

**Scottish MPA Programme
Data Confidence Assessment**

RED ROCKS AND LONGAY POSSIBLE MPA

DECEMBER 2021

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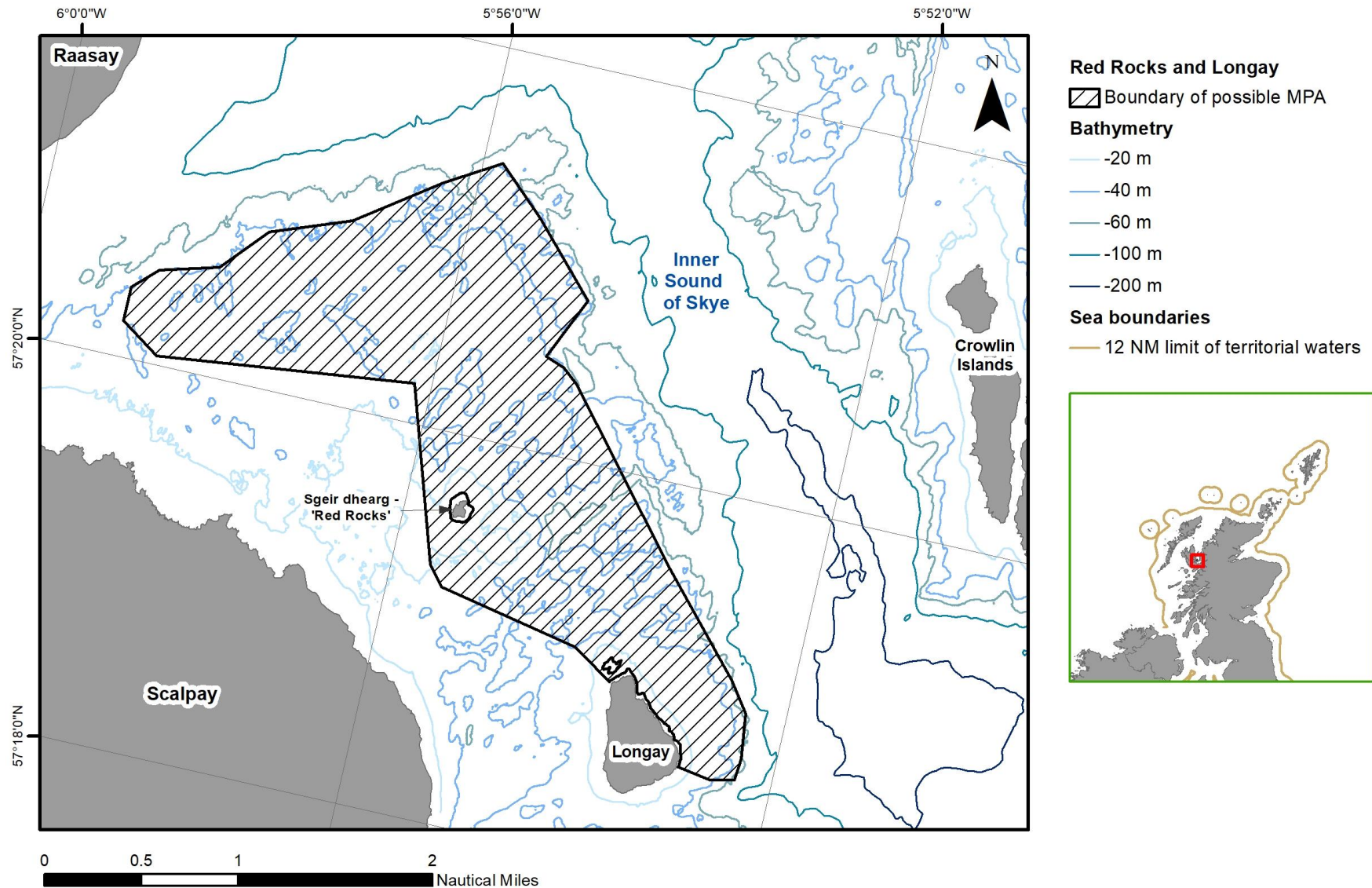
www.nature.scot/mpas or www.jncc.defra.gov.uk/scottishmpas

Document version control			
Version	Date	Author	Reason / Comments
Version 1	01/11/2021	Ben James	Completion of initial assessment
Version 2	12/11/2021	Ben James	Address feedback and comments
Version 3	16/11/2021	Ben James & Suz Henderson	Refinements to geodiversity component mapping following discussions with BGS
Version 4	18/11/2021	Katie Gillham	Final review
Version 5	19/11/2021	Suz Henderson	Final alterations
Version 6	03/12/2021	Ben James	Insert refined maps following SAC review
Version 7	03/12/2021	Suz Henderson	Accepting edits referencing Map F

Distribution list			
Format	Version	Issue date	Issued to
Electronic	1	01/11/2021	Katie Gillham, Suz Henderson, Sarah Cunningham and Jane Dodd
Electronic	5	19/11/2021	Sarah Hutcheon and SAC MPA subgroup
Electronic	7	3/12/2021	Sarah Hutcheon and Aileen Mill SAC MPA subgroup Chair
Electronic	7	6/12/2021	Nick Halfhide
Eelctronic	7	7/12/2021	Sarah Hutcheon and PAC

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Figure 1 The Red Rocks and Longay possible MPA



Map projected in Europe Albers Equal Area Conic (Modified Standard Parallels - Standard Parallel 1 = 50.2; Standard Parallel 2 = 58.5). Contains Ordnance Survey data © Crown copyright [and database rights] 2021 OS 100017908. Bathymetry © Crown Copyright, 2021. All rights reserved. Licence No. EK001-20140401. Not to be used for Navigation. Contains Public Sector information licensed under the Open Government Licence v3.0. © SNH, 2021.

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MPA name	Red Rocks and Longay	Assessor(s)	BJ; SH and JD
Red Rocks and Longay MPA is situated at the southern end of the Inner Sound of Skye, between the island of Scalpay to the west and the Crowlin Islands to the east. The MPA encompasses nearshore waters to the east of the island of Longay and across the shallow bedrock platform to the north-west, around Sgeir dhearg (Red Rocks). The proposed protected features of the Red Rocks and Longay MPA (shown in Figures 2i and 2ii) are flapper skate (<i>Dipturus intermedius</i>), with a particular focus on their eggs and egg-laying habitat, and geodiversity interests under the Quaternary of Scotland feature. Flapper skate are considered critically endangered globally by the IUCN and are extinct across large parts of their former range. Red Rocks and Longay MPA was initially designated on an urgent basis on 10 March 2021 to protect multiple discrete records of flapper skate eggs including, what was at the time the only known example of high-density egg-laying habitat in Scottish waters. Follow-up survey work by NatureScot and Marine Scotland in 2021 recorded a more widespread distribution of flapper skate eggs and suitable egg-laying habitat, extending beyond the boundary of the initial urgent MPA. Analysis of a recent multibeam dataset from the area, initially undertaken to guide the 2021 survey work, identified an outstanding assemblage of landforms of international scientific importance for our understanding of past glacial and interglacial cycles. It is thought to be the first time that 'boulder moraine' belt deposits, present within and adjacent to the MPA, have been observed in such detail off the Scottish coastline. The geodiversity interests represent a retreat stage (or local re-advance) of the last British-Irish Ice Sheet and in this location play a key functional role in supporting flapper skate egg-laying activities.			

Proposed protected features			
Biodiversity	Flapper skate (FS)	Geodiversity	Quaternary of Scotland - moraines, crag and tails, and rock drumlins (GEO)

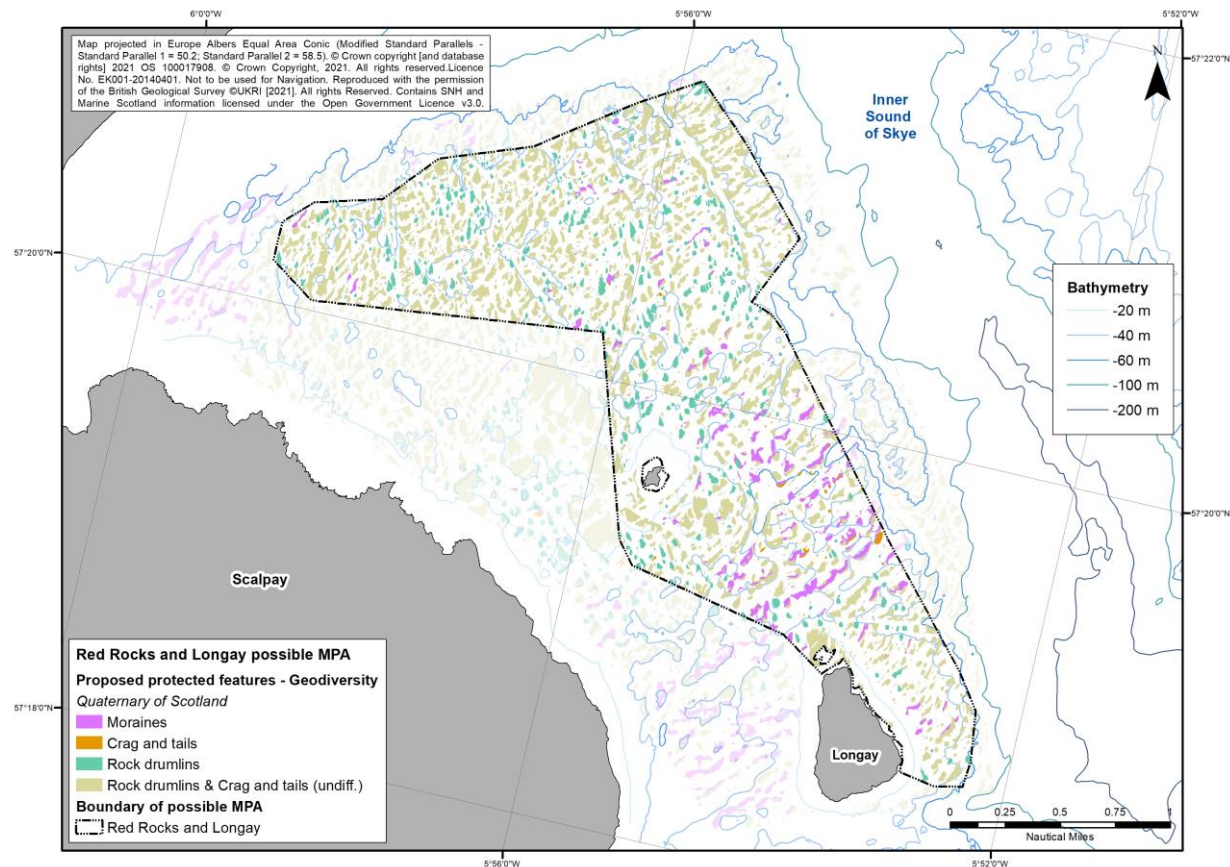
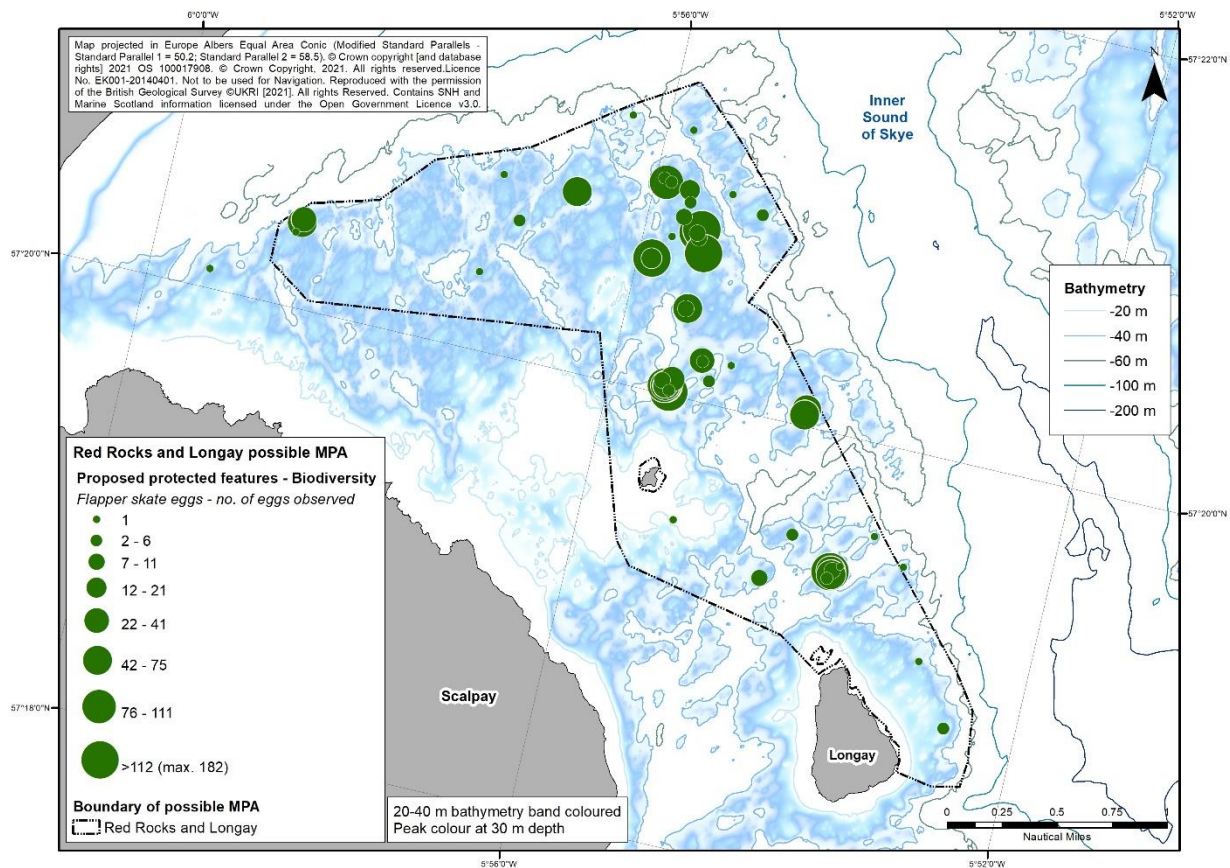
Data used in assessment			
Version of GeMS database	Ver. 10 (i26)	Other datasets used in feature maps (specify) -	- NatureScot DDV and ROV survey datasets: 29 July - 5 September, 2021 (Maps 2i, A & B) - Geodiversity feature distribution produced by the British Geological Survey (BGS) (Map 2ii) - Marine Recorder sample data [part of 'other sampling records' on Map A - ver. 20201016] - Civil Hydrography Programme (CHP) derived acoustic datasets (Map C) - EUNIS broadscale habitat map generated by the British Geological Survey (BGS) (Map D) - Contextual mapping (protected area boundaries, coastline; bathymetry) [Map E & 'All']

Summary of data confidence assessment (see detailed assessment on following pages)							
Confident in underpinning data			Yes	✓	Partial		No
Confident in presence of identified features?	✓ FS; GEO	Data suitable to define extent of individual proposed protected features	✓		Partial		✖
			GEO	FS			
Summary	We have high confidence in the data underpinning this possible MPA and in the presence of the proposed protected features. The results of targeted nature conservation surveys carried out in 2021 by NatureScot, in collaboration with Marine Scotland, have built on earlier citizen science observations and confirmed that flapper skate eggs are widely distributed at variable densities on suitable boulder and cobble substrates across the possible MPA. Work in 2021 included the analysis of available high-resolution multibeam bathymetry data and collectively the studies have greatly improved our understanding of seabed habitats and Quaternary of Scotland geodiversity features present across the area. The proportion of the sea floor checked to determine flapper skate egg presence is relatively modest and further records are anticipated both within the MPA and outside the proposed boundary.						

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Figures 2i and ii The known distribution of proposed protected features within Red Rocks and Longay possible MPA.

Two single skate egg records that lie outside the boundary of the possible MPA are shown for reference on Figure 2i, as is the wider distribution of geodiversity interests on Figure 2ii.



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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. Wider survey effort and the scope of 2021 acoustic data analyses in the sea area adjacent to the possible MPA shown on Map F. Map F shows the wider distribution of relevant EUNIS broadscale habitats. These are used by flapper skate for egg-laying within the Red Rocks and Longay possible MPA where other physical conditions are suitable (e.g. bathymetry).
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Age of proposed protected feature data (Map A)					
Number of records collected within last 6 years	All FS; GEO	Number of records collected 6-12 years ago	None	Number of records >12 years old	None
Comments	<i>All of the records of the proposed protected features are recent, derived from survey work undertaken between 2018 and 2021. Local scallop divers first reported the presence of flapper skate eggs here with a record from the south-east of Sgeir dhearg in October 2019. Citizen scientist divers followed-up the initial reports in November 2019 at a location where the scallop divers more regularly observed egg clusters, and recorded ~40 eggs, resulting in the boulder strewn, rocky rise being coined 'Big Skate Rocks'. Analysis of drop-down video (DDV) footage collected in the Inner Sound in March 2019, but not reviewed until early 2020, confirmed the presence of a small number of flapper skate eggs at a site to the east of Longay (Shucksmith et al., 2021). This observation prompted a review of a related dataset from July 2018 (O'Dell et al., 2021) and the identification of a bank of suitable boulder habitat with eggs to the north of the island. NatureScot commissioned further diver survey work at Big Skate Rocks in March 2020 (Dodd et al., in press) to determine the proportion of viable, live vs. hatched eggs, with samples taken for genetic analyses to explore site fidelity and usage by multiple female skate. The work improved understanding of the seabed habitats favoured by the skate in this location.</i> <i>A further series of citizen science dives were undertaken in October and December 2020, focussing primarily on Big Skate Rocks where estimates of ~100 eggs in discrete clusters on multiple dives correlated with the numbers seen earlier in the year. Additional reconnaissance dives were also undertaken just to the north and a little further to the east, with small numbers of eggs observed at both locations.</i> <i>Following the designation of Red Rocks and Longay MPA on an urgent basis in March 2021, two further remote camera surveys were completed by NatureScot between 29 July and 5 September (see NatureScot, 2021 and 2022 for further details). 242 drop-down video stations were surveyed across the shallow coastal area off NE Scalpay, comprising 108 stations within, and 134 outside the original urgent MPA boundary. On 1-2 September a Remotely Operated Vehicle (ROV) was deployed at 18 stations. Flapper skate eggs were observed on 33 of the 2021 DDV stations and on 13 of the ROV 'flights'. The latter primarily targeted locations where eggs had been seen previously (DDV or divers).</i>				

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) -	
Comments	<i>The proposed biodiversity protected feature records were collected as part of targeted nature conservation surveys undertaken either by citizen science divers or commissioned by NatureScot as Scotland's statutory nature agency. The acoustic multibeam data used to guide the 2021 remote video sampling, and ultimately to map the distribution of seabed habitats and geodiversity features, were collected by the Maritime and Coastguard Agency (MCA) as part of the Civil Hydrography Programme (CHP, 2019) and supplied courtesy of the UK Hydrographic Office (UKHO). Analysis of the acoustic datasets and associated mapping tasks were completed by the British Geological Survey (BGS) as part of an ongoing collaboration with NatureScot (Stewart et al., 2022).</i>				

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Sampling methods / resolution							
Feature	Modelled	Acoustic / remote sensing	Remote video / camera	Infaunal - grab / core	Sediment	Diving	Visual census
FS		✓	✓			✓	
GEO	✓	✓	✓				
Comments	Appropriate sampling methods of differing resolution were used to generate information on the proposed protected features. Commercial scallop divers and citizen scientists provided initial observations of flapper skate eggs in 2019. Subsequent more detailed diving studies in 2020 included the collection and examination of eggs at the surface to determine developmental status prior to repositioning the eggs in secure boulder crevice locations on the seabed (Dodd et al., in press). Remote video / camera techniques were used in 2018, 2019 and 2021 with several different DDV systems deployed (see NatureScot, 2021 and 2022; and Pasco et al., 2021 for further details). Two days of ROV sampling were undertaken in early September 2021 to explore potentially suitable egg-laying habitat derived from existing multibeam datasets (CHP, 2019, Stewart et al., 2022). The ROV was able to actively navigate and search for flapper skate eggs at the seabed and the deployments varied considerably in length from just over 6 minutes to >40 minutes depending on the habitats encountered. The ROV runs included a 40+min dive around 'Big Skate Rocks' where ~115 eggs were recorded (see - https://media.nature.scot/record/~d41170de93 - NatureScot, 2021 & 2022).						

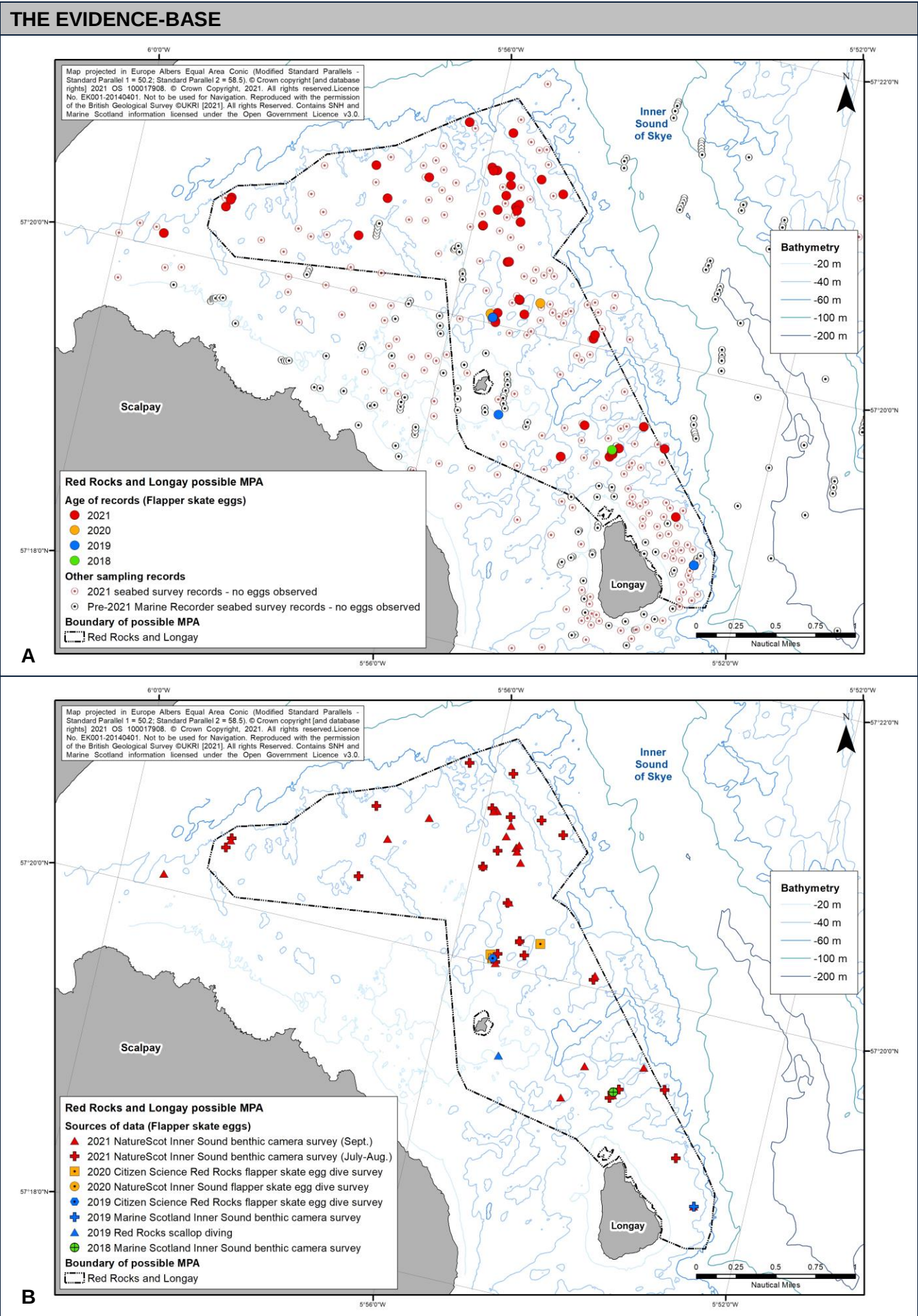
Proposed protected feature data coverage (Maps A - D)							
Across the possible MPA							
Large numbers of proposed protected feature records distributed across the possible MPA		Numerous proposed protected feature records scattered across the possible MPA with some clumping		Numerous protected feature 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	✓ FS; GEO	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 the whole of the possible MPA were collected in 2019 (CHP, 2019) - see Figure 2ii and Maps C and D. The acoustic data underpinned the development of predictive seabed habitat and geodiversity feature mapping (Stewart et al., 2022). Mapped EUNIS (European Nature Information System) habitats (Map C) are not proposed protected features in their own right, but the rock and coarse sediment classes (large boulders and cobbles around the margins of bedrock outcrops as well as more substantial areas mapped as boulder moraines) represent potentially suitable ground for flapper skate egg laying.						

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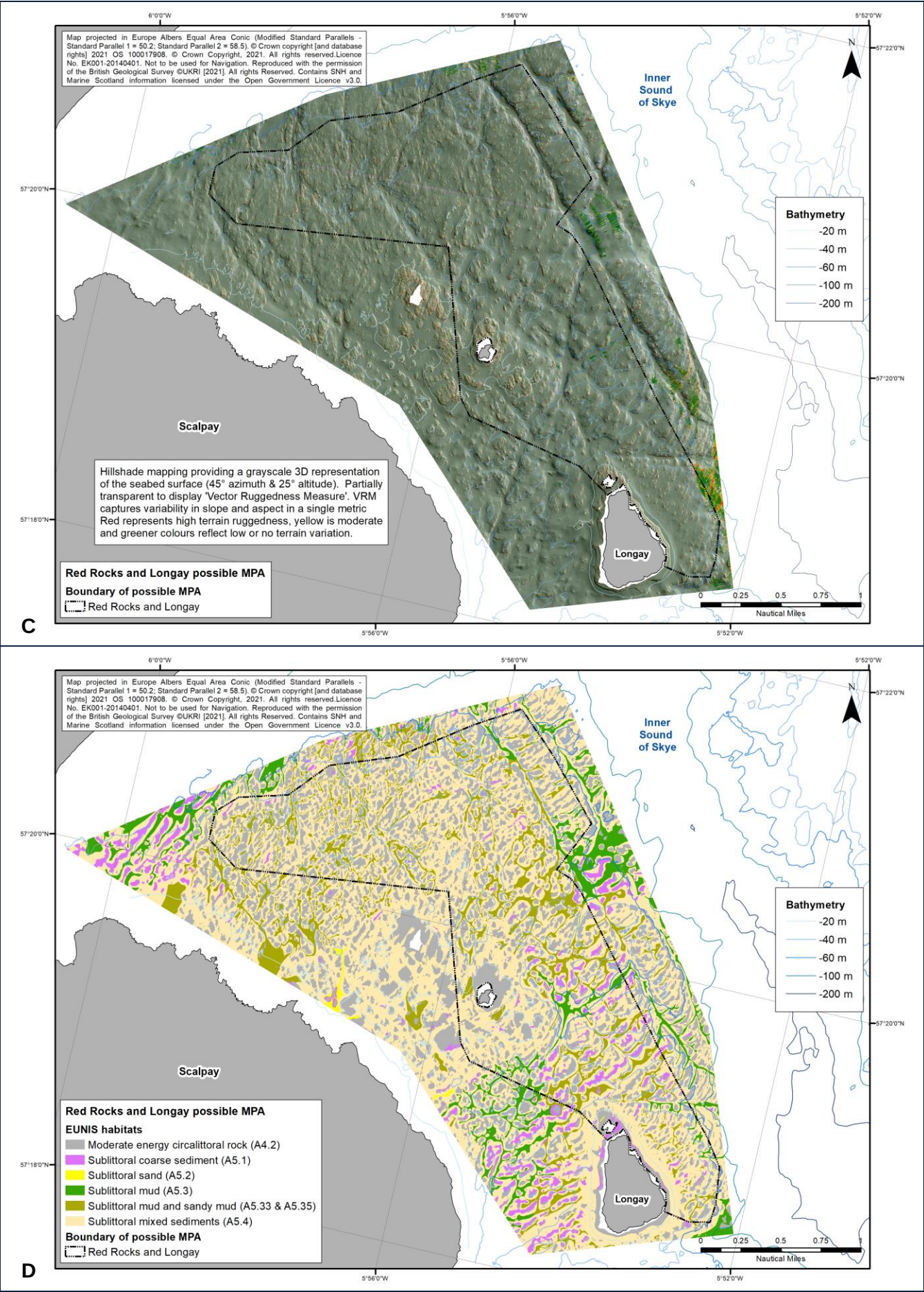
Proposed protected feature data coverage (Maps A - D)	
Comments	Available protected feature records are unevenly distributed across the possible MPA. There are numerous records of flapper skate eggs of differing densities from solitary eggs to multiple clusters of numerous eggs (>50-60 eggs per cluster) within a few metres of each other. This 'clumped' or uneven distribution in part reflects repeat sampling of previous stations and the application of multiple methodologies at a subset of confirmed egg sites as part of 2021 ROV trials (i.e. revisiting DDV stations at which eggs were recorded). Flapper skate eggs are currently known from ~25-40 m below sea level (BSL) within the possible MPA. A modest number of remote video stations were completed on potentially suitable habitats in deeper and shallower areas in 2021 but the work focussed on the depth band where eggs had been recorded previously in this geographic location. Areas of potentially suitable habitat in deeper water therefore remain unsurveyed (contributing to the observed irregular distribution) and future studies may extend the known egg depth range. The remote video sampling and previous diver studies collectively validated the new, full coverage predictive mapping products generated from high quality CHP multibeam datasets. These products provide a detailed and accurate interpretation of seabed terrain and illustrate the wider distribution of potentially suitable egg-laying habitat across the possible MPA. The mapped moraine geodiversity features appear to offer particularly favourable egg-laying habitat. However, the 2021 surveys demonstrated that not all of the mapped moraines host eggs and also that not all of the moraines present have been mapped. Extensive areas of boulders and cobbles present around and on top of the numerous mapped rocky outcrops (including the crag and tails and rock drumlins geodiversity components) cannot be distinguished due to similarities in their acoustic signatures but are also used for egg laying. Smaller, more localised boulder patches may have resulted from glacial erosion of in situ bedrock rather than from deposition (viz. moraines) following subsequent ice-sheet retreat (Stewart et al., 2022).

Data sources and bibliography			
Year	Title	Survey (Map B)	Features
2022	Stewart, H.A, Cooper, R.M. and Lewis, W.D. (2022). Reprocessing of CHP Datasets (HI 1567 &1570) and Seafloor Substrate Interpretation for Selected Areas: Inner Sound off Skye on the West Coast of Scotland. <i>British Geological Survey Commissioned Report, CR/21/080</i> . 43pp.	n/a - CHP, 2019 - see Figure 2ii and Maps C, D & F	GEO
2022	NatureScot. (2022). <i>Red Rocks and Inner Sound of Skye remote camera survey 2021 - Field report</i> .	2021 NatureScot Inner Sound benthic camera surveys	FS
2021	NatureScot. (2021). <i>Summary of remote camera survey work undertaken between July and September 2021 within the Red Rocks and Longay urgent MPA (March 2021 version)</i> .		
2022	Dodd, J., Donnan, D.W., Mogg, A.O.M. and Thorburn, J. A. (<i>in press</i>). First report of an egg nursery for the Critically Endangered flapper skate <i>Dipturus intermedius</i> (Rajiformes; Rajidae). <i>Aquatic Conservation: Marine and Freshwater Ecosystems</i> .	2020 SNH Inner Sound flapper skate egg dive survey	FS
2021	O'Dell, J., Bulgakova, A., Amos, W. and Dewey, S. (2021). Biological analyses of seabed imagery from within and around Loch Alsh, Loch Carron, Wester Ross, Small Isles and South Arran Marine Protected Areas in 2018. <i>Scottish Marine and Freshwater Science</i> , 12 (1), 222p. DOI: 10.7489/12363-1	2018 Marine Scotland Inner Sound benthic camera survey	FS
2021	Pasco, G., James, B., Burke, L., Johnston, C., Orr, K., Clarke, J., Thorburn, J., Boulcott, P., Kent, F., Kamphausen, L. and Sinclair, R. (2021). Engaging the Fishing Industry in Marine Environmental Survey and Monitoring. <i>Scottish Marine and Freshwater Science</i> , 12 (3), 68pp. DOI: 10.7489/12365-1	2018 and 2019 Marine Scotland Inner Sound benthic camera surveys	-
2021	Shucksmith, R.J., Shelmerdine, R.L. and Shucksmith, R. (2021). Biological analyses of seabed imagery from within and around Marine Protected Areas in Orkney, Shetland, Inner Sound, and Islay and Jura in 2019. <i>Scottish Marine and Freshwater Science</i> , 12 (2), 518pp. DOI: 10.7489/12364-1	2019 Marine Scotland Inner Sound benthic camera survey	FS
2019	CHP. (2019). <i>Civil Hydrography Programme Data. Linne Crowlin and Loch Carron HI 1567</i> .	n/a (Figure 2ii; Maps C, D & F)	GEO

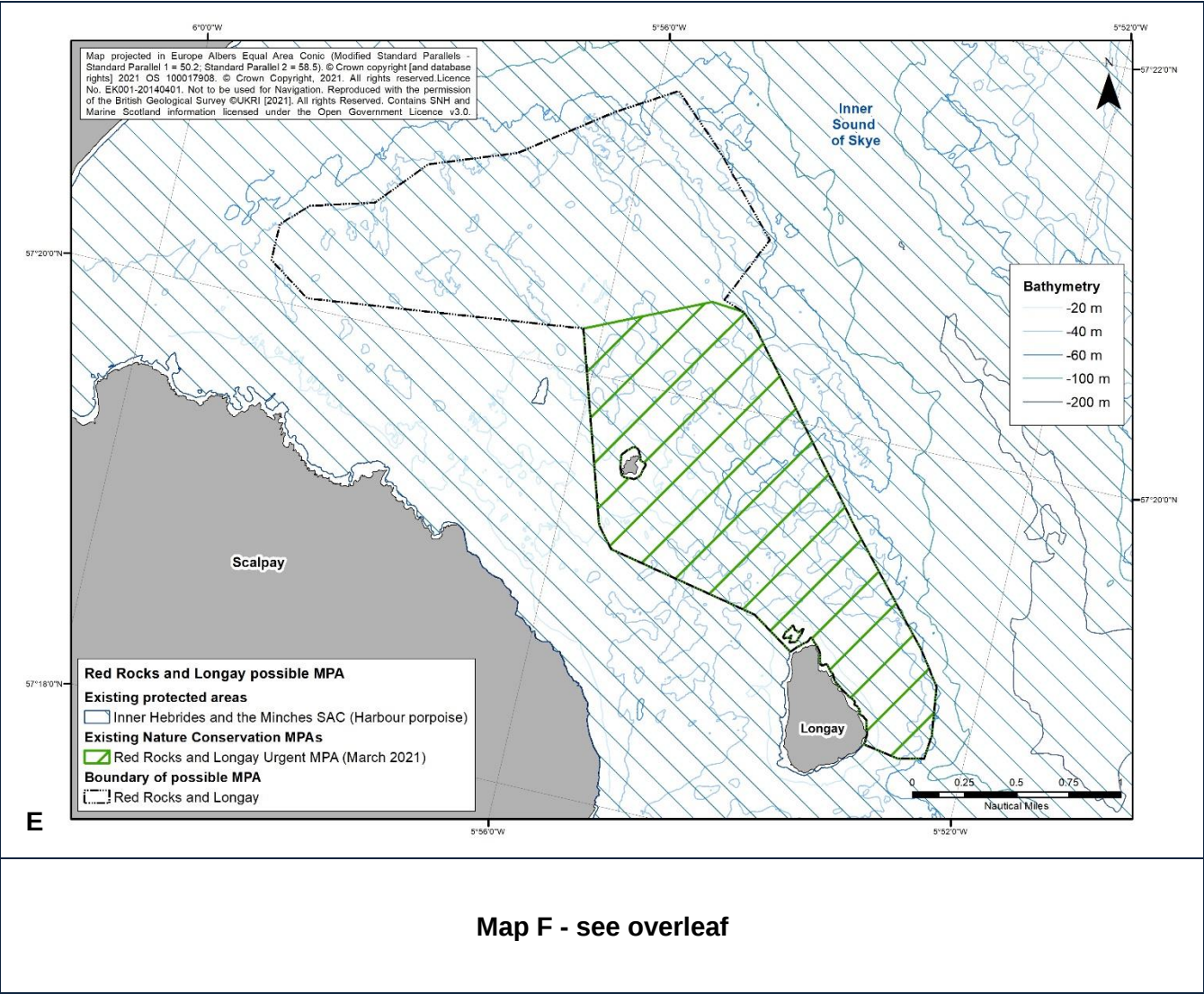
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