

**Scottish MPA Project
Data confidence assessment**

LOCHS DUICH, LONG AND ALSH MPA PROPOSAL

Document version control

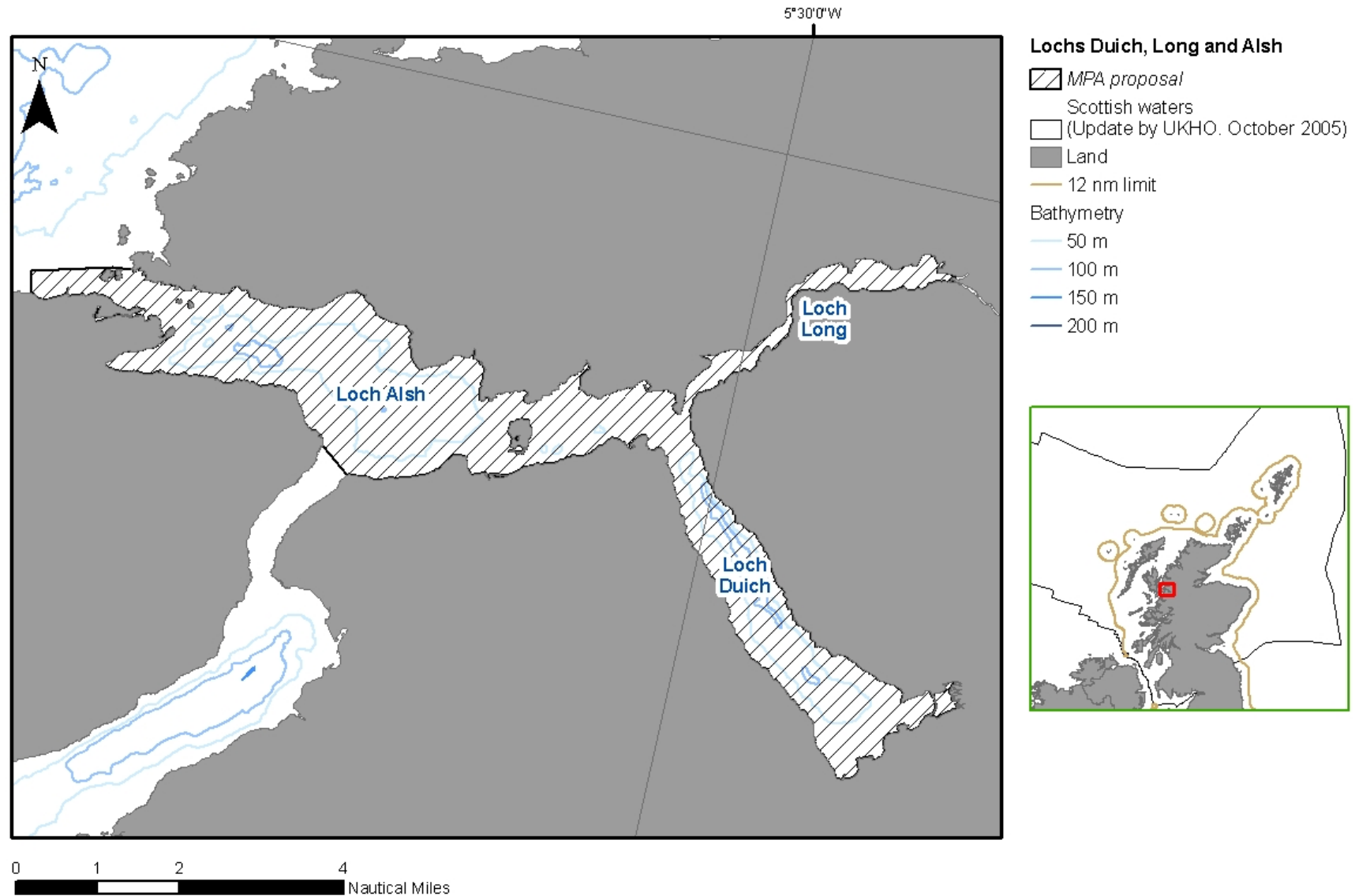
Version	Date	Author	Reason / Comments
Version 1	01/10/2012	Siobhan Mannion, Laura Clark and Ben James	Revised protected feature / MPA proposal boundary format, updating search location version (ver. 9).
Version 2	02/10/2012	Siobhan Mannion	Formatting revisions to take account of initial comments.
Version 3	18/10/2012	Laura Clark and Lisa Kamphausen	Production and insertion of revised mapping, updates and edits.
Version 4	18/10/2012	John Baxter	QA review.
Version 5	19/10/2012	Lisa Kamphausen	Refinements in response to QA review comments.
Version 6	11/11/2012	Ben James	Review.
Version 7	29/11/2012	Ian Bainbridge	QA review and sign-off.

Distribution list

Format	Version	Issue date	Issued to
Electronic			

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Figure 1 The Lochs Duich, Long and Alsh MPA proposal



Map projected in Europe Albers Equal Area Conic (Modified Standard Parallels - Standard Parallel 1 = 50.2; Standard Parallel 2 = 58.5). 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 2012. All rights reserved. Scotland (Adjacent waters) Updated by the Law of the Sea Division, United Kingdom Hydrographic Office October 2005. Bathymetry © British Crown Copyright. All rights reserved. Permission Number Defra012012.002. MPA proposals/search locations © JNCC/SNH

LOCHS DUICH, LONG AND ALSH MPA PROPOSAL - DATA CONFIDENCE ASSESSMENT

MPA proposal name	Lochs Duich, Long and Alsh	Date of assessment	01 October, 2012	Assessor(s)	SM; LC; BJ; LK
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The Lochs Duich, Long and Alsh MPA proposal shown on Figure 1 encompasses a series of fjordic sea lochs in the north-west of Scotland. The three proposed MPA protected features; flame shell beds, burrowed mud and inshore deep mud with burrowing heart urchins are not qualifying interests of the existing Special Area of Conservation (SAC). The MPA proposal boundary builds on that of the Lochs Duich, Long and Alsh SAC, which is designated for extensive areas of tide-swept reefs, extremely sheltered rocky reefs and horse mussel beds (biogenic reefs). Salinity varies considerably throughout the loch system: Loch Long has the largest input of freshwater and is the second most brackish sea loch in Scotland. Situated at the mouth of Loch Alsh, the flame shell bed feature was first surveyed in detail in 2012 and found to cover an area of ca. 90 ha, representing the largest known bed in Scotland and possibly the largest reported bed in the world (Moore and Harries, 2012). Burrowed mud is distributed throughout the MPA proposal with the greatest number of records of this habitat in Loch Duich. The fauna associated with this habitat is diverse, and includes forests of the scarce tall seapen and high densities of fireworks anemones, as well as records of burrowing heart urchins. The Lochs Duich, Long and Alsh MPA proposal fully encompasses two discrete third-party MPA proposals from the National Trust for Scotland and the Marine Conservation Society.

Protected features

Biodiversity	<i>Burrowed mud (BM)</i> <i>Flame shell beds (FS)</i> <i>Inshore deep mud with burrowing heart urchins (IM)</i>	Geodiversity	<i>n/a</i>
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Data used in assessment

Version of GeMS database	<i>Ver.2 (i10)</i>	Other datasets used in feature map (specify)	<i>Flame shell bed records from the 2012 Marine Scotland-commissioned survey undertaken by Heriot-Watt University.</i>
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Summary of data confidence assessment (see detailed assessment on following pages)

Confident in underpinning data	Yes	✓	Partial		No	
Confident in presence of identified features?	✓ <i>BM;FS</i>	Data suitable to define extent of individual protected features	✓ FS	Partial	BM	* IM

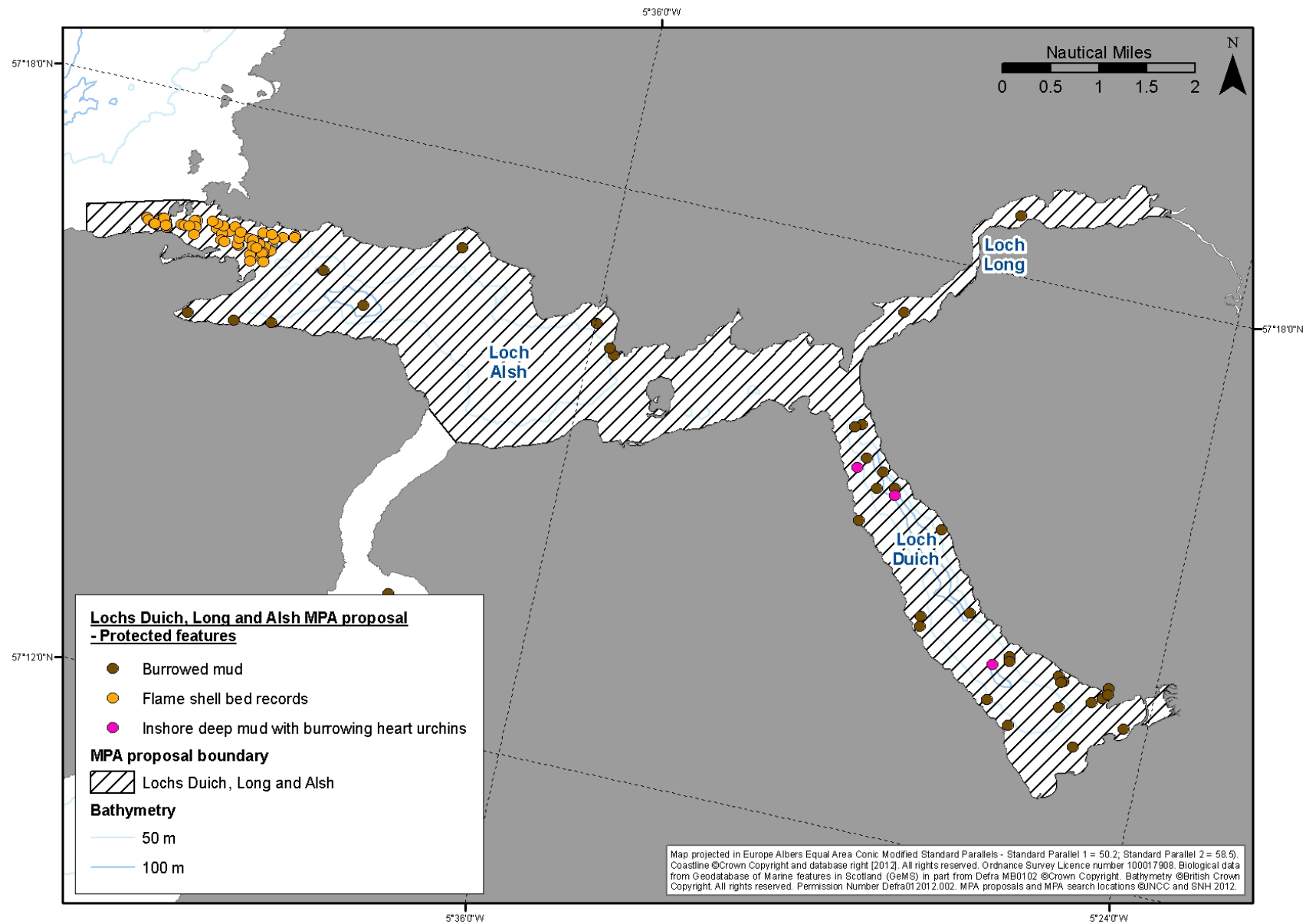
Summary

We have high confidence in the data underpinning this MPA proposal and in the presence and distribution of two of the protected features (burrowed mud and flame shell beds). The majority of data for these features are less than 6 years old. The flame shell bed in Loch Alsh was studied in detail for the first time in 2012 when its extent was mapped. Burrowed mud records extend back to 1988, with more recent observations, particularly of fireworks anemones (which are a component species of this MPA search feature) from a series of volunteer Seasearch diving surveys undertaken between 2004 and 2011 (data held in GeMS, not written up as published reports). The distribution and extent of burrowed mud is well known within Loch Duich following survey work in 2012 but additional work is required to confirm the full extent of this habitat within Lochs Long and Alsh and to validate predictive habitat mapping completed in 1996 (Entec, 2000).

There is some uncertainty over the presence of inshore deep mud with burrowing heart urchins. The only records of this feature are from 1988 (Connor, 1989) and are considered 'uncertain', lacking the confirmed presence of the characterising species of burrowing heart urchin. Infaunal samples collected from Loch Duich in August 2012 are currently being analysed and will in due course provide more data on the distribution of burrowed mud and determine whether the inshore deep mud with burrowing heart urchins proposed protected feature is actually present.

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Figure 2 The known distribution of protected features within the Lochs Duich, Long and Alsh MPA proposal (2012 sampling records within Loch Duich are not displayed on the map series - they are still being analysed. Once processed they will enhance our understanding of the extent and distribution of burrowed mud and inshore deep mud with burrowing heart urchins within the loch)



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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 MPA proposal (see also Maps A - C). Existing protected areas are shown on Map D.
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Age of protected feature data (Map A)					
Number of records collected within last 6 years	Many BM;FS	Number of records collected 6-12 years ago	Few BM	Number of records >12 years old	Many BM;IM
Comments	<i>Data age varies between < 6 to > 12 years old. Survey work in 2012 recorded the largest known flame shell bed in Scotland and has also validated older burrowed mud records within Loch Duich (data points not shown - analyses ongoing). The burrowed mud records from Loch Long and the three records of inshore deep mud with burrowing heart urchins within Loch Duich are from the 1988 Marine Nature Conservation (MNCR) survey (Connor, 1989). Preliminary results from infaunal sampling undertaken in 2012 indicate that the latter feature may no longer be present but this can only be confirmed once the full sample analyses have been completed.</i>				

Source of 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 majority of the protected feature records within the MPA proposal were collected through SNH and Marine Scotland-commissioned nature conservation-orientated surveys (including site condition monitoring work undertaken to determine the status of reef features of the existing SAC). Volunteer diving surveys undertaken as part of the Seasearch recording scheme have generated a number of protected feature records, primarily within Loch Duich. The Seasearch records (data held in GeMS - survey reports not published) include species typically associated with burrowed mud, but the associated seabed habitat is not specified for all records (e.g. 2005 - 2009 Seasearch fireworks anemone surveys).</i>				

Sampling methods / resolution							
Feature	Modelled	Acoustic / remote sensing	Remote video / camera	Infaunal - grab / core	Sediment	Diving	Visual census
BM	✓		✓	✓	✓	✓	
FS			✓	✓	✓	✓	✓
IM				✓			
Comments	<i>A number of sampling methods have been used to obtain data of differing resolution on the proposed protected features. Burrowed mud has been surveyed using drop-down video and ROV equipment, grab sampling, and in shallower areas by Seasearch volunteer divers. The 2012 flame shell bed records represent in situ diver observations. The divers collected detailed records of the plants and animals living on and within the seabed. Observations also included noting the percentage cover of flame shell nest material, the thickness of flame shell nest substrate and the percentage of algal turf cover. Core samples were collected for infaunal and seabed substrate particle size analyses. The three records of inshore deep mud with burrowing heart urchins from 1988 are based on infaunal grab samples.</i>						

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Protected feature data coverage (Maps A - C)					
<i>Across the MPA proposal</i>					
Large numbers of protected feature records distributed across MPA proposal		Numerous protected feature records scattered across MPA proposal with some clumping	✓	Numerous protected feature records possibly with some clumping. Boundary not defined solely by recorded feature distribution	Few or isolated protected feature records - possibly clumped
<i>For individual features</i>					
Multiple records of individual protected features providing indication of extent and distribution throughout MPA proposal	✓ BM;FS	Few or scattered records of specific protected features making extent and broad distribution assessment difficult		Few or isolated records of specific protected features	✓ IM
Are acoustic remote sensing data available to facilitate the development of a full coverage predictive seabed habitat map?			Yes. Predictive habitat maps were produced for the SAC in 1996. These were derived from a single track acoustic system only, using a QTC™ signal processor (see Entec, 2000).		
Comments	<p>Available protected feature data are scattered across the MPA proposal. The flame shell bed records are clumped at the mouth of Loch Alsh. Recent survey work (August 2012) established that this is the largest known bed in Scotland and possibly the largest reported bed in the world (Moore and Harries, 2012). The main basin of Loch Duich contains multiple records of burrowed mud including large numbers of fireworks anemones. There are only two discrete records of burrowed mud within Loch Long but predictive habitat mapping completed in 1996 (Entec, 2000) indicates that this habitat is present across the two deep basins of this narrow sea loch. Burrowed mud is similarly believed to cover a significant proportion of the extensive central part of Loch Alsh (Entec, 2000). Existing records of this habitat around the margins of the loch are from the 1988 MNCR survey and 2004 Seasearch dives. Two burrowed mud habitat records in deeper parts of the main basin were captured as part of the 1995 SNH ROV survey. Additional survey work is required to validate the coarse resolution predictive habitat mapping and confirm the extent, distribution and qualities of this habitat in Lochs Long and Alsh. There are three historic records of inshore deep mud with burrowing heart urchins in the basin of Loch Duich, the continued presence of this proposed protected feature will be determined following analysis of infaunal samples collected in 2012.</p>				

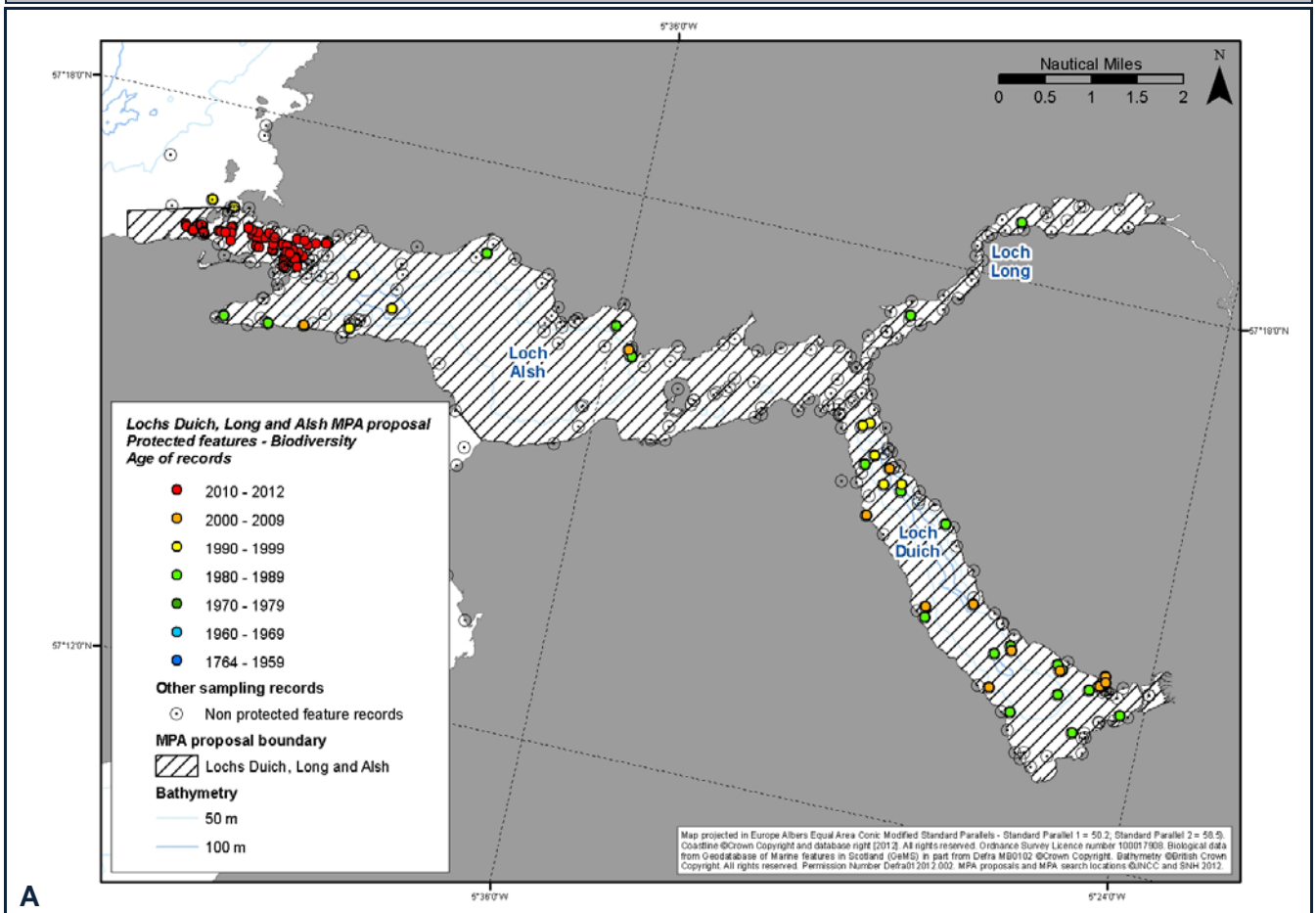
Data sources and bibliography			
Year	Title	Survey (Map B)	Features covered
2012	Moore, C.G. and Harries, D.B. (2012). Lochs Alsh, Duich, Fyne and Creran PMF validation surveys 2012. <i>Interim survey report to Scottish Natural Heritage</i> .		BM; FS; IM
2007	Marine Bio-images. (2007). Repeat monitoring of the 'unfavourable declining' <i>Modiolus</i> biogenic reef feature of the Lochs Duich, Long and Alsh SAC. <i>Scottish Natural Heritage Commissioned Report No. 297</i> . Available from < http://www.snh.org.uk/pdfs/publications/commissioned_reports/297.pdf >		FS

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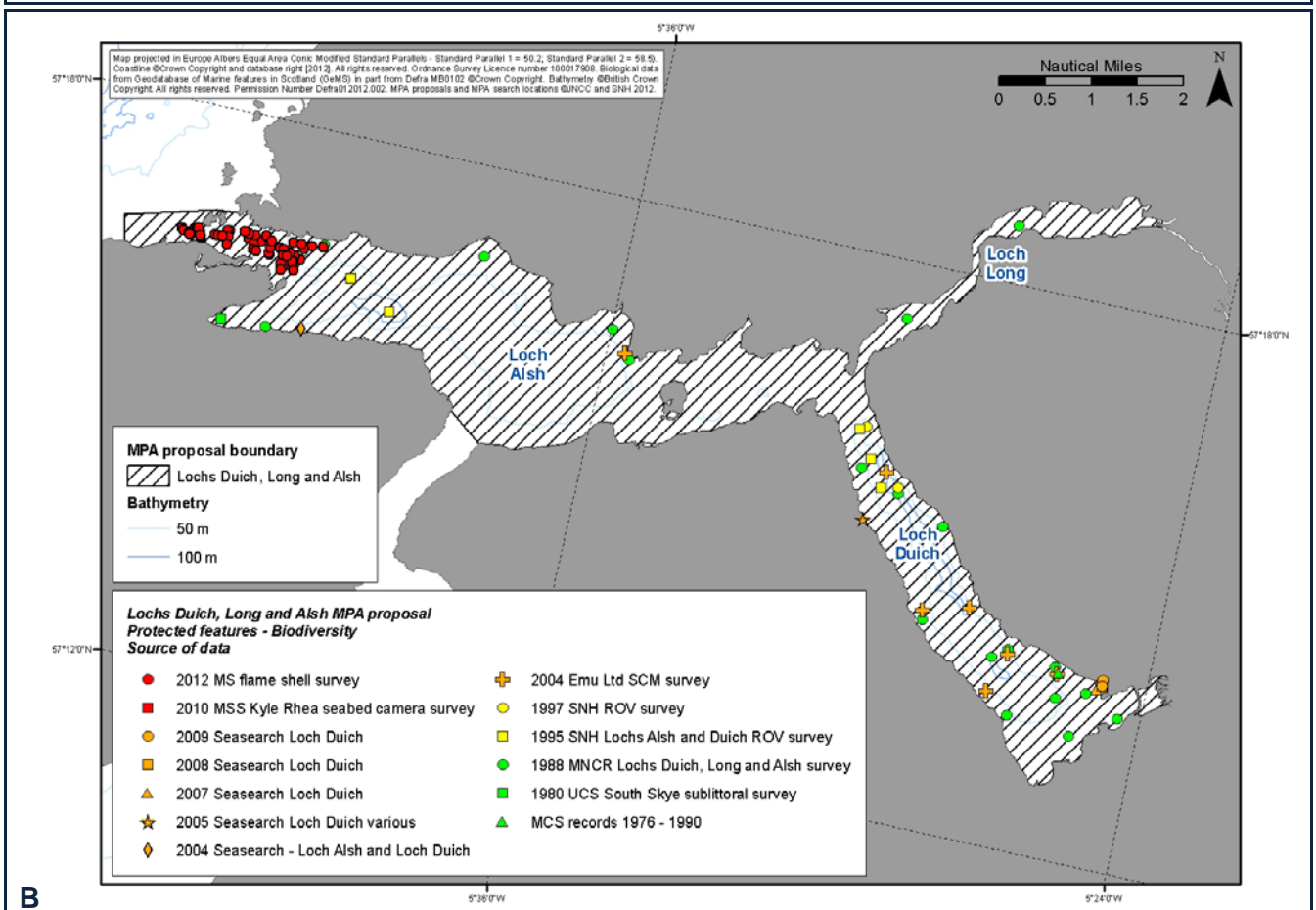
Data sources and bibliography			
Year	Title	Survey (Map B)	Features covered
2006	Emu Ltd. (2006). Site condition monitoring: Surveys of biogenic and rocky reefs in the lochs Duich, Long and Alsh cSAC. <i>Scottish Natural Heritage Commissioned Report No. 240</i> . Available from < http://www.snh.org.uk/pdfs/publications/commissioned_reports/Report%20No240.pdf >	2004 SCM survey of biogenic and rocky reefs	FS
2000	Mair, J.M., Moore, C.G., Kingston, P.F. and Harries, D.B. (2000). A review of the status, ecology and conservation of horse mussel <i>Modiolus modiolus</i> beds in Scotland. <i>Scottish Natural Heritage Commissioned report F99PA08</i> . Available from < http://www.snh.org.uk/pdfs/publications/commissioned_reports/f99pa08.pdf >		FS
2000	Entec (2000). Broad scale survey and mapping of the seabed and shore habitats and biota: Lochs Duich, Long and Alsh pSAC. <i>SNH Commissioned Report F97PA05</i> .	1996 Entec mapping survey	BM; FS
1994	Howson, C.M., Connor, D.W. and Holt, R.H.F. (1994). The Scottish sealochs - an account of surveys undertaken for the Marine Nature Conservation Review. (Contractor: University Marine Biological Station, Millport). <i>Joint Nature Conservation Committee Report, No. 164</i> (Marine Nature Conservation Review Report MNCR/SR/27).		BM
1989	Connor, D. (1989). Survey of Loch Duich, Loch Long and Loch Alsh. Marine Nature Conservation Review Report MNCR/SR/010/89. <i>Nature Conservancy Council, CSD Report No. 977</i> .	1988 MNCR Lochs Duich, Long and Alsh survey	BM; FS; IM

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THE EVIDENCE-BASE

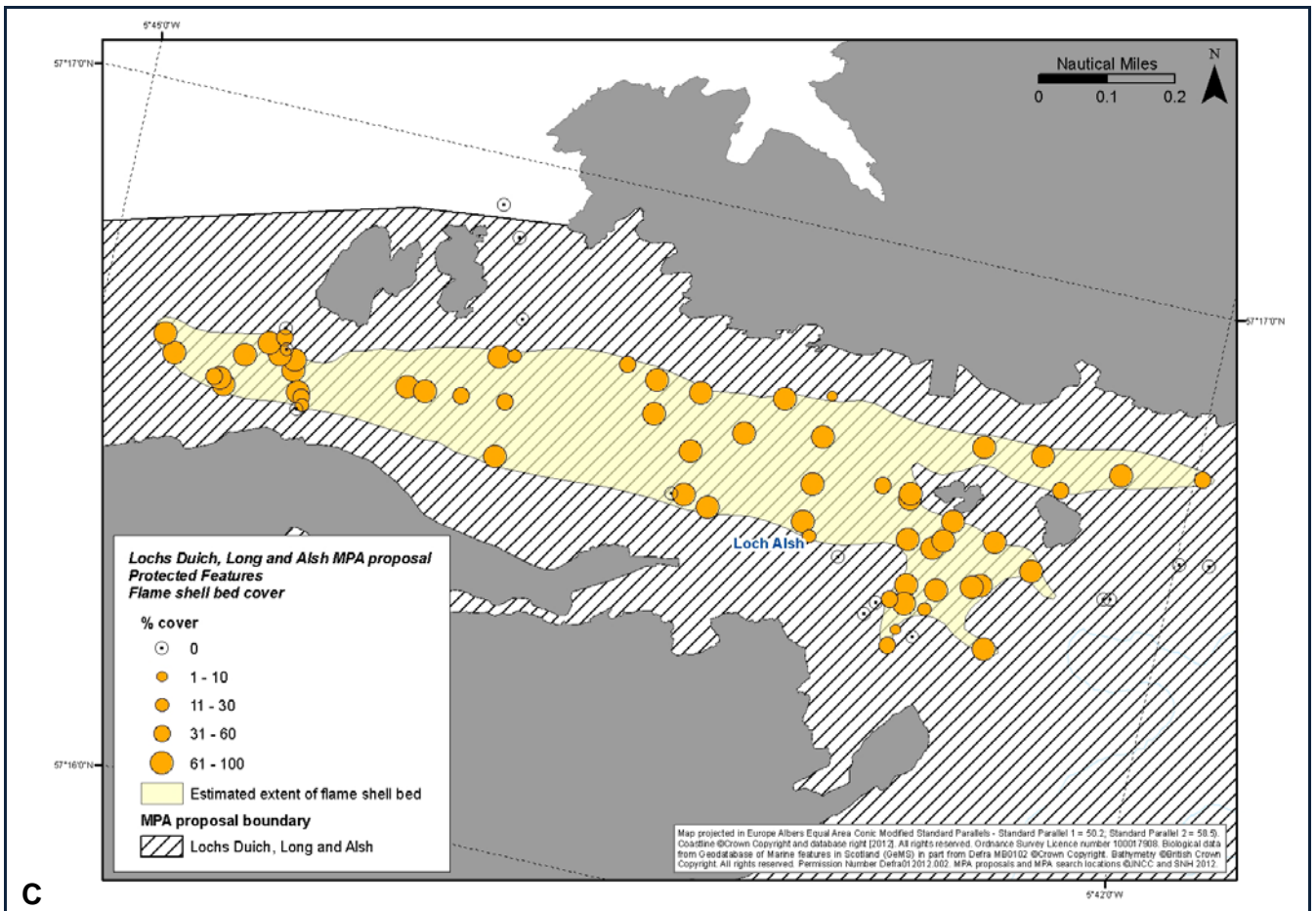


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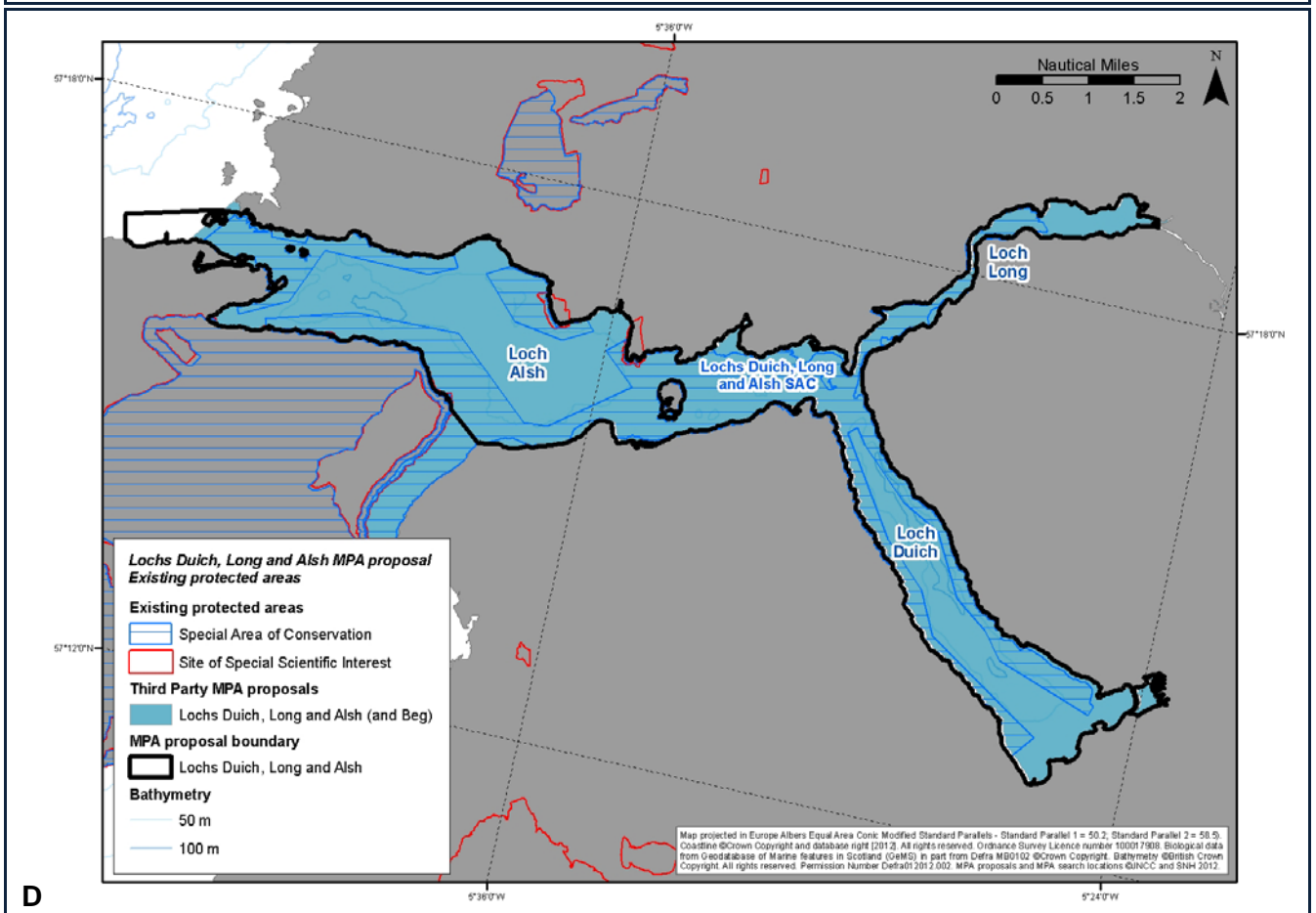


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C



D