Scottish MPA Project **Data Confidence Assessments**
WEST SHETLAND SHELF NATURE CONSERVATION MPA
JULY 2014

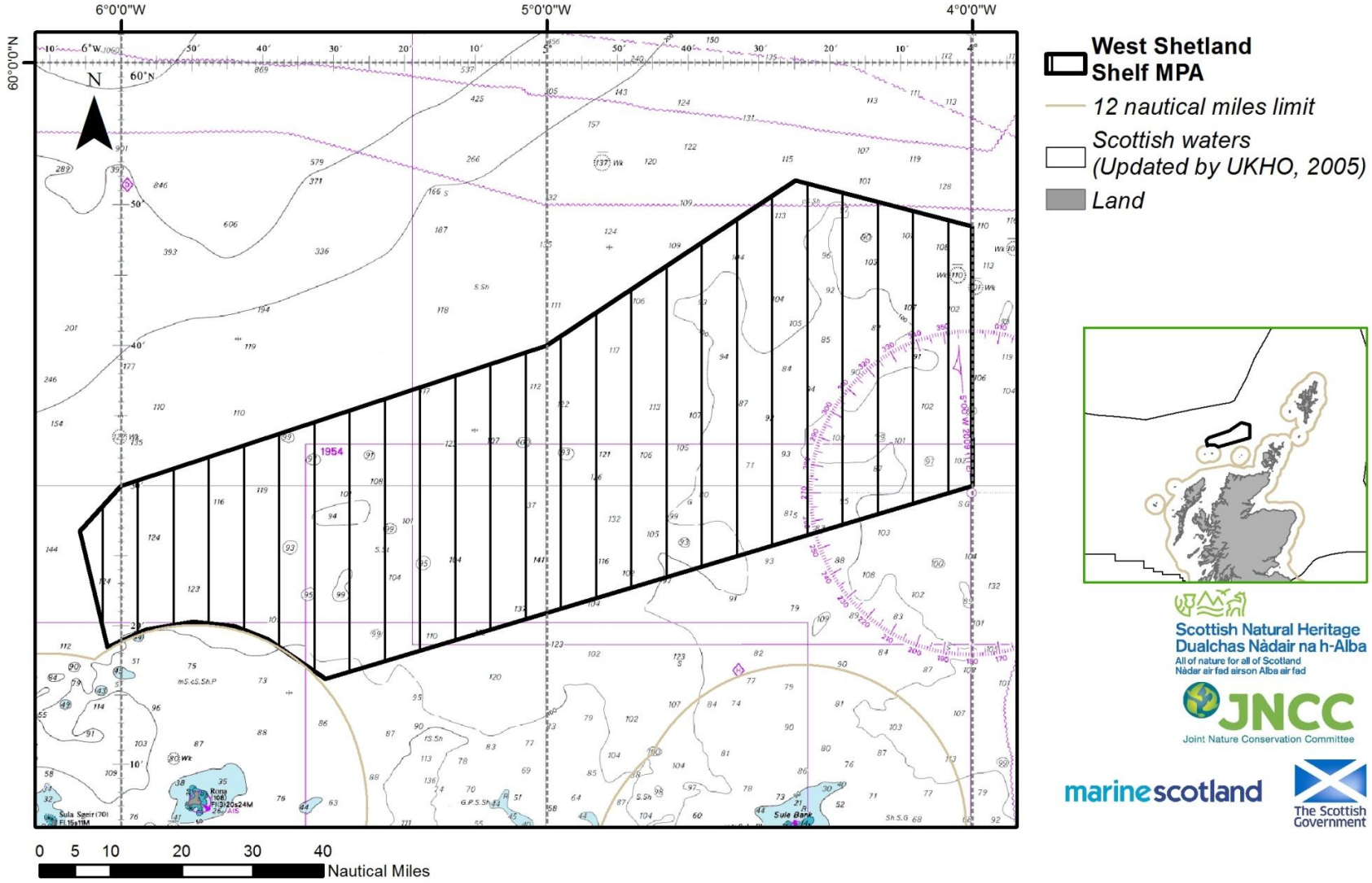
The following documents provide further information about the West Shetland Shelf Marine Protected Area (MPA):

- Site Summary Document
- Detailed assessment against the MPA Selection Guidelines
- Management Options Paper

The documents are all available at www.jncc.defra.gov.uk/page-6491

Document Distribution List and Version Control				
Format	**Version**	**Issue date**	**Version development and review**	**Issued to**
Electronic	2.0	11/04/2013	Internal drafting and review of pre-version 2.0 drafts by JNCC SMPA team and Grade 7 staff and editorial review prior to release to MPA Sub Group	MPA Sub Group
Electronic	3.0	10/06/2013	Review of document to take into account MPA Sub-Group comments by JNCC SMPA team prior to release to MPA Sub Group for sign-off	MPA Sub Group
Electronic	4.0	12/07/2013	Review of document to take into account MPA Sub-Group comments by JNCC SMPA team and editorial review before release of document for public consultation.	Uploaded to JNCC website
Electronic	5.0	15/07/2014	Document update to align with designation status and text revised in response to consultation and independent review report	Delivery to Marine Scotland to support MPA designation and upload to JNCC website

Figure 1 Map of West Shetland Shelf MPA



Map projected in Mercator (World) projection, geographic coordinate system WGS1984. The exact limits of the UK Continental Shelf are set out in the Continental Shelf (Designation of Areas) Order 2013, Statutory Instrument 2013/3162 (© Crown Copyright). Landmass, Ordnance Survey © Crown Copyright and database right 2011. All rights reserved. Scotland (Adjacent waters) Updated by the Law of the Sea Division, United Kingdom Hydrographic Office October 2005. MPA © JNCC and SNH, 2014. All rights reserved. Admiralty Chart © Crown Copyright, 2013. All rights reserved. License No. EK001-20130405.
NOT TO BE USED FOR NAVIGATION

MPA name	West Shetland Shelf	**Date of initial assessment**	26th July 2012	**Assessors**	ALR, NC, PC, ML
The West Shetland Shelf MPA is recommended to protect offshore subtidal sands and gravel habitat features. This area was selected following JNCC's consideration of other area based measures (Windsock Fisheries Restriction Area) as detailed in Cunningham *et al*. (2011). The boundary of the MPA broadly encompasses the element of the Windsock Fisheries Restriction Area in offshore waters.					

Protected features			
Biodiversity	Offshore subtidal sands and gravels (OSSG) on the shelf	**Geodiversity**	*None*

Feature exclusions (MPA search features recorded within the MPA but excluded from the assessment with reasons)

Northern sea fan and sponge communities - A small number of photographic images collected during the 1111S survey to the 'Windsock' in 2011 have been classified as the northern sea fan and sponge communities search feature (Goudge & Morris, 2014), but with some uncertainty. This uncertainty is due to the samples being determined as a proposed sparsely populated version of the biotope CR.HCR.DpSp.PhaAxi, one of the component biotopes of the search feature. Furthermore, the stage 5 assessment of MPA search features judged that the proposed network is adequate for this MPA search feature and so it has been excluded from the current MPA. The following existing measures provide protection for the feature: Pobie Bank cSAC in OSPAR region II, Firth of Lorn SAC, Loch nam Madadh SAC, St Kilda SAC and Sunart SAC in OSPAR region III.

Sandeels (specifically *Ammodytes marinus* within offshore waters) – Although point records of sandeels are present within the MPA, the area was not considered significant to the life history of the species and its wider population (Marine Scotland Science, 2012).

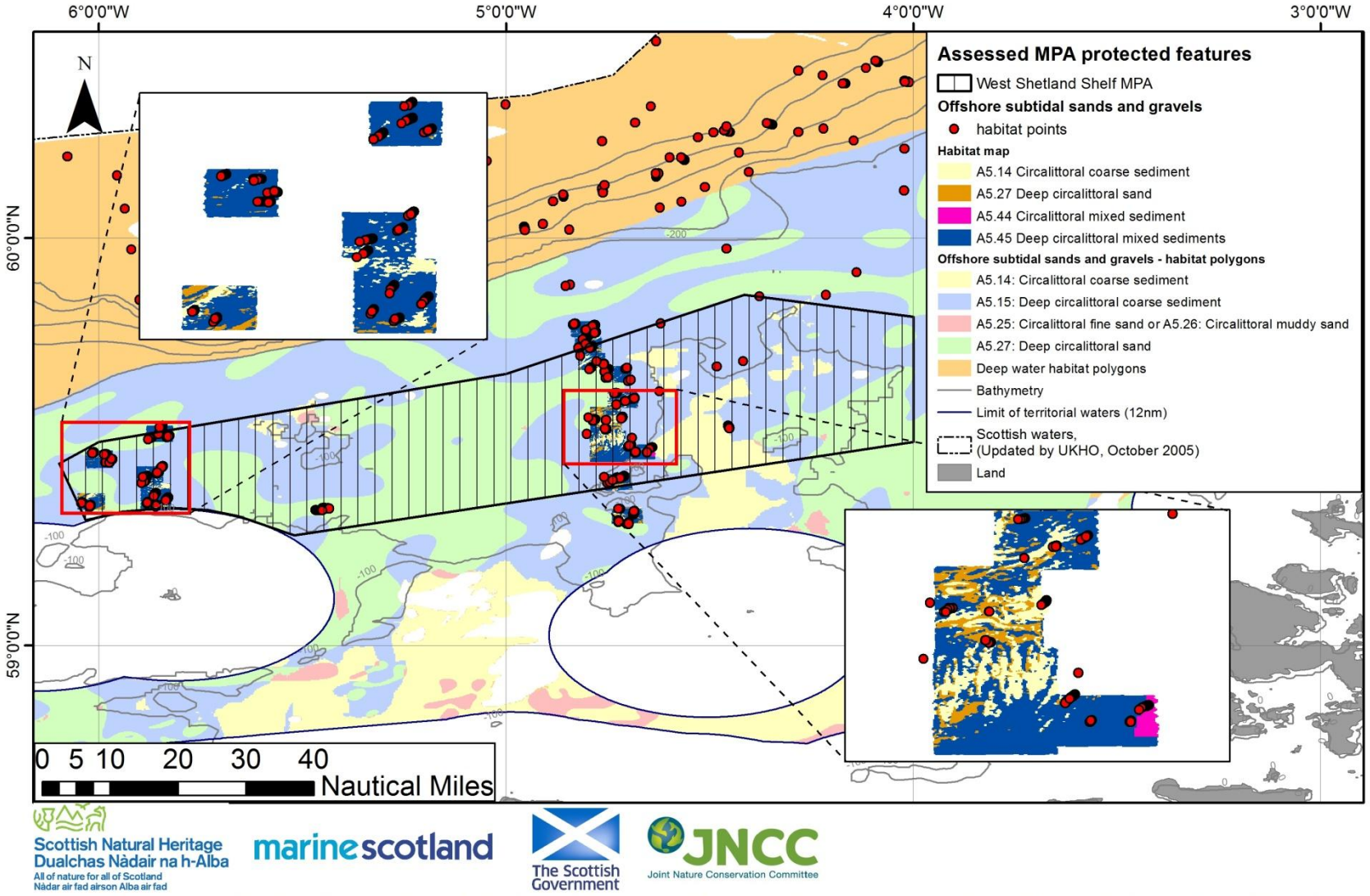
Data used in assessment			
Version of GeMS holding feature data used to support site selection	Ver.4	**Other datasets used** (not in GeMS) [superscripts are used to reference these datasets in the following discussion]	• [1]British Geological Survey (BGS) Marine Particle Size Analysis (PSA) dataset (February 2012)) - data collected between 1967 and 1987 categorised according to the Folk classification and subsequently to the EUNIS habitat classification by JNCC based on the BGS modified Folk scheme • [2]Particle Size Analysis (PSA) results from the JNCC/MSS survey of the Windsock 1111S and the opportunistic sampling during the MSS Quarter 4 International Bottom Trawl Survey (IBTS Q4) surveys in 2011 • [3]Habitat maps the interpretation of acoustic and biological samples collected during the MSS/JNCC survey 1111S (Sotheran & Crawford-Avis, 2014) • [4]EUSeaMap predictive habitat modelling project habitat map (Cameron and Askew, 2011). Note that the product used in the maps is the 2012_08 version, which is an improvement on that published in the 2011 report.

Summary of data confidence assessment (see detailed assessment on following pages)						
Confident in underpinning data	**Yes**	✓	**Partial**	**-**	**No**	**-**

Confident in presence of identified features?	*OSSG*	**Data suitable to define extent of individual MPA protected features**	**Yes**	**Partial**	**No**
			OSSG	-	-

Summary	JNCC has high confidence in the presence of offshore subtidal sands and gravels, with the majority of data having been collected in 2011 using a range of sampling methodologies including the acquisition of blocks of high-resolution multibeam & backscatter data. The multibeam data have been processed and interpreted to provide information on feature extent within the survey area[3]. The evidence comes from a targeted 2011 JNCC/MSS survey that acquired multibeam, grab samples and photographic imagery, opportunistic sampling during the 2011 Q4 International Bottom Trawl Survey and the infaunal analysis of samples collected during a 1996 Department of Trade and Industry (DTI) SEA survey (Bett, 2012). The samples generated clusters of data points, one in the eastern area and two in the western area of the MPA, each confirming the presence of offshore circalittoral coarse sediment and sand biotopes (Axelsson *et al.,* 2014; Goudge & Morris, 2014, Pearce *et al.,* 2014). This evidence supports the distribution of offshore subtidal sands and gravels predicted to occur across the entire MPA by the map produced from habitat models by the EUSeaMap project (Cameron and Askew, 2011).

Figure 2 Map of the known distribution of protected features within the West Shetland Shelf MPA



Map displayed in geographic coordinates WGS84.The exact limits of the UK Continental Shelf are set out in the Continental Shelf (Designation of Areas) Order 2013, Statutory Instrument 2013/3162 (© Crown Copyright). Landmass Ordnance Survey © Crown Copyright and database right 2011. All rights reserved. Scotland (Adjacent waters) Updated by the Law of the Sea Division, United Kingdom Hydrographic Office October 2005. Bathymetry © GEBCO, 2011. Biological data from Geodatabase of Marine features in Scotland (GeMSv4) © Crown Copyright; MPA © JNCC and SNH 2014. All rights reserved. PSA data © BGS. Habitat map © JNCC, 2014. EUSeaMap © EUSeaMap consortium 2012 (www.emodnet-seabedhabitats.eu)

Data confidence assessment	JNCC's assessment of data confidence considered the age and source of the data, the type of sampling methodologies used and the overall coverage of data across the MPA

Age of data (Map A)			
Multiple or majority of records collected post 2000	✓	**Multiple records collected pre 2000**	✓
Comments	The majority of data for offshore subtidal sands and gravels have been collected since 2011, from which habitat maps were generated in 2013. A small proportion of infaunal data points originate from a 1996 survey. The evidence base for the offshore subtidal sand and gravels habitat feature includes additional BGS PSA data from 1984-88[1].		

Source of 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) – EUSeaMap, BGS PSA data	✓
Comments	The majority of the data verifying the presence of offshore sands and gravels data come from photographic imagery and grab samples (in GemS v4) from a survey lead by JNCC in collaboration with Marine Scotland Science in 2011 (1111s) (Goudge & Morris, 2014, Pearce *et al*., 2014). Additional data were sourced from opportunistic sampling during the Marine Scotland Science IBTS Q4 survey in 2011 (1511S) (Axelsson *et al.,* 2014) (in GeMS v4). Further evidence comes from the 1996 SEA/DTI survey data analysed by the National Oceanography Centre (NOC) (Bett, 2012). The predictive seabed habitat map (modelling project EUSeaMap) used in this assessment was developed by a consortium lead by the JNCC (Cameron and Askew, 2011). PSA samples collected across the entire MPA confirming the extent of sand and gravel substrates have been sourced from BGS[1].				

Sampling methods / resolution							
Feature	**Modelled**	**Acoustic / remote sensing**	**Remote video / camera**	**Infaunal - grab / core**	**Fisheries trawl**	**Diving**	**Sediment Sampling**
OSSG	✓	✓	✓	✓			✓
Comments	A range of sampling methods were used to collect information of differing resolution of classification for offshore subtidal sands and gravels within the MPA. Drop-down or towed video cameras and Day grab equipment deployed from the RV Scotia in 2011, together with multibeam & backscatter data collected in blocks, give an indication of the continuity of the subtidal sand and gravels feature across the MPA (Maps D-E). A Day grab was used for the infaunal sampling aboard the RRS Charles Darwin (101) survey in 1996. The BGS PSA data[1] came from seabed sediment samples collected in the 1980s using grab and core samplers. JNCC acknowledge that the spatial accuracy of older PSA records may be limited in places where the Decca Main Chain or similar types of positioning systems were used that have poorer spatial accuracy by modern standards. Results from geological cores below the seabed surface have not been reported here.						

Data coverage (Maps A to I)					
Across the MPA					
Numerous protected feature records evenly distributed across MPA?	✓ (PSA data)	**Numerous protected feature records scattered across MPA with some clumping?**	✓	**Few or isolated protected feature records - possibly clumped?**	-
For Individual features					
Multiple records of individual protected features providing indication of extent and distribution throughout MPA?	✓	**Few or scattered records of specific protected features making extent and broad distribution assessment difficult?**	-	**Few or isolated records of specific protected feature records**	-
Are acoustic remote sensing data available to facilitate the development of a full coverage predictive seabed habitat map?			Partially: acoustic data are available for the areas surveyed on 1111S in 2011 that have been used to complete a partial habitat map for the MPA (Maps D-I) (Sotheran & Crawford-Avis, 2014).		
Comments	***Offshore subtidal sands and gravels (OSSG)*** • EUSeaMap, version 2012_08 (Cameron and Askew, 2011)[1] – The habitat map predicts that offshore subtidal sands and gravel habitats are continuous throughout the MPA. The following EUNIS habitats are predicted to be present A5.14 Circalittoral coarse sediment (several patches, particularly in the eastern area), A5.15 Deep circalittoral coarse sediment, and A5.27 Deep circalittoral sand (both of which are evenly distributed and slightly patchy throughout the site and together comprise the dominant habitats). There are some small patches of A5.25 Circalittoral fine sand or A5.26 Circalittoral muddy sand isolated in the east and west. • British Geological Survey (BGS) Marine Particle Size Analysis (PSA) dataset (February 2012)[1] – These data represent sediment				

[1] Note that the product used in the maps is the 2012_08 version, which is an improvement on that published in the 2011 report

Data coverage (Maps A to I)	
	sampling between 1967 and 1987 across the UK waters in which the PSA results were categorised according to the Folk Scheme and subsequently to EUNIS categories/BGS modified Folk classification. Note these data also underpin the BGS substrate map used in the predictive seabed habitat modelling project EUSeaMap2011 habitat map[1] – There are multiple samples collected by the BGS within the MPA, all within the predicted extent of the offshore subtidal sands and gravels feature. 68 records show the presence of 'coarse sediment' and 53 records show the presence of 'sand and muddy sand': both classes are components of offshore subtidal sands and gravel. The data points are evenly distributed across the predicted extent of the feature within the MPA. • 1111S Seabed Towed Video Survey Windsock, Blocks A & B (Goudge & Morris, 2014) (in GeMS v4) – Clusters of data from photographic samples (video and still images) are situated in the western area and the middle to eastern area of the MPA confirming the predictions of EU SeaMap for the presence of offshore subtidal sands and gravel habitats. In particular the following habitat types were confirmed as present: A5.15 Deep circalittoral coarse sediment, A5.27 Deep circalittoral sand, and A5.45 Deep circalittoral mixed sediment. • 2011 JNCC IBTS Quarter 4 survey (Axelsson *et al.,* 2014) (in GeMS v4) - JNCC collected photographic samples (video and still images) opportunistically during the MSS IBTS Q4 survey in 2011. The samples generated three clusters of data points, one in the eastern area and two (in close proximity) in the western area of the MPA, each of which confirm the presence of offshore circalittoral coarse sediment. • Biotope analysis of 1111S & 2011 IBTSQ4 survey infaunal samples (Pearce *et al.,* 2014) (in GeMS v4) – 116 grab samples from the 2011 MSS-JNCC survey to the Windsock (1111S) lie within the MPA. Of the 116, nine habitat classes were determined including 6 new biotope proposals. The majority of samples were classified under the offshore circalittoral coarse sediments habitat type (93), for which two new biotopes have been proposed. 17 samples were classified under the offshore circalittoral sand habitat type for which three new biotopes have been proposed. Offshore circalittoral mixed sediments were recorded in two samples. During the 2011 IBTS Q4 survey, three grab samples were collected at one station within the MPA. These were classified under the offshore circalittoral sand habitat type and consist of a new proposed biotope. All the proposed biotopes identified in this work may be considered in the planned development of the offshore section of the Marine Habitat Classification of Britain & Ireland. • NOC biotope analysis of SEA4 AFEN and DTI data (Bett, 2012) (in GeMS v4) – Six records for offshore subtidal sands and gravel habitat features are present in the eastern part of the MPA, which have been assigned to the proposed biotope Spionidae-Syllidae-Syllidae in Atlantic sand and muddy sand (100-300m). • Particle Size Analysis (PSA) results from the 1111S and IBTS Q4 surveys in 2011[2] – these data confirm that the majority of the sampled substrate is coarse sediment (gravel, gravelly sand, sandy gravel) and sands (sand and slightly gravelly sand) with a minority classed as mixed (muddy sandy gravel). • Habitat maps generated from the interpretation of acoustic and biological samples collected during the MSS/JNCC survey 1111S (Sotheran & Crawford-Avis, 2014)[3] - During the 1111S survey multibeam and backscatter data were collected from 14 areas, nine areas in the west (Map D) and five areas in the east (Map E). These data have been processed to provide bathymetric and backscatter intensity data layers of the areas. These were interpreted using the ground-truthing data (photographic imagery and benthic grab samples) to create a substrate data layer. Using a rule-based mapping approach this substrate map was combined with other physical parameter data layers (light penetration and energy) to generate a habitat data layer according to level 4 of the EUNIS habitat classification scheme (Maps H & I) to indicate the likely distribution of seabed habitats across the MPA. The resulting habitat extent data layer shows that the majority of the areas fall within the deep circalittoral biological zone, in a low energy environment. The western section of the area is predominantly deep circalttoral mixed sediments (A5.45) with patches of deep circalittoral coarse

Data coverage (Maps A to I)	
	sediment (A5.15) throughout and occasional areas of deep circalittoral sand (A5.27). The eastern section has relatively large areas of deep circalittoral mixed sediments (A5.45) and a small section of circalittoral mixed sediments (A5.44). The raised, linear-form banks appear to be of a coarse substrate (A5.14) with the deeper areas and troughs occupied by mixed sediments. This study shows there is greater variance in the spatial distribution and classification level of habitats across the site, reflecting the patchiness of the broad habitats, than EUSeaMap exhibits. Sotheran & Crawford-Avis (2014) discuss methods to present classification of mapping certainty.

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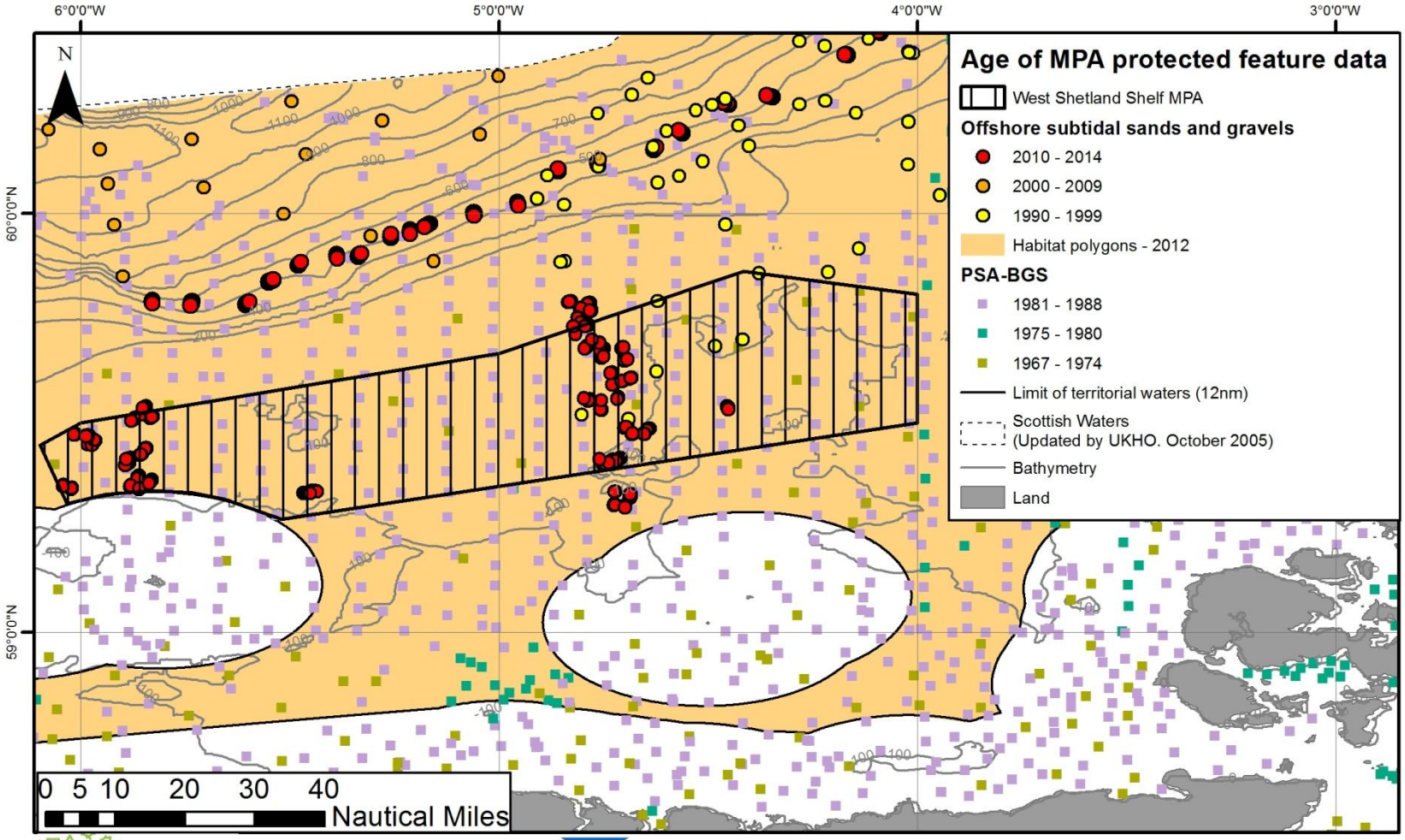

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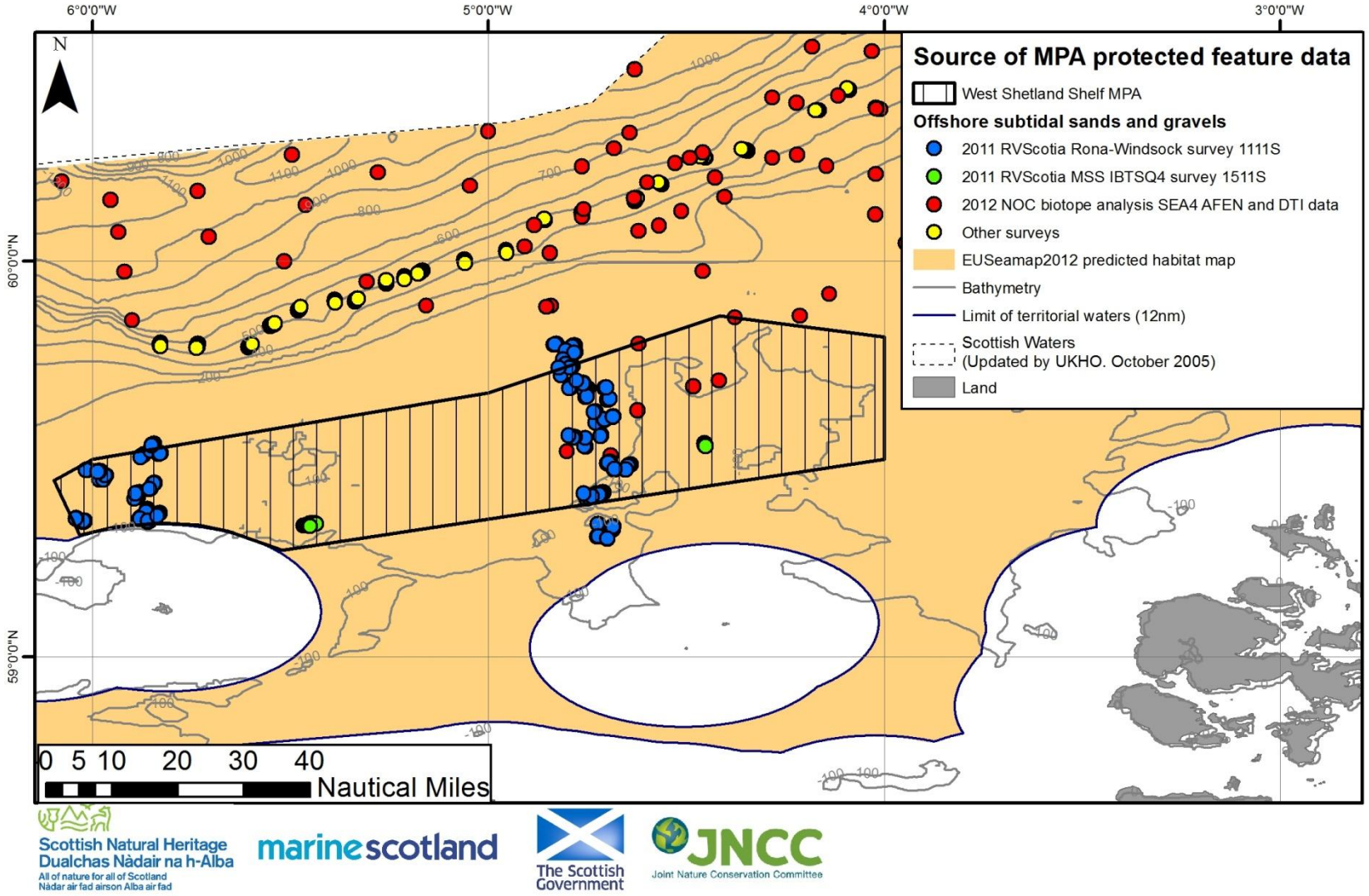

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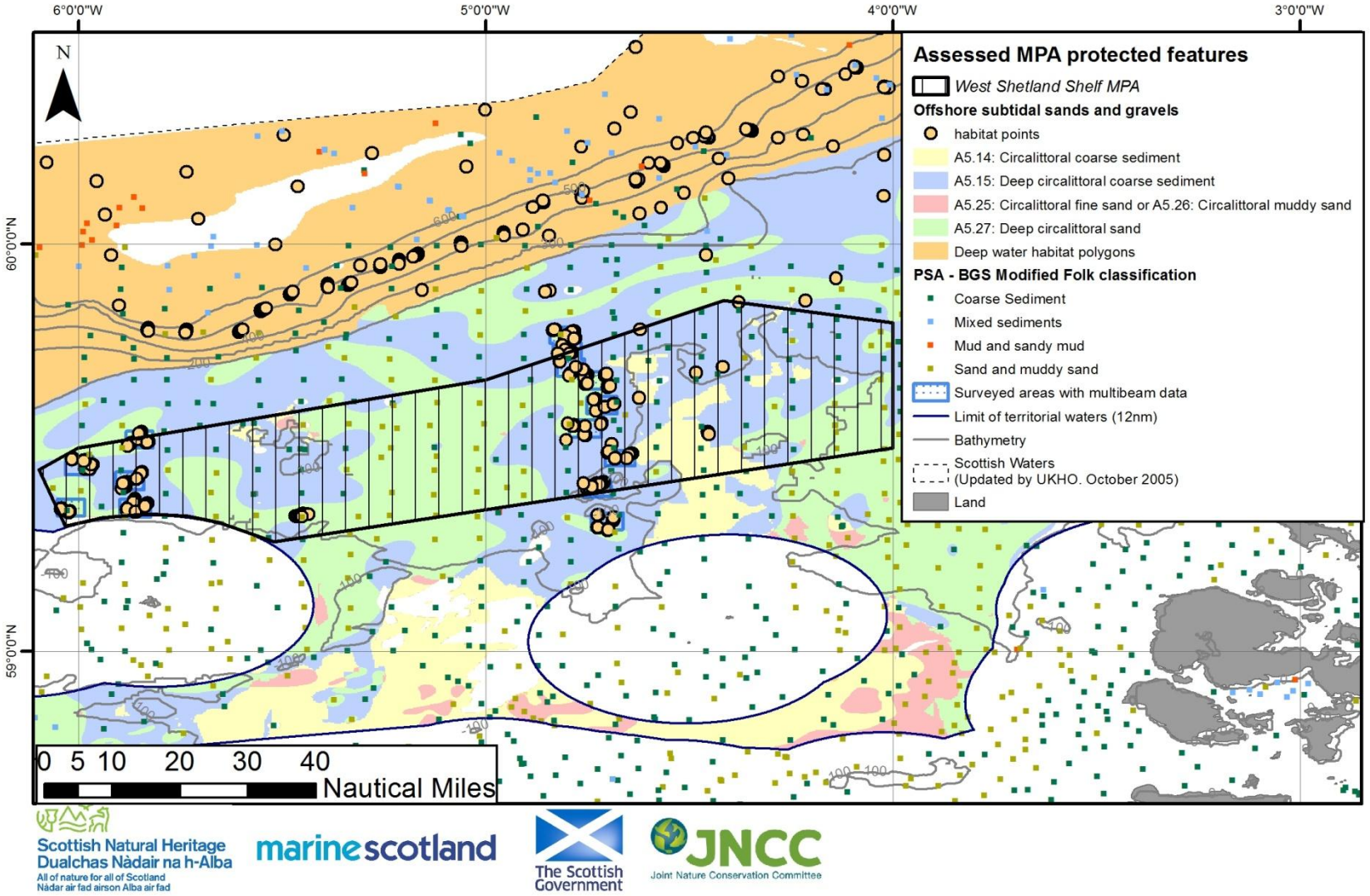

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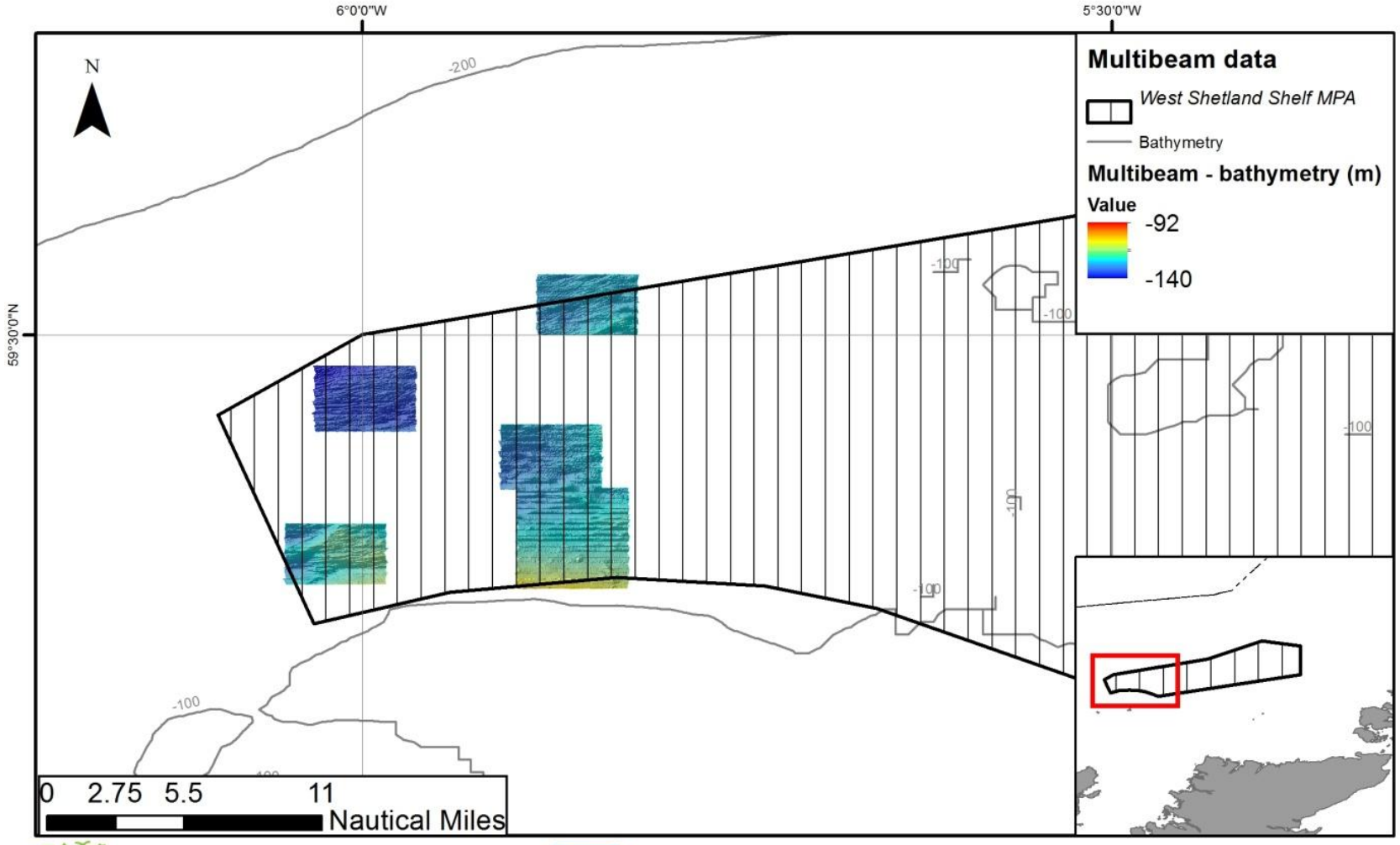

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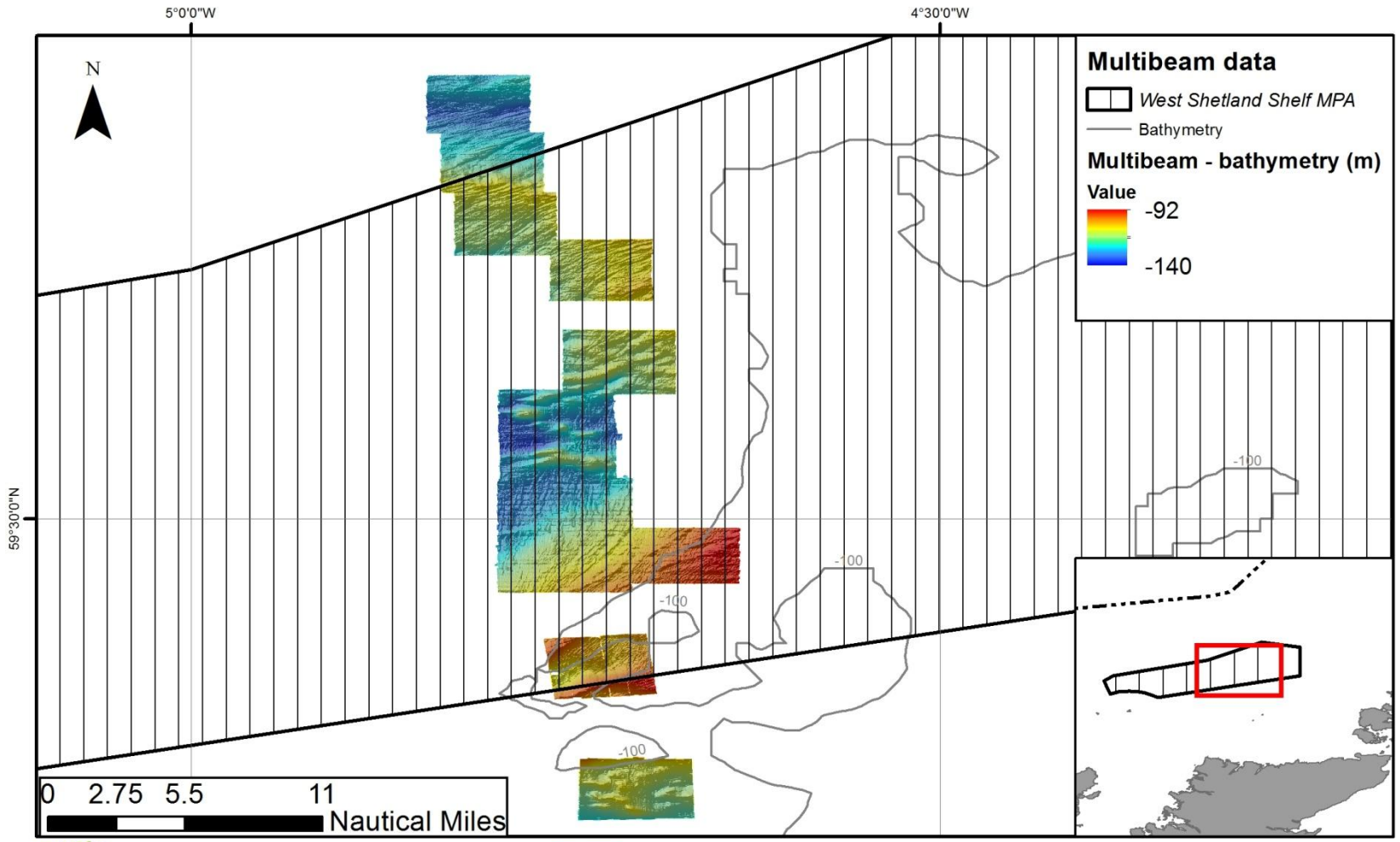

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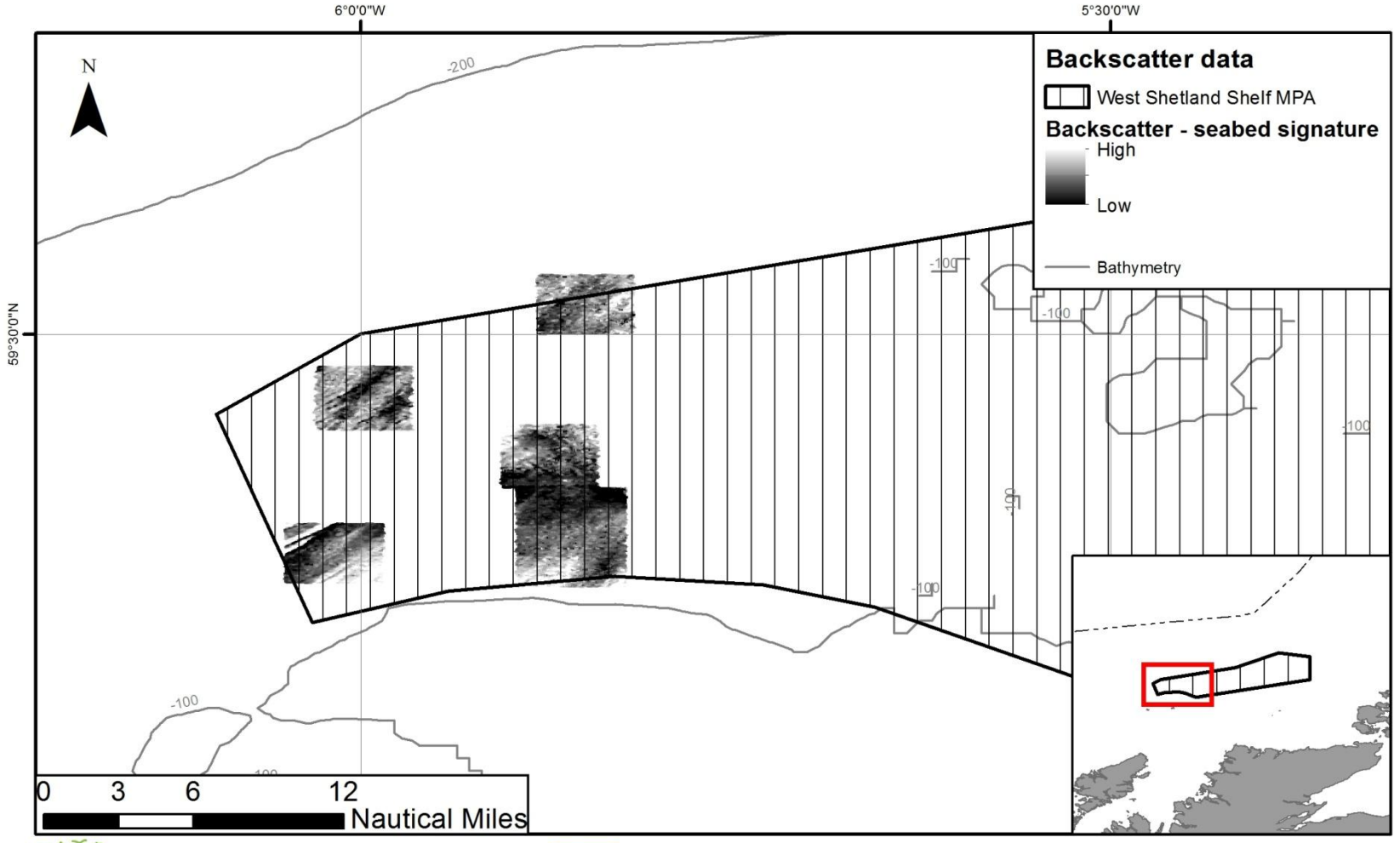

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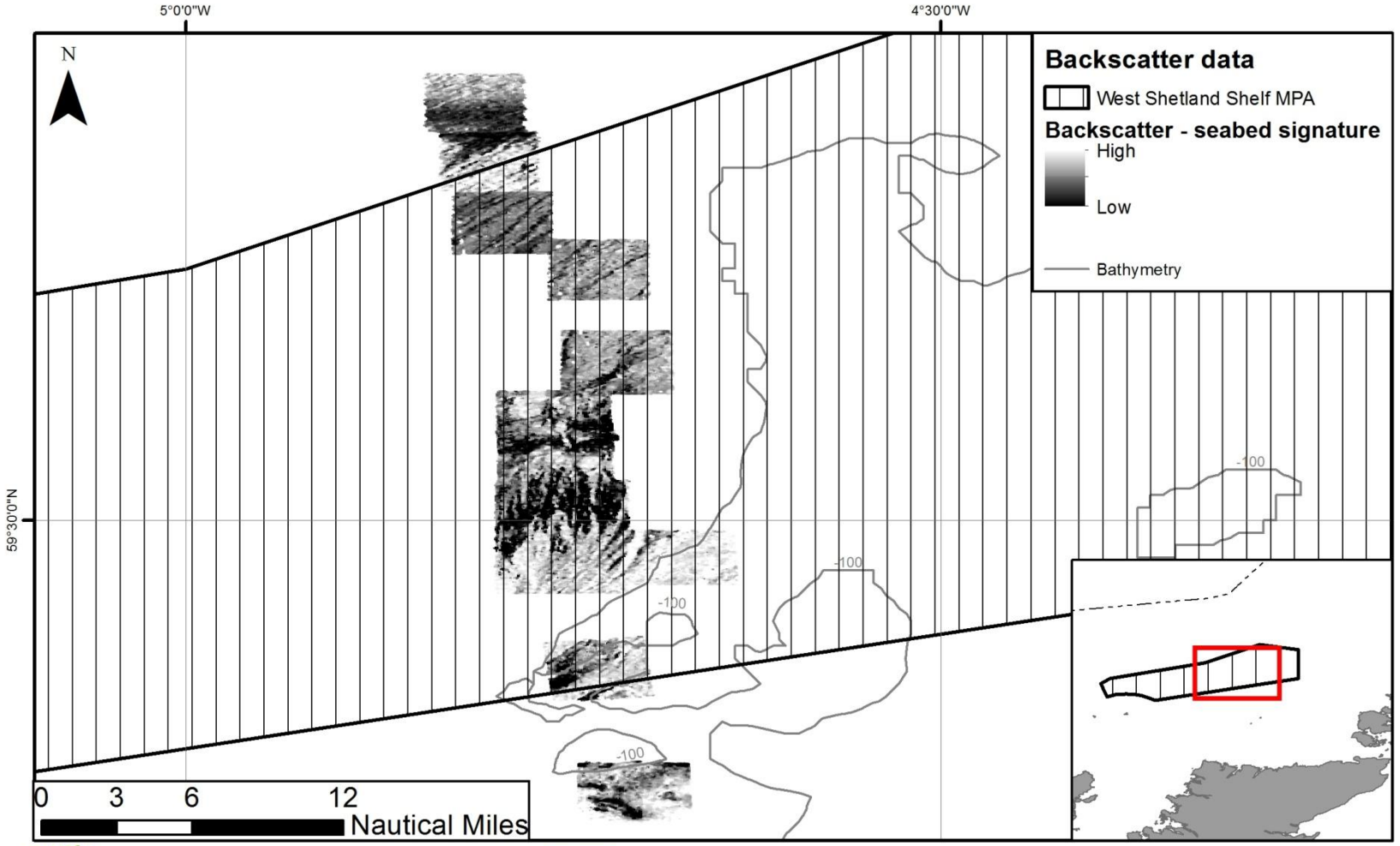

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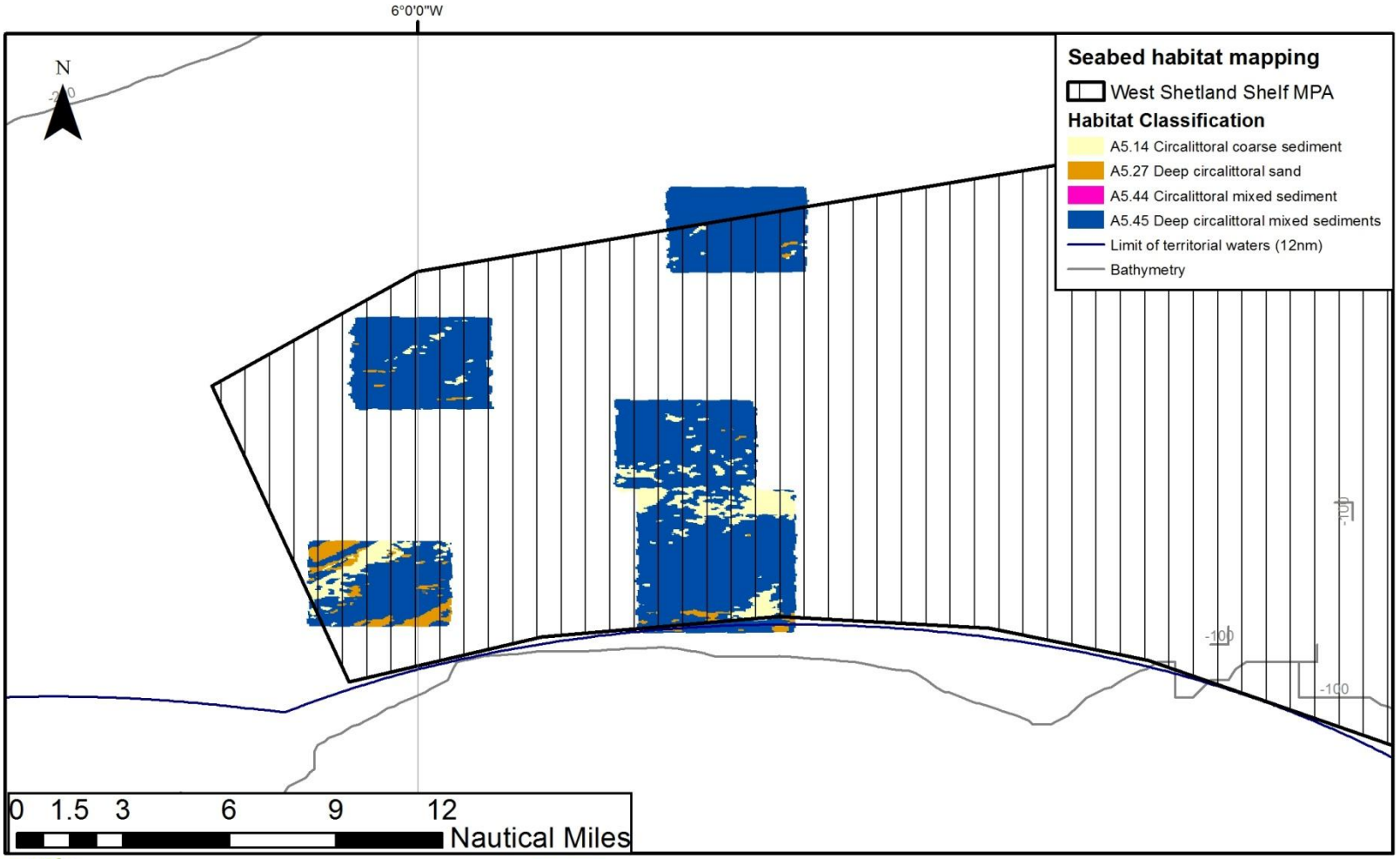

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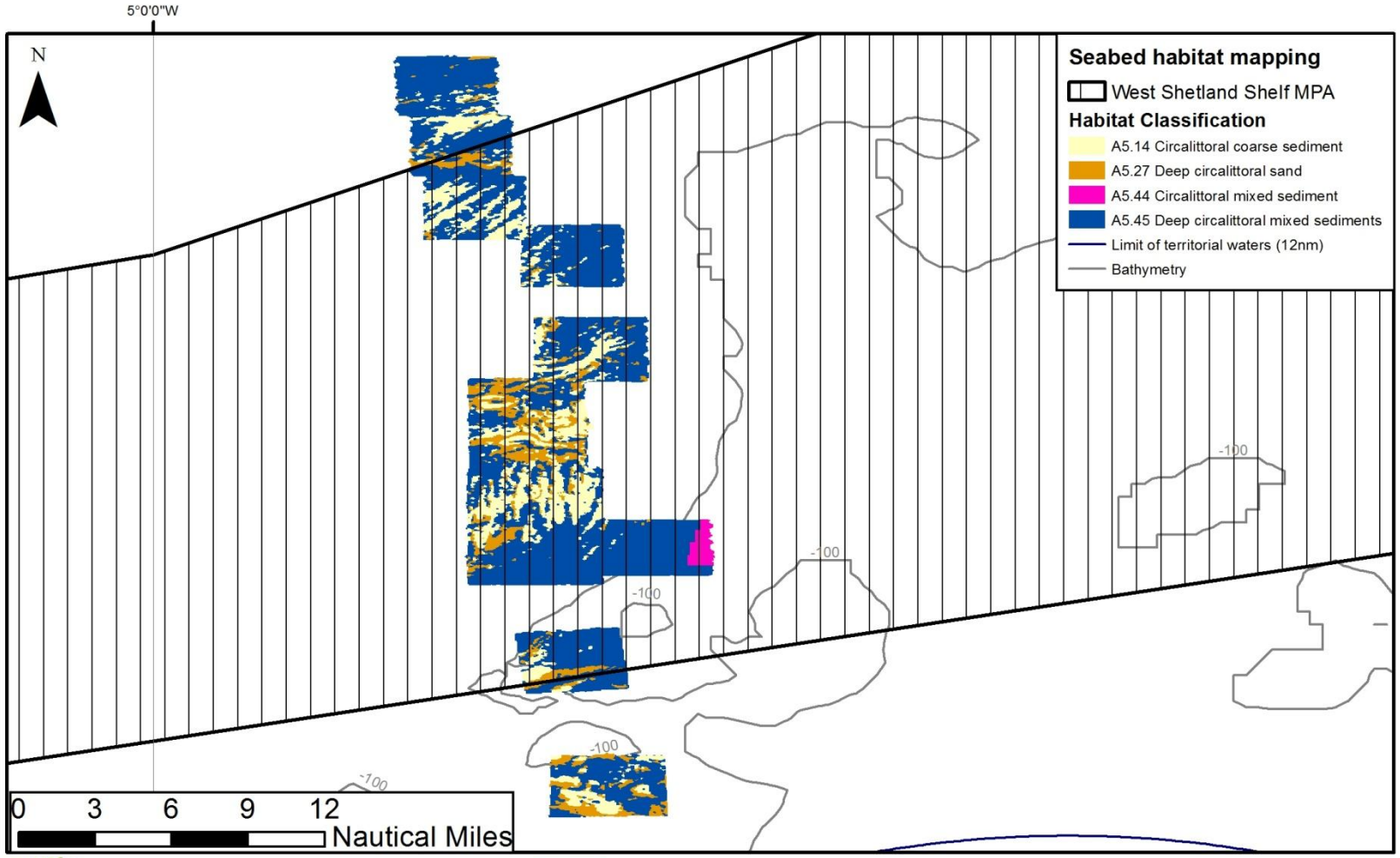

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Data sources and bibliography		
Year	**Title**	**Features covered**
2014	Geodatabase of Marine features in Scotland (GeMS) Version 4	OSSG
2014	Sotheran, I. & Crawford-Avis, O., (2014). Mapping habitats and biotopes to strengthen the information base of Marine Protected Areas in Scottish waters. JNCC Report 503.	OSSG
2014	Axelsson, M., Dewey, S. and Allen, C., (2014). Analysis of seabed imagery from the 2011 survey of the Firth of Forth Banks Complex, the 2011 IBTS Q4 survey and additional deep-water sites from Marine Scotland Science surveys. A report by Seastar Survey Ltd. for the Joint Nature Conservation Committee (2012), JNCC Report 471.	OSSG
2014	Goudge, H. & Morris, L., (2014). Seabed imagery analysis from three Scottish offshore towed video surveys: 2011 MSS BTSQ3 survey, 2011 1111s FRV Scotia Rona-Windsock survey & 2011 MSS Rockall survey. A report for the Joint Nature Conservation Committee (2012), JNCC Report 470.	OSSG
2014	Pearce, B., Grubb, L., Earnshaw, S., Pitts, J., and Goodchild, R., (2014). Biotope Assignment of Grab Samples from Four Surveys Undertaken in 2011 Across Scotland's Seas. A report by Gardline Caledonia Ltd. for the Joint Nature Conservation Committee (2012), JNCC Report 509	OSSG
2012	Bett, B.J. (2012). Seafloor biotope analysis of the deep waters of the SEA4 region of Scotland's seas. JNCC Report No. 472.	OSSG
2012	Marine Scotland Science. (2012). *Marine Protected Areas and sandeels (Ammodytes marinus & A. tobianus). Position paper for 4th MPA Workshop, Heriot-Watt University, 14-15 March 2012*. Available online - <http://www.scotland.gov.uk/Resource/0038/00389460.doc>	Sandeels
2012	British Geological Survey (BGS) Marine Particle Size Analysis (PSA) dataset (February 2012)	OSSG
2011	Cameron, A. and Askew, N. (eds.). (2011). EUSeaMap - Preparatory Action for development and assessment of a European broad-scale seabed habitat map final report. Available at http://jncc.gov.uk/euseamap	OSSG
2011	Cunningham, S., Gillham, K., Chaniotis, P.D., Crawford-Avis, O., Linwood, M. and Payne, O. (2011). *Assessing the contribution of other area-based measures to the ecological coherence of the MPA network in Scotland's seas*. Report produced by Scottish Natural Heritage, the Joint Nature Conservation Committee and Marine Scotland for the Scottish Marine Protected Areas Project. Available from <www.scotland.gov.uk/Resource/Doc/295194/0121831.pdf>	-