

**Scottish MPA Project**  
**Data confidence assessment**

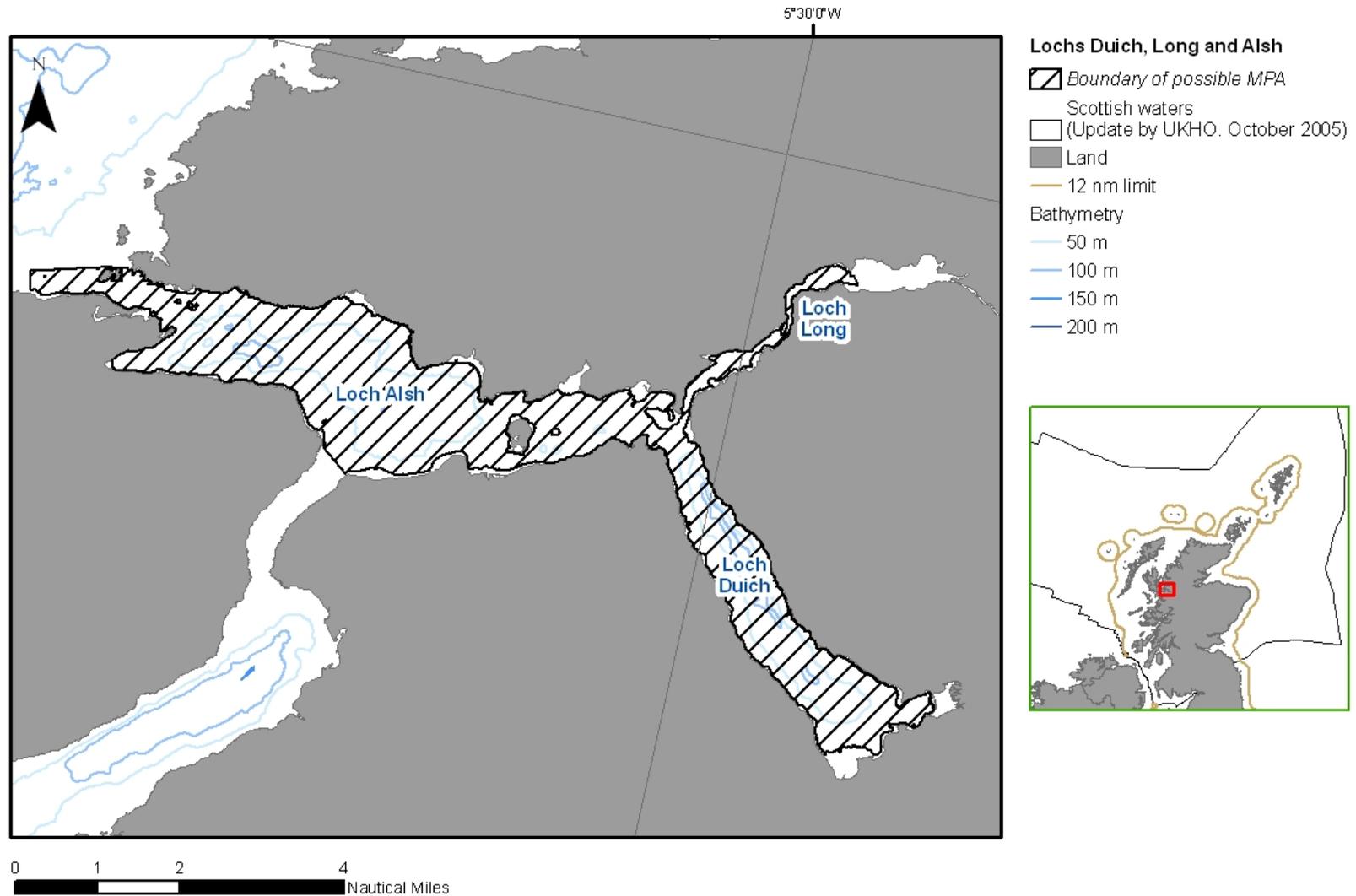
**LOCHS DUICH, LONG AND ALSH**  
**POSSIBLE NATURE CONSERVATION MPA**

<b>Document version control</b>			
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Reason / Comments</b>
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.
Version 8	29/07/2013	Laura Clark	Updated into possible MPA format.
Version 9	16/08/2013	Ben James	Review.
Version 10	21/08/2013	John Baxter	QA review and sign-off.

<b>Distribution list</b>			
<b>Format</b>	<b>Version</b>	<b>Issue date</b>	<b>Issued to</b>
Electronic	7	14/12/2012	SNH web publication.
Electronic	10	21/08/2013	SNH web publication [A990526 / 7(#7)].

# LOCHS DUICH, LONG AND ALSH POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Figure 1 The Lochs Duich, Long and Alsh possible MPA



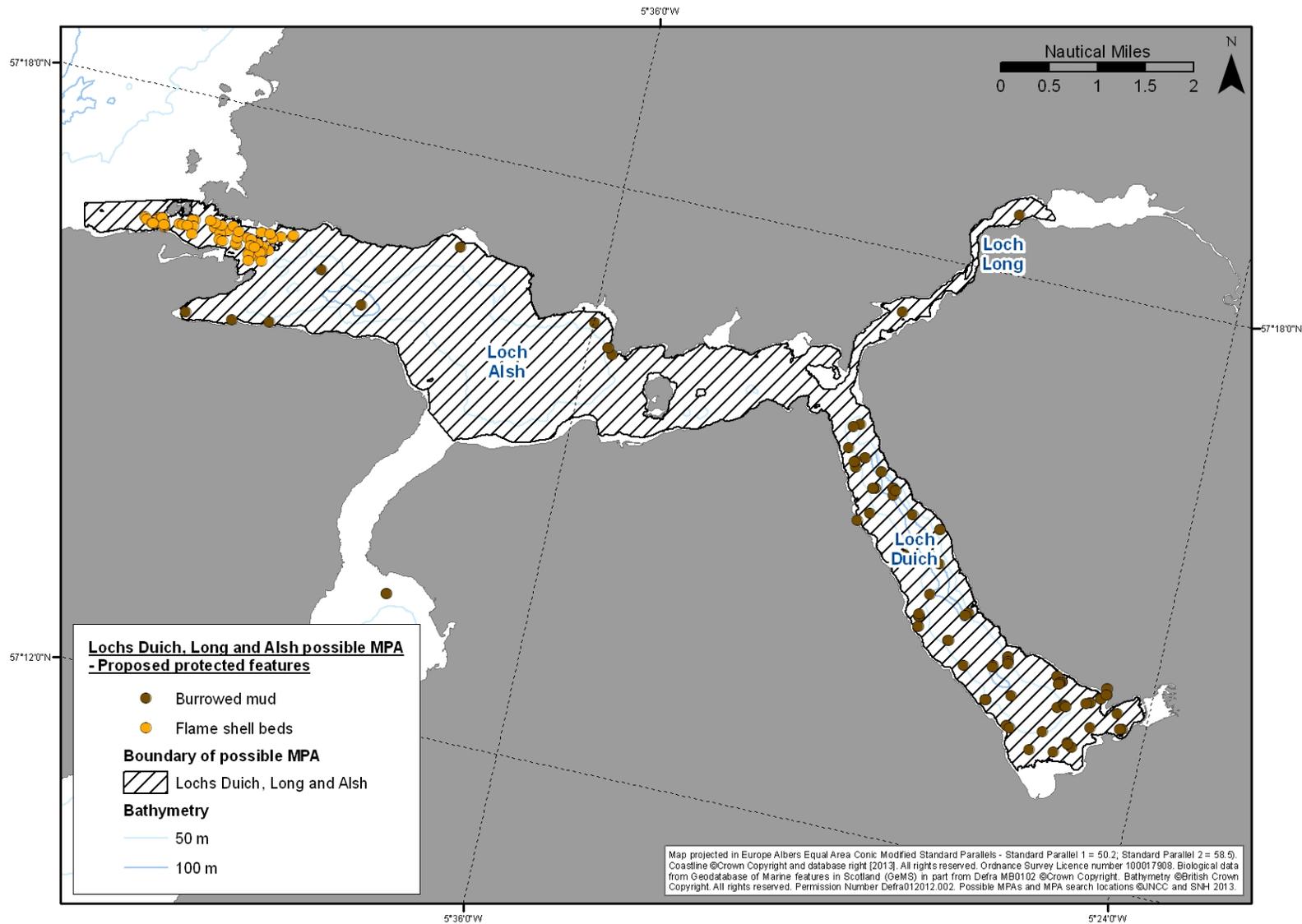
Map projected in Europe Albers Equal Area Conic (Modified Standard Parallels - Standard Parallel 1 = 50.2; Standard Parallel 2 = 58.5). The exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown Copyright). Landmass Ordnance Survey © Crown Copyright and database right 2013. 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. Possible MPAs/search locations © JNCC/SNH

## LOCHS DUICH, LONG AND ALSH POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

<b>Name of possible MPA</b>	Lochs Duich, Long and Alsh		<b>Assessor(s)</b>	SM; LC; BJ; LK	
<p>The Lochs Duich, Long and Alsh possible MPA shown on Figure 1 encompasses a series of fjordic sea lochs in the north-west of Scotland. The two proposed protected features; flame shell beds and burrowed mud are not qualifying interests of the existing Special Area of Conservation (SAC), 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. 75 ha, representing the largest known bed in Scotland and possibly the largest reported bed in the world (Moore <i>et al.</i>, 2013). Burrowed mud is distributed throughout the possible MPA with the greatest number of records of this habitat in Loch Duich. The fauna associated with this habitat is diverse, and includes high densities of fireworks anemones. The Lochs Duich, Long and Alsh possible MPA fully encompasses two discrete third-party MPA proposals from the National Trust for Scotland and the Marine Conservation Society.</p>					
<b>Protected features</b>					
<b>Biodiversity</b>	Burrowed mud (BM) Flame shell beds (FS)		<b>Geodiversity</b>	n/a	
<b>Data used in assessment</b>					
<b>Version of GeMS database</b>	Ver.2 (i10)	<b>Other datasets used in feature map</b> (specify) -	Flame shell bed records from the 2012 Marine Scotland-commissioned survey undertaken by Heriot-Watt University.		
<b>Summary of data confidence assessment</b> (see detailed assessment on following pages)					
<b>Confident in underpinning data</b>		<b>Yes</b>	✓	<b>Partial</b>	<b>No</b>
<b>Confident in presence of identified features?</b>	✓ BM;FS	<b>Data suitable to define extent of individual proposed protected features</b>	✓	<b>Partial</b>	<b>*</b>
			FS	BM	
<b>Summary</b>	<p>We have high confidence in the data underpinning this possible MPA and in the presence of the two proposed 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 proposed protected 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 now well known within Loch Duich following the survey work in 2012 (Moore <i>et al.</i>, 2013), 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 2013 (Envision Mapping Ltd., 2013).</p>				

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Figure 2 The known distribution of proposed protected features within the Lochs Duich, Long and Alsh possible MPA



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<b>Data confidence assessment</b>	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 - C). Existing protected areas are shown on Map E.
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<b>Age of proposed protected feature data (Map A)</b>					
<b>Number of records collected within last 6 years</b>	<b>Many BM;FS</b>	<b>Number of records collected 6-12 years ago</b>	<b>Few BM</b>	<b>Number of records &gt;12 years old</b>	<b>Many BM</b>
<b>Comments</b>	<i>Data age varies between &lt; 6 to &gt; 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 (Moore et al., 2013). The burrowed mud records from Loch Long are from the 1988 Marine Nature Conservation (MNCR) survey (Connor, 1989).</i>				

<b>Source of proposed protected feature data (Map B)</b>					
<b>Targeted data collection for nature conservation purposes</b>	✓	<b>Statutory monitoring (marine licensing etc.)</b>		<b>Fisheries survey work</b>	
<b>Data collection associated with development proposals (EIA etc.)</b>		<b>Recreational / volunteer data collection</b>	✓	<b>Other (specify) -</b>	
<b>Comments</b>	<i>The majority of the proposed protected feature records within the possible MPA 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 proposed 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>				

<b>Sampling methods / resolution</b>							
<b>Feature</b>	<b>Modelled</b>	<b>Acoustic / remote sensing</b>	<b>Remote video / camera</b>	<b>Infaunal - grab / core</b>	<b>Sediment</b>	<b>Diving</b>	<b>Visual census</b>
BM	✓	✓	✓	✓	✓	✓	
FS			✓	✓	✓	✓	✓
<b>Comments</b>	<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 sea bed. 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. A full coverage multibeam bathymetric survey was undertaken throughout the possible MPA in early 2013 (Map D). These data are being used to generate predictive seabed habitat maps (Envision Mapping Ltd., 2013).</i>						

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Proposed protected feature data coverage (Maps A - C)							
<i>Across the possible MPA</i>							
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 <sup>1</sup>	✓	Few or isolated proposed protected feature records - possibly clumped	
<i>For individual features</i>							
Multiple records of individual proposed protected features providing an indication of extent and distribution throughout the possible MPA	✓ BM;FS	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. Detailed full coverage multibeam acoustic data were collected in March 2013 by the British Geological Survey (see Map D). These data supersede coarse resolution single track acoustic data collected from the existing SAC in 1996 (see Entec, 2000).			
<b>Comments</b>	Available proposed protected feature data are scattered across the possible MPA. 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 et al., 2013). 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 and a handful of records around the margins of Loch Alsh, derived mainly from a 1988 MNCR survey and Seasearch dives completed in 2004. Records of this feature in the deeper parts of the main basin of Loch Alsh were captured as part of an SNH ROV survey in 1995. Recent predictive habitat mapping (Envision Mapping Ltd., 2013) suggests that the burrowed mud habitat may be more widely distributed in both lochs. A programme of targeted benthic sampling is required to validate (or otherwise) the conclusions of the predictive mapping and to confirm the full extent, distribution and qualities of this habitat within the possible MPA.						

Data sources and bibliography			
Year	Title	Survey (Map B)	Features covered
2013	Envision Mapping Ltd. (2013). Predictive mapping of MPA protected features within selected possible Nature Conservation MPAs in Scottish territorial waters using available datasets. <i>Scottish Natural Heritage Commissioned Report No. 600.</i>		BM; FS

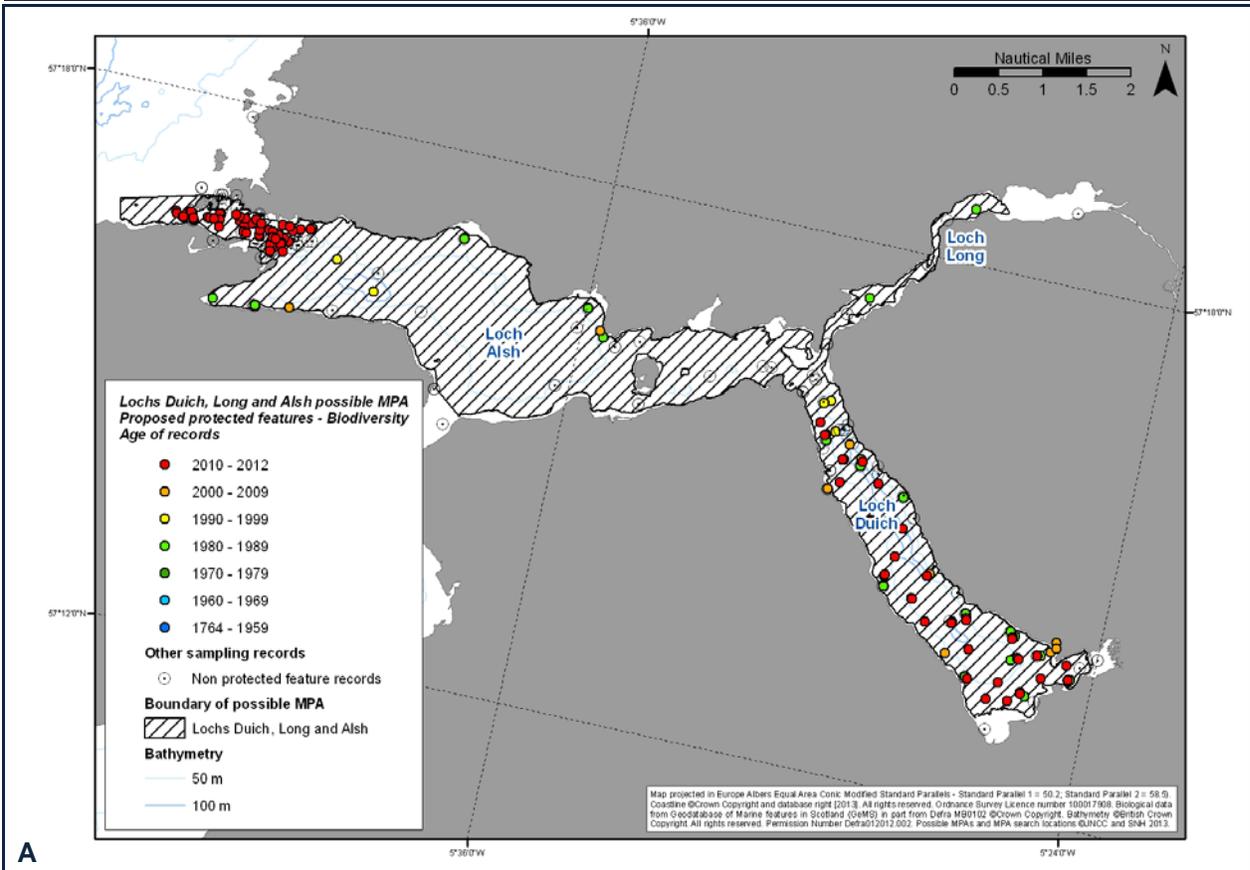
<sup>1</sup> Boundary setting is guided by the known distribution of proposed protected feature records but also takes account of species foraging requirements (e.g. 2 km sea area around black guillemot nest sites), habitat suitability (e.g. for sandeels), the ecological functioning of the areas (e.g. the use of natural boundaries or allowing for the possible expansion of seabed habitats) and / or, the possible adoption of an existing protected area boundary.

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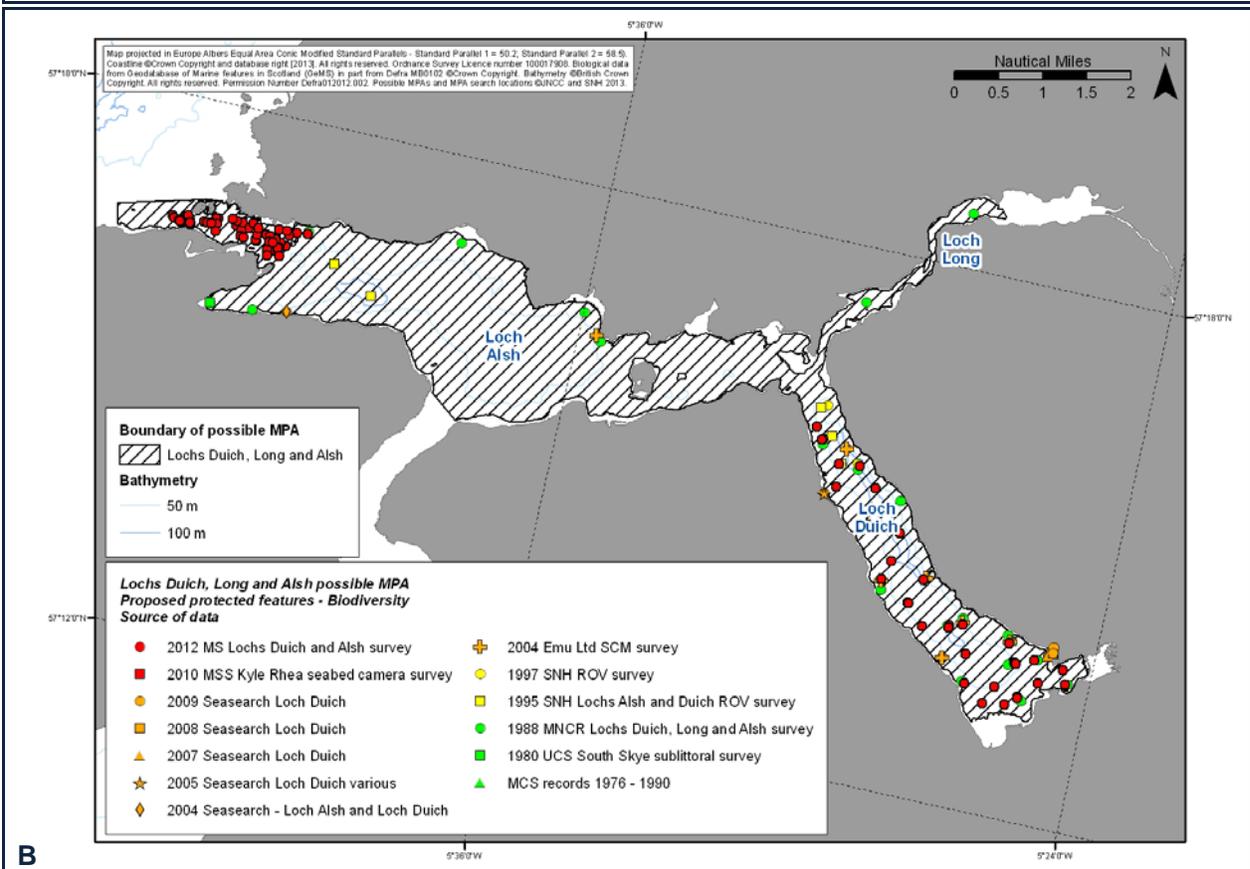
Data sources and bibliography			
Year	Title	Survey (Map B)	Features covered
2013	Moore, C.G., Harries, D.B., Cook, R.L., Hirst, N.E., Saunders, G.R., Kent, F.E.A., Trigg, C. and Lyndon, A.R. (2013). The distribution and condition of selected MPA search features within Lochs Alsh, Duich, Creran and Fyne. <i>Scottish Natural Heritage Commissioned Report No. 566</i> . Available from < <a href="http://www.snh.org.uk/pdfs/publications/commissioned_reports/566.pdf">http://www.snh.org.uk/pdfs/publications/commissioned_reports/566.pdf</a> >	2012 MS Lochs Duich and Alsh survey	BM; FS
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 < <a href="http://www.snh.org.uk/pdfs/publications/commissioned_reports/297.pdf">http://www.snh.org.uk/pdfs/publications/commissioned_reports/297.pdf</a> >		FS
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 < <a href="http://www.snh.org.uk/pdfs/publications/commissioned_reports/Report%20No240.pdf">http://www.snh.org.uk/pdfs/publications/commissioned_reports/Report%20No240.pdf</a> >	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 < <a href="http://www.snh.org.uk/pdfs/publications/commissioned_reports/f99pa08.pdf">http://www.snh.org.uk/pdfs/publications/commissioned_reports/f99pa08.pdf</a> >		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

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## THE EVIDENCE-BASE

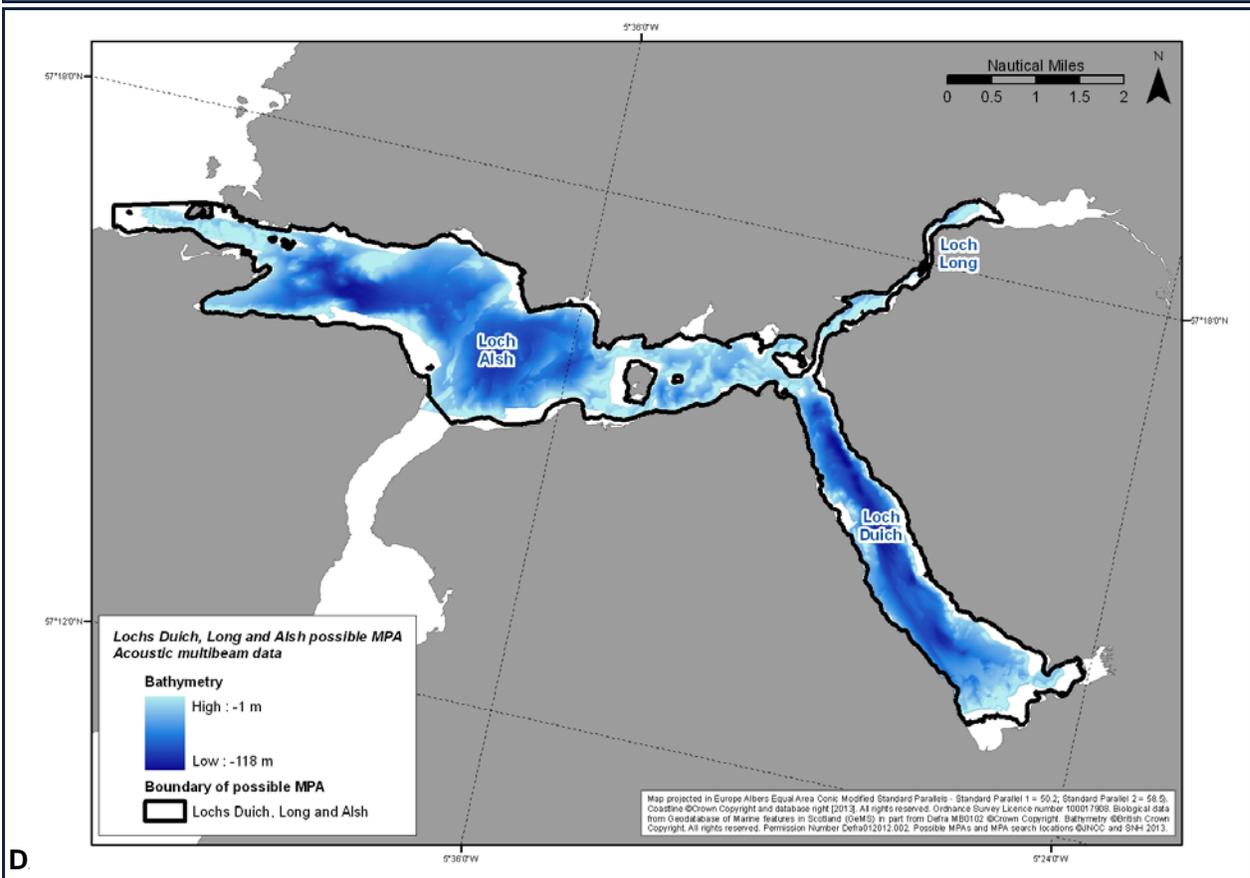
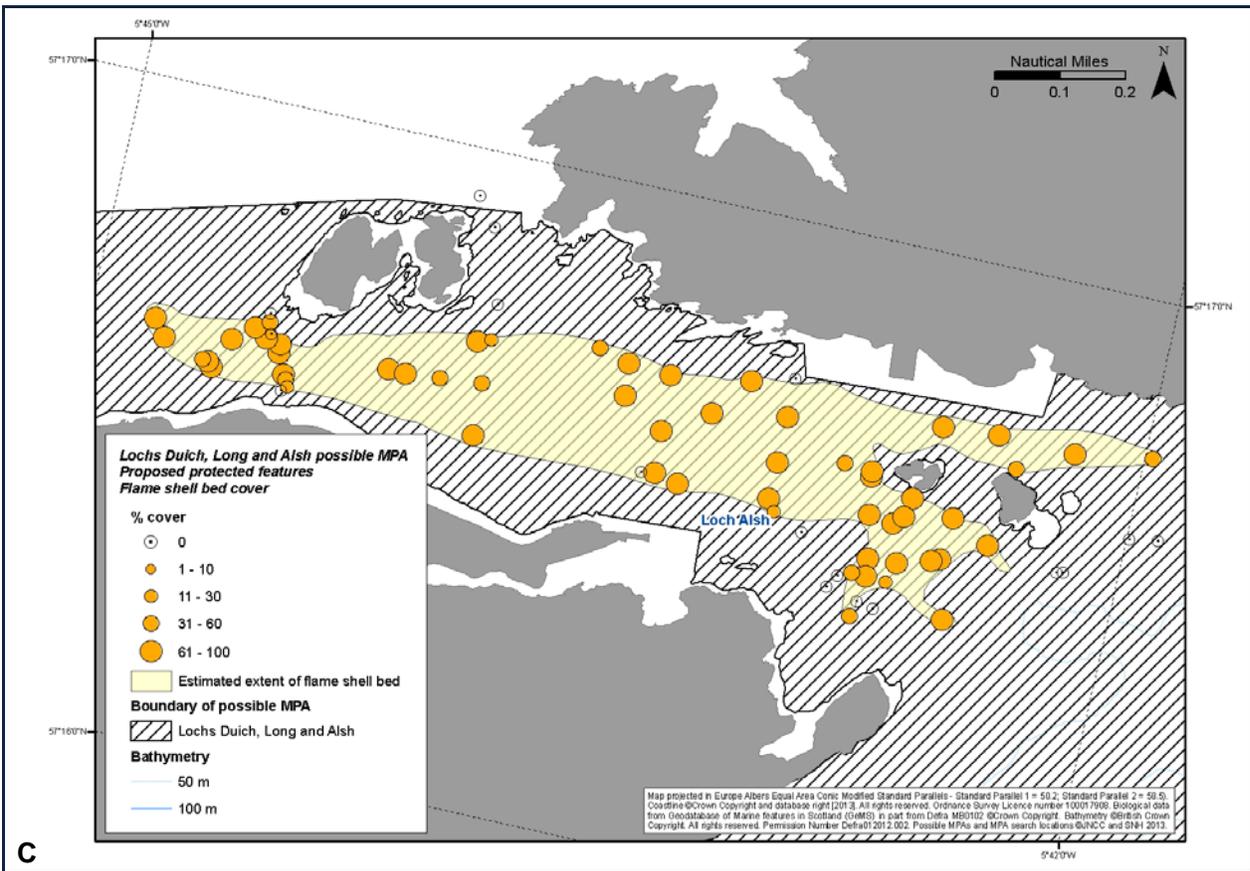


A



B

# LOCHS DUICH, LONG AND ALSH POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT



# LOCHS DUICH, LONG AND ALSH POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

