



Scottish MPA Project Data Confidence Assessments
TURBOT BANK NATURE CONSERVATION MPA
JULY 2014

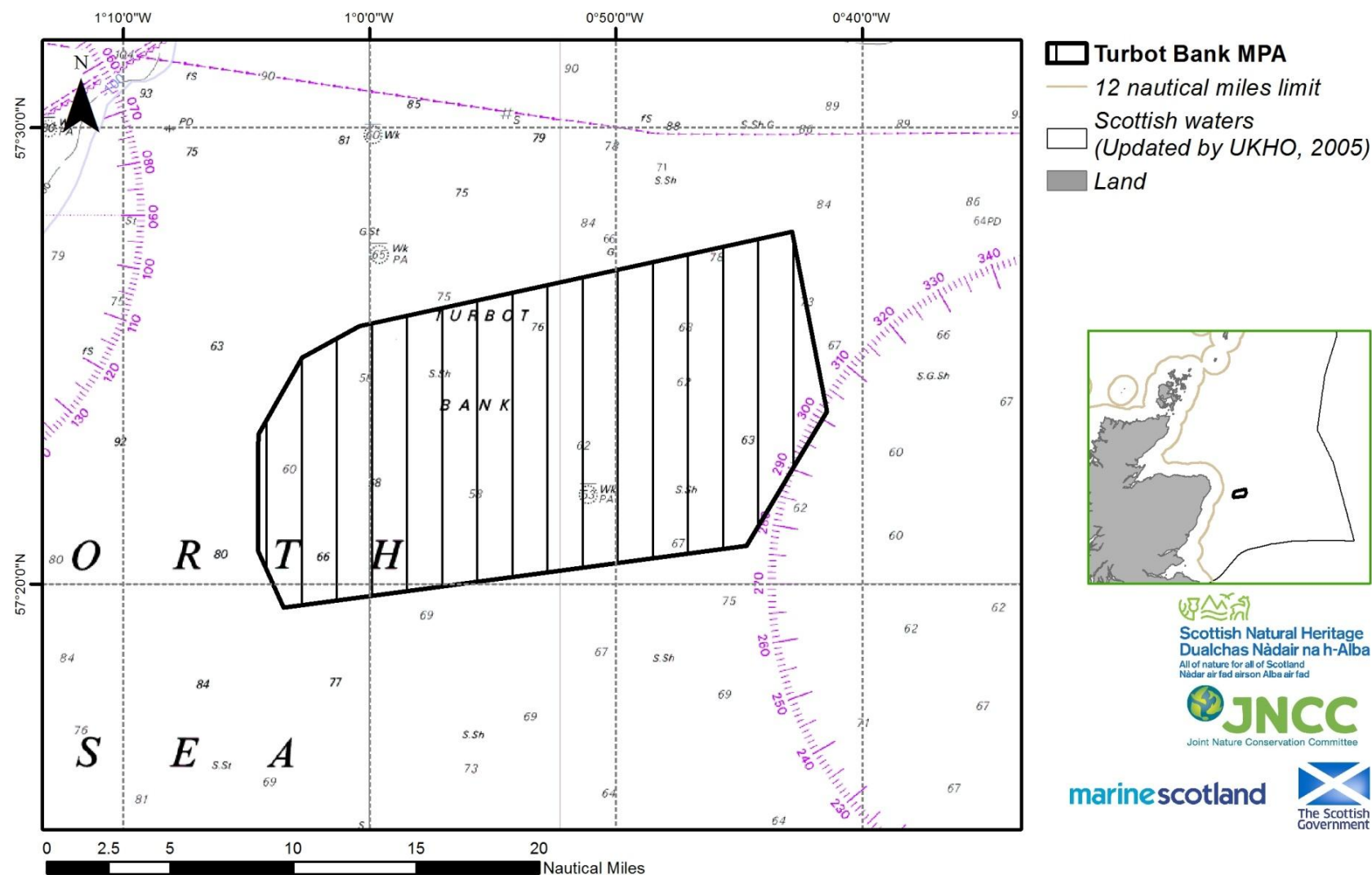
The following documents provide further information about the Turbot Bank Marine Protected Area (MPA):

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

The documents are all available at www.jncc.defra.gov.uk/page-6490

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	18/07/2014	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 Turbot Bank 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

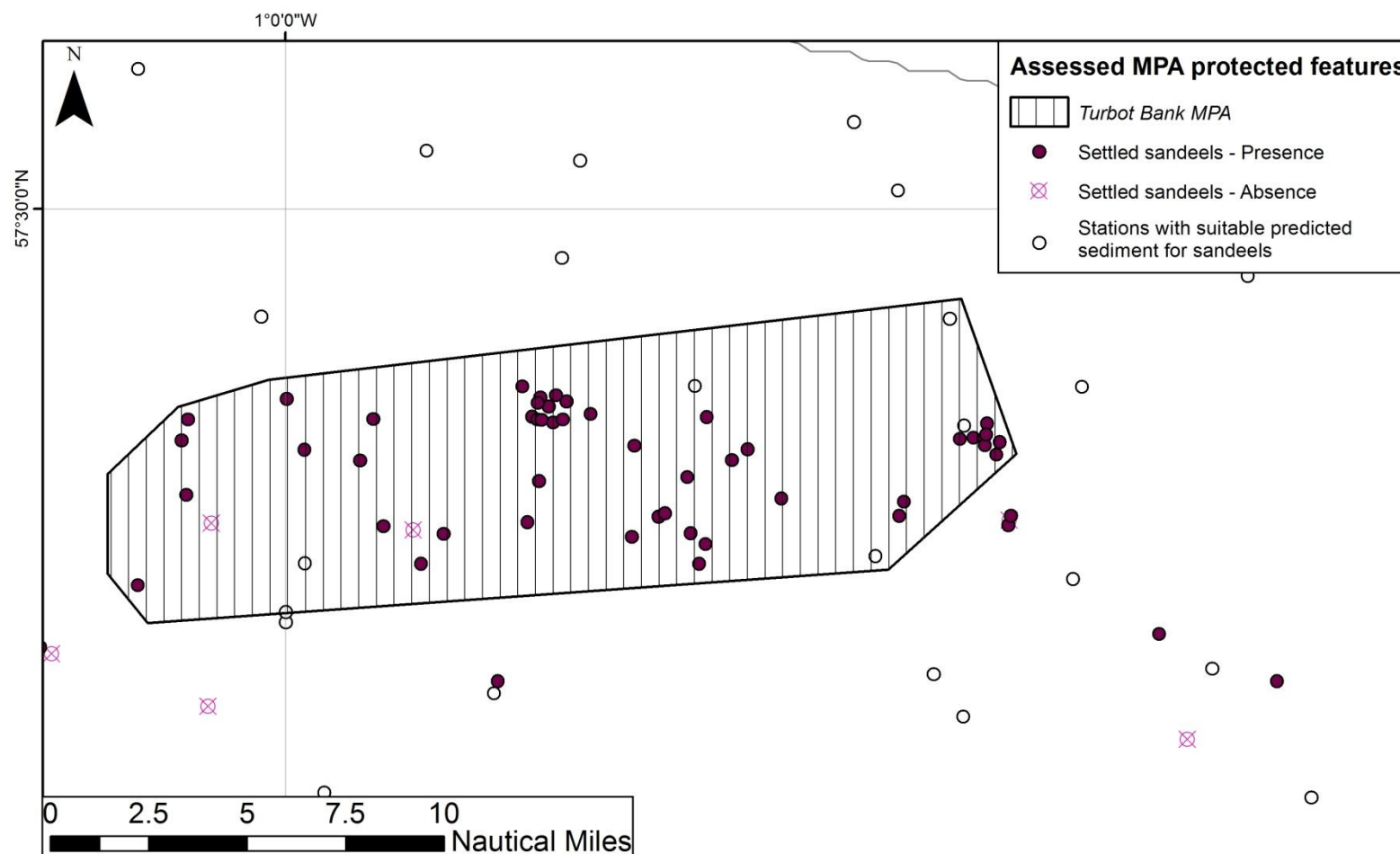
MPA name	Turbot Bank	Date of initial assessment	13 th July 2012	Assessors	ALR, NC, PC, ML, OCA
<p>Following the application of the selection guidelines and discussion with Marine Scotland Science (MSS) regarding sandeel populations (specifically <i>Ammodytes marinus</i> within offshore waters) in the OSPAR Region, JNCC concluded that the Turbot Bank search location should be proposed as an MPA for the protection of sandeels. The boundary has been drawn to encompass Turbot Bank and the known records of relatively high-density adult sandeels in proximity to the bank feature. It also includes those sediments considered appropriate to support the sandeel populations.</p>					

Protected features			
Biodiversity	Sandeels (SE)	Geodiversity	None
Feature exclusions (MPA search features recorded within the MPA but excluded from the assessment with reasons)			
Atlantic influenced shelf offshore subtidal sands and gravels (OSSG) and Shelf banks and mounds (SB) occur within the Turbot Bank MPA boundary. These are not protected within this MPA as JNCC conclude there is adequate protection of these features in other MPAs in the network.			

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]	<ul style="list-style-type: none">¹Sediment suitability data and information (Wright <i>et al.</i>, 2000) (SE)
Data exclusions	Sandeel fishing grounds – Jensen <i>et al.</i> (2011) report the distribution of sandeel fishing grounds in Scotland’s seas. Marine Scotland Science (MSS) advised that it was not appropriate to use this socio-economic information in the context of MPA site selection and so the data were excluded from our assessments.		

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 MPA search features	Yes	Partial	No	
			SE	-	-	
Summary	<p>JNCC are confident sandeel populations are present based on the records from the MSS east-coast dredge surveys from 2008-2011 located mainly in the central and eastern parts of the MPA (in GeMS v4). Of the 29 dredge samples, catch per unit effort (CPUE) values are available for 17 (the remainder recording presence only). These CPUE values reach up to 285 individuals within the boundary of the MPA with a mean value of 98.5. There are nine records from the sediment suitability dataset distributed across the area, of which seven are considered suitable for colonisation by sandeels (Wright et al., 2000)¹. These seven records are located in the south-west and eastern parts of the MPA. Habitat mapping (in GeMS v4) based on semi-automated interpretation of multibeam and backscatter data (Eggleton <i>et al.</i>, 2013) shows that suitable substrates for colonisation by sandeels are distributed over the entire shelf bank. Sandeels were also recovered in grab samples (in GeMS v4) from the 2012 RV Cefas Endeavour survey (CEND19x/12).</p>					

Figure 2 Map of the known distribution of protected features within the Turbot Bank MPA



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
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Age of data (Map A)			
Multiple or majority of records collected post 2000	SE	Multiple records collected pre 2000	(PSA)
Comments	The assessment of the presence of sandeels (<i>Amnodytes spp.</i>) within the MPA used data from fisheries surveys undertaken between 2008 and 2011. The sediment suitability information for sandeel colonisation was derived from the PSA results of British Geological Survey (BGS) sediment samples collected in the area in 1973 and 1980 and analysis by Wright <i>et al.</i> (2000) ¹ . Grab samples from the 2012 RV Cefas Endeavour survey (CEND19x/12) provided further data to confirm the presence of sandeels.		

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) – Sediment suitability information¹	✓
Comments	The data used to verify the presence of sandeels came from MSS east coast sandeel dredge surveys and the 2012 JNCC/Cefas survey. The sediment suitability information came from the analysis by Wright et al. (2000) ¹ . Their analysis draws upon BGS Particle Size Analysis (PSA) results from sediment samples and data from a series of underwater video systems and grab sample techniques. These datasets were entered into a General Additive Model (GAM) to derive information on sediment suitability for colonisation of sandeels across the study area.				

Sampling methods / resolution							
Feature	Modelled	Acoustic / remote sensing	Remote video / camera	Infaunal - grab / core	Fisheries trawl	Diving	Sediment sampling
SE				✓	✓		
Comments	Data for sandeels were recorded by MSS sandeel dredge surveys and grab samples from the 2012 JNCC/Cefas survey. Information on sediments suitable for colonisation of sandeels in this MPA are derived from BGS sediment samples collected using a variety of grab and core sampling methods.						

Data coverage (Maps A to E)					
Across the MPA					
Numerous protected feature records evenly distributed across the MPA?	-	Numerous protected feature records scattered across MPA with some clumping?	SE	Few or isolated protected feature records - possibly clumped?	-
For Individual features					
Multiple records of individual protected features providing indication of extent and distribution throughout the MPA?	SE	Few or scattered records of specific protected features making extent and broad distribution assessment difficult?	-	Few or isolated records of specific protected features	-
Are acoustic remote sensing data available to facilitate the development of a full coverage predictive seabed habitat map?			Yes, partially. UKHO Multibeam/Backscatter data are available for the western part of the MPA, overlapping the shelf bank. Corridors of multibeam/backscatter data were captured across the remaining area (Maps D - multibeam) in 2012. These data have been interpreted to map the habitat types present, based on the extent of acoustic data and the ground-truth sampling (Map E).		
Comments	Sandeels (SE)				
	<ul style="list-style-type: none">Marine Scotland Science east coast sandeel dredge survey data (in GeMSv4) – There are MPA 33 survey records of sandeel abundance from 2008 (2), 2009 (8), 2010 (7) and 2011 (11) and 5 with unspecified date within the MPA. The data points are spread across the area with the majority in the central and eastern parts. The catch per unit effort (CPUE) values range from 0 (i.e. present) to 285 individuals with the mean equal to 98.5 individuals and a standard deviation of 95 (note 2011 data are presence only information). There are a cluster of high values present in the central part of the MPA, whilst in the eastern part the values for the cluster range from 15 to 280 individuals. The 2011 records are spread mainly between the central and eastern part of the MPA.Sediment suitability information (Wright <i>et al.</i>, 2000)¹ - There are 9 records in the sediment suitability dataset distributed across the area, of which 7 were deemed suitable for colonisation of sandeels, located in the south-west and eastern parts of the MPA. Running a similar assessment on the more widespread 2012 PSA results would generate a more comprehensive understanding of the suitability of the sediments at a greater spatial resolution.Habitat mapping based on semi-automated interpretation of multibeam and backscatter data (Eggleton <i>et al.</i>, 2013) (in GeMS v4) shows that suitable substrates for colonisation by sandeels are distributed over the entire shelf bank (Map E).Data on sandeel larvae and models of larval transport indicate that the larvae from Turbot Bank may be widely dispersed throughout Sandeel Area 4 (SA4) (one of the management areas for sandeels proposed by the International Council for the Exploration of the Seas (ICES) representing the north-west of the North Sea) and occasionally outside this area (Proctor <i>et al.</i>, 1998; Chistensen <i>et al.</i>, 2008). Therefore, sandeels from within the MPA may be important for supplying other sandeel grounds over a wider geographical area (Marine Scotland Science, 2012).2012 Braemar/Scanner/Turbot Bank RV Cefas Endeavour survey (CEND19x/12) (Eggleton <i>et al.</i>, 2013) (in GeMSv4) – <i>Ammodytes sp.</i> was identified at 14 of the 70 stations sampled by Hamon grab. Note that the number of individuals would most likely only be a small proportion of <i>Ammodytes</i> present in the sediment at the time of sampling, since this sampling equipment is not designed to accurately sample the fish.				

Data coverage (Maps A to E)	
	<ul style="list-style-type: none">Sandeels have been reported to aggregate in dense schools at the edge of banks, which may represent areas of preferred feeding (Van der Kooij <i>et al.</i>, 2008).

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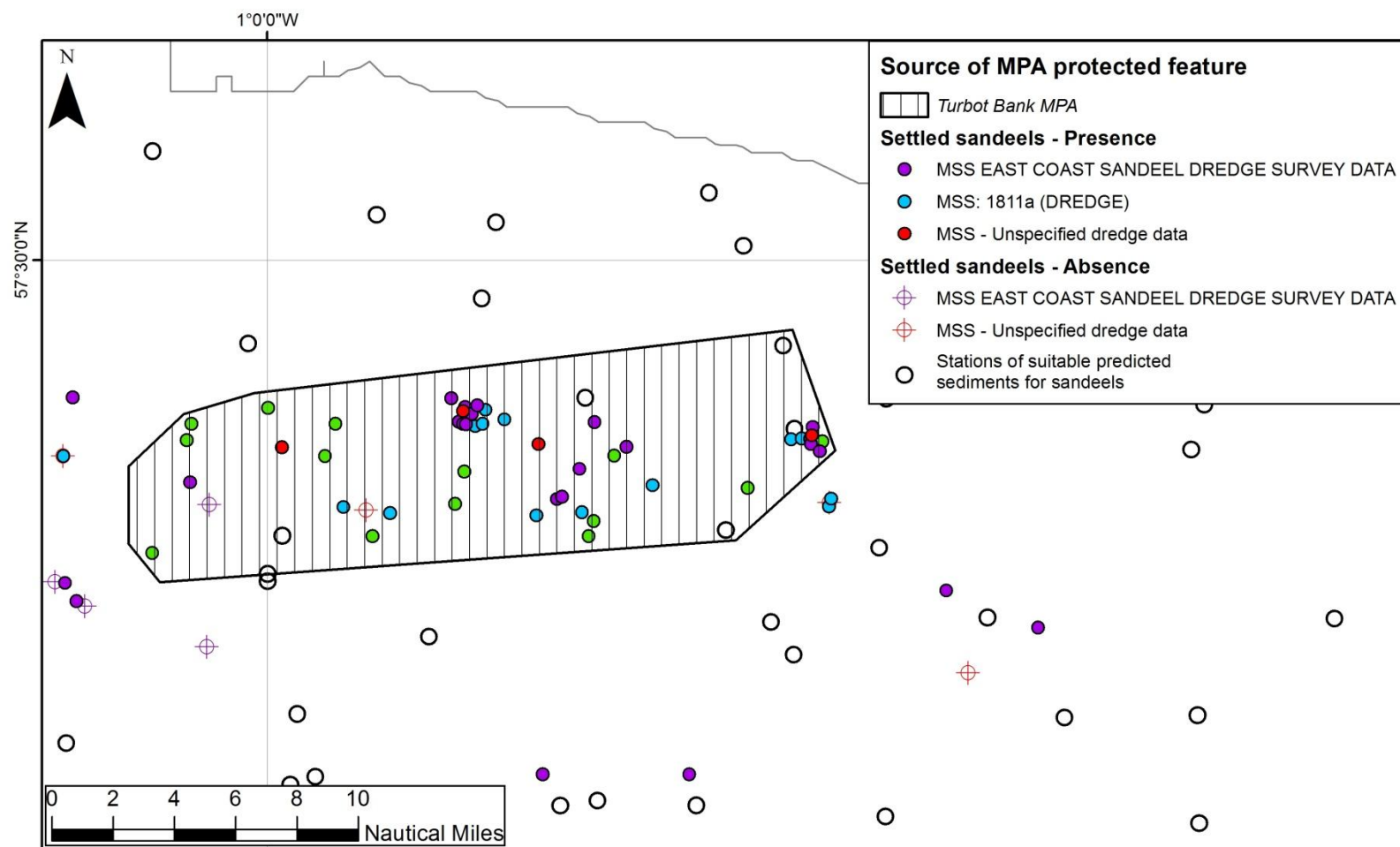
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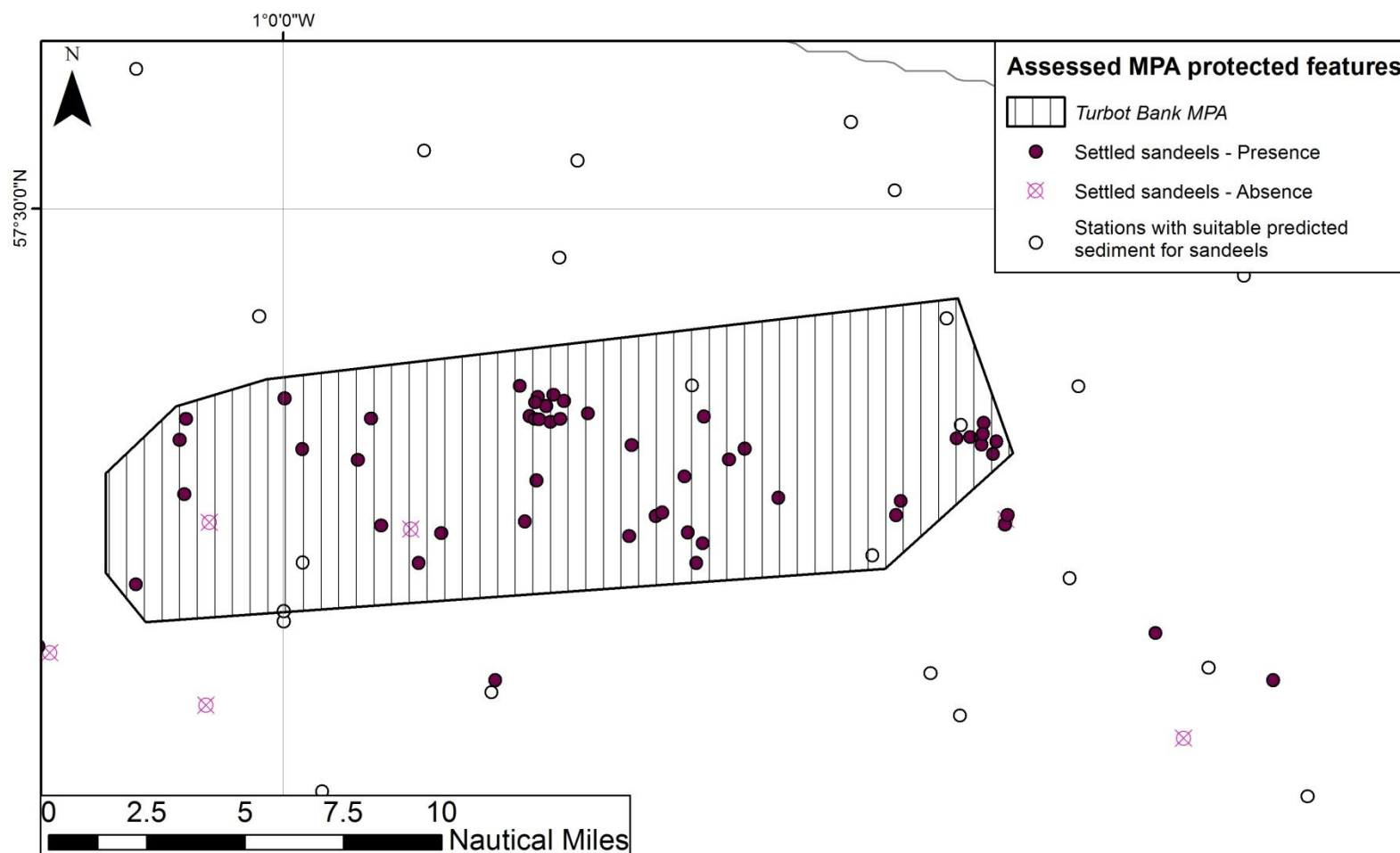

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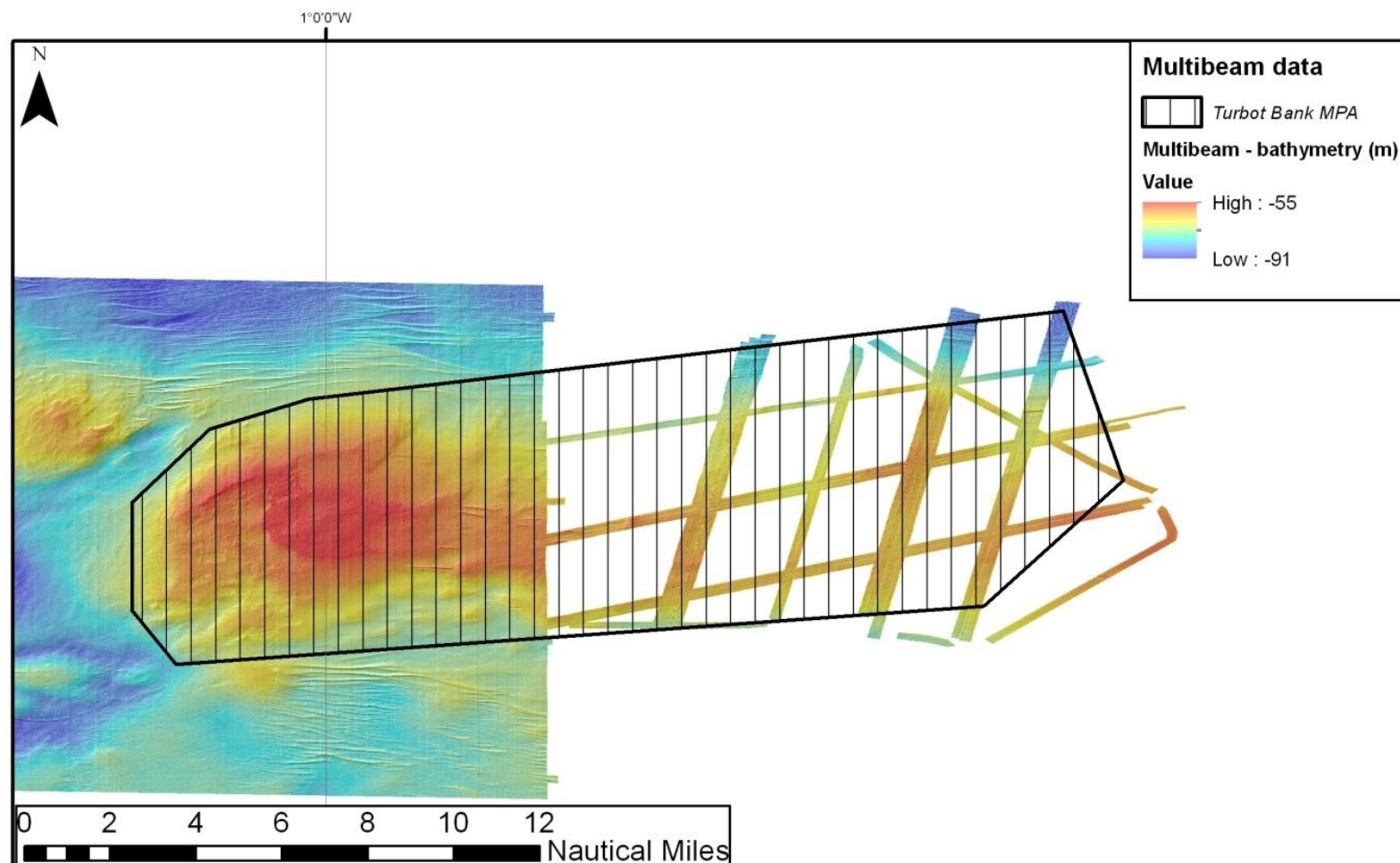
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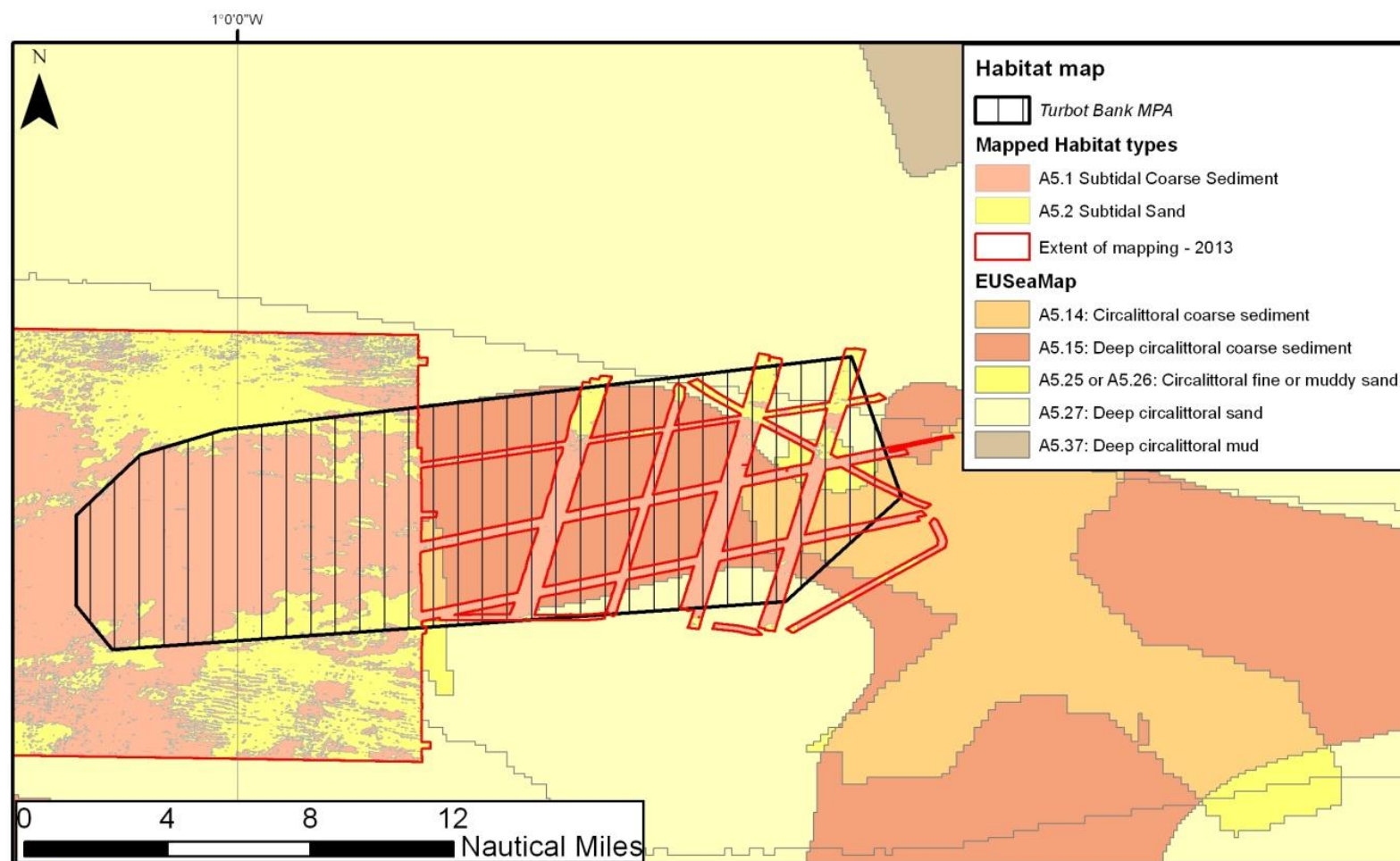
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E

Data sources and bibliography		
Year	Title	Features covered
2014	Geodatabase of Marine features in Scotland (GeMS) Version 4	SE
2013	Eggleton, J., Diesing, M. & Schinaia, S., 2013. Offshore seabed survey of Turbot Bank possible MPA, CEFAS Report C5817	SE and SE habitat
2012	Marine Scotland Science. (2012) <i>Marine Protected Areas and sandeels</i> (<i>Ammodytes marinus</i> & <i>A. tobianus</i>). <i>Position paper for 4th MPA Workshop, Heriot-Watt University, 14-15 March 2012</i> . Available online - http://www.scotland.gov.uk/Resource/0038/00389460.doc	SE
2011	Jensen, H., Rindorf, A., Wright, P.J. and Mosegaard, H., (2011). Inferring the location and scale of mixing between habitat areas of lesser sandeel through information from the fishery. <i>ICES Journal of Marine Science</i> 68 : 43-51.	SE
2008	Christensen, A., Jensen, H., Mosegaard, H., John, M.S. and Schrum, C., (2008). Sandeel (<i>Ammodytes marinus</i>) larval transport patterns in the North Sea from an individual-based hydrodynamic egg and larval model. <i>Canadian Journal of Fisheries and Aquatic Sciences</i> 65 (7): 1498-1511.	SE
2008	Van der Kooij, J. Scott, B.E., Mackinson, S. (2008). The effects of environmental factors on daytime sandeel distribution and abundance on the Dogger Bank. <i>Journal of Sea Research</i> (60): 201-209	SE
2000	Wright, P.J., Jensen, H. and Tuck, I., (2000). The influence of sediment type on the distribution of the lesser sandeel, <i>Ammodytes marinus</i> . <i>Journal of Sea Research</i> 44 (3-4): 243-256.	SE
1998	Proctor, R., Wright, P.J. and Everitt, A., (1998). Modelling the transport of larval sandeels on the north-west European shelf. <i>Fisheries Oceanography</i> 7 (3-4): 347-354.	SE