Joint Nature Conservation Committee

Scottish MPA Project
Assessment against the MPA Selection Guidelines

NORTH-WEST ORKNEY NATURE CONSERVATION MPA

JULY 2014

The following documents provide further information about the North-west Orkney Marine Protected Area (MPA):

- Site Summary Document
- Data Confidence Assessment
- Management Options Paper

The documents are all available at www.jncc.defra.gov.uk/page-6484

Document Distribution List and Version Control				
Format	**Version**	**Issue date**	**Version development and review**	**Issued to**
Electronic	1.0	10/07/2012	Internal drafting and review of pre-version 1.0 drafts by JNCC SMPA team prior to release to Marine Scotland Science for technical review.	Marine Scotland Science
Electronic	2.0	16/04/2013	Action of comments from Marine Scotland Science and Grade 7 staff prior to release to MPA Sub-Group.	MPA Sub Group
Electronic	3.0	30/05/2013	Review of document to take into account MPA Sub-Group comments, editorial review and Grade 7 review prior to release to MPA Sub Group for sign-off.	MPA Sub Group
Electronic	4.0	17/07/2013	Review of document to take into account MPA Sub-Group comments and release of document for public consultation.	Uploaded to JNCC website
Electronic	5.0	07/07/2014	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 uploaded to JNCC website

Background

This document provides details of JNCC's assessment of the North-west Orkney Nature Conservation MPA (herein referred to as 'MPA') against the Scottish MPA Selection Guidelines. It presents an assessment for each of the protected features. We have used the terminology set out in the Selection Guidelines to describe the five main stages in the assessment process from the identification of MPA search locations through to an MPA.

The main terms used are described below.

MPA search feature - specified marine habitats, species and large-scale features which underpin the selection of Nature Conservation MPAs.

Geodiversity features - specified geodiversity interests of the Scottish seabed categorised under themed 'blocks' that are analogous to the MPA search features for biodiversity.

Protected feature - any feature (habitats, species, large-scale features and/or geodiversity features) which are specified in the MPA Designation Order.

MPA search location - this describes a location identified at stage 1 [of the Selection Guidelines] until it passes the assessment against stage 4.

Potential area for an MPA - if an MPA search location passes assessment against stage 4 it goes on to be considered at stage 5 as a potential area for an MPA.

Nature Conservation MPA – a location that has been approved by Ministers for designation.

Details of evidence supporting the designation of the North-west Orkney MPA are provided in the Data Confidence Assessment document.

NORTH-WEST ORKNEY MPA - APPLICATION OF THE MPA SELECTION GUIDELINES

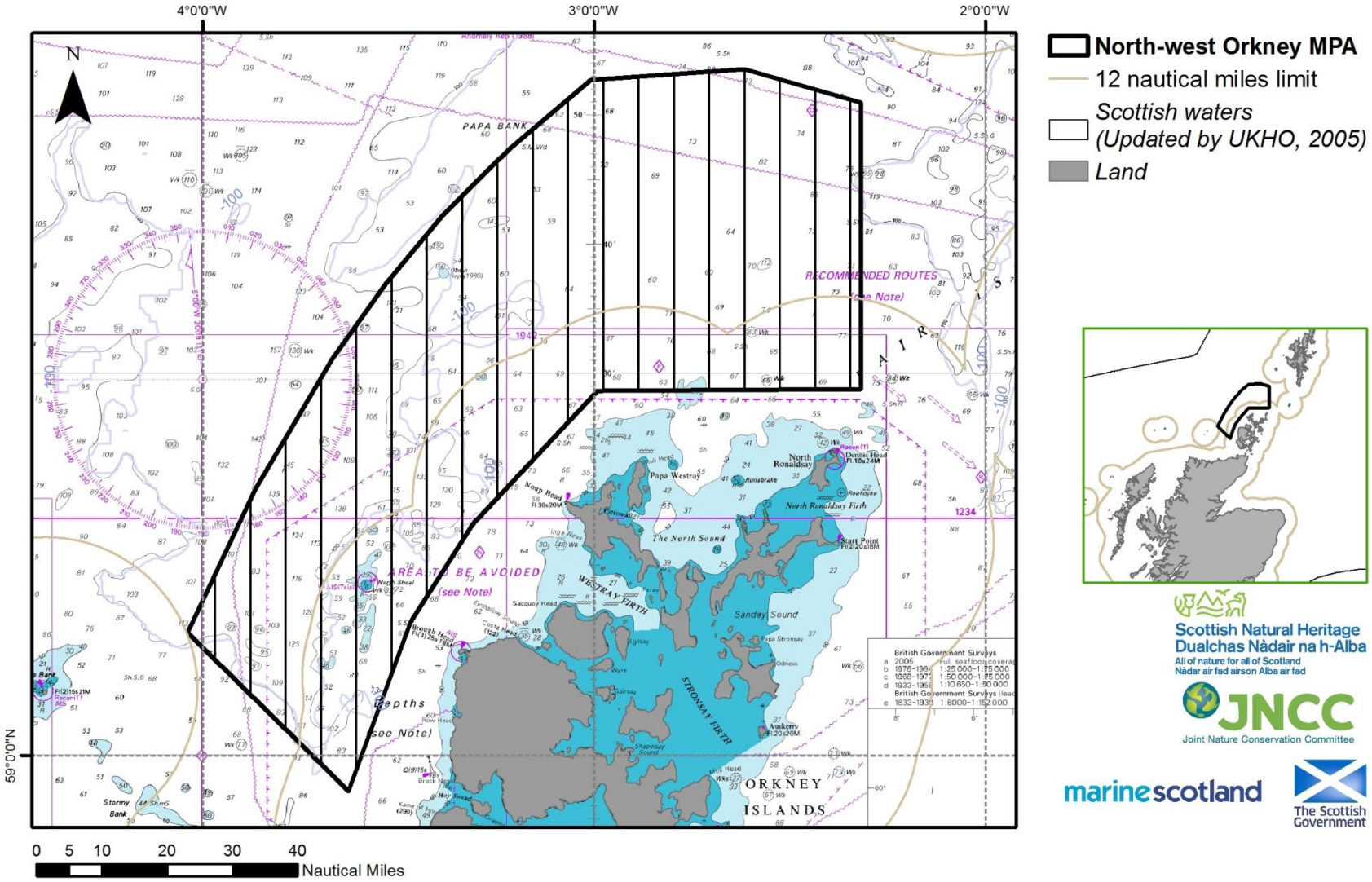
Stage 1 - Identifying search locations that would address any significant gaps in the conservation of MPA search features

Summary of assessment	**The MPA is being considered for four protected features – sandeels (specifically *Ammodytes marinus* within offshore waters) from the North-west Orkney area, and three geodiversity features: sediment wave fields, sand banks and sand wave fields. The geodiversity features are representative of the Fair Isles Strait Marine Process Bedforms Key Geodiversity Area (Brooks *et al.,* 2013). The MPA is thought to be an important source of sandeel larvae (Wright & Bailey, 1996), which are exported by ocean currents to sandeel grounds around Shetland and south to the Moray Firth (Proctor *et al.,* 1998). The geodiversity features representative of the Fair Isle Strait Marine Process Bedforms Key Geodiversity Area are regarded as scientifically important for the study of marine shelf processes and the relationship between currents, bed sediments and bed forms (Brooks *et al.,* 2013).**

Detailed assessment			
Protected features	**Guideline 1a** *Presence of key features* [MPA search features and geodiversity equivalents]	**Guideline 1b** *Presence of features under threat and/or subject to rapid decline*	**Guideline 1c** *Functional significance for the overall health and diversity of Scottish seas*
Biodiversity			
Sandeel spawning area	✓	**✓T&D**[1]	**✓ larval source**
Geodiversity			
Sediment wave fields, sand banks, sand wave fields (Marine Geomorphology of the Scottish Shelf Seabed Block)	✓		

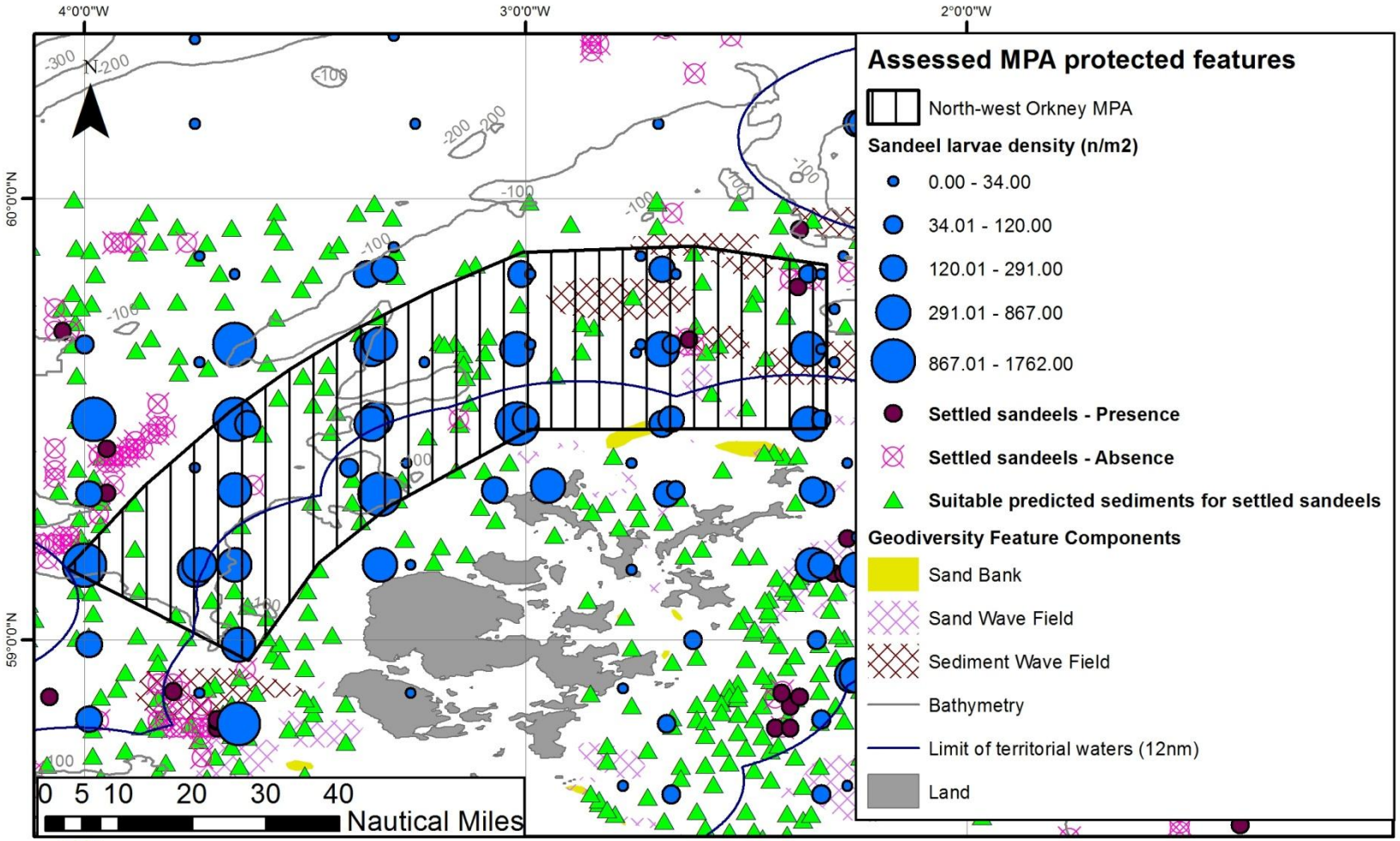
[1] The 2012 report of the Working Group on the assessment of Demersal stocks in the North Sea and Skagerrak suggest that sandeel abundance in Sandeel Areas 5 and 7 shows some evidence of decline (ICES, 2012).

Map showing the location of the North-west Orkney 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

Map of the North-west Orkney MPA showing the known distribution of protected features



Scottish Natural Heritage
Dualchas Nàdair na h-Alba
All of nature for all of Scotland
Nàdar air fad airson Alba air fad

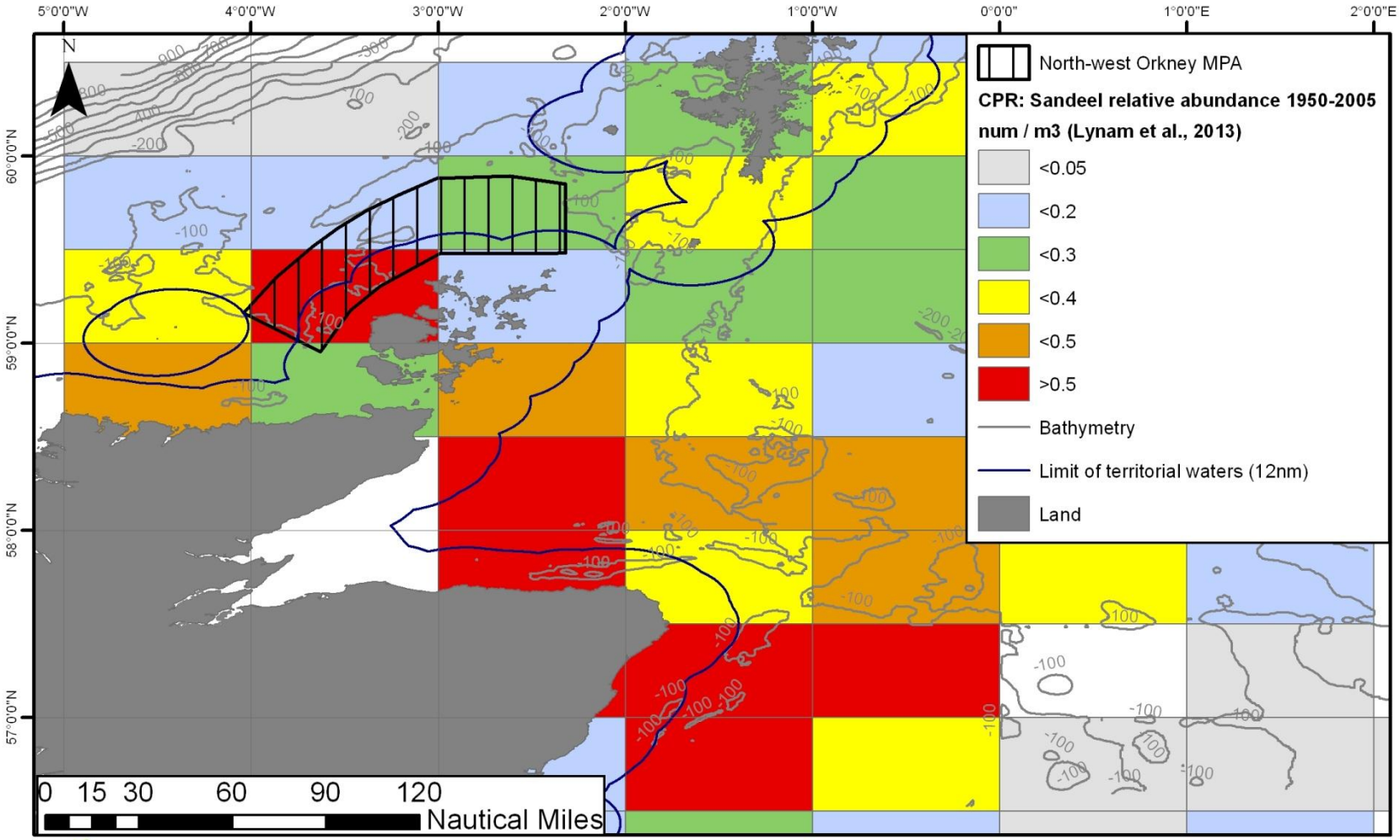
marinescotland

The Scottish Government

JNCC
Joint Nature Conservation Committee

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 and geodiversity data © JNCC and SNH 2014.

Map of the North-west Orkney MPA showing the relative sandeel larval abundance information from Continuous Plankton Recorder samples 1950 – 2005 presented in Lynam *et al.* (2013)



Scottish Natural Heritage
Dualchas Nàdair na h-Alba
All of nature for all of Scotland
Nàdar air fad airson Alba air fad

marinescotland

The Scottish Government

JNCC
Joint Nature Conservation Committee

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. MPA boundary © JNCC and SNH 2014. Sandeel relative abunace data proceesed from data provided by C.Lynam, Cefas, 2014.

Stage 2 - Prioritisation of search locations according to the qualities of the MPA search features they contain

Summary of assessment	For biodiversity, the North-west Orkney MPA is designated for one protected feature – sandeels. The seabed sediments present are suitable for colonisation of sandeels (Wright *et al.,* 2000). The presence of adult sandeels in the North-west Orkney MPA is supported by the presence of the high density of newly emerged (1 – 10 day old) sandeel larvae across the MPA area (Wright & Bailey, 1996; Proctor *et al.,* 1998). The mixed ground type (areas of rough substrate within the areas of sediment suitable for sandeel colonisation) makes it unsuitable for demersal trawling. The high density of emergent larvae and simulations of larval transport indicate this spawning area is an important source of larvae that populate sandeel grounds around Shetland and south to the Moray Firth (Proctor *et al.,* 1998). The persistence of sandeels spawning in the area is evident from larval surveys ranging from 1950 (Langham, 1971; Proctor *et al*., 1998), through to 2005 (Lynam *et al.,* 2013). The patchiness of emergent sandeel larvae may be considered natural in the MPA owing to the patchiness of the sediments suitable for sandeel colonisation. Although there have been attempts to fish for sandeels within the MPA boundary, there has never been a persistent commercial fishery targeting sandeels because there are not sufficiently large areas of ground suitable for the light, fine, mesh gear typically used to capture sandeels (Wright *et al.,* 2000). In addition, the MPA overlaps with Sandeel Areas 5 and 7 management units, for which a zero Total Allowable Catch (TAC) has been set and so no targeted sandeel fishery can currently take place in the MPA. As such, sandeels are considered to have been relatively undisturbed in the MPA and there are no records of other types of activity being undertaken in the area that could adversely affect sandeel populations. Nevertheless, sandeels are considered to be at high risk of damage by human activity in the MPA Region[2]. Sediment wave fields, sand wave fields and sand banks are protected features within the MPA to represent the Fair Isles Strait Marine Process Bedforms Key Geodiversity Area (Brooks *et al.,* 2013). Shelf tidal bedform features such as these are active, and are maintained under a specific range of tidal current conditions. As such, even if the features were physically damaged by the present-day activities taking place within the MPA, they are likely to be able to recover relatively quickly (Brooks, 2013). It is not thought that there are any activities taking place within or in proximity to the MPA that may alter tidal current conditions. Consequently, it is considered that the geodiversity protected features are unlikely to have been significantly modified by human activity. Sediment wave fields, sand wave fields and sand banks are at low risk of damage by human activity across Scotland's seas. **JNCC conclude that all relevant parts of the stage 2 guideline are met for the protected features.**

Detailed assessment

Guideline 2a **The search location contains combinations of features, rather than single isolated features, especially if those features are functionally linked**

The only protected biodiversity feature is sandeels, but the seabed sediments present are considered suitable for sandeel colonisation and harbour the eggs from which relatively high densities of sandeel larvae emerge (Wright *et al.,* 2000). The MPA encompasses highly productive sandeel spawning grounds based on the densities of newly emergent sandeel larvae recorded (Wright & Bailey 1996), which are an important source of recruits for export to adult populations in grounds around Shetland and south of the Moray Firth (Proctor *et al.,* 1998).

[2] North (Offshore) MPA Region as described in the Scottish MPA Selection Guidelines

Guideline 2b	**The search location contains example(s) of features with a high natural biological diversity (for habitats only)**
N.A – The guideline is applicable to habitats only.	
Guideline 2c	**The search location contains coherent examples of features, rather than smaller, potentially more fragmented ones**
Sandeels	The MPA encompasses a highly productive sandeel spawning ground based on the densities of newly emergent sandeel larvae recorded (Wright & Bailey 1996), which are an important source of recruits for export to adult populations in grounds around Shetland and south of the Moray Firth (Proctor *et al.,* 1998). The persistence of this aggregation is evident from larval surveys since 1950 (Langham, 1971; Proctor *et al.,* 1998) including in the CPR records through to 2005 (Lynam *et al.,* 2013). Sandeels present are therefore considered to persist over time and this is an important area for sandeel larval export. Overall, we consider the sandeel presence in this MPA comprises a coherent example of the feature.

Guideline 2d	**The search location contains features considered least damaged / more natural, rather than those heavily modified by human activity**[3]
Sandeels	Although there have been attempts to fish for sandeels in the MPA boundary, there has never been a persistent commercial fishery targeting sandeels because there are not sufficiently large areas of ground suitable for the light fine mesh gear typically used to capture sandeels (Wright *et al.,* 2000). In addition, the MPA overlaps with Sandeel Areas 5 and 7 management units, for which a zero Total Allowable Catch (TAC) has been set and so no targeted sandeel fishery can currently take place in the MPA. As such, sandeels are considered to have been relatively undisturbed in the MPA and there are no records of other types of activity being undertaken in the area that could adversely affect sandeel populations.
Sediment wave fields, sand wave fields and sand banks	There is no information on the condition of the geodiversity protected features representative of the Fair Isle Strait Marine Process Bedforms Key Geodiversity Area within the MPA. Consequently, the likely condition of the features has been inferred from information on exposure to activities associated with pressures to which the geodiversity protected features may be sensitive (Brooks, 2013). Rasterised Vessel Monitoring System (VMS) data from fishing vessels from 2006-2009, VMS point data from 2009-2011, and good anecdotal evidence of an under 15 m (i.e. non-VMS) creel fishery from the local Orkney based-fleet operating in the area, indicate that the majority of the extent of sediment wave fields and sand banks, and half the extent of sand wave fields in the MPA boundary are exposed to activities (otter trawling and to a lesser extent demersal seine netting) to which the geodiversity protected features have a low sensitivity. Sediment and sand wave fields and sand banks are formed and maintained by the action tidal currents (Belderson *et al.,* 1982). As long as current patterns and flow rates are maintained, these features are likely to be maintained, or re-formed, over time even if subject to physical disturbance (Brooks, 2013). There is no evidence to suggest that there will be a change in tidal current patterns or flow rates within the MPA and so we consider these features unlikely to have been significantly modified by human activity.

[3] The least damaged/more natural stage 2d assessment considers protected feature exposure to activities associated with pressures to which the features are sensitive. This is distinct from the work outlined in Chaniotis *et al.* (2011), which mapped available activities data at the scale of Scotland's seas to identify broad areas of low/no activity from which to identify MPA search locations in the initial phase of the MPA selection process. Unlike the stage 2d assessment, Chaniotis *et al.* (2011) did not consider the sensitivity of features to pressures.

Guideline 2e	The search location contains features considered to be at risk[4] of significant damage by human activity
Sandeels	The protected feature is considered to be at high risk of significant damage in the MPA Region (Chaniotis *et al.,* 2014). This risk is primarily driven by pressures associated with otter trawling (using specialised mesh) that is used to target sandeels.
Sediment and sand wave fields, sand banks	Sediment wave fields, sand wave fields and sand banks are considered to be at low risk of significant damage across Scotland's seas. Any potential risks would be primarily those associated with otter trawling and demersal seine netting.

Stage 3 - Assessment of the appropriate scale of the search location in relation to the search features it contains

Summary of assessment	**The MPA boundary was provided by Marine Scotland Science (Marine Scotland Science, 2012) and then refined to reflect the greatest density of newly emergent sandeel larvae and the geodiversity features representative of the Fair Isle Strait Marine Process Bedforms Key Geodiversity Area (Brooks *et al.,* 2013).**

Detailed assessment	
The size of the search location should be adapted where necessary to ensure it is suitable for maintaining the integrity of the features for which the MPA is being considered. Account should also be taken where relevant of the need for effective management of relevant activities	
Sandeels	The boundary of the MPA has been drawn to focus on the greatest density of newly emergent sandeel larvae following consideration of newly hatched larvae (Wright and Bailey (1996) and MSS unpublished data), predicted larval dispersal (Proctor *et al,.* 1998), and suitable sediment using BGS data (Wright *et al.,* 2000).
Sediment and sand wave fields, and sand banks	Geodiversity features have not been used to define the shape of the MPA, but the MPA sits partially within the Fair Isle Strait Marine Process Bedforms Key Geodiversity Area and includes sediment wave fields, sand banks and sand wave fields representative of this Key Geodiversity Area (Brooks *et al.,* 2013).

[4] Information on the sensitivity of the biodiversity protected features to pressures and their associated activities was taken from Marine Scotland (2013). The degree to which a feature is exposed to activities associated with those pressures to which it is sensitive in each MPA Region (as described in the Scottish MPA Selection Guidelines) was assessed to provide a qualitative measure of risk. Risk assessments for the various activities were examined to produce an overall qualitative risk assessment by MPA Region. The conclusions do not reflect the level of risk at the scale of the MPA. The sensitivity of the geodiversity protected features to pressures and their associated activities was taken from Brooks (2013) and an assessment of risk was undertaken at the national level.

Stage 4 - Assessing the potential effectiveness of managing features within a search location as part of a Nature Conservation MPA

Summary of assessment	**Mechanisms exist through the European Commission under the Common Fisheries Policy to support the introduction of spatial/temporal fisheries management measures to conserve the protected features within the MPA if this is deemed necessary in the future. For licensed activities, JNCC consider their management could be addressed through the Environmental Impact Assessment (EIA) process. There is therefore potential for management actions to be implemented successfully to achieve the conservation objectives of the protected features of the MPA.**

Detailed assessment

There is a high probability that management measures, and the ability to implement them, will deliver the objectives of the MPA

Protection for sandeels in the MPA aims to manage the risk of any future harmful activities occurring in the area that could significantly reduce the local reproductive potential of the adult population. Therefore, there may not be an immediate need for management measures. Similarly, the geodiversity protected features within the MPA are not currently considered exposed to activities that pose a significant risk to the integrity of the features, but if activities occur in the future that may pose a risk to maintenance of tidal current conditions within or adjacent to the MPA, then management actions may need to be considered.

Mechanisms exist through the European Commission under the Common Fisheries Policy to support the introduction of spatial/temporal fisheries management measures to conserve the protected features within the MPA if this is deemed necessary in the future. For licensed activities, JNCC consider their management could be addressed through the EIA process. There is therefore potential for management measures to be implemented to meet the conservation objective to conserve sandeels populations in the MPA.

Further discussion concerning management of the protected features of the MPA is provided in the North-west Orkney Management Options Paper.

Stage 5 - Assessment of the contribution of the potential area to the MPA network

Summary of assessment	**The MPA makes a contribution to the MPA network for its sandeel population, and the export of larval recruits that minimise the risk to the depletion of grounds around Shetland and south of the Moray Firth. The MPA includes geodiversity features representative of the Fair Isle Strait and Marine Process Bedforms Key Geodiversity Area (Brooks *et al.,* 2013).**

Detailed assessment
The potential area contributes significantly to the coherence of the MPA network in the seas around Scotland

Assessment of biodiversity features	
Feature	**Summary**
Sandeels	The MPA represents an area considered to be an important source of sandeel recruits to adult populations in grounds around Shetland and south to the Moray Firth (Wright & Bailey, 1996; Proctor *et al.,* 1998). The MPA is therefore considered to be important to the life history of the species. Further information is provided in the sandeels adequacy assessment (SNH and JNCC, 2014).

Assessment of geodiversity features	
Geodiversity features[5]	The MPA sits partially within the Fair Isle Strait Marine Process Bedforms Key Geodiversity Area. Representative features of the Key Geodiversity Area (sediment wave fields, sand banks and sand wave fields from the Marine Geomorphology of the Scottish Shelf Seabed block) are being considered as part of the MPA because they are regarded as scientifically important for the study of marine-shelf processes and the relationship between currents, bed sediments and bed forms (Brooks *et al.,* 2013).

[5] For geodiversity the stage 5 assessment primarily considers the contribution of the MPAs to the principal 'networks' of marine geodiversity interests present in Scottish waters (representation). The MPA Selection Guidelines propose that there should be minimal duplication of geodiversity features at a national level.

Data sources and bibliography

Belderson, R.H., Johnson, M.A. and Kenyon, N.H. (1982). *Bedforms*. In: Stride, A.H. (ed.) *Offshore tidal sands, processes and deposits.* Chapman and Hall Ltd, London, UK pp. 27-57.

Brooks, A.J., Kenyon, N.H., Leslie, A., Long,, D., and Gordon, J.E. (2013). *Characterising Scotland's marine environment to define search locations for new Marine Protected Areas. Part 2: The identification of Key Geodiversity Areas in Scottish waters.* Scottish Natural Heritage Commissioned report No. 432.

Brooks, A.J., (2013). *Assessing the sensitivity of geodiversity features in Scotland's seas to pressures associated with human activities.* Scottish Natural Heritage Commissioned Report No. 590.

Chaniotis., P.D., Crawford-Avis, O.T., Cunningham, S., Gillham, K., Tobin, D., Linwood, M. (2011). *Identifying locations considered to be least damaged/more natural in Scotland's seas.* Report produced by the Joint Nature Conservation Committee, Scottish Natural Heritage and Marine Scotland for the Scottish Marine Protected Areas Project.

Chaniotis, P.D., Cunningham, S., Gillham, K., Epstein, G. (2014). *Assessing risk to Scottish MPA search features at the MPA regional scale.* Final report produced by the Joint Nature Conservation Committee, Scottish Natural Heritage and Marine Scotland for the Scottish Marine Protected Areas Project.

Christensen, A., Jensen, H., Mosegaard, H., St John, M., and Schrum, C. (2008). *Sandeel (Ammodytes marinus) larval transport patterns in the North Sea from an individual-based hydrodynamic egg and larval model.* Canadian Journal of Fisheries and Aquatic Sciences, **65:**1498–1511.

ICES (2012). *Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSKK).* 27th April – 3rd May, Copenhagen, Denmark, ICES CM2012/ACOM:13. 1346pp.

Langham, N.P.E. (1971). *The distribution and abundance of larval sand-eels (Ammodytidae) in Scottish waters.* Journal of The Marine Biological Association of the United Kingdom, **51:** 697-707.

Lynam, C.P., Pitois, S., Halliday, N.C., Van Damme, C. Wright, P.J. and Edwards, M. (2013). *Spatial patterns and trends in abundance of larval Ammodytidae from Continuous Plankton Recorder surveys of the North Sea: 1950 – 2005.* ICES Journal of Marine Science doi:10.1093/icesjms/fst006.

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>.

Proctor, R., Wright, P. J., and Everitt, A. (1998). *Modelling the transport of larval sandeels on the north-west European shelf.* Fisheries Oceanography, **7:** 347–354.

SNH & JNCC (2014). *Assessment of the adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.* Final report produced by Scottish Natural Heritage, the Joint Nature Conservation Committee and Marine Scotland for the Scottish Marine Protected Areas Project.

Wright, P.J. and Bailey, M.C. (1996). *Timing of hatching in Ammodytes marinus from Shetland waters and its significance to early growth and survivorship.* Marine Biology **126**(1): 143-152.

Wright, P.J., Jensen, H. and Tuck, I. (2000). The influence of sediment type on the distribution of the lesser sandeel, Ammodytes marinus. *Journal of Sea Research*, **44**(3-4): 243-256.