Scottish MPA Project

Data confidence assessment

LOCH SWEEN POSSIBLE NATURE CONSERVATION MPA

Document version control			
Version	**Date**	**Author**	**Reason / Comments**
Version 1	21/09/2012	Ben James, Laura Clark and Siobhan Mannion	Revised protected feature / MPA proposal format, updating search location version (ver. 4).
Version 2	09/10/2012	Lisa Kamphausen	Review and update of full data confidence assessment.
Version 3	17/10/2012	Laura Clark and Lisa Kamphausen	Production and insertion of revised mapping. Edits.
Version 4	17/10/2012	John Baxter	QA review.
Version 5	19/10/2012	Laura Clark and Lisa Kamphausen	Refinements in response to QA review comments.
Version 6	27/11/2012	Ben James	Review.
Version 7	06/12/2012	Ian Bainbridge	QA review and sign-off.
Version 8	29/07/2013	Laura Clark	Updated into possible MPA format.
Version 9	21/08/2013	Ben James	Review.
Version 10	22/08/2013	John Baxter	QA review and sign-off.

Distribution list			
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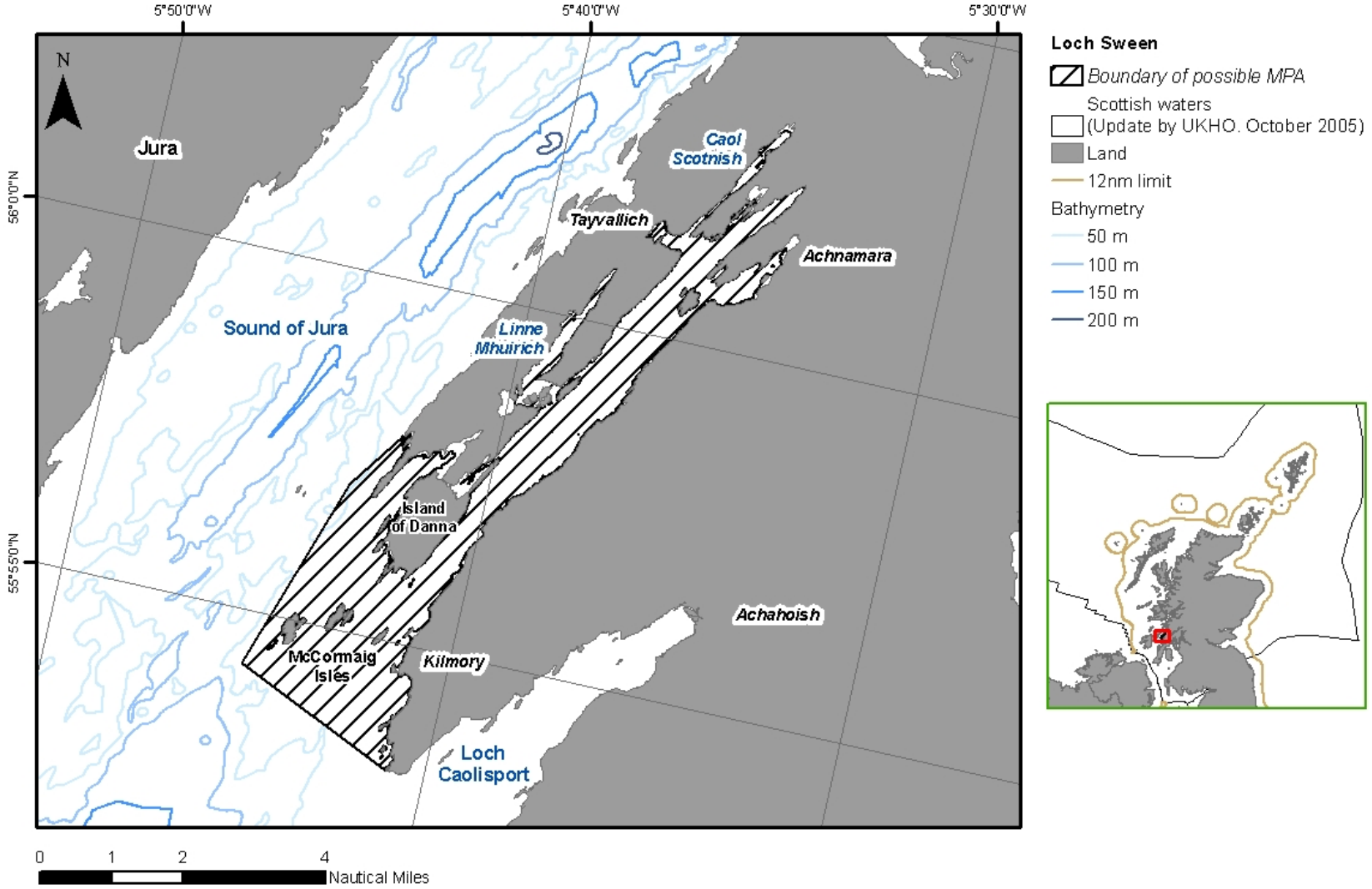
Electronic	7	14/12/2012	SNH web publication.
Electronic	10	22/08/2013	SNH web publication [A990738 / 5(#5)].

LOCH SWEEN POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Figure 1 The Loch Sween 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

LOCH SWEEN POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Name of possible MPA	Loch Sween	**Assessor(s)**	BJ; LC; SM

The possible MPA (Figure 1) encompasses Loch Sween and the tide-swept waters of the Sound of Jura at its mouth that surround the Island of Danna and the McCormaig Isles. Loch Sween is a typical fjordic sea loch, it is orientated from south-west to north-east and has a complex shape with a number of inlets and embayments at the inner eastern end. Another long narrow inlet, Linne Mhuirich, branches off about halfway down the loch on the north side. Each part of the loch system, which is ~15 km in length with a maximum depth of ~40 m, has its own distinctive physical characteristics and collectively they support a diverse range of seabed habitats and species. Burrowed mud floors the deeper parts of the central loch basin. Extensive and biologically diverse maerl beds are largely confined to the narrow tidal entrances of Linne Mhuirich and Caol Scotnish (the longest of the narrow inlets at the head of the loch). Native oysters are scattered across the possible MPA with concentrations in some of the inlets. Muddy mixed sediment communities, representative of Scotland's seas more generally, have a more ubiquitous distribution from the exposed loch mouth through to the sheltered head of Caol Scotnish. The Loch Sween possible MPA fully encompasses the area and suite of features outlined within the third-party MPA proposal for this sea loch submitted by the Marine Conservation Society.

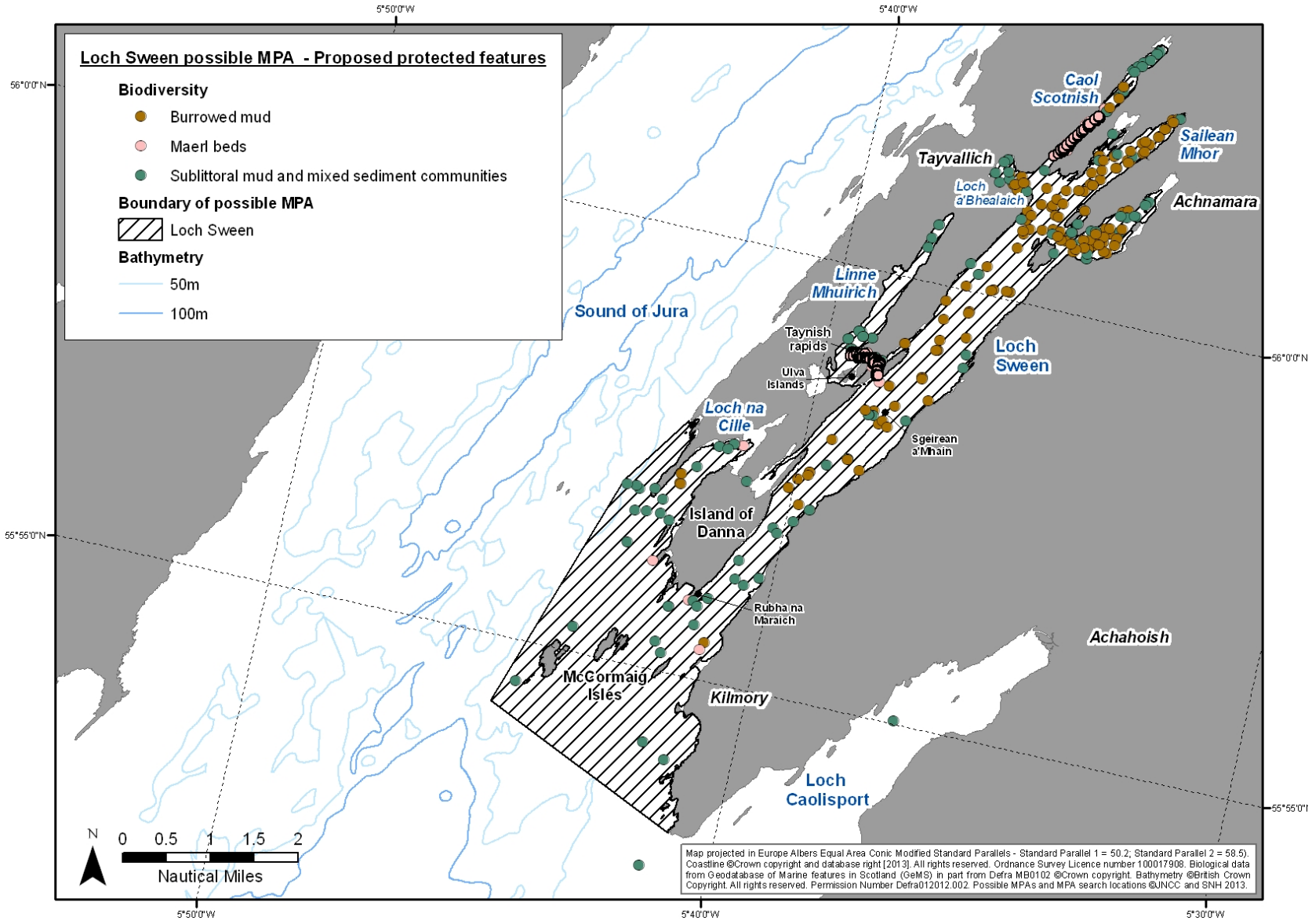
Proposed protected features			
Biodiversity	*Burrowed mud (BM)* *Maerl beds (MB)* *Native oysters (NO)* *Sublittoral mud and mixed sediment communities* (SMS)[1]	**Geodiversity**	*n/a*

Data used in assessment			
Version of GeMS database	*Ver.2 (i10)*	**Other datasets used in feature map** (specify) -	*Civil Hydrography Programme (CHP) multibeam coverage dataset (see Map C). Marine Recorder habitats dataset (for SMS records).*

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**	✖	
			All			
Summary	*We have high confidence in the underpinning data for this possible MPA and in the presence of all proposed protected features. Data for the proposed protected features cover the last three decades but with the majority of records collected in the mid 1980s. A survey in 2013 confirmed the extent of maerl beds within Linne Mhurich and Caol Scotnish and the distribution of burrowed mud throughout the possible MPA (Moore* et al*., 2013). The 2013 survey work also confirmed the presence of beds of native oysters* Ostrea edulis*. The native oyster records are not displayed on the maps - the population of this species in Loch Sween has been subject to unlawful exploitation in the past.*					

[1] Comprising 'Infralittoral sandy mud' (SS.SMu.ISaMu - A5.33), 'Infralittoral fine mud' (SS.SMu.IFiMu - A5.34), 'Infralittoral mixed sediment' (SS.SMx.IMx - A5.43), and 'Circalittoral mixed sediment' (SS.SMx.CMx - A5.444).

Figure 2 The known distribution of proposed protected features within the Loch Sween possible MPA



LOCH SWEEN 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 - B). Existing protected areas are shown on Map C.

Age of proposed protected feature data (Map A)					
Number of records collected within last 6 years	**Many** *BM;MB;NO;SMS*	**Number of records collected 6-12 years ago**	**Few** *NO*	**Number of records >12 years old**	**Many** *BM;MB;NO;SMS*
Comments	*Data on proposed protected features in Loch Sween span the last three decades. The most recent survey work was undertaken in 2013 (Moore* et al.*, 2013), designed to confirm the continued presence and extent of the individual proposed protected features within the possible MPA. However, the majority of previous records were collected between 1982 and 1987, with other more recent records (<6 years) derived from monitoring work undertaken by the Scottish Environment Protection Agency (SEPA) in 2009 and 2010 (the programme of work was expanded in 2010 with the support of Marine Scotland and SNH to cover additional stations in the main basin of the loch). SNH also undertook a diver video survey of the maerl beds within the Linne Mhuirich rapids in 2008. The findings of these studies are outlined in Allen and Birkett (*in prep.*). As part of an SNH-funded PhD study, surveys of native oyster populations in parts of the loch were undertaken in 2004 and 2005 (UMBSM, 2007 - records not mapped). Prior to the 2013 survey, studies undertaken within the last 12 years focused on discrete areas within the possible MPA or upon specific features of conservation interest. Records for the broad sublittoral mud and mixed sediment communities feature primarily date back to Nature Conservancy Council[2] surveys undertaken in the 1980s.*				

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	*The majority of the proposed protected feature records within the possible MPA have been collected through nature conservation-orientated surveys. These are supplemented by records from volunteer diving surveys undertaken as part of the Seasearch recording scheme (primarily within Caol Scotnish and Linne Mhuirich) and from statutory surveillance monitoring studies undertaken by SEPA to meet the requirements of the Water Framework Directive. SNH's 2008 sampling within the Linne Mhuirich rapids was undertaken as part of an ongoing programme of site condition monitoring to determine the health of existing protected areas, in this case the tidal rapids notified feature of the adjacent Ulva, Danna and the McCormaig Isles, and Taynish Woods SSSIs.*				

Sampling methods / resolution							
Feature	**Modelled**	**Acoustic / remote sensing**	**Remote video / camera**	**Infaunal - grab / core**	**Sediment**	**Diving**	**Visual census**
BM			✓	✓	✓	✓	
NO						✓	✓

[2] Predecessor to SNH and its sister nature conservation agencies in the UK.

LOCH SWEEN POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Sampling methods / resolution							
Feature	**Modelled**	**Acoustic / remote sensing**	**Remote video / camera**	**Infaunal - grab / core**	**Sediment**	**Diving**	**Visual census**
MB				✓	✓	✓	
SMS				✓	✓	✓	
Comments	*A number of sampling methods have been used to collect information of differing resolution on the proposed protected features. Recent studies (in 2010 and more recently in 2013) introduced now more commonly applied remote video sampling techniques. The visual census of native oyster populations in shallow (<5 m) waters (UMBSM, 2007) was undertaken using diving and snorkelling methods. These methods were used again in 2013 to confirm the current status of this feature. Detailed* in situ *diver observations also exist for the maerl beds and burrowed mud features that provide information on their extent, quality, and structure. During the most recent survey (2013), GPS tracking technology was used to accurately delineate the extent of the maerl beds (Moore* et al.*, 2013). Work undertaken in the 1980s was particularly detailed, with air-lift suction samplers used to extract and confirm the identity of deep burrowing species and the use of polyester resin to take burrow casts of the different megafauna (Atkinson, 1987 and 1989). Box cores and naturalist dredges were also used to collect infaunal and epifaunal specimens with some light beam trawl sampling undertaken at night.*						

Proposed protected feature data coverage (Maps A and B)							
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	✓ BM;MB; NO;SMS	**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?		*Partial. A Civil Hydrography Programme-led acoustic multibeam survey scheduled for 2013 covers the mouth of the sea loch only (see Map C).*					

LOCH SWEEN POSSIBLE MPA - DATA CONFIDENCE ASSESSMENT

Proposed protected feature data coverage (Maps A and B)	
Comments	*Proposed protected feature records are distributed throughout the possible MPA but with greater numbers at the eastern end of the main basin and within the inlets and embayments including Linne Mhuirich and Caol Scotnish. The possible MPA was the subject of detailed and extensive nature conservation-orientated survey work in the 1980s. New, targeted survey work was completed in 2013 to validate the continued presence of the proposed protected features and to fill gaps in sampling coverage. Burrowed mud, mainly comprising the 'burrowing megafauna and the mud volcano worm* Maxmuelleria lankesteri*' component biotope (**SS.SMu.CFiMu.MegMax**), carpets the floor of the centre of the loch and extends into the deeper arms and embayments at the head. Other muddy and mixed sediment communities are interspersed with the burrowed mud throughout. The intensity of seabed habitat sampling to date within the middle of the loch hasn't been sufficient to delimit the extent of the individual components of this benthic mosaic with confidence. New full coverage high resolution multibeam data, covering the mouth of the loch only, is scheduled to be collected through the Civil Hydrography Programme (Map C). When available, these data will be acquired (through a Pan-Government agreement on the access and use of bathymetric data) and processed to enhance our understanding of seabed habitat distribution in these outer reaches of the possible MPA (when combined with existing and any new data on the seabed habitats present).*

Data sources and bibliography

Year	Title	Survey (Map B)	Features covered
2013	Moore, C.G., Harries, D.B., Atkinson, R.J.A., Clark, L., Cook, R.L., Hirst, N.E., Saunders, G.R., Lyndon, A.R., Sanderson, W.G. and Porter, J.S. (2013). The distribution and condition of proposed protected features within the Loch Sween possible Nature Conservation MPA. *Scottish Natural Heritage Commissioned Report No. 621*.	2013 MS Loch Sween survey	BM; MB; NO; SMS
2012	Allen, J.H. and Birkett, S.R. (*in prep*.). A review of existing and new benthic data to ascertain the current marine nature conservation value of Loch Sween (Argyll) and inform the need for new survey work. *Scottish Natural Heritage Commissioned Report No. 493*.	2010 SEPA/MS/SNH survey 2009 SEPA surveillance monitoring 2008 SNH Linne Mhuirich rapids survey	BM; MB; NO
2007	ERT (Scotland) Ltd. (2009). Baseline mapping and development of monitoring protocols for marine features within five Sites of Special Scientific Interest and one Special Area of Conservation on the west coast of Scotland. *Scottish Natural Heritage Commissioned Report No. 336*. Available from <http://www.snh.org.uk/pdfs/publications/commissioned_reports/336.pdf>		MB; NO
2007	University Marine Biological Station Millport (UMBSM). (2007). Conservation of the native oyster *Ostrea edulis* in Scotland. *Scottish Natural Heritage Commissioned Report No. 251*. Available from <http://www.snh.org.uk/pdfs/publications/commissioned_reports/Report%20No251.pdf>		NO
1999	Bunker, F.St.P.D. (1999). *Monitoring within Linne Mhuirich and rapids in January 1999*. An unpublished Scottish Natural Heritage report.	1999 SNH Linne Mhuirich rapids survey	MB; NO
1990	Lumb, C. and Hiscock, S. (1990). Loch Sween sublittoral survey August 25 - September 6, 1985. Volume 1. Survey report. Nature Conservancy Council, Peterborough. *Nature Conservancy Council (NCC) CSD Report 1138*.	1985 NCC Loch Sween sublittoral survey	BM; MB; SMS

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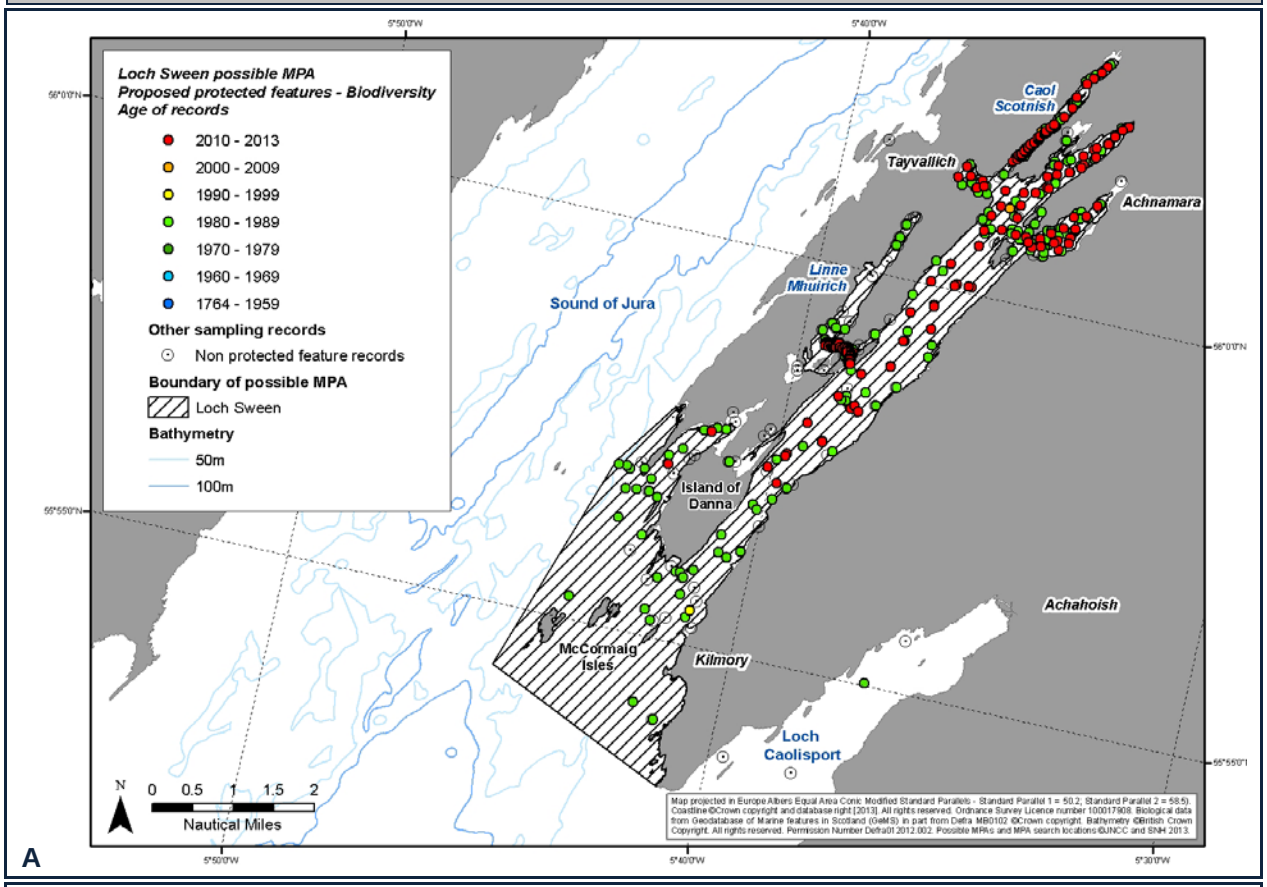
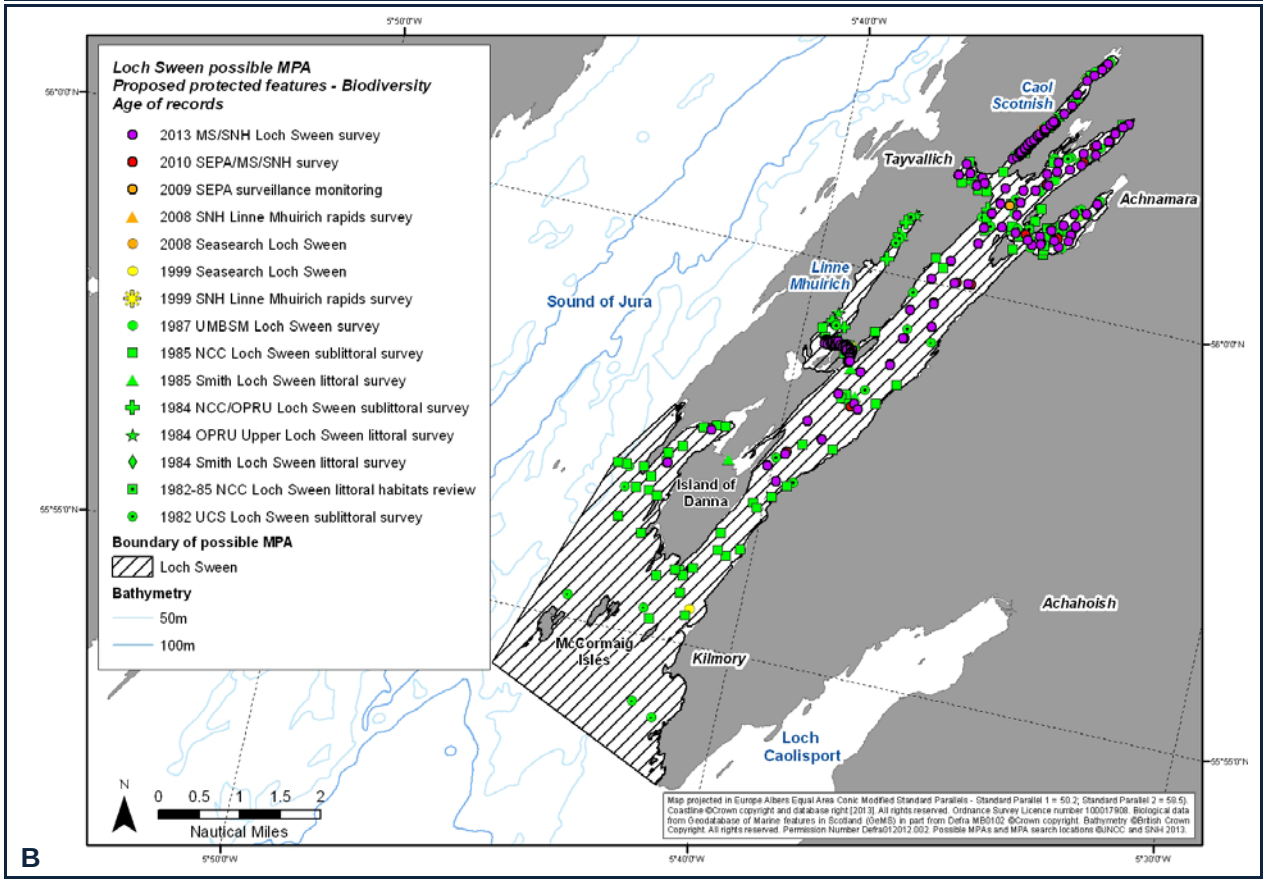
Data sources and bibliography			
1989	Atkinson, R.J.A. (1989). Baseline survey of the burrowing megafauna of Loch Sween PMNR and an investigation of the effects of trawling on the benthic megafauna. *Nature Conservancy Council* (NCC) *CSD Report 909*.		BM
1987	Atkinson, R.J.A. (1987). The burrowing megafaunal communities of the upper arms of Loch Sween. *Nature Conservancy Council (NCC) CSD Report 795*.	1987 UMBSM Loch Sween burrowing megafauna survey	BM; SMS
1985	Rostron, D. and Hiscock, S. (1985). Upper Loch Sween littoral survey Vol. 1. *Report to Nature Conservancy Council (NCC), Field Studies Council, Oil Pollution Research Unit.*	1984 OPRU Upper Loch Sween littoral survey 1982 - 1985 NCC Loch Sween littoral habitats review	MB; NO
1984	Earll, R.C. (1984). Species and communities of Loch Sween. *Nature Conservancy Council (NCC) CSD Report 583*.	1984 NCC/OPRU Loch Sween sublittoral survey	BM; MB; NO; SMS
1983	Earll, R.C. (1983). A sublittoral survey of Loch Sween and adjacent areas. A study completed by diving and literature review. *Nature Conservancy Council (NCC) CSD Report 475*.	1982 UCS Loch Sween sublittoral survey	BM; MB; SMS

THE EVIDENCE-BASE





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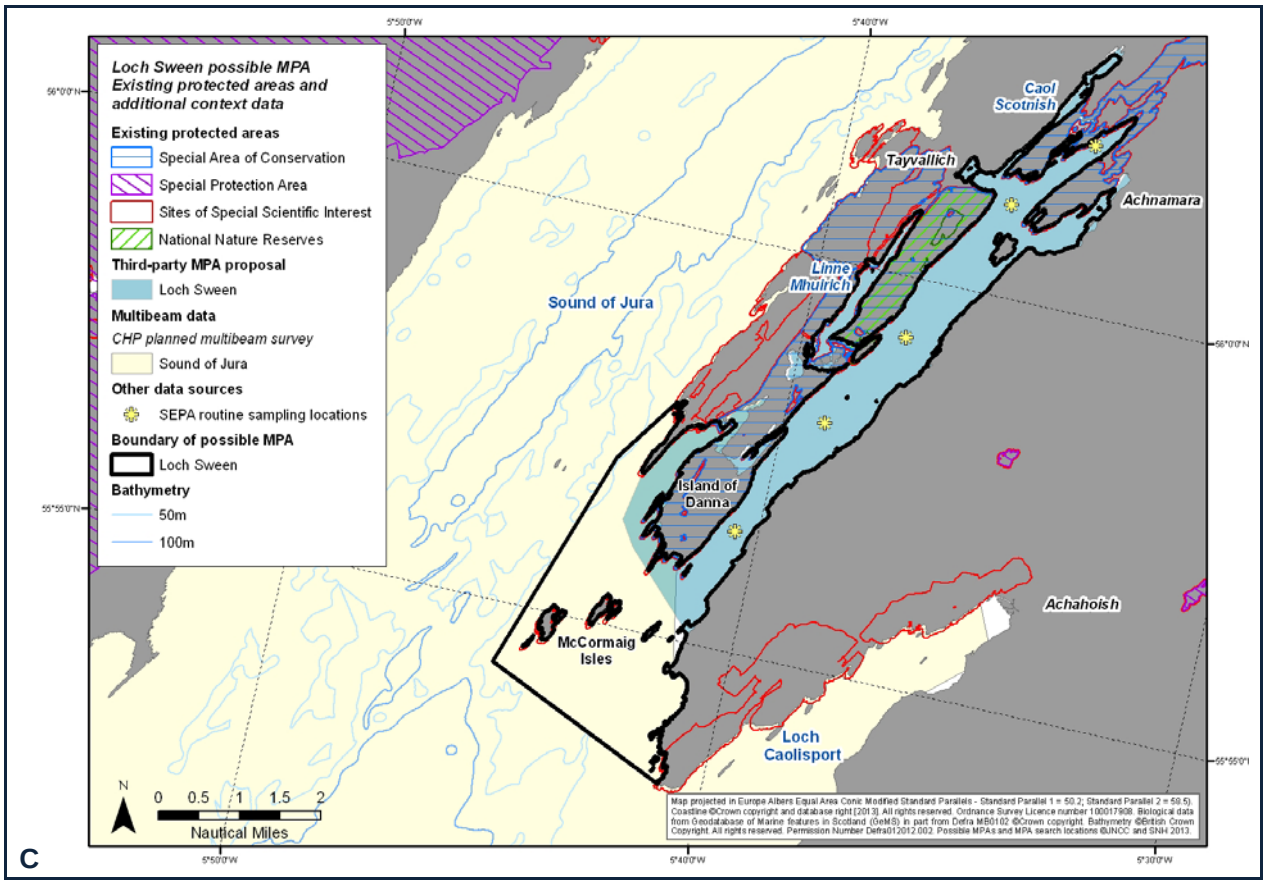

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