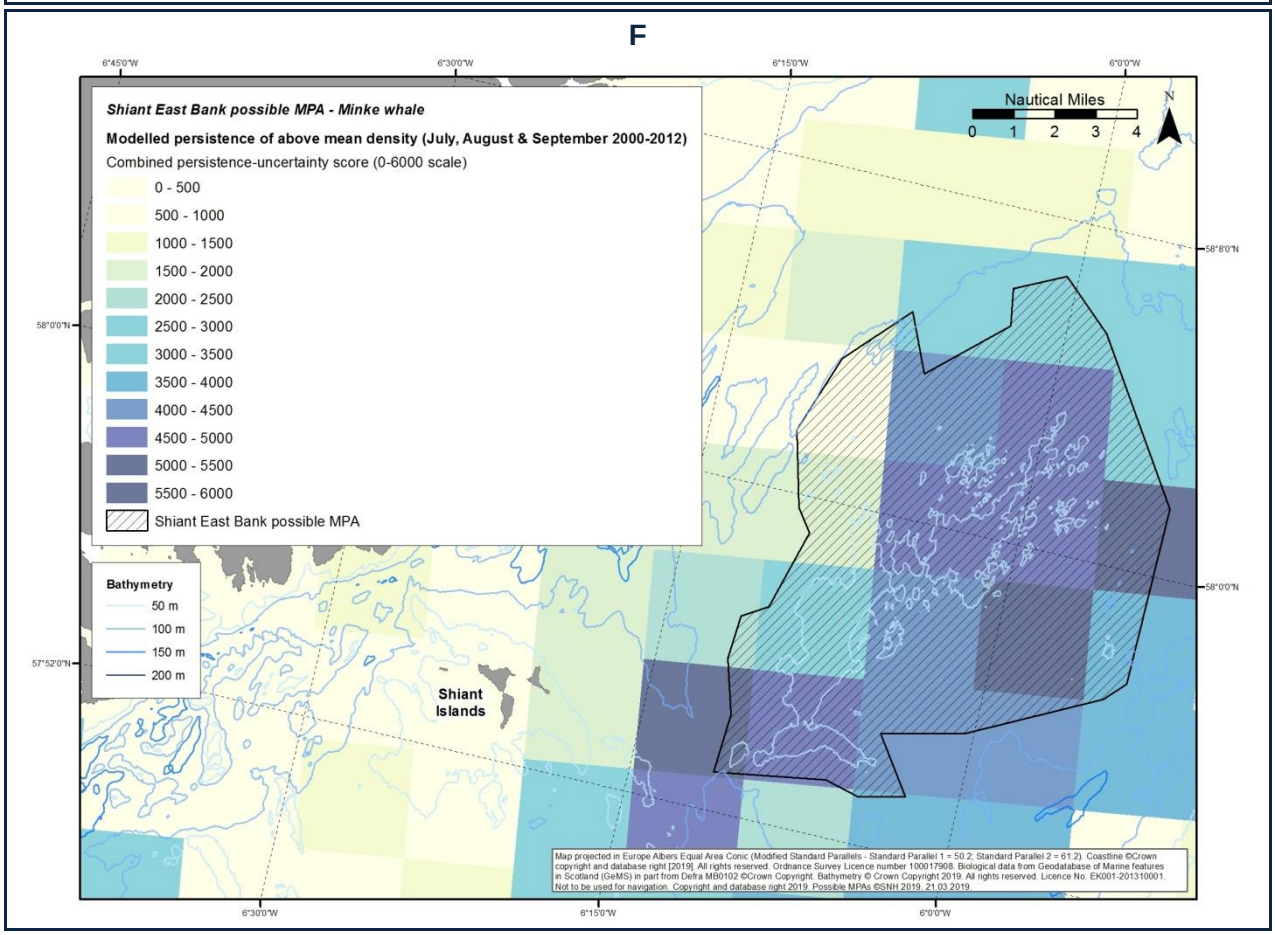

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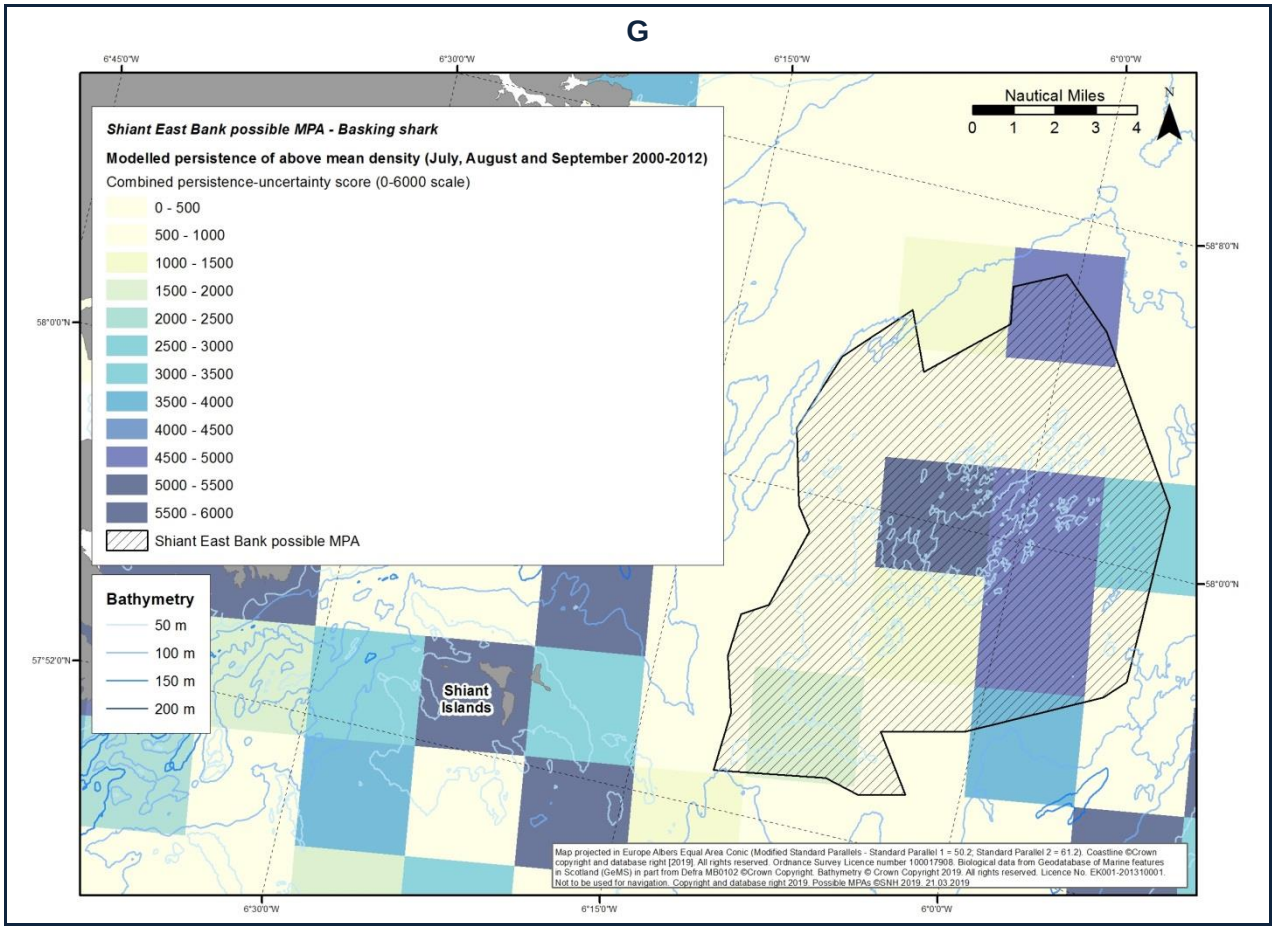
Shiant East Bank possible MPA - Basking shark
Modelled persistence of above mean density (July, August and September 2000-2012)
Combined persistence-uncertainty score (0-6000 scale)
0 - 500
500 - 1000
1000 - 1500
1500 - 2000
2000 - 2500
2500 - 3000
3000 - 3500
3500 - 4000
4000 - 4500
4500 - 5000
5000 - 5500
5500 - 6000
Shiant East Bank possible MPA
Bathymetry
50 m
100 m
150 m
200 m
Nautical Miles
0 1 2 3 4
N
Shiant Islands
6°45'0"W
6°30'0"W
6°15'0"W
6°0'0"W
58°8'0"N
58°0'0"N
57°52'0"N
Map projected in Europe Albers Equal Area Conic (Modified Standard Parallels - Standard Parallel 1 = 50.2; Standard Parallel 2 = 61.2). Coastline ©Crown copyright and database right [2019]. All rights reserved. Ordnance Survey Licence number 100017908. Biological data from Geodatabase of Marine features in Scotland (GeMS) in part from Defra MB0102 ©Crown Copyright. Bathymetry © Crown Copyright 2019. All rights reserved. Licence No. EK001-201310001. Not to be used for navigation. Copyright and database right 2019. Possible MPAs ©SNH 2019. 21.03.2019