

Planning Scotland's Seas

The Scottish Marine Protected Area Project –
Developing the Evidence Base for Impact
Assessments and the Sustainability Appraisal

Final Report – Appendix E – Marine Site Reports
Part 1: Inshore and Part 2: Offshore

Appendix E. MPA Site Reports

Part 1 - Inshore Sites:

Clyde Sea Sill (CSS)
East Caithness Cliffs (ECC)
Fetlar to Haroldswick (FTH)
Loch Creran (LCR)
Loch Sunart (LSU)
Loch Sunart to the Sound of Jura (SJU)
Loch Sween (LSW)
Lochs Duich, Long and Aish (DLA)
Monach Isles (MOI)
Mousa to Boddam (MTB)
North-west Sea Lochs & Summer Isles (NWS)
Noss Head (NOH)
Papa Westray (PWY)
Small Isles (SMI)
South Arran (ARR)
Upper Loch Fyne & Loch Goil (LFG)
Wyre and Rousay Sounds (WYR)

Part 2 - Offshore Sites:

The Barra Fan & Hebrides Terrace Seamount (BHT)
Central Fladen (CFL)
Central Fladen (core) (CFL(core))
East of Gannet & Montrose Fields (EGM)
Faroe-Shetland Sponge Belt (FSS)
Firth of Forth Banks Complex (FOF)
Geikie Slide & Hebridean Slope (GSH)
Hatton-Rockall Basin (HRB)
North-east Faroe-Shetland Channel (NEF)
Norwegian Boundary Sediment Plain (NSP)
North-west Orkney (NWO)
Rosemary Bank Seamount (RBS)
South-east Fladen (SEF)
South-west Sula Sgeir & Hebridean Slope (SSH)
Turbot Bank (TBB)
West Shetland Shelf (WSS)
Western Fladen (WFL)

Part 1. Inshore Sites

Clyde Sea Sill (CSS)

Site Area (km²): 714

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [CSS]					
Proposed protected features					
<i>Biodiversity Features</i> Black guillemot, fronts, circalittoral sand and coarse sediment communities.					
<i>Geodiversity Features</i> Marine Geomorphology of the Scottish Shelf Seabed – sand banks, sand ribbon fields, sand wave fields.					
<i>Site Description</i> The Clyde Sea Sill MPA proposal stretches across the mouth of the Clyde Sea on the west of Scotland. The proposal runs from the Mull of Kintyre to Corsewall Point on the Rhinns of Galloway.					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Black guillemot	*Lower: 29.05 Intermediate: 29.05 Upper: 29.05	Yes (Seabird 2000 census)	Yes	Not known	Conserve
Fronts	Lower: 713.30 Intermediate: 713.30 Upper: 713.30	Yes (Ocean thermal imagery, 2000 – 2009)	Yes	Not known	Conserve
Circalittoral sand and coarse sediment communities	Lower: 528.31 Intermediate: 528.31 Upper: 528.31	Yes (Marine Scotland surveys, 2012)	Yes	Not known	Conserve
Geodiversity Features					
Marine Geomorphology of the Scottish Shelf Seabed – sand banks, sand ribbon fields, sand wave fields	Sand Bank: 4.99 Sand Ribbon Field: 34.06 Sand Wave Field: 146.08	Yes (Defra research, 2009; SNH & JNCC review, 2012)	Yes	Not known	Conserve
Key: * Estimated area based on best available data References: Area of Feature: GeMs Confidence in feature presence and extent: SNH (2012a)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [CSS]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries*	0.000	1.616	3.232
Energy Generation	0.011	0.022	0.022
Military	See national costs	See national costs	See national costs
Telecom Cables	0.007	0.007	0.007
Total Quantified Economic Costs	0.018	1.645	3.261
Non-Quantified Economic Costs			
Commercial Fisheries	▪ None.	▪ Displacement impacts.	▪ Displacement impacts.
Energy Generation	▪ Costs of project delays during consenting; risk of deterrent to investment.	▪ Costs of project delays during consenting; risk of deterrent to investment.	▪ Costs of project delays during consenting; risk of deterrent to investment.
Military	▪ See national assessment.	▪ See national assessment.	▪ See national assessment.
Telecom Cables	▪ Costs of project delays during consenting; risk of deterrent to investment.	▪ Costs of project delays during consenting; risk of deterrent to investment.	▪ Costs of project delays during consenting; risk of deterrent to investment.
Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [CSS]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	0.041	0.045
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.002	0.003	0.003
Total Quantified Public Sector Costs	0.002	0.044	0.048
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [CSS]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 3 jobs Upper: 5 jobs	West West N. Ireland West	Ayr Campbeltown Belfast Oban	Impacts concentrated in urban and rural coastal areas	Nephrops trawls Dredges	Lower: N/A Upper: <15m	No Impact.	No breakdown of fisherman employment by ethnic origin.	No employment data but unlikely to be employed in fisheries..
<p>If any energy generation developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).</p> <p>Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.</p>										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [CSS]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use value of natural environment	Low - Moderate. Wrecks and the protected features, and a contribution of the site to MPA network, has non-use values.	Low - Moderate
Other Benefits		
Tourism	Higher biodiversity due to designation, and presence of designations, may attract more tourism activity to local economy.	
Contribution to ecologically coherent network	See report Section 7.5.	
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [CSS]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Black guillemot	-	-	-	-	-	-	L/I/U	L/I/U	L/I/U	U	U	U	L/I/U	-	L/I/U	L/I/U	L/I/U
Circolittoral sand and coarse sediment communities	-	-	-	-	-	-	L/I/U	L/I/U	L/I/U	L/I/U	-	L/I/U	L/I/U	-	L/I/U	L/I/U	L/I/U
Fronts	-	-	-	-	-	-	L/I/U	L/I/U	L/I/U	L/I/U	L/I/U	L/I/U	L/I/U	-	L/I/U	L/I/U	L/I/U
Geodiversity Features																	
Marine Geomorphology of the Scottish Shelf Seabed – sand banks	Not considered to be sensitive at the levels of exposure expected from human activities; thus, not considered in the context of management.																
Marine Geomorphology of the Scottish Shelf Seabed – sand ribbon fields																	
Marine Geomorphology of the Scottish Shelf Seabed – sand wave fields																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity) [CSS]			
<p>According to VMS-based estimates and ICES rectangle landings statistics, Nephrops trawls, dredges, pelagic trawls, whitefish trawls and seines (over-15m) and nephrops trawls, pots, dredges and other gear (under-15m vessels) operate within the CSS proposed MPA. The value of catches from the CSS area was £398,000 (over-15m vessels) and £476,000 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels were made predominantly into Campbeltown (48%), Portavogie (16%), Ardglass (9%), Girvan (8%) and Troon and Saltcoats (7%). For the over-15m fleet, dredgers operated in particular in the northern part of the proposed MPA across the area of circalittoral sand and coarse sediment, while nephrops trawlers operated mainly in the south-west part of the proposed MPA outside of this area of sediment.</p> <p>Provisional ScotMap data indicate that the annual average earnings from the CSS proposed MPA was £105,000, with over 40% from pots (velvet crab, brown crab and lobster), over 30% from dredges, and over 25% from Nephrops trawls. The spatial distribution of value from Nephrops trawls indicates that the majority of value is derived from further north than the CSS proposed MPA area in the Firth of Clyde. It is likely that the ICES rectangle estimate for the cost impact on <15m Nephrops trawls is an over-estimate. The coverage for ScotMap interviews in the region was 63.8% (total value of reported landings from the Fisheries Information Network for those vessels included in the ScotMap value analysis expressed as a percentage of the total reported landings for all vessels <15m). Therefore the ScotMap estimate is likely to under-represent the value of fishing by under-15m vessels, and the spatial representation of the value of fishing is less robust than in regions where coverage is higher.</p> <p>VMS data indicated that there are no foreign vessels fishing within the CSS proposed MPA. Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and SNH recommendations.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No cost impacts expected. 	<ul style="list-style-type: none"> ▪ Reduce mobile bottom-contact gear pressure (whitefish, nephrops and other trawls and seines, beam trawls and dredges) by 50% across circalittoral sand and coarse sediment communities feature. 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gears (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across circalittoral sand and coarse sediment communities feature.

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Description of one-off costs	▪ None.	▪ None.	▪ None.
Description of recurring costs	▪ None.	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.010); ▪ Dredges (0.063); ▪ Other affected gears (0.006). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.131); ▪ Dredges (0.016); ▪ Other affected gears (<0.001). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.019); ▪ Dredges (0.127); ▪ Other affected gears (0.012). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.262); ▪ Dredges (0.032); ▪ Other affected gears (<0.001).
Description of non-quantified costs	▪ None.	▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.	▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	4.523	9.046
Average annual costs	0.000	0.226	0.452
Present value of total costs (2014–2033)	0.000	3.327	6.653
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.000	2.197	4.394
Average annual change to GVA	0.000	0.110	0.220
Present value of total change in GVA (2014–2033)	0.000	1.616	3.232
Direct and Indirect reduction in Employment	0.0 jobs	2.6 jobs	5.2 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4b. Energy Generation **[CSS]**

There are no energy generation activities currently operating within the CSS proposed MPA boundary or corresponding buffer zones. Thus, economic costs and management measures associated with energy generation in this proposed MPA are described in light of known possible future developments.

The Sanda Sound (Oceanflow Energy, 35kW (nominal)) tidal energy project is a ¼ scale testing device in preparation for a larger scale future development. The development, planned for deployment in 2013, overlaps the MPA features 'black guillemot' and 'fronts' under all scenarios (i.e. lower, intermediate and upper extent), with further extensive overlap observed through consideration of a 5km buffer (also overlapping the MPA feature 'circalittoral sand and coarse sediment communities'). Nevertheless, any associated costs of the Sanda Sound tidal development are considered sunk as the application process (agreement reached for lease, test device currently undergoing checks) has the potential to reach a conclusion prior to 2014.

Within the CSS proposed MPA boundary, the 5km buffer zone of the possible Argyll Mull of Kintyre Tidal Array (Nautricity Ltd and Argyll Tidal Ltd, potential 3MW capacity in total) overlaps MPA features 'circalittoral sand and coarse sediment communities' and 'fronts' under all scenarios. The MPA feature 'black guillemot' also overlaps the 5km buffer for the potential Argyll Tidal Array development, but only under the upper scenario. An export cable route for the Argyll Mull of Kintyre Tidal Array will potentially pass through the CSS proposed MPA boundary, overlapping all three previously mentioned MPA features under all extent scenarios. Sanda Island SSSI is notified for black guillemots and extends to MLWS. Main breeding colonies within the CSS proposed MPA boundary are already managed through SSSI designation. Given the medium sensitivity of black guillemot to death or injury by collision, barriers to species movement, sub-surface abrasion/penetration and changes in water flow (tidal current), there may be additional management costs incurred.

Economic Costs on the Activity of Designation of the Site as an MPA

	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to black guillemot within 1km of proposed activities. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to black guillemot within 5km of proposed activities. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to all features within 5km of proposed activities.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k. Application estimated to be submitted in 2016 (Argyll Mull of Kintyre Tidal Array export cable route). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k per licence application (up to 2 in total). Application(s) estimated to be submitted in 2016 (Argyll Mull of Kintyre Tidal Array and export cable route). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k per licence application (up to 2 in total). Application(s) estimated to be submitted in 2016 (Argyll Mull of Kintyre Tidal Array and export cable route).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.

Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)

Total costs (2014–2033)	0.012	0.024	0.024
Average annual costs	0.001	0.001	0.001
Present value of total costs (2014–2033)	0.011	0.022	0.022

Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period.
 Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20).
 Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.

Table 4c. Military				[CSS]
<p>18 military practice areas (Luce Bay (D402A; bombing), Campbeltown (D509), Campbeltown South (X556; minelaying), Mermaid (X5529), Sanda (X5530), Stafnish (X5523), Ailsa (X5524), Ballantrae (X5525) and Corsewall (X5526); five submarine exercise areas and four firing danger areas) overlap with the CSS proposed MPA.</p> <p>The military practice areas Luce Bay (D402A; bombing), Campbeltown (D509), Campbeltown South (X556; minelaying), Mermaid (X5529), Sanda (X5530), Stafnish (X5523), Ailsa (X5524), Ballantrae (X5525) and Corsewall (X5526) overlap with circalittoral sand and coarse sediment communities (all scenarios), fronts (all scenarios) and Black Guillemot (upper scenario only). Sanda (X5530) and Stafnish (X5523) also overlap with Black Guillemot under all scenarios.</p> <p>The five submarine exercise areas and four firing danger areas overlap with the features of the CSS proposed MPA to varying degrees under the different extent scenarios.</p> <p>The features and associated habitats which overlap with military activities have not been described as vulnerable to MOD activities in this proposed MPA. It is assumed that management relating to MOD activity will be coordinated through the MOD’s Maritime Environmental Sustainability Appraisal Tool (MESAT) which the MOD uses to assist in meeting its environmental obligations. This process will include operational guidance to reduce significant impacts of military activities on MPAs. It is assumed that the MoD will incur additional costs in adjusting MESAT and other MoD environmental assessment tools in order to consider whether its activities will impact on the conservation objectives of MPAs and also incur additional costs in adjusting electronic charts to consider MPAs. However, these costs will be incurred at national level and hence no site-specific cost assessments have been made.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	
Description of one-off costs				
Description of recurring costs				
Description of non-quantified costs				
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)				
Total costs (2014–2033)	See national costs	See national costs	See national costs	
Average annual costs	See national costs	See national costs	See national costs	
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs	
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>				

Table 4d. Telecom Cables			
[CSS]			
<p>Three telecom cables overlap with the CSS proposed MPA boundary; Lanis 3 for a distance of 19.5km, Scotland-N.Ireland 2 for a distance of 19.4km and Sirius North for a distance of 18.6km. All three telecom cables overlap with circalittoral sand and coarse sediment communities (all scenarios), fronts (all scenarios) and Black Guillemot (upper scenario only). The possible cost associated with replacement of existing telecom cables at the end of their working life is provided.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Where cables need replacing, additional licensing costs to assess potential impacts to features within the proposed development footprint. 	<ul style="list-style-type: none"> ▪ Where cables need replacing, additional licensing costs to assess potential impacts to features within the proposed development footprint. 	<ul style="list-style-type: none"> ▪ Where cables need replacing, additional licensing costs to assess potential impacts to features within the proposed development footprint; and ▪ Seasonal restrictions on laying cables due to Black Guillemot (assumed developer could work around these at no additional cost).
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £10k assumed to be in 2024 (assume only one of existing telecom cables will need replacing over assessment period). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £10k assumed to be in 2024 (assume only one of existing telecom cables will need replacing over assessment period). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £10k assumed to be in 2024 (assume only one of existing telecom cables will need replacing over assessment period).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment;
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.010	0.010	0.010
Average annual costs	0.001	0.001	0.001
Present value of total costs (2014–2033)	0.007	0.007	0.007
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [CSS]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Tourism	Coastal areas are well represented when considering the locations of various tourist related sites within Scotland with a range of site types present in all regions including the West. Where significant impacts to recreational boating or water sports have been identified for the site, there could also be consequential impacts on tourism.	Tourism may benefit from the designation of the MPA as an added attraction to the destination. In addition, there may also be indirect benefits to tourism as a result of benefits to some water sports activities, for example, recreational angling and diving.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN), CSS proposed MPA covers two section of coastline and these areas out to 6nm overlap with recreational sea angling. All proposed MPA features and their corresponding extents overlap with the sea angling areas however no management restrictions upon this activity are required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation and corresponding management restrictions on sector activities including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Scuba diving	There are seven dive sites located within CSS proposed MPA, one dive site is an unnamed submarine wreck and six are wreck dive sites (Hereford express, Agba, Empire Adventure, Windsor Castle, Byron Darnton and Siant Conan). All seven dive sites overlap with features in the lower, intermediate and upper scenarios. No management restrictions upon this activity are required.	The added protection offered by an MPA designation and management measures placed upon sector activities may increase the aesthetic attraction of the dive sites through an improved marine ecosystem and a reduction in degradation to the wreck sites.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA [CSS]	
Activity	Description
Oil and Gas	There is one pipeline within the CSS proposed MPA boundary that overlaps with features proposed for designation; black guillemot, circalittoral sand and coarse sediment communities and fronts. The presence of the existing pipeline is not expected to require additional management measures. The designation of the MPA proposal would not lead to additional management for black guillemot above that of the Sanda Island SSSI.
Recreational Boating	There are no recreational boating anchorages located within the CSS proposed MPA that overlap with features proposed for designation, although three Crown Estate mooring points are present that overlap with feature extents for black guillemot and fronts under all scenarios. Neither feature is considered sensitive to pressures associated with anchoring, however; therefore no cost impacts are expected. Seven cruising routes intersect the CSS proposed MPA; three with low traffic and four with medium traffic. It is not considered that cruising routes will incur any management or assessment costs.
Ports and Harbours	There is one port/harbour (Southend) within the CSS proposed MPA boundary. Southend overlaps the MPA feature fronts under all scenarios; however, management costs are not expected to be incurred.
Power Interconnectors	Two existing power interconnectors and one consented power interconnector (Western HVDC Link) overlap with the CSS proposed MPA. Both existing power interconnectors and the one consented power interconnector overlap with circalittoral sand and coarse sediment communities (all scenarios), fronts (all scenarios) and Black Guillemot (upper scenario). No cost impacts are foreseen, as it is assumed that there will be no review of the existing consents.
Water Sports – Windsurfing	There is one popular windsurfing location (Southend) within the CSS proposed MPA. Water sports activities including windsurfing are assessed as not requiring any additional management measures. It is also considered that no additional benefit to windsurfing from management measures applied to other activities will occur.

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [CSS]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.00m Intermediate: £0.23m Upper: £0.45m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: £0.11m Upper: £0.22m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: xx (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 2.6 jobs Upper: 5.2 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Displacement Effects	Not Quantified	Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences: <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion 		xx

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			<p>among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited;</p> <ul style="list-style-type: none"> ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		
Energy Generation	Additional operational costs	Quantified Cost Impact (2014–2033): £0.011 – 0.022m	Future employment opportunities – if increased operational costs associated with management measures render projects unviable or restrict project size there will be a negative impact on economic activity and job creation in this sector.		0
	Costs associated with delays during the consenting process Loss of investor confidence (developments do not proceed)	Not Quantified	<p>Future employment opportunities – if the delays deter investments there will be a negative impact on economic activity and future job creation in this sector.</p> <p>Environment – possible negative impact in relation to climate change and the ability of the Scottish Government to meet its 2020 renewables targets, decarbonisation targets and climate change targets. There would also be consequent financial implications of climate change impacts.</p> <p>This impact is uncertain and is only likely to arise under the upper scenario. JNCC's current advice is that the intermediate scenario represents their best view on management requirements.</p>		xxx (under the upper scenario only)
<p>Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [CSS]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries	xx	xx	xx	xxx	xxx	xx	xxx	xxx
Reduction in landed value, GVA and employment	West (and Belfast)	Largest employment impacts in: Ayr (41%), Campbeltown (24%), Belfast (16%), Oban (14%)	Coastal Rural and Urban	Potentially significant negative effect if parent loses job/becomes unemployed.	Potentially significant negative effect if individuals lose job/become unemployed.	Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0-5 job losses Potentially significant negative effect on individuals that lose job/become unemployed	Potentially significant negative effect if member of household loses job/becomes unemployed
Fish Processors	x	x	x	0	0	0	0	0
Reduction in local landings at landing ports	West	Campbeltown Troon and Saltcoates Girven	Coastal Rural and Urban					
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [CSS]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: <15m	Nephrops trawls Dredges	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Fish Processors Reduction in local landings at landing ports		Shellfish: xxx Demersal: xx Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

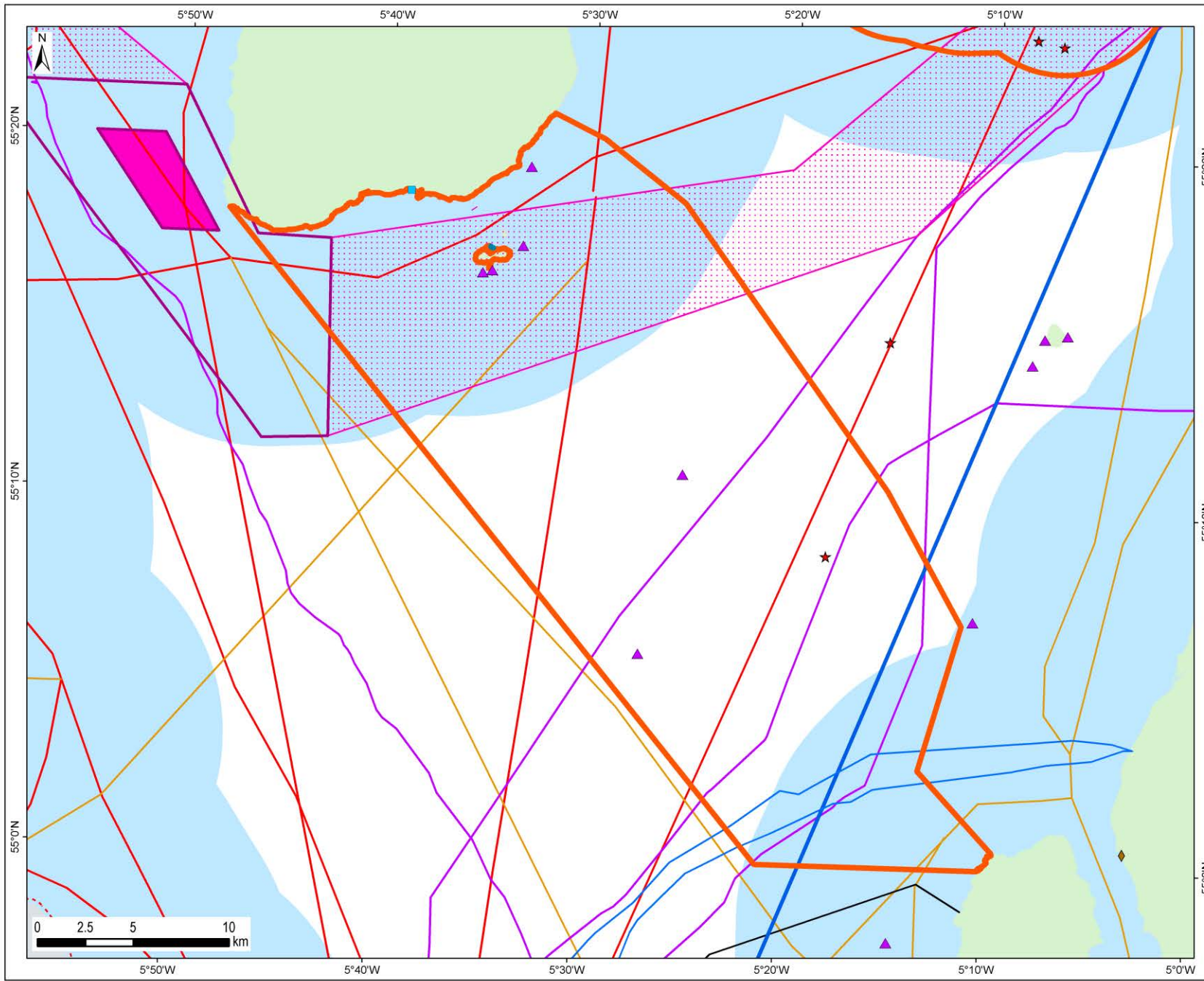
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [CSS]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Black guillemot	Provides representation of the southern limit for black guillemot in OSPAR Region III.	Represents one of six potential MPA areas that will protect black guillemot in Scotland's seas.	Will be reviewed in light of Northern Ireland proposals to determine connectivity with wider MPA network.	Represents the southern limit of the species' range in the UK and provides a link with the population in Northern Ireland.	Not listed as threatened and/or declining on OSPAR list, although there is evidence to suggest declines in Scottish seas. MPA may increase resilience.
Fronts	Provides representation for a topographic and density-driven front in OSPAR Region III.	Represents one of three potential MPA areas in OSPAR Regions II and III covering shelf seas. Replication is therefore provided in the network.	Not currently understood for fronts.	Each potential MPA is considered to cover functionally significant examples, reflecting different shelf fronts in a range of settings.	Not considered to be threatened and/or declining. No need to represent a greater proportion within MPA network.
Circalittoral sand and coarse sediment communities	Information not available.				
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ¹ [CSS]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Stocks not at MSY	Nil	Low. Some recovery of benthic species possible.		High, site fishing grounds are valuable	Nil - Low	Moderate
Fish for non-human consumption		Stocks reduced from potential maximum	Nil					
Gas and climate regulation	Nil - Low	Nil - Low	Nil	Nil	Minimal	Moderate	Nil	High
Natural hazard protection	Low	Low	Nil, would not affect stability of coastline			Moderate, Clyde is valuable for marine activities	Nil	High
Regulation of pollution	Low	Low	Nil	Minimal - Low, maintained by protecting seabed features		Low - Moderate, for recreational use of waters	Nil - Low	High
Non-use value of natural environment	Low - Moderate. Wrecks and protected features, and contribution of the site to MPA network, have non-use value.	Non-use value of the site may decline	Nil, no change in key characteristics of site	Low – protection of key characteristics of site from minor decline	Moderate – protection of key characteristics of site from decline, and/or allowing some recovery of values	Moderate	Low - Moderate	Low
Recreation	Moderate	7 active dive sites, Sea angling	Nil	Low – slightly higher biodiversity encountered by divers		Moderate	Low	Moderate
Research and Education	Moderate	Biological and geological features have research value but there are substitutes	Nil, no change in key characteristics of site	Low – protection of key characteristics of site from decline, improving future research opportunities		Low	Nil - Low	Low
Total value of changes in ecosystem services			Low for lower scenario, moderate for upper scenarios				Low - Moderate	Low

¹ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



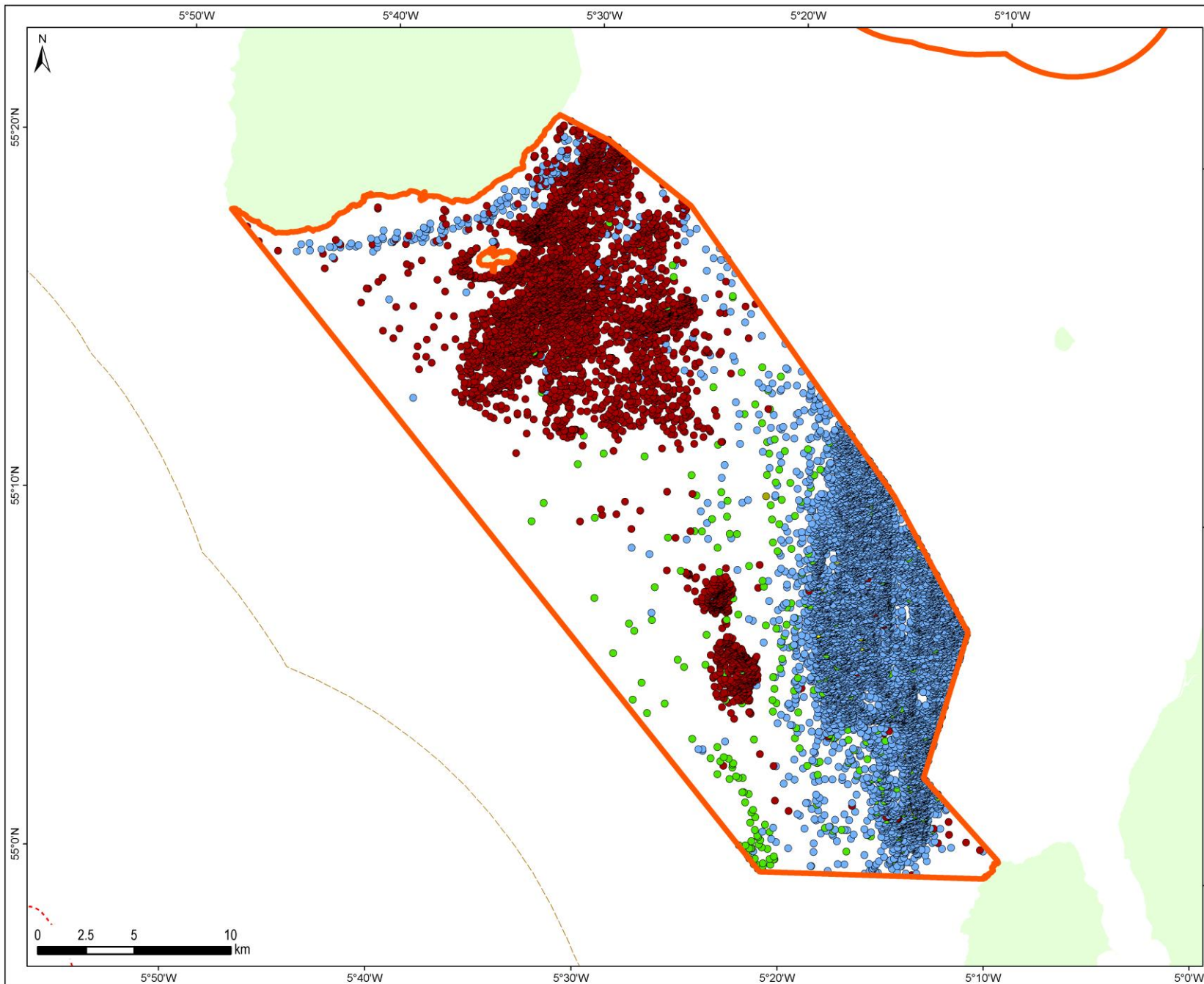
- Proposed Marine Protected Area
- Energy Generation**
- Tidal Lease Area
- Draft Plan Option Areas - Tidal
- Indicative Cable Routes - Tidal
- Power Interconnectors**
- Existing Power Interconnectors
- Future Proposed Interconnectors
- Subsea Telecommunication Cables**
- Active
- Oil & Gas**
- Pipelines
- Watersports**
- ◆ Shore Dive Sites
- ★ Submarine Dive Sites
- ▲ Wreck Dive Sites
- Wind Surfing Sites
- Sea Angling (6 nm from Coast)
- Recreational Boating**
- RYA Cruising Routes**
- Light
- Medium
- Mooring Areas

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:270,000	
QA		FMM	
4136MPA_HA_Clyde_Sea_Sill.mxd			



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Human Activities which Occur within the Proposed MPA: Clyde Sea Sill



- Proposed Marine Protected Area
- UK Continental Shelf
- Scottish 12 Nautical Mile Limit
- VMS Fishing Ping Data (2007 to 2011)
- Nephrops Trawls
- Other Trawls
- Dredges
- Pots
- Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:270,000	
QA		FMM	
4136MPA_Fish_Clyde_Sea_Sill.mxd			
Produced by ABPmer			



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Data Source: Scottish Government, 2013
NOT TO BE USED FOR NAVIGATION

Fishing Activities which Occur within the Proposed MPA: Clyde Sea Sill

East Caithness Cliffs (ECC)

Site Area (km²): 117

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [ECC]					
Proposed protected features					
<p><i>Biodiversity Features</i> Black guillemot.</p> <p><i>Geodiversity Features</i> None.</p> <p><i>Site Description</i> The East Caithness Cliffs MPA proposal is located on the east coast of Caithness and represents important breeding and foraging areas for black guillemots. The proposal boundary mirrors the East Caithness Cliffs SPA, extending 2km out to sea from the cliffs.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Black guillemot	*Lower: 116.93 Intermediate: 116.93 Upper: 116.93	Yes (Seabird 2000 census)	Yes	Not known	Conserve (uncertain)
Geodiversity Features					
N/A					
Key: * Estimated area based on best available data References: Area of Feature: GeMs Confidence in feature presence and extent: SNH (2012b)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [ECC]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Military	See national costs	See national costs	See national costs
Ports and Harbours	0.019	0.019	0.019
Total Quantified Economic Costs	0.019	0.019	0.019
Non-Quantified Economic Costs			
Military	▪ See national assessment.	▪ See national assessment.	▪ See national assessment.
Ports and Harbours	▪ Costs of project delays during consenting; risk of deterrent to investment.	▪ Costs of project delays during consenting; risk of deterrent to investment.	▪ Costs of project delays during consenting; risk of deterrent to investment.

Note: For detailed information on economic cost impacts on activities, see Table 4.

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [ECC]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	None	None
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.002	0.002	0.002
Total Quantified Public Sector Costs	0.002	0.002	0.002
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [ECC]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
No social impacts are expected.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [ECC]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use value of natural environment	Low	Low - Moderate
Other Benefits		
Tourism	Higher biodiversity due to designation, and presence of designations, may attract more tourism activity to local economy.	
Contribution to ecologically coherent network	See report Section 7.5	
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [ECC]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Black guillemot	-	-	-	-	-	-	L/I/U	-	L/I/U	L/I/U	L/I/U	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Geodiversity Features																	
N/A																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Military			
[ECC]			
<p>Three military practice areas (Wick (X5819) rifle area; and two firing and danger areas (Tain firing and bombing range and X5819)) overlap with the Black Guillemot feature of the ECC proposed MPA under all scenarios (lower, intermediate and upper).</p> <p>The features and associated habitats which overlap with military activities have not been described as vulnerable to MoD activities in this proposed MPA. It is assumed that management relating to MoD activity will be coordinated through the MoD's Maritime Environmental Sustainability Appraisal Tool (MESAT) which the MoD uses to assist in meeting its environmental obligations. This process will include operational guidance to reduce significant impacts of military activities on MPAs. It is assumed that the MoD will incur additional costs in adjusting MESAT and other MoD environmental assessment tools in order to consider whether its activities will impact on the conservation objectives of MPAs and also incur additional costs in adjusting electronic charts to consider MPAs. However, these costs will be incurred at national level and hence no site-specific cost assessments have been made.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment.
Description of one-off costs			
Description of recurring costs			
Description of non-quantified costs			
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	See national costs	See national costs	See national costs
Average annual costs	See national costs	See national costs	See national costs
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>			

Table 4b. Ports and Harbours			
[ECC]			
There are four ports/harbours (Whaligoe, Dunbeath, Latheronwheel and Lybster) within the ECC proposed MPA boundary. All four ports/harbours overlaps the MPA feature black guillemot under all scenarios. Therefore, management costs may be incurred under the assumption that small ports/harbours will undergo one new development within the relevant time frame (2014-2033), assumed for the year 2024.			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 4 in total). 	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 4 in total). 	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 4 in total).
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Whaligoe, Dunbeath, Latheronwheel and Lybster). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Whaligoe, Dunbeath, Latheronwheel and Lybster). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Whaligoe, Dunbeath, Latheronwheel and Lybster).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.027	0.027	0.027
Average annual costs	0.001	0.001	0.001
Present value of total costs (2014–2033)	0.019	0.019	0.019
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [ECC]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Tourism	Coastal areas are well represented when considering the locations of various tourist related sites within Scotland with a range of site types present in all regions including the North East. Where significant impacts to recreational boating or water sports have been identified for the site, there could also be consequential impacts on tourism.	Tourism may benefit from the designation of the MPA as an added attraction to the destination. In addition, there may also be indirect benefits to tourism as a result of benefits to some water sports activities, for example, recreational angling and diving.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN). ECC proposed MPA is a coastal site and is located wholly within 6nm of the UK coastline. Therefore sea angling overlaps with all features and there corresponding extents within the proposed MPA. No management restrictions upon this activity are required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation and corresponding management restrictions on sector activities including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Scuba diving	There is one shore dive site (Trinkie) located within ECC proposed MPA. The dive site overlaps with the lower, intermediate and upper scenarios for Black Guillemot. No management restrictions upon this activity are required.	The added protection offered by an MPA designation and management measures placed upon sector activities may increase the aesthetic attraction of the dive sites through an improved marine ecosystem.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA [ECC]	
Activity	Description
Commercial Fisheries	Dredges and otter trawls (over-15m) and pots, nephrops trawls, other trawls, dredges and other gears (under-15m vessel) operate within the ECC proposed MPA. The value of landings from the ECC area was £26,600 (over-15m vessels) and £98,400 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels are into Wick (79% by value), Macduff (7%) and Fraserburgh (6%). VMS data indicate that there are no non-UK vessels fishing within the ECC proposed MPA. Provisional ScotMap data indicate that the annual average earnings from the ECC proposed MPA was £292,700, with over 90% from pots (predominantly for brown crab). The coverage for ScotMap interviews in the region was 66.4% (total value of reported landings from the Fisheries Information Network for those vessels included in the ScotMap value analysis expressed as a percentage of the total reported landings for all vessels <15m). Therefore the ScotMap estimate is likely to under-represent the value of fishing by under-15m vessels, and the spatial representation of the value of fishing is less robust than in regions where coverage is higher. Black guillemot, the proposed designated biodiversity feature for the site, are not thought to be sensitive or vulnerable to pressures from fishing gears, therefore no management measures for fisheries are proposed and no cost impacts are anticipated.
Oil and Gas	Within the ECC proposed MPA, there are a number of overlaps with oil and gas activity and the extents of features proposed for designation. Under all scenarios, seven wells overlap with the feature extent for the 'black guillemot' within the 1km buffer zone, as well as two licensed blocks and one hydrocarbon field; the Lybster oil field. However, no oil and gas infrastructure is located within the proposed MPA – extraction from the Lybster oil field occurs on land. SNH currently advise that there are no activities currently considered to be a risk to black guillemot within the ECC proposed MPA, and it is unlikely that the MPA would lead to management over and above that already required for the SPA on land.
Power Interconnectors	One consented power interconnector (Caithness-Moray HVDC Reinforcement) overlaps with the ECC proposed MPA. The power interconnector overlaps with Black Guillemot (all scenarios). No cost impacts are foreseen, as it is assumed that there will be no review of the existing consents.
Recreational Boating	There are four cruising routes that intersect the ECC proposed MPA boundary; all of which are medium traffic routes. All routes overlap with the lower, intermediate and upper scenarios of the feature extents for black guillemot, although cruising routes are not expected to require additional management measures. Two Crown Estate moorings are present within the proposed MPA that overlap with black guillemot, although black guillemot are not considered sensitive to pressures associated with anchoring, and no costs are expected.

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [ECC]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
None identified.					
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [ECC]								
Sector/Impact	Location			Age			Gender	
	Region	Ports	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
None identified.								
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [ECC]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m	Gear Types/Sector	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long-term Sick
None identified.								
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

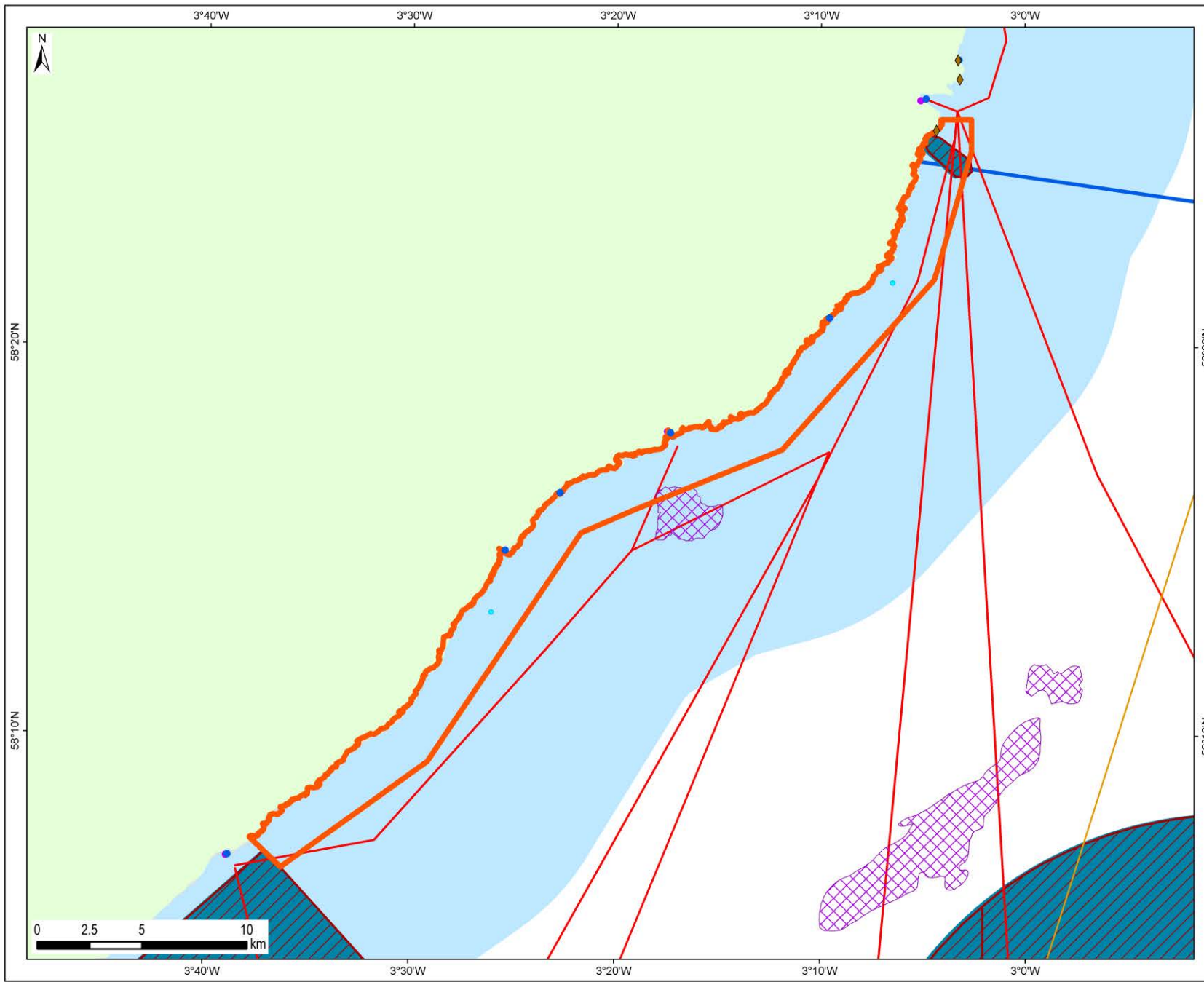
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [ECC]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Black guillemot	Provides representation of black guillemot in OSPAR Region II.	One of six potential MPAs recommended for black guillemot.	Not currently understood for black guillemot.	Represents the only significant colony on the Scottish east coast. The recommended MPA areas would reflect the geographic range and variation of black guillemot and the environments in which they are present.	Although not listed by OSPAR as threatened and/or declining, there is evidence of decline. The potential MPA areas may increase resilience.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

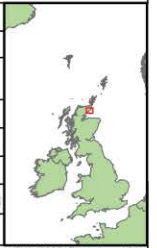
Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ² [ECC]									
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence	
			Lower	Intermediate	Upper				
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Stocks not at MSY	Nil	Nil	Nil	Low. Site fishing grounds have low value	Nil	High	
Fish for non-human consumption		Stocks reduced from potential maximum	Nil	Nil	Nil				
Gas and climate regulation	Nil	Nil	Nil	Nil	Nil	Moderate	Nil	High	
Natural hazard protection	Minimal	Low	Nil			Low	Nil	High	
Regulation of pollution	Minimal	Low	Nil	Nil		Low - Moderate, for recreational use of waters	Nil	High	
Non-use value of natural environment	Low - protected feature, and contribution of the site to MPA network, have non-use value.	Non-use value of the site may decline, but probably stable	Nil, no change in key characteristics of site	Low – protection of feature of site from minor decline	Moderate – protection of feature of site from decline, possibly allowing some recovery	Low, Although black guillemot is charismatic species, it is site's only feature	Low - Moderate	Moderate	
Recreation	Low	1 active dive site	Nil	Minimal – slightly higher biodiversity encountered by divers and boating		Low	Minimal	Moderate	
Research and Education	Minimal	Nil - Low	Nil	Minimal		Low	Minimal	Moderate	
Total value of changes in ecosystem services			Nil for lower scenario, Minimal for upper scenarios				Low		Moderate

² This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



- Proposed Marine Protected Area
- Military Practice Areas**
- Firing Danger Areas
- Other Exercise Areas
- Oil & Gas**
- Hydrocarbon Fields
- Ports & Harbours**
- Port Locations
- Power Interconnectors**
- Future Proposed Interconnectors
- Recreational Boating**
- RYA Cruising Routes
- Light
- Medium
- Mooring Areas
- Watersports**
- ◆ Shore Dive Sites
- Sea Angling (6 nm from coast)

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:247,000	
QA		FMM	
4136MPA_HA_East_Calth_Cliffs1.mxd			



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**Human Activities which Occur within the Proposed MPA:
East Caithness Cliffs**

Fetlar to Haroldswick (FTH)

Site Area (km²): 241

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [FTH]					
Proposed protected features					
<p><i>Biodiversity Features</i> Kelp and seaweed communities on sublittoral sediment, horse mussel beds, maerl beds, shallow tide-swept coarse sands with burrowing bivalves, black guillemot, circalittoral and coarse sediment communities.</p> <p><i>Geodiversity Features</i> Marine Geomorphology of the Scottish Shelf Seabed – components to be confirmed by SNH</p> <p><i>Site Description</i> The Fetlar to Haroldswick MPA proposal covers the area around Fetlar and off the east coast of Yell in the north of the Shetlands. The MPA encompasses the majority of the existing Fetlar SPA area.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Kelp and seaweed communities on sublittoral sediment	*Lower: 16.67 Intermediate: 16.67 Upper: 16.67	Yes (Marine Scotland Science & Marine Scotland survey data, 2011 & 2012)	Partial – few or scattered records	Not known	Conserve
Horse mussel beds	Lower: 7.82 Intermediate: 7.82 Upper: 7.82	Yes (MNCR survey data, 1987, 1988)	Yes	Not known	Conserve
Maerl beds	Lower: 22.41 Intermediate: 22.41 Upper: 22.41	Yes (MNCR survey data, 1987, 1988)	Yes	Not known	Conserve
Shallow tide-swept coarse sands with burrowing bivalves	Lower: 4.68 Intermediate: 4.68 Upper: 63.42	Yes (Marine Scotland Science & Marine Scotland survey data, 2011 & 2012)	Partial – few or scattered records	Not known	Conserve
Black guillemot	Lower: 203.79 Intermediate: 203.79 Upper: 241.27	Yes (Seabird 2000 census)	Yes	Not known	Conserve
Circalittoral and coarse sediment communities	Lower: 78.58 Intermediate: 96.24 Upper: 96.24	Yes (Marine Scotland Science & Marine Scotland survey data,	Yes	Not known	Conserve

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Geodiversity Features		2011 & 2012)			
Marine Geomorphology of the Scottish Shelf Seabed – components to be confirmed by SNH		Yes	All	Not known	Conserve
Key: * Estimated area based on best available data References: Area of Feature: GeMs Confidence in feature presence and extent: SNH (2012c)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [FTH]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Aquaculture (Finfish)	0.016	0.066	0.066
Aquaculture (Shellfish)	See national costs	See national costs	See national costs
Commercial Fisheries*	0.000	0.000	0.030
Ports and Harbours	0.014	0.014	0.014
Total Quantified Economic Costs	0.030	0.081	0.111
Non-Quantified Economic Costs			
Aquaculture (Finfish)	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment
Aquaculture (Shellfish)	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment
Commercial Fisheries	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Displacement impacts.
Ports and Harbours	<ul style="list-style-type: none"> ▪ Relocation of anchorages/ mooring areas away from features of high sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/ mooring areas away from features of high and medium sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/ mooring areas away from features of high and medium sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
<p>Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [FTH]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	None	None
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.001*	0.001*	0.001*
Total Quantified Public Sector Costs	0.001	0.001	0.001
Non-Quantified Public Sector Costs			
None identified.			

* Regulatory and advisory costs of finfish and shellfish aquaculture assessed at national level.

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [FTH]									
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis						
			Location			Fishing Groups Predominantly Affected		Social Groups Affected	
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities
No social impacts are expected.									

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [FTH]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use value of natural environment	Moderate - High	Low - Moderate
Other Benefits		
Tourism	Higher biodiversity due to designation, and presence of designations, may attract more tourism activity to local economy.	
Contribution to ecologically coherent network	See report Section 7.5.	
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [FTH]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Black guillemot	-	L/I/U	L/I/U	-	-	-	L/I/U	L/I/U	-	-	L/I/U	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Kelp and seaweed communities on sublittoral sediment	-	L/I	L/I	-	-	-	L/I/U	L/I/U	-	-	L/I/U	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Horse mussel beds	-	L/I/U	L/I/U	-	-	-	L/I/U	L/I/U	-	-	-	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Maerl beds	-	L/I/U	L/I/U	-	-	-	L/I/U	L/I/U	-	-	-	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Shallow tide-swept coarse sands with burrowing bivalves	-	U	U	-	-	-	L/I/U	L/I/U	-	-	L/I/U	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Cirralittoral and coarse sediment communities	-	L/I/U	L/I/U	-	-	-	L/I/U	-	-	-	L/I/U	-	L/I/U	-	-	L/I/U	L/I/U
Geodiversity Features																	
Marine Geomorphology of the Scottish Shelf Seabed - components to be confirmed by SNH	Not considered to be sensitive at the levels of exposure expected from human activities; thus, not considered in the context of management.																
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Aquaculture (Finfish)				[FTH]
<p>There are 21 finfish aquaculture sites within the boundary of the FTH proposed MPA. These are Balta Island, Baltasound Harbour, Baltasound Pier, Bastavoe North, Bastavoe South, Bow of Hascosay, Brecknagarth, Djubawick, East of Holm Heogland (Burkwel), Kirkabister, Mula, Pier, Rockfield, Sandwick, Swarta Skerry, Turness, Uyea Isle, Vee Taing, Wick of Belmont, Wick of Vatsetter and Winna Ness. All of these sites directly overlap with the Black Guillemot feature under all scenarios. There is an additional finfish farm within 1km of the proposed MPA boundary under all scenarios (Wick of Garth). There is one pending aquaculture site within the boundary of the FTH proposed MPA, Bunya Sand, which directly overlaps with the Black Guillemot feature under all scenarios.</p> <p>There are four aquaculture sites, Balta Island, Baltasound Harbour, Baltasound Pier and Swarta Skerry, which directly overlap with the circalittoral sand and coarse sediment communities feature under all scenarios. There are two additional sites, Djubawick and Turness, are located within 1km of this feature under all scenarios.</p> <p>One aquaculture site, Sandwick, directly overlaps with the Horse mussel bed feature under all scenarios. Bastavoe North and Kirkabister aquaculture sites are located within 1km of this feature under all scenarios.</p> <p>Bastavoe South aquaculture site directly overlaps with the Kelp and seaweed sublittoral communities under the lower and intermediate scenarios. A further eight sites are located within 1km of this feature under the lower and intermediate scenarios (Bastavoe North, Brecknagarth, East of Holm Heogland, Kirkabister, Rockfield, Sandwick, Uyle Isle and Vee Taing).</p> <p>Ten Aquaculture sites (Balta Island, Bow Hascosay, Brecknagarth, East of Holm Heogland , Pier, Rockfield, Sandwick, Swarta Skerry, Turness and Uyea Isle) directly overlap with the maerl bed feature under all scenarios. A further six sites are located within 1km of the feature under all scenarios (Baltasound Harbour, Djubawick, Kirkabister, Mula, Vee Taing, and the Wick of Vatsetter).</p> <p>Balta Island, Turness, Uyea Isle, Vee Taing and Winna Ness all directly overlap with the feature tide-swept coarse sands with burrowing bivalves under the upper scenario only. Nine are located within 1km of the feature under the upper scenario only (Brecknagarth, East of Holm Heogland, Pier, Rockfield, Turness, Uyea Isle, Vee Taing, Wick of Vatsetter and Winna Ness), and five are located within 1km of the feature under all scenarios (Balta Island, Baltasound Harbour, Kirkabister, Swarta Skerry and Wick of Belmont).</p> <p>There is no public information on potential future development within the proposed MPA. In the absence of information on potential future developments, the assessment has focused on the costs associated with obtaining new CAR licences. A national assessment of the costs of obtaining planning permission for new developments is provided separately.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features; and ▪ Additional survey costs incurred once every 10 years (2019 & 2029) to inform new CAR licence applications. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features; and ▪ Additional survey costs incurred once every 10 years (2019 & 2029) to inform new CAR licence applications. 	

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application; and ▪ Additional baseline visual survey costs -£1.6k per CAR licence application. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application; and ▪ Additional baseline visual survey costs -£1.6k per CAR licence application.
Description of recurring costs	<ul style="list-style-type: none"> ▪ None 	<ul style="list-style-type: none"> ▪ None 	<ul style="list-style-type: none"> ▪ None
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.022	0.092	0.092
Average annual costs	0.001	0.005	0.005
Present value of total costs (2014–2033)	0.016	0.066	0.066
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4b. Aquaculture (Shellfish)	[FTH]
<p>There are ten shellfish aquaculture sites within the boundary of the FTH proposed MPA. These are Baltasound Harbour, Baltasound Voe, Basta Ness, Bastavoe Yell, Bunes, Camb Mid Yell, Croo Taing, Hawksness, Kirkabister and Port Henry and all directly overlap with the Black Guillemot feature under all scenarios (lower, intermediate and upper). There is an additional shellfish farm (North Ayre) within 1km of the proposed MPA boundary under all scenarios.</p> <p>Three shellfish farms, Baltasound Harbour, Baltasound Voe and Bunes, directly overlap with Circalittoral sand and coarse sediment communities under all scenarios. There are no additional sites within 1km boundary of the proposed MPA feature.</p> <p>There are two shellfish aquaculture sites, Hawksness and Kirkabister, within the FTH proposed MPA boundary which directly overlap with the Kelp and seaweed sublittoral communities on sublittoral mixed sediment feature under the lower and intermediate scenarios. There is an additional shellfish farm (Basta Ness) within 1km of the proposed MPA boundary under the lower and intermediate scenarios.</p> <p>One shellfish farm, Croo Taing, directly overlaps with the interest feature Maerl Beds under all scenarios. Three additional shellfish farms (Baltasound Harbour, Basta Ness and Hawksness) are within 1km of this feature under all scenarios.</p>	

One shellfish farm, Croo Taing, directly overlaps with the interest feature tide-swept coarse sand with burrowing bivalves under the upper scenario only. There are two additional shellfish farms (Hawksness) within 1km of this feature, Hawksness under the upper scenario only and Baltasound Harbour under all scenarios all scenarios.

There are two shellfish farms (Bastavoe Yell and North Aye) within 1km of Horse mussel beds under all scenarios.

There is no public information on potential future development within the proposed MPA. In the absence of information on potential future developments, no site specific assessment has been possible. A national assessment of the costs of obtaining planning permission for new developments is provided separately.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	▪ N/A	▪ N/A	▪ N/A
Description of one-off costs	▪ N/A	▪ N/A	▪ N/A
Description of recurring costs	▪ N/A	▪ N/A	▪ N/A
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	See national costs	See national costs	See national costs
Average annual costs	See national costs	See national costs	See national costs
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4c. Commercial Fisheries (assuming zero displacement of fishing activity) [FTH]

According to landings statistics, pelagic trawls, dredges, whitefish trawls and seines and other gears (over-15m) and pelagic trawls, dredges, lines, pots and other gears (under-15m vessel) operate within the FTH proposed MPA. The value of landings from the FTH area was £158,000 (over-15m vessels) and £51,500 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels are into Ijmuiden, The Netherlands (29% by value), Lerwick (16%), Out Skerries (15%), Cullivoe (9%), Yell and Fetlar (8%) and Whalsay (7%). VMS data indicate that there were 12 non-UK vessels present within the FTH proposed MPA — 1 Danish vessel (purse seiner); 4 French vessels (1 bottom trawler, 3 unknown gear type); 1 German vessel (bottom trawler); 2 Dutch vessels (pelagic trawlers) and 4 Norwegian vessels (unknown gear type). Since the site is within 6nm, these vessels would not have been fishing and may have been transiting to Yell port. Provisional ScotMap data do not cover the Shetland Islands. For the over-15m fleet, dredgers operated in particular in the eastern part of the proposed MPA, while various trawlers operated across the area.

Shetland Shellfish Management Organisation have implemented a series of areas with known maerl beds, horse mussel beds and eel grass beds which are closed to scallop dredging. Therefore maerl beds within the MPA proposal are already protected from scallop dredging. This was originally done on an informal basis but is now underpinned by a statutory fishing order. Equally, it is unlikely that trawling would be taking place over these habitats and suction dredging is prohibited (comment from NAFC). Black guillemot, the other proposed designated biodiversity feature for the site, are not thought to be sensitive or vulnerable to pressures from fishing gears. Management measures are therefore only assessed under the upper scenario.

Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.

GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.

It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No cost impacts expected. 	<ul style="list-style-type: none"> ▪ No additional management. 	<ul style="list-style-type: none"> ▪ Closure to dredges across horse mussel beds and maerl beds; and ▪ Reduce 50% of pressure from mobile bottom contact gear (whitefish trawls and seines, nephrops trawls and seines, other trawls and seines, dredges, beam trawls) across shallow tide-swept coarse sands.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (0.001); ▪ Dredges (0.001).

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Other trawls (<0.001); ▪ Other affected gears (0.003). ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	0.000	0.098
Average annual costs	0.000	0.000	0.005
Present value of total costs (2014–2033)	0.000	0.000	0.072
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.000	0.000	0.040
Average annual change to GVA	0.000	0.000	0.002
Present value of total change in GVA (2014–2033)	0.000	0.000	0.030
Direct and Indirect reduction in Employment	0.0 jobs	0.0 jobs	0.1 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4d. Ports and Harbours [FTH]			
<p>Three ports/harbours (Mid Yell, Baltasound and Yell and Fetlar) overlap the boundary of the FTH proposed MPA. The three ports/harbours overlap the MPA feature black guillemot under all three extent scenarios (i.e. lower, intermediate and upper). Baltasound overlaps the MPA feature circalittoral sand and coarse sediment communities under all three extent scenario. Yell and Fetlar overlaps the OSPAR designated MPA feature tide-swept coarse sands with burrowing bivalves under the upper extent scenario only. Therefore, management costs may be incurred under the assumption that small ports/harbours will undergo one new development within the relevant time frame (2014-2033), assumed for the year 2024.</p> <p>There are four anchorages/mooring areas within the FTH proposed MPA boundary, although only two overlap features of potential designation. One anchorage/mooring area overlaps the feature kelp and seaweed sublittoral communities on sublittoral mixed sediment, whilst the other overlaps tide-swept coarse sands with burrowing bivalves, both under all scenarios. Costs may be expected to relocate anchorages/mooring areas to less sensitive areas, although any associated costs are non-quantifiable.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 3 in total); and ▪ Relocate anchorages/mooring areas away from all features with a high sensitivity. 	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 3 in total); and ▪ Relocate anchorages/mooring areas away from all features with a high or medium sensitivity. If not possible to relocate away from medium-sensitivity features, relocate to more representative areas. 	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 3 in total); and ▪ Relocate anchorages/mooring areas away from all features with a high or medium sensitivity. If not possible to relocate away from medium-sensitivity features, relocate to more representative areas.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application(s) estimated to be submitted in 2024 (Mid Yell, Baltasound and Yell and Fetlar). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application(s) estimated to be submitted in 2024 (Mid Yell, Baltasound and Yell and Fetlar). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application(s) estimated to be submitted in 2024 (Mid Yell, Baltasound and Yell and Fetlar).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high and medium sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high and medium sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.020	0.020	0.020
Average annual costs	0.001	0.001	0.001
Present value of total costs (2014–2033)	0.014	0.014	0.014
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [FTH]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Tourism	Coastal areas are well represented when considering the locations of various tourist related sites within Scotland with a range of site types present in all regions including the North. Where significant impacts to recreational boating or water sports have been identified for the site, there could also be consequential impacts on tourism.	Tourism may benefit from the designation of the MPA as an added attraction to the destination. In addition, there may also be indirect benefits to tourism as a result of benefits to some water sports activities, for example, recreational angling and diving.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN). FTH proposed MPA is a coastal site with the majority of the site being located within 6nm of the UK coastline. Therefore sea angling overlaps with all features and there corresponding extents within the proposed MPA. No management restrictions upon this activity are required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation and corresponding management restrictions on sector activities including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Scuba diving	There is one submarine wreck dive site (E49) located within FTH proposed MPA. The dive site overlaps with 'Circalittoral sand and coarse sediment communities' and 'Black Guillemot' under the lower, intermediate and upper scenarios. No management restrictions upon this activity are required.	The added protection offered by an MPA designation and management measures placed upon sector activities may increase the aesthetic attraction of the dive sites through an improved marine ecosystem and a reduction in degradation to the wreck sites.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA [FTH]	
Activity	Description
Energy Generation	The 5km buffer zone of the Bluemull Sound (Nova Innovation, 30kW capacity) potential tidal energy generation developments overlaps the MPA features tide-swept coarse sands with burrowing bivalves, horse mussel beds and maerl beds under all scenarios (i.e. lower, intermediate and upper extent) within the FTH proposed MPA boundary. All three features are OSPAR designated and the latter two are also BAP designated. The potential tidal array also overlaps the MPA features black guillemot and kelp and seaweed sublittoral communities on sublittoral mixed sediment under all scenarios. Maerl beds are of high sensitivity to physical change (to another seabed type) and sub-surface abrasion/ penetration and of medium sensitivity to water clarity changes and changes in water flow (tidal current). Black guillemot is of medium sensitivity to barrier to species movement, death or injury by collision, sub-surface abrasion/penetration, underwater noise and changes in water clarity and water flow (tidal current). Horse mussel beds are of high sensitivity to physical change (to another seabed type). Therefore, additional management measures may be required. However, deployment is likely to be completed before 2014 and, therefore, no additional costs are anticipated (i.e. costs effectively sunk) following any decision to designate the site an MPA in 2014.
Power Interconnectors	Two existing power interconnectors overlap with the FTH proposed MPA. An additional power interconnector is also within 1km of the MPA. The two existing power interconnectors directly overlap with Black Guillemot (all scenarios), horse mussel beds (all scenarios), kelp and seaweed communities on sublittoral mixed sediment (all scenarios) and maerl beds (all scenarios). One of the existing power interconnectors is also within 1km of tide-swept coarse sands with burrowing bivalves (all scenarios). An additional power interconnector is also within 1km of the Black Guillemot feature (all scenarios). No cost impacts are foreseen, as it is assumed that there will be no review of the existing consents.
Recreational Boating	One light traffic cruising route intersects the FTH proposed MPA boundary and overlaps with features proposed for protection, although it is not expected to incur any management or assessment costs. There are eleven anchorages for recreational boating (and associated 100m buffer zones) that overlap with the feature extent for black guillemot under the upper scenario, although black guillemot are not considered sensitive to pressures associated with anchoring. Under the lower and intermediate scenarios, SNH have identified two anchorages that overlap with proposed protected features. The 200m buffer zone of one recreational anchorage overlaps with a horse mussel bed and another is in close proximity to records of maerl beds, although it is unclear of the extent of the maerl bed feature. Due to a lack of geographic overlap between the anchorages and features sensitive to the associated pressures, SNH have recommended that no additional management is required.

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [FTH]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	No social impacts are expected.				
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [FTH]								
Sector/Impact	Location			Age			Gender	
	Region	Ports	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries	No social impacts are expected.							
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [FTH]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m	Gear Types/Sector	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long-term Sick
Commercial Fisheries	No social impacts are expected.							
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

Potential Contribution of the Site to an Ecologically-Coherent Network

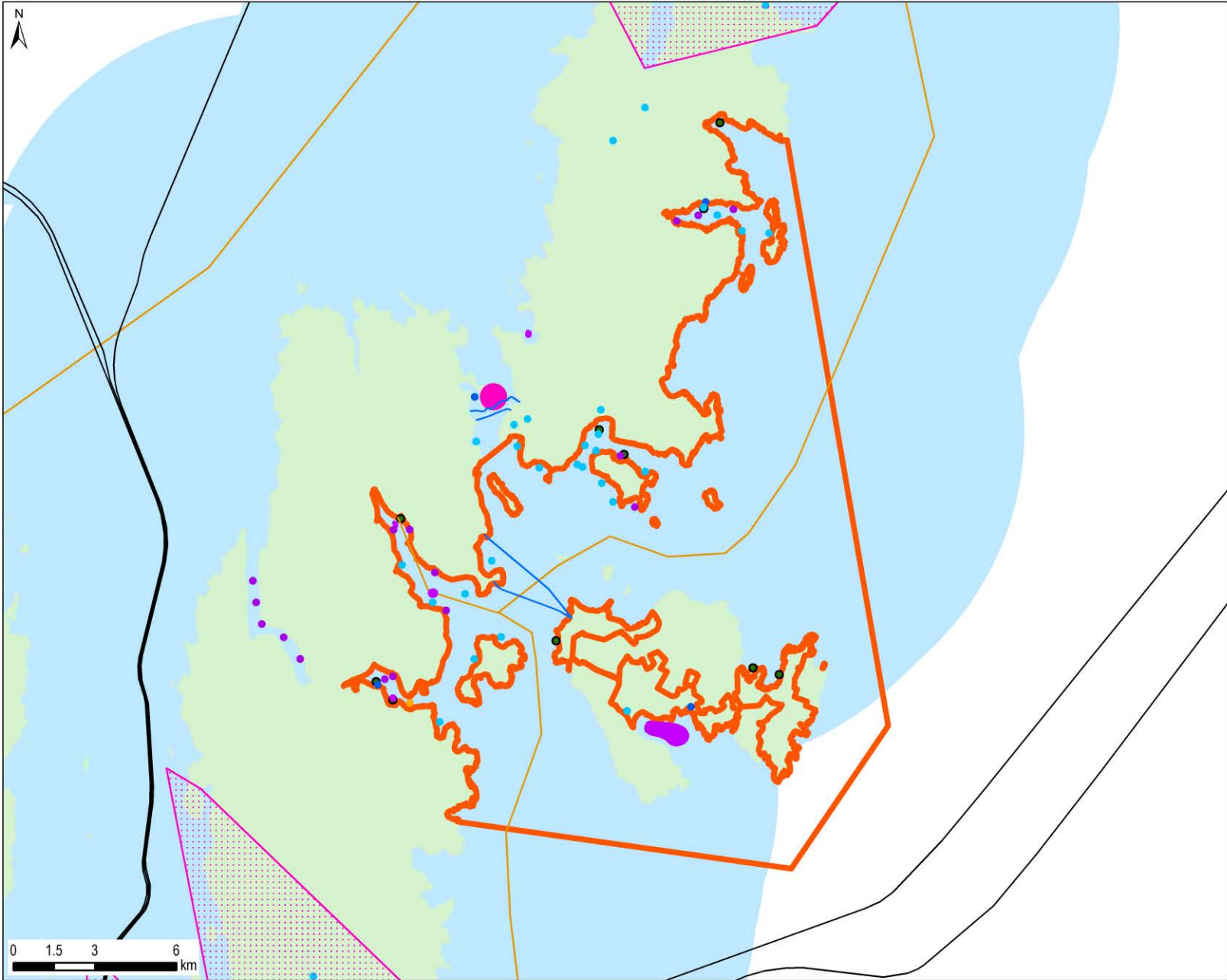
Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [FTH]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Kelp and seaweed communities on sublittoral sediment	Provides representation for kelp and seaweed communities on sublittoral sediment in OSPAR Region II.	Contributes one of xx replicates within Scottish seas.			
Horse mussel beds	Provides representation for horse mussel beds in OSPAR Region II.				Horse mussel beds are listed by OSPAR as threatened and/or declining. MPA area may increase resilience.
Maerl beds	Provides representation for maerl beds in OSPAR Region II.	Represents one of two areas recommended for the protection of maerl beds in OSPAR Region II and one of five in Scottish waters.			Maerl beds are listed by OSPAR as threatened and/or declining. MPA area may increase resilience.
Shallow tide-swept coarse sands with burrowing bivalves	Provides representation for the shallow tide-swept coarse sands with burrowing bivalves in OSPAR Region II.	Provides representation for one of two potential MPA areas where it is known to occur in Scotland's seas.	Not currently understood for shallow tide-swept coarse sands with burrowing bivalves.	Shallow tide-swept coarse sands with burrowing bivalves occur in OSPAR Regions II and III in Scotland's seas. This MPA represents a distinct contribution to coverage of the feature's geographic range.	Not considered to be threatened and/or declining by the OSPAR commission. Feature only occurs in OSPAR Regions II and III.
Black guillemot	Provides representation of black guillemot in OSPAR Region II.	One of six potential MPAs recommended for black guillemot.	Not currently understood for black guillemot.	MPA area is within the core range of black guillemot and the most northerly in the MPA network.	Although not listed by OSPAR as threatened and/or declining, there is evidence of decline. The potential MPA areas may increase resilience.
Circalittoral and coarse sediment communities	No information available.				
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ³ [FTH]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	High. Support food web and contain nursery habitats.	Maerl beds already protected	Nil	Minimal	Low	Moderate. Commercially valuable species supported.	Nil - Low	Moderate, uncertain if habitats need to recover.
Fish for non-human consumption		Uncertain	Nil	Minimal	Low			
Gas and climate regulation	Low, extent of relevant benthic communities uncertain	Low, mainly from kelp & seaweed communities	Minimal, little change to protection of kelp & seaweed communities.			Moderate, social cost of carbon	Minimal	High
Natural hazard protection	Low	Low	Nil			Low	Nil	High
Regulation of pollution	Moderate, benthic communities regulate pollution	Low, major water quality issues to be dealt with through WFD	Nil	Minimal, if protection allows recovery of habitats, service could increase slightly		Low, water quality in this area not affecting human welfare	Minimal, increase in this service unlikely	Moderate
Non-use value of natural environment	Moderate - High, variety of protected features, and contribution of the site to MPA network, have non-use value.	Non-use value of the site already protected by fisheries order	Nil	Low, if protection allows recovery of habitats, service could increase slightly		Moderate – range of features means strong contribution to halting decline of marine biodiversity.	Low - Moderate	Moderate, value to society uncertain
Recreation	Low	1 active dive site, some angling and recreational boating routes	Nil - Minimal, Angling benefits and biodiversity encountered by divers and recreational boaters are already protected from possible decline.			Low, some activities, but substitutes are available.	Minimal	Moderate

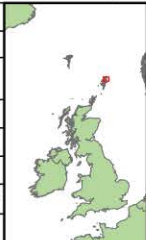
³ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ³ [FTH]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Research and Education	Low	Low, small number of biological features have research value and there are substitutes	Nil	Minimal, if protection allows recovery of habitats, service could increase slightly		Low	Low	Low - Moderate, extent to which research uses site in future uncertain
Total value of changes in ecosystem services			Nil for lower scenario, Low for upper scenarios				Minimal	Low



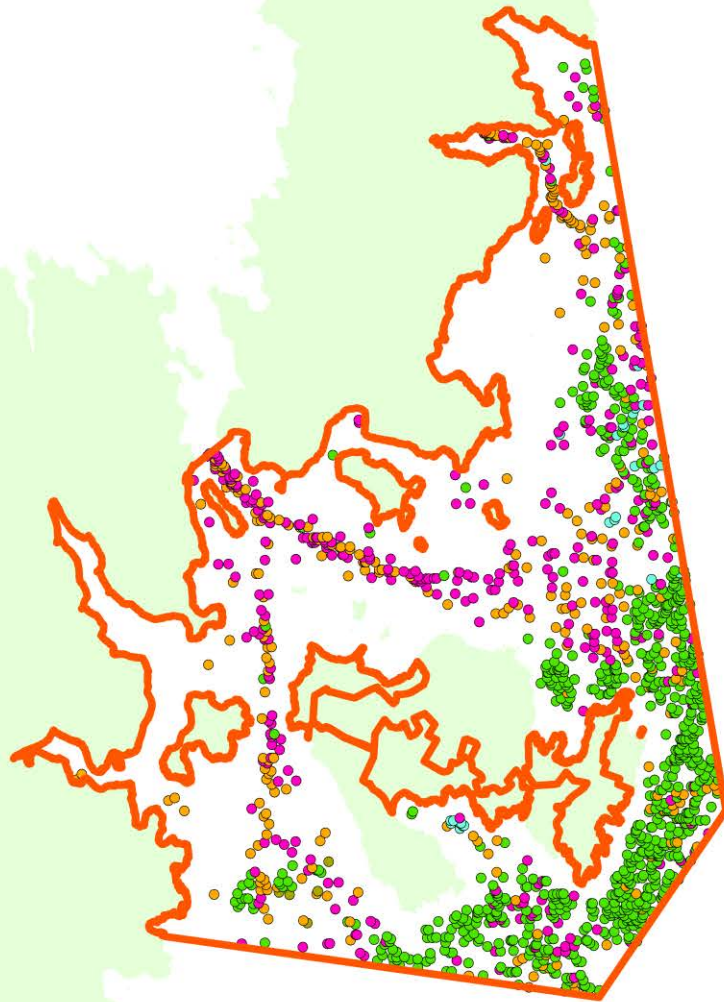
- Proposed Marine Protected Area
- UK Continental Shelf
- Energy Generation**
- Indicative Cable Routes - Tidal
- Tidal Lease Area
- Oil & Gas**
- Pipelines
- Power Interconnectors**
- Existing Power Interconnectors
- Aquaculture**
- Existing Shellfish Installations
- Existing Finfish Installations
- Shellfish Installations Under Application
- Ports & Harbours**
- Port Locations
- Anchorage Areas
- Recreational Boating**
- RYA Cruising Routes
- Recreational Anchorages
- Watersports**
- Sea Angling (6 nm from coast)

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:200,000	
QA		FMM	
4136-MPA_HA_Fetlar_Haroldswick.mxd			
Produced by ABPmer			



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Human Activities Which Occur Within Fethlar to Haroldswick



 Proposed Marine Protected Area

VMS Fishing Ping Data (2007 to 2011)

-  Whitefish Trawls
-  Whitefish Seines
-  Other Trawls
-  Pelagic Trawls
-  Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:200,000	
QA		FMM	

4136-MPA_Fish_Fetlar_Haroldswick.mxd

Produced by ABPmer

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Data Source: Scottish Government, 2013
NOT TO BE USED FOR NAVIGATION



**Fishing Activities which Occur
within the Proposed MPA:
Fetlar to Haroldswick**

Loch Creran (LCR)

Site Area (km²): 12

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [LCR]					
Proposed protected features					
<p><i>Biodiversity Features</i> Flame shell beds.</p> <p><i>Geodiversity Features</i> Quaternary of Scotland – components to be confirmed by SNH.</p> <p><i>Site Description</i> Loch Creran is situated on the west coast of Scotland and is notable for biogenic reefs that occur in shallow water around its periphery. The Loch Creran MPA proposal boundary is identical to the Loch Creran SAC.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Flame shell beds	*Lower: 0.19 Intermediate: 0.19 Upper: 0.19	Yes (Heriot-Watt University records, 2006; dive survey, 2012)	Yes	Not known	Conserve
Geodiversity Features					
Quaternary of Scotland - components to be confirmed by SNH		Yes	No	Not known	Conserve
<p>Key: * Estimated area based on best available data References: Area of Feature: GeMs Confidence in feature presence and extent: SNH (2012d)</p>					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [LCR]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Aquaculture (Shellfish)	See national costs	See national costs	See national costs
Commercial Fisheries*	0.000	0.000	<0.001
Military	See national costs	See national costs	See national costs
Total Quantified Economic Costs	0.000	0.000	<0.001
Non-Quantified Economic Costs			
Aquaculture (Shellfish)	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Commercial Fisheries	<ul style="list-style-type: none"> ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Displacement impacts.
Military	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment.
Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [LCR]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	None	0.004
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	None*	None*	None*
Total Quantified Public Sector Costs	0.000	0.000	0.004
Non-Quantified Public Sector Costs			
None identified.			
* Regulatory and advisory costs of finfish and shellfish aquaculture assessed at national level.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [LCR]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Economic costs (commercial fisheries) are expected to be negligible and, therefore, no social impacts are expected.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [LCR]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use value of natural environment	Low – Protected features, and contribution of the site to MPA network has non-use values.	Nil - Moderate
Other Benefits		
Tourism	Higher biodiversity due to designation, and presence of designations, may attract more tourism activity to local economy.	
Contribution to ecologically coherent network	See report Section 7.5.	
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [LCR]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Flame shell beds	-	-	L/I/U	-	-	-	L/I/U	-	L/I/U	-	-	-	L/I/U	-	-	L/I/U	L/I/U
Geodiversity Features																	
Quaternary of Scotland - components to be confirmed by SNH	Not considered to be sensitive at the levels of exposure expected from human activities; thus, not considered in the context of management.																
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Aquaculture (Shellfish) [LCR]			
<p>There are three shellfish aquaculture sites whose 1km buffer overlaps with the boundary of the LCR proposed MPA. These are c/o Creagan Farm, South Shian Bay and South Shian Bay 2. All sites overlap with the Flame Shell Beds feature under all scenarios. Flame Shell Beds is not an OSPAR or BAP feature and has a proposed conservation objective to conserve, it is possible that management measures could be required for new planning applications should the feature be designated within an MPA.</p> <p>There is no public information on potential future development within the proposed MPA. In the absence of information on potential future developments, no site specific assessment has been possible. A national assessment of the costs of obtaining planning permission for new developments is provided separately.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	▪ N/A	▪ N/A	▪ N/A
Description of one-off costs	▪ N/A	▪ N/A	▪ N/A
Description of recurring costs	▪ N/A	▪ N/A	▪ N/A
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	See national costs	See national costs	See national costs
Average annual costs	See national costs	See national costs	See national costs
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>			

Table 4b. Commercial Fisheries (assuming zero displacement of fishing activity) [LCR]

According to VMS-based estimates and ICES rectangle landings statistics, pots, nephrops trawls and other gears (under-15m vessels) operate within the LCR proposed MPA. There was no over-15m fleet fishing within the proposed MPA. The value of catches from the LCR area was £3,620 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Provisional ScotMap data indicate that the annual average earnings from the LCR proposed MPA was £5,800, almost entirely from pots, which are not expected to be impacted by management measures. VMS data indicate that there was 1 Norwegian vessel within the LCR proposed MPA, but this vessel will not have been actively fishing within the proposed MPA, which is within 6nm, and is more likely to have been transiting to Oban port.

Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and SNH recommendations and existing management measures for the Loch Creran SAC. Scallop dredging is already prohibited throughout the loch under the Loch Creran Order, and creel fishing is prohibited in zones, to protect serpulid reefs and horse mussel beds. The flame shell beds are towards the mouth of the loch, where mobile gear fishing is not expected to be used due to the restricted nature of the mouth, and towards the upper part of the loch.

Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.

GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.

It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No cost impacts expected. 	<ul style="list-style-type: none"> ▪ No cost impacts expected. 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gears (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across flame shell beds.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (<0.001); ▪ Other affected gears (<0.001).
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	0.000	<0.001
Average annual costs	0.000	0.000	<0.001
Present value of total costs (2014–2033)	0.000	0.000	<0.001
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.000	0.000	<0.001
Average annual change to GVA	0.000	0.000	<0.001
Present value of total change in GVA (2014–2033)	0.000	0.000	<0.001
Direct and Indirect reduction in Employment	0.0 jobs	0.0 jobs	0.0 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4c. Military				[LCR]
<p>Two military practice areas (Linhe (X5624), and one submarine exercise area) overlap with the flame shell beds feature of the LCR proposed MPA boundary under all scenarios.</p> <p>The features and associated habitats which overlap with military activities have not been described as vulnerable to MoD activities in this proposed MPA. It is assumed that management relating to MoD activity will be coordinated through the MoD's Maritime Environmental Sustainability Appraisal Tool (MESAT) which the MoD uses to assist in meeting its environmental obligations. This process will include operational guidance to reduce significant impacts of military activities on MPAs. It is assumed that the MoD will incur additional costs in adjusting MESAT and other MoD environmental assessment tools in order to consider whether its activities will impact on the conservation objectives of MPAs and also incur additional costs in adjusting electronic charts to consider MPAs. However, these costs will be incurred at national level and hence no site-specific cost assessments have been made.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	
Description of one-off costs				
Description of recurring costs				
Description of non-quantified costs				
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)				
Total costs (2014–2033)	See national costs	See national costs	See national costs	
Average annual costs	See national costs	See national costs	See national costs	
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs	
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>				

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [LCR]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Tourism	Coastal areas are well represented when considering the locations of various tourist related sites within Scotland with a range of site types present in all regions including the West. Where significant impacts to recreational boating or water sports have been identified for the site, there could also be consequential impacts on tourism.	Tourism may benefit from the designation of the MPA as an added attraction to the destination. In addition, there may also be indirect benefits to tourism as a result of benefits to some water sports activities, for example, recreational angling.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN). LCR proposed MPA is a coastal site and is located wholly within 6nm of the UK coastline. Therefore sea angling overlaps with all features and there corresponding extents within the proposed MPA. No management restrictions upon this activity are required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation and corresponding management restrictions on sector activities including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA		[LCR]
Activity	Description	
Recreational Boating	There is one cruising route that intersects the LCR proposed MPA boundary that overlaps flame shell beds under all scenarios, although cruising routes are not expected to require any additional management measures. One mooring area owned by The Crown Estate is in close proximity to flame shell beds, although no management is required as there is no physical overlap. Any future expansion of the mooring area should not encroach on the flame shell bed extent.	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [LCR]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	No social impacts are expected.				
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [LCR]								
Sector/Impact	Location			Age			Gender	
	Region	Ports	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries	No social impacts are expected.							
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [LCR]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m	Gear Types/Sector	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long-term Sick
Commercial Fisheries	No social impacts are expected.							
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [LCR]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Flame shell beds	Provides representation for flame shell beds in OSPAR Region III.	Represents one of five recommended areas for protection of flame shell beds in Scottish seas.	Not currently understood for flame shell beds.	All records of flame shell beds are from OSPAR Region III. The recommended MPA areas would to some extent reflect the geographic range of flame shell beds in Scottish seas.	Not listed by OSPAR as threatened and/or declining although there is evidence of damage and decline on Scotland's seas. The MPA may increase resilience.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

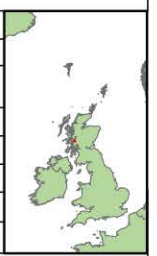
Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ⁴ [LCR]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Low. Habitats make small contribution to food webs.	Stocks not at MSY	Nil	Nil	Low	Minimal. Site fishing grounds have very low value	Minimal	High
Fish for non-human consumption		Stocks reduced from potential maximum	Nil	Nil	Low			
Gas and climate regulation	Nil	Nil	Nil	Nil	Nil	Moderate	Nil	High
Natural hazard protection	Minimal	Low	Nil			Low	Nil	High
Regulation of pollution	Minimal	Low	Nil	Nil	Low	Low	Nil - Minimal	High
Non-use value of natural environment	Low – protected feature, and contribution of the site to MPA network, have non-use value.	Non-use value of the site may decline, vulnerable to mobile bottom fishing gears	Nil, no change in key characteristics of site		Moderate – protection of feature of site from decline, possibly allowing some recovery	Low, Although flame shell is charismatic species, it is sites only feature	Nil - Moderate	Moderate
Recreation	Low	Limited activity	Nil		Minimal – slightly higher biodiversity encountered by boating	Low	Minimal	Moderate
Research and Education	Minimal	Nil - Low	Nil		Minimal	Low	Minimal	Moderate
Total value of changes in ecosystem services			Nil for lower scenario, Low for upper scenarios				Minimal	Moderate

⁴ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



- Proposed Marine Protected Area
- Ports & Harbours**
- Port Locations
- Aquaculture**
- Existing Shellfish Installations
- Existing Finfish Installations
- Recreational Boating**
- RYA Cruising Routes
- Light
- Medium
- Recreational Anchorages
- Mooring Areas
- Watersports**
- Sea Kayak Locations
- Scenic Boat Dive Sites
- ◆ Shore Dive Sites
- Sea Angling (6 nm from coast)

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:60,000	
QA		FMM	
4136-MPA_HA_Loch_Creran.mxd			
Produced by ABPmer			



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 Sources: RYA, 2008; Finstrokes, 2011; Marine Scotland, 2012; SNH, 2013. NOT TO BE USED FOR NAVIGATION

**Human Activities which Occur
 within the Proposed MPA:
 Loch Creran**

Loch Sunart (LSU)

Site Area (km²): 55

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [LSU]					
Proposed protected features					
<p><i>Biodiversity Features</i> Flame shell beds, northern feather star aggregations on mixed substrata, serpulid aggregations.</p> <p><i>Geodiversity Features</i> None.</p> <p><i>Site Description</i> The Loch Sunart MPA proposal mirrors that of the existing SAC, also encompassing Loch Teacuis. Loch Sunart is located on the west coast of Scotland, opening into the Sound of Mull.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Flame shell beds	*Lower: 0.25 Intermediate: 4.16 Upper: 27.05	Yes (Seasearch surveys, 1988, 1993, 1995)	Partial	Not known	Conserve
Northern feather star aggregations on mixed substrata	Lower: 0.34 Intermediate: 0.88 Upper: 27.16	Yes (MNCR sublittoral survey, 1989; MCS & JNCC survey, 1997)	Yes	Not known	Conserve
Serpulid aggregations	Lower: 0.20 Intermediate: 0.20 Upper: 0.20	Yes (2006 survey work)	Yes	Not known	Conserve
Geodiversity Features					
N/A					
<p>Key: * Estimated area based on best available data References: Area of Feature: GeMs Confidence in feature presence and extent: SNH (2012f)</p>					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [LSU]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Aquaculture (Finfish)	0.002	0.009	0.009
Aquaculture (Shellfish)	See national costs	See national costs	See national costs
Commercial Fisheries*	0.000	0.009	0.028
Military	See national costs	See national costs	See national costs
Ports and Harbours	0.000	0.000	0.005
Total Quantified Economic Costs	0.002	0.018	0.042
Non-Quantified Economic Costs			
Aquaculture (Finfish)	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment
Aquaculture (Shellfish)	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment
Commercial Fisheries	<ul style="list-style-type: none"> ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Displacement impacts.
Military	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment.
Ports and Harbours	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.
Recreational Boating	<ul style="list-style-type: none"> ▪ Cost of anchorage/mooring relocation. 	<ul style="list-style-type: none"> ▪ Cost of anchorage/mooring relocation. 	<ul style="list-style-type: none"> ▪ Cost of anchorage/mooring relocation.
<p>Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [LSU]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	0.024	0.024	0.024
Preparation of Statutory Instruments	0.004	0.004	0.004
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	None*	None*	<0.001*
Total Quantified Public Sector Costs	0.028	0.028	0.028
Non-Quantified Public Sector Costs			
None identified.			

* Regulatory and advisory costs of finfish and shellfish aquaculture assessed at national level.

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [LSU]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 0 jobs Upper: 0 jobs	West North West	Oban Mallaig	Impacts concentrated in urban and rural coastal areas	N/A	N/A	No Impact.	No breakdown of fisherman employment by ethnic origin.	No employment data but unlikely to be employed in fisheries.

Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [LSU]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use value of natural environment	Moderate - High. Variety of protected features and contribution of the site to MPA network has non-use values.	Nil - Moderate
Other Benefits		
Tourism	Higher biodiversity due to designation, and presence of designations, may attract more tourism activity to local economy.	
Contribution to ecologically coherent network	See report Section 7.5.	
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [LSU]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Flame shell beds	-	U	L/I/U	-	-	-	L/I/U	-	L/I/U	-	U	-	L/I/U	-	-	L/I/U	L/I/U
Northern feather star aggregations on mixed substrata	-	U	U	-	-	-	L/I/U	-	L/I/U	-	-	-	L/I/U	-	-	L/I/U	L/I/U
Serpulid aggregations	-	-	-	-	-	-	L/I/U	-	L/I/U	-	-	-	L/I/U	-	-	L/I/U	L/I/U
Geodiversity Features																	
N/A																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Aquaculture (Finfish) [LSU]			
<p>There are three finfish farms (Camas Glas, Glencripesdale and Invasion Bay) within the boundary of the LSU proposed MPA and all directly overlap with the Flame Shell Bed feature under the upper scenario only. Camas Glas and Invasion Bay are within 1km of this feature under the intermediate and upper scenarios and Glencripesdale is within 1km of the feature under the upper scenario only.</p> <p>Camas Glas and Glencripesdale both directly overlap with the Northern Feather star aggregations on mixed substrata under the upper scenario. Camas Glas is within 1km of the feature under the intermediate and upper scenarios and Glencripesdale is within 1km of the feature under the upper scenario.</p> <p>There is no public information on potential future development within the proposed MPA. In the absence of information on potential future developments, the assessment has focused on the costs associated with obtaining new CAR licences. A national assessment of the costs of obtaining planning permission for new developments is provided separately.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features; and ▪ Additional survey costs incurred once every 10 years (2019 & 2029) to inform new CAR licence applications. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features; and ▪ Additional survey costs incurred once every 10 years (2019 & 2029) to inform new CAR licence applications.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application; and ▪ Additional baseline visual survey costs -£1.6k per CAR licence application 	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application; and ▪ Additional baseline visual survey costs -£1.6k per CAR licence application
Description of recurring costs	<ul style="list-style-type: none"> ▪ None 	<ul style="list-style-type: none"> ▪ None 	<ul style="list-style-type: none"> ▪ None
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately. ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately. ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately. ▪ Costs of project delays during consenting; risk of deterrent to investment

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.003	0.013	0.013
Average annual costs	<0.001	0.001	0.001
Present value of total costs (2014–2033)	0.002	0.009	0.009
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4b. Aquaculture (Shellfish)		[LSU]
<p>There are four shellfish aquaculture sites (Camas Inas, Liddesdale, Rhuda Aird Beithe and Site 1) within the boundary of the LSU proposed MPA. All sites directly overlap with the Flame Shell Bed feature under the upper scenario. The Flame Shell Bed is also within the 1km buffer in the intermediate scenario for Camas Inas, Liddesdale, and Site and within the 1km buffer for Rhuda Aird Beithe under all scenarios.</p> <p>Camas Inas, Rhuda Aird Beithe and Site 1 directly overlap with the Northern Feather star aggregations on mixed substrata under the upper scenario.</p> <p>There is no public information on potential future development within the proposed MPA. In the absence of information on potential future developments, no site specific assessment has been possible. A national assessment of the costs of obtaining planning permission for new developments is provided separately.</p>		

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	▪ N/A	▪ N/A	▪ N/A
Description of one-off costs	▪ N/A	▪ N/A	▪ N/A
Description of recurring costs	▪ N/A	▪ N/A	▪ N/A
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	See national costs	See national costs	See national costs
Average annual costs	See national costs	See national costs	See national costs
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4c. Commercial Fisheries (assuming zero displacement of fishing activity) [LSU]

According to VMS-based estimates and ICES rectangle landings statistics, Nephrops trawls and dredges (over-15m) and pots, nephrops trawls, hand fishing and other gears (under-15m vessels) operate within the LSU proposed MPA. The value of landings from the LSU area was £2,690 (over-15m vessels) and £18,300 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels were predominantly into Oban (65%), Mallaig (11%), Ardnamurchan (10%) and Tobermory (8%). For the over-15m fleet, there was sparse activity by dredgers and nephrops trawlers in the west and central part of the proposed MPA across areas of flame shell beds and northern feather star aggregations.

Provisional ScotMap data indicate that the annual average earnings from the LSU proposed MPA was £41,100, with over 80% from Nephrops pots. Pots are only affected in the Upper Scenario within Loch Teacuis, and ScotMap data indicate that this area is not intensively fished by pots. The coverage for ScotMap interviews in the region was 63.8% (total value of reported landings from the Fisheries Information Network for those vessels included in the ScotMap value analysis expressed as a percentage of the total reported landings for all vessels <15m). Therefore the ScotMap estimate is likely to under-represent the value of fishing by under-15m vessels, and the spatial representation of the value of fishing is less robust than in regions where coverage is higher.

VMS data indicate that there are no non-UK vessels fishing within the LSU proposed MPA.

Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and SNH recommendations.

Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.

GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.

It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across serpulid aggregations and flame shell beds. 	<ul style="list-style-type: none"> ▪ Reduce mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) pressure by 25% across the MPA area. 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gears (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across full extent of MPA; and ▪ Closure to nets, lines and pots across Loch Teacuis (for serpulid aggregations).
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices):

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
	<ul style="list-style-type: none"> ▪ None. ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (<0.001); ▪ Nephrops trawls (<0.001); ▪ Other trawls (<0.001); ▪ Dredges (<0.001). 	<ul style="list-style-type: none"> ▪ Nephrops trawls (<0.001); ▪ Dredges (<0.001). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (<0.001); ▪ Nephrops trawls (0.001); ▪ Other trawls (<0.001); ▪ Dredges (<0.001). 	<ul style="list-style-type: none"> ▪ Nephrops trawls (0.001); ▪ Dredges (0.001). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (<0.001); ▪ Nephrops trawls (0.003); ▪ Other trawls (<0.001); ▪ Dredges (<0.001); ▪ Nets (<0.001); ▪ Pots (0.001).
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	<0.001	0.027	0.121
Average annual costs	<0.001	0.001	0.006
Present value of total costs (2014–2033)	<0.001	0.020	0.089
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	<0.001	0.013	0.038
Average annual change to GVA	<0.001	0.001	0.002
Present value of total change in GVA (2014–2033)	<0.001	0.009	0.028
Direct and Indirect reduction in Employment	0.0 jobs	0.0 jobs	0.1 jobs
<p>* Due to data confidentiality, the value of catches from the affected gear types has been summed together with other gear types that are not expected to be impacted by management measures. The cost impact is therefore an overestimate of the actual expected impact from the proposed management measures. Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4d. Military				[LSU]
<p>Two military practice areas (Staffa (X5627) and one submarine exercise area) overlap with the LSU proposed MPA.</p> <p>The military practice area Staffa (X5627) overlaps with flame shell beds (all scenarios), northern feather star (all scenarios) and serpulid aggregations (all scenarios).</p> <p>The submarine exercise area overlaps with 'flame shell beds' (all scenarios) and 'northern feather star' (all scenarios).</p> <p>The features and associated habitats which overlap with military activities have not been described as vulnerable to MoD activities in this proposed MPA. It is assumed that management relating to MoD activity will be coordinated through the MoD's Maritime Environmental Sustainability Appraisal Tool (MESAT) which the MoD uses to assist in meeting its environmental obligations. This process will include operational guidance to reduce significant impacts of military activities on MPAs. It is assumed that the MoD will incur additional costs in adjusting MESAT and other MoD environmental assessment tools in order to consider whether its activities will impact on the conservation objectives of MPAs and also incur additional costs in adjusting electronic charts to consider MPAs. However, these costs will be incurred at national level and hence no site-specific cost assessments have been made.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	
Description of one-off costs				
Description of recurring costs				
Description of non-quantified costs				
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)				
Total costs (2014–2033)	See national costs	See national costs	See national costs	
Average annual costs	See national costs	See national costs	See national costs	
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs	
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>				

Table 4e. Ports and Harbours		LSU	
<p>There is one port/harbour (Salen) within the LSU proposed MPA boundary. Salen overlaps with the MPA feature flame shell beds under the upper scenario only. Therefore, management costs may be incurred under the assumption that small ports/harbours will undergo one new development within the relevant time frame (2014-2033), assumed for the year 2024.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	▪ None.	▪ None.	▪ Additional licensing costs for small port developments (up to 1 in total).
Description of one-off costs	▪ None.	▪ None.	▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Salen).
Description of recurring costs	▪ None.	▪ None.	▪ None.
Description of non-quantified costs	▪ None.	▪ None.	▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	0.000	0.007
Average annual costs	0.000	0.000	0.000
Present value of total costs (2014–2033)	0.000	0.000	0.005
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>			

Table 4f. Recreational Boating	[LSU]
<p>One medium traffic cruising route for recreational boating intersects the LSU MPA proposal boundary, although vessels transiting along cruising routes are not assessed as requiring any additional management measures.</p> <p>Under the upper scenario there are five recreational boating anchorages within the MPA proposal that overlap with features proposed for protection. Four of the anchorages (and associated 100m buffer zones) overlap with feature extents for flame shell beds. The fifth anchorage overlaps with northern feather star aggregations on mixed substrata. A further 65 Crown Estate mooring points are present in the proposed MPA under the upper scenario that overlap with flame shell beds, serpulid aggregations and northern feather star aggregations on mixed substrata. Five larger moorings areas owned by The Crown Estate are also present and two additional mooring points lie within one of them, although it is expected that this is an underestimate and additional mooring points are present within the areas that are not represented by the data.</p> <p>Under the intermediate and lower scenarios, SNH have identified one recreational anchorage within Loch Teacius that overlaps with potential habitat for Serpulid growth, and one mooring area owned by The Crown Estate that overlaps with one point record of flame shell beds.</p>	

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Remove anchorage from the head of Loch Teacius and relocate elsewhere out of Loch Teacius. Whilst there is no overlap with Serpulid aggregations this feature has high sensitivity to the pressures associated with anchoring and anchorage may potentially inhibit further spatial growth of the habitat. Additionally, any anchoring elsewhere in the loch has the potential to impact this feature and result in the conservation objectives for the feature not being achieved. If not possible to relocate away from features, relocate to more representative area; and ▪ Relocate mooring area (after confirmation of presence by TCE) away from highly sensitive flame shell beds. 	<ul style="list-style-type: none"> ▪ Remove anchorage from the head of Loch Teacius and relocate elsewhere out of Loch Teacius. Whilst there is no overlap with Serpulid aggregations this feature has high sensitivity to the pressures associated with anchoring and anchorage may potentially inhibit further spatial growth of the habitat. Additionally, any anchoring elsewhere in the loch has the potential to impact this feature and result in the conservation objectives for the feature not being achieved. If not possible to relocate away from features, relocate to more representative area; and ▪ Relocate mooring area (after confirmation of presence by TCE) away from highly sensitive flame shell beds. 	<ul style="list-style-type: none"> ▪ Relocate all anchorages/moorings away from all features with a high or medium sensitivity to surface abrasion pressure associated with anchoring: flame shell beds; northern feather star aggregations on mixed substrata; serpulid aggregations. If not possible to relocate away from features, relocate to less sensitive or more representative area.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Cost of anchorage/mooring relocation. 	<ul style="list-style-type: none"> ▪ Cost of anchorage/mooring relocation. 	<ul style="list-style-type: none"> ▪ Cost of anchorage/mooring relocation.

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [LSU]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Tourism	Coastal areas are well represented when considering the locations of various tourist related sites within Scotland with a range of site types present in all regions including the West. Where significant impacts to recreational boating or water sports have been identified for the site, there could also be consequential impacts on tourism.	Tourism may benefit from the designation of the MPA as an added attraction to the destination. In addition, there may also be indirect benefits to tourism as a result of benefits to some water sports activities, for example, recreational angling and diving.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Scuba Diving	There are six dive locations within the LSU proposed MPA, three scenic boat dive sites (Risga pinnacle, Sligneach Beag and Sligneach Mhor) and three shore dive locations (Camas Torsa, Laudale Pier, Laudale Slip and Scot's Pine Bay). All six dive locations overlap with Flame Shell Beds and Northern Feature star aggregations on mixed substrata under the upper scenario. Risga pinnacle overlaps with Flame Shell Beds under both the upper and intermediate scenarios. No management restrictions upon this activity are required.	The added protection offered by an MPA designation and management measures placed upon sector activities may increase the aesthetic attraction of the dive sites through an improved marine ecosystem and a reduction in degradation to the wreck sites.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN). LSU proposed MPA is a coastal site and is located wholly within 6nm of the UK coastline. Therefore, sea angling overlaps with all features and there corresponding extents within the proposed MPA. No management restrictions upon this activity are required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation and corresponding management restrictions on sector activities including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA		[LSU]
Activity	Description	
None identified.		

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [LSU]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.00m Intermediate: <£0.01m Upper: <£0.01m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: <£0.01m Upper: <£0.01m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: x (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 0.0 jobs Upper: 0.1 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Displacement Effects	Not quantified	Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences: <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing 		x

			<p>grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited;</p> <ul style="list-style-type: none"> ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		
<p>Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [LSU]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries Reduction in landed value, GVA and employment	x West North-West	x Largest employment impacts in: Oban (95%), Mallaig (5%)	x Coastal Rural and Urban	0	0	xx Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0	0
Fish Processors Reduction in local landings at landing ports	0	0	0	0	0	0	0	0
<p>Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.</p>								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [LSU]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	N/A	N/A	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Fish Processors Reduction in local landings at landing ports		Shellfish: xxx Demersal: x Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

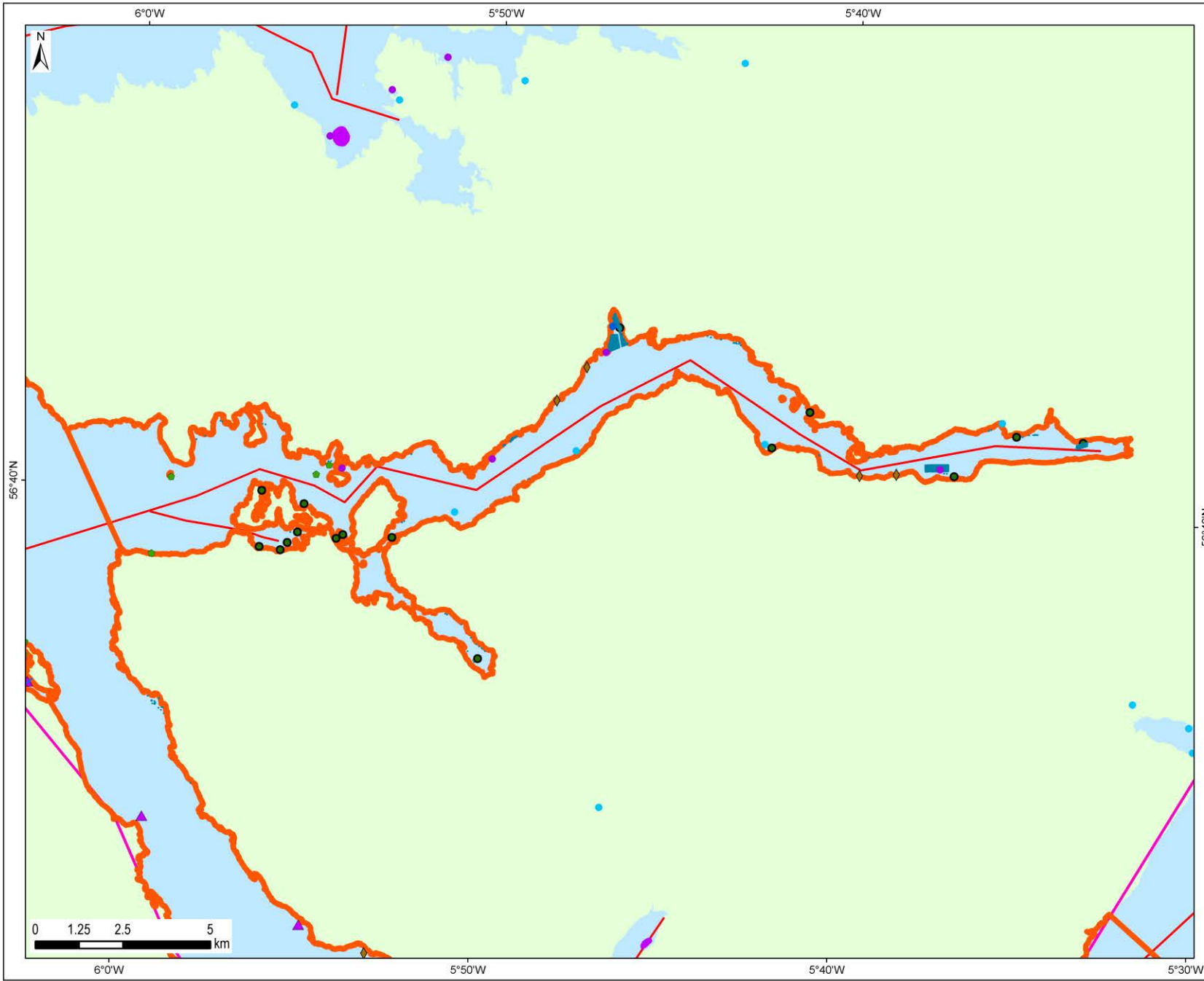
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [LSU]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Flame shell beds	Provides representation of the best and most extensive example of flame shell beds in OSPAR Region III.	Represents one of five recommended areas for flame shell beds in OSPAR Region III.	Not currently understood for flame shell beds.	All records of flame shell beds are from OSPAR Region III. The recommended MPA areas would to some extent reflect the geographic range of flame shell beds in Scottish seas.	Not listed by OSPAR as threatened and/or declining, although there is evidence of decline. The MPA may increase resilience.
Northern feather star aggregations on mixed substrata	Provides representation of northern feather star aggregations on mixed substrata in OSPAR Region III.	Represents one of three recommended areas for northern feather star aggregations on mixed substrata in OSPAR Region III.	Not currently understood for Northern feather star aggregations on mixed substrata.	All records of Northern feather star aggregations on mixed substrata are from OSPAR Region III.	
Serpulid aggregations	No information available.				
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ⁵ [LSU]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Stocks not at MSY	Minimal	Low. Some recovery of benthic species possible.		Moderate. Site fishing grounds are valuable	Minimal - Low	Moderate
Fish for non-human consumption		Stocks reduced from potential maximum	Minimal					
Gas and climate regulation	Nil - Low	Nil - Low	Nil	Nil	Low	Moderate	Nil	High
Natural hazard protection	Low	Low	Nil, won't affect stability of coastline			Low	Nil	High
Regulation of pollution	Low	Low	Nil	Minimal - Low, maintained by protecting seabed features		Low - Moderate, for recreational use of waters	Nil - Low	High
Non-use value of natural environment	Moderate – High, protected features, and contribution of the site to MPA network, have non-use value.	Non-use value of the site may decline	Nil, no change in key characteristics of site	Low – protection of key characteristics of site from minor decline	Moderate – protection of key characteristics of site from decline, and/or allowing some recovery of values	Moderate	Nil - Moderate	Low
Recreation	Moderate	7 active dive sites, Sea angling	Nil	Low – slightly higher biodiversity encountered by divers		Moderate	Low	Moderate
Research and Education	Moderate	Biological and geological features have research value but there are substitutes	Nil, no change in key characteristics of site	Low – protection of key characteristics of site from decline, improving future research opportunities		Low	Nil - Low	Low
Total value of changes in ecosystem services			Low for lower scenario, moderate for upper scenarios				Low - Moderate	Low

⁵ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



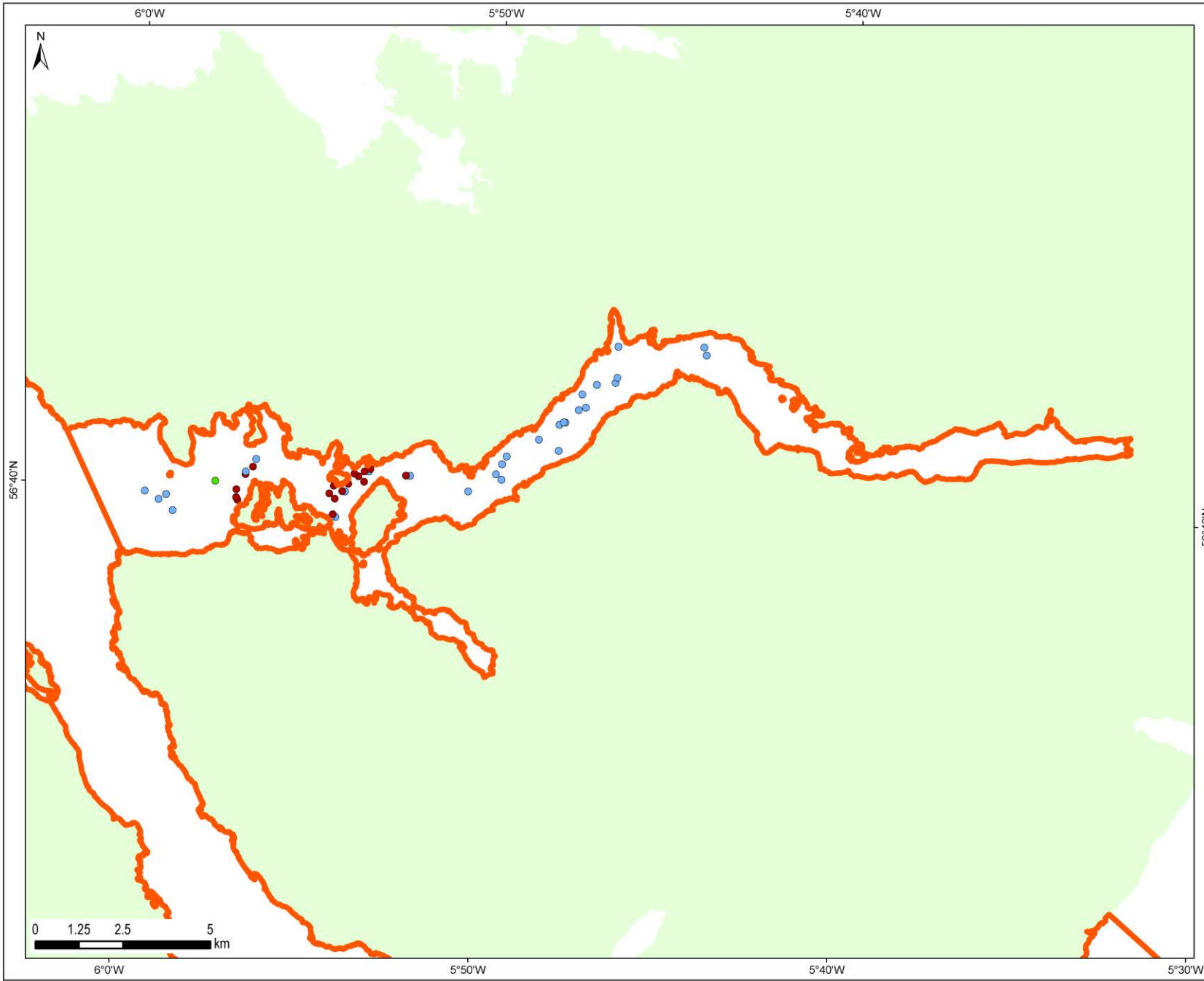
- Proposed Marine Protected Area
- Aquaculture**
- Existing Shellfish Installations
- Existing Finfish Installations
- Ports & Harbours**
- Port Locations
- Anchorage Areas
- Power Interconnectors**
- Existing Power Interconnectors
- Recreational Boating**
- RYA Cruising Routes
- Medium
- Recreational Anchorages
- Recreational Marinas
- Mooring Areas
- Watersports**
- Sea Kayak Locations
- Scenic Boat Dive Sites
- ◆ Shore Dive Sites
- ★ Submarine Dive Sites
- ▲ Wreck Dive Sites
- Sea Angling (6 nm from coast)

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System	WGS 1984 UTM Zone 30N		
Projection	Transverse Mercator		
Scale	1:148,000		
QA	FMM		
4136-MPA_HA_Loch_Sunart.mxd			
Produced by ABPmer			



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**Human Activities which Occur
within the Proposed MPA:
*Loch Sunart***



- Proposed Marine Protected Area
- VMS Fishing Ping Data (2007 to 2011)
 - Nephrops Trawls
 - Dredges
 - Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:148,000	
QA		FMM	
4136-MPA_Fish_Loch_Sunart.mxd			
Produced by ABPmer			



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 Data Source: Scottish Government, 2013
 NOT TO BE USED FOR NAVIGATION

**Fishing Activities which Occur
 within the Proposed MPA:
 Loch Sunart**

Loch Sunart to the Sound of Jura (SJU)

Site Area (km²): 795

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [SJU]					
Proposed protected features					
<i>Biodiversity Features</i> Common skate.					
<i>Geodiversity Features</i> Quaternary of Scotland – glaciated channels/troughs (other features to be confirmed by SNH).					
<i>Site Description</i> The Loch Sunart to the Sound of Jura MPA proposal extends northwards from the Sound of Jura, covering the Firth of Lorn and the south-western part of Loch Linnhe. The proposal site extends through the Sound of Mull and into Loch Sunart.					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Common skate	*Lower: 795.04 Intermediate: 795.04 Upper: 795.04	Yes (Marine Scotland Science trawl data, 1975 – present; MSS tagging, 2011 – 2013)	Yes	Not known	Conserve
Geodiversity Features					
Quaternary of Scotland – glaciated channels/troughs (other features to be confirmed by SNH)	87.74	Yes (Nature conservation work)	Partial – need to define additional components	Not known	Conserve
Key: * Estimated area based on best available data References: Area of Feature: GeMs Confidence in feature presence and extent: SNH (2012g)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [SJU]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Aquaculture (Finfish)	0.018	0.076	0.076
Aquaculture (Shellfish)	See national costs	See national costs	See national costs
Commercial Fisheries*	0.000	1.447	3.437
Energy Generation	0.037	0.229	0.229
Military	See national costs	See national costs	See national costs
Ports and Harbours	0.053	0.053	0.053
Total Quantified Economic Costs	0.108	1.804	3.794
Non-Quantified Economic Costs			
Aquaculture (Finfish)	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment
Aquaculture (Shellfish)	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment
Commercial Fisheries	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Displacement impacts.
Energy Generation	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.
Military	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment.
Ports and Harbours	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.
<p>Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [SJU]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	0.024	0.024	0.024
Preparation of Statutory Instruments	None	0.004	0.004
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.009*	0.009*	0.009*
Total Quantified Public Sector Costs	0.033	0.037	0.037
Non-Quantified Public Sector Costs			
None identified.			

* Regulatory and advisory costs of finfish and shellfish aquaculture assessed at national level.

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [SJU]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 3 jobs Upper: 5 jobs	West West	Oban Campbeltown	Impacts concentrated in urban and rural coastal areas	Nephrops trawls Dredges	Lower: N/A Upper: >15m	No Impact.	No breakdown of fisherman employment by ethnic origin.	No employment data but unlikely to be employed in fisheries.

If any energy generation developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).

Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [SJU]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use value of natural environment	Moderate. Protected features are endangered species and wrecks, and contribution of the site to MPA network has non-use values. Wrecks are protected by virtue of designation under what are soon to become Historic MPAs.	Minimal - Moderate
Other Benefits		
Tourism	Higher biodiversity due to designation, and presence of designations, may attract more tourism activity to local economy.	
Contribution to ecologically coherent network	See report Section 7.5.	
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [SJU]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Common skate	-	L/I/U	L/I/U	-	-	-	L/I/U	L/I/U	L/I/U	-	L/I/U	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Geodiversity Features																	
Quaternary of Scotland – glaciated channels/troughs (other features to be confirmed by SNH)	Not considered to be sensitive at the levels of exposure expected from human activities; thus, not considered in the context of management.																
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Aquaculture (Finfish) [SJU]			
<p>There are 21 finfish farms Ardmaddy, Bagh Dail Nan Cean, Bloody Bay, Camas Glas, Eilean Coltair, Fishnish (A), Fishnish (B), Glencripesdale, Invasion Bay, Kames Bay (east), Kames Bay (west), Kerrera A, Kerrera B, Lismore West, Lunga East Side, Poll Na Gille, Port Na Cro, Scallastle, Shuna Castle and Site 10 Rubha a'Mhothair, Walters (East Lismore) within the SJU proposed MPA boundary. All 21 sites directly overlap with the feature Common Skate under all scenarios (lower, intermediate and upper). There are three additional finfish farms within 1km of the proposed MPA boundary under all scenarios (Ardifuir, Dunstaffnage and Site 9 Camas Nathais).</p> <p>There is one pending finfish farm (Ardmaddy fish farm) within the boundary of the proposed MPA and will directly overlap the Common Skate feature under all scenarios. This site is assessed assuming it is fully licensed by 2014.</p> <p>There is no public information on potential future development within the proposed MPA. In the absence of information on potential future developments, no site specific assessment has been possible. A national assessment of the costs of obtaining planning permission for new developments is provided separately.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features; and ▪ Additional survey costs incurred once every 10 years (2019 & 2029) to inform new CAR licence applications. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features; and ▪ Additional survey costs incurred once every 10 years (2019 & 2029) to inform new CAR licence applications.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application; and ▪ Additional baseline visual survey costs -£1.6k per CAR licence application 	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application; and ▪ Additional baseline visual survey costs -£1.6k per CAR licence application
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.025	0.105	0.105
Average annual costs	0.001	0.005	0.005
Present value of total costs (2014–2033)	0.018	0.076	0.076
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4b. Aquaculture (Shellfish) [SJU]

There are 21 shellfish farms (Acairseid Mhor, Ardfad, Ardshellach, Aros Estuary, Balvicar, Camas Inas, Cutter Rock, East Balvicar, Gigas, Liddesdale, Lismore Seafoods, Melfort, Oitir Mhor Bay, Port Na Coite, Rhuda Aird Beithe, Sgeir Liath, Sgeir Liath – Mhor, Site 1 and Tobermory Bay) within the SJU proposed MPA boundary . All 21 sites directly overlap with the feature Common Skate under all scenarios (lower, intermediate and upper). There are three additional shellfish farms within 1km of the proposed MPA boundary under all sceneraios (Husky, Loch Crinan and Portmor).

There is no public information on potential future development within the proposed MPA. In the absence of information on potential future developments, no site specific assessment has been possible. A national assessment of the costs of obtaining planning permission for new developments is provided separately.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	▪ N/A	▪ N/A	▪ N/A
Description of one-off costs	▪ N/A	▪ N/A	▪ N/A
Description of recurring costs	▪ N/A	▪ N/A	▪ N/A
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	See national costs	See national costs	See national costs
Average annual costs	See national costs	See national costs	See national costs
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4c. Commercial Fisheries (assuming zero displacement of fishing activity) [SJU]

According to VMS-based estimates and ICES rectangle landings statistics, Dredges, nephrops trawls, whifefish trawls, hand fishing and other gears (over-15m) and pots, nephrops trawls, dredges and other gears (under-15m vessels) operate within the SJU proposed MPA. The value of catches from the SJU area was £710,000 (over-15m vessels) and £490,000 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels were predominantly into Oban (51% by value), Crinan (16%) and Cuan (8%). For the over-15m fleet, dredgers and nephrops trawlers operated in particular over the whole proposed MPA and across the common skate feature.

Provisional ScotMap data indicate that the annual average earnings from the SJU proposed MPA was £1,153,800, with over 80% of this from pots, and 13% from diving, neither of which are expected to be affected by management measures assessed under the scenarios. The spatial distribution of value from Nephrops trawls indicates that the majority of value from the relevant ICES rectangles (41E4, 42E3 and 42E4) is derived from the area outside the SJU proposed MPA. It is likely that the ICES rectangle estimate for the cost impact on <15m nephrops trawls is an over-estimate. ScotMap data would indicate an annual cost impact of around £0.04 million on <15m Nephrops trawls under the Upper Scenario. Provisional ScotMap data also indicate minimal dredge activity within the SJU area, suggesting that the estimate from ICES rectangle data for dredges is also an over-estimate. The coverage for ScotMap interviews in the region was 63.8% (total value of reported landings from the Fisheries Information Network for those vessels included in the ScotMap value analysis expressed as a percentage of the total reported landings for all vessels <15m). Therefore the ScotMap estimate is likely to under-represent the value of fishing by under-15m vessels, and the spatial representation of the value of fishing is less robust than in regions where coverage is higher.

VMS data indicate that there were 4 non-UK vessels within the SJU proposed MPA (3 Irish and 1 Norwegian), but these vessels will not have been actively fishing within the proposed MPA, which is within 6nm, and is more likely to have been transiting the area.

Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and SNH recommendations. Common skate are distributed throughout the proposed MPA area and although there is no targeted fishery for skate (retention of common skate on board is prohibited), skate may be caught as bycatch in other fisheries.

The Clyde Fishermen’s Association have indicated that the value of the scallop fishery in the area is likely to be greater than the value indicated for dredges in the Upper scenario and would increase if the Firth of Lome area were to reopen to scallop dredging.

Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.

GVA estimates have been generated by applying fleet segment-specific ‘GVA/total income’ ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.

It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No cost impacts expected. 	<ul style="list-style-type: none"> ▪ Reduce mobile bottom-contact gear (whitefish, nephrops and other trawls) 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gears (whitefish, nephrops and other

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
		and seines, beam trawls and dredges) pressure by 50% across the MPA area.	trawls and seines, beam trawls and dredges) across full extent of MPA.
Description of one-off costs	▪ None.	▪ None.	▪ None.
Description of recurring costs	▪ None.	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Dredges (0.139); ▪ Other affected gears (0.050). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.036); ▪ Dredges (0.007); ▪ Other affected gears (0.001). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Dredges (0.277); ▪ Other affected gears (0.100). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.073); ▪ Dredges (0.014); ▪ Other affected gears (0.002).
Description of non-quantified costs	▪ None.	▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.	▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	4.647	9.294
Average annual costs	0.000	0.232	0.465
Present value of total costs (2014–2033)	0.000	3.418	6.835
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.000	1.967	4.673
Average annual change to GVA	0.000	0.098	0.234
Present value of total change in GVA (2014–2033)	0.000	1.447	3.437
Direct and Indirect reduction in Employment	0.0 jobs	2.6 jobs	5.3 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers</p>			

Table 4d. Energy Generation				[SJU]
<p>There are no energy generation activities currently operating within the SJU proposed MPA boundary or corresponding buffer zones. Thus, economic costs and management measures associated with energy generation in this proposed MPA are described in light of known possible future developments. Two possible export cable routes (north and south of the Isle of Mull) for the potential Argyll Array Windfarm (ScottishPower Renewables, project currently on hold, up to 1800MW capacity) overlap the OSPAR and BAP designated MPA mobile species feature 'Common Skate' under all scenarios. Note, only one of these export cable routes will be chosen upon application. Three potential future export cable routes from offshore wind, wave and tidal energy Areas of Search (AoS) overlap the MPA feature Common Skate extents under all scenarios. Additional assessments of potential impacts to Common Skate feature will be required for all of these potential future developments under all scenarios. While Common Skate may be sensitive to electromagnetic fields (EMF) associated with live power cables, it has been assumed that no additional mitigation measures would be required beyond existing good practice (burial to 1-2m in sediment habitats). Therefore, no additional mitigation costs would be attributable to the designation of the proposed MPA. However, additional post-licence monitoring costs may be incurred for intermediate and upper scenarios.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to Common Skate within 1km of proposed activities. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to Common Skate within 1km of proposed activities; and ▪ Additional post-licence monitoring of any features within 1km of development footprint in year 3 following construction. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to Common Skate within 1km of proposed activities; and ▪ Additional post-licence monitoring of any features within 1km of development footprint in year 3 following construction. 	
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k per licence application (up to 4 in total). Application(s) estimated to be submitted in 2015 (Argyll Array Windfarm) and 2024 (wind, wave and tidal energy AoS). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k per licence application (up to 4 in total). Application(s) estimated to be submitted in 2015 (Argyll Array Windfarm) and 2024 (wind, wave and tidal energy AoS); and ▪ Additional post-licence monitoring costs - £5k per linear km of development in year 3 following construction (20km). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k per licence application (up to 4 in total). Application(s) estimated to be submitted in 2015 (Argyll Array Windfarm) and 2024 (wind, wave and tidal energy AoS); and ▪ Additional post-licence monitoring costs - £5k per linear km of development in year 3 following construction (wind, wave & tidal energy AoS export cable route, 20km). 	
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)				
Total costs (2014–2033)	0.048	0.348	0.348	
Average annual costs	0.002	0.017	0.017	
Present value of total costs (2014–2033)	0.037	0.229	0.229	
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>				

Table 4e. Military				[SJU]
<p>Fifteen military practice areas (Jura Sound (X5623), Linnhe (X5624), Staffa (X5627) and Mull (X5628); and 11 submarine exercise areas) overlap with the feature common skate of the SJU proposed MPA under all scenarios (lower, intermediate and upper).</p> <p>The features and associated habitats which overlap with military activities have not been described as vulnerable to MOD activities in this proposed MPA. It is assumed that management relating to MOD activity will be coordinated through the MOD's Maritime Environmental Sustainability Appraisal Tool (MESAT) which the MOD uses to assist in meeting its environmental obligations. This process will include operational guidance to reduce significant impacts of military activities on MPAs. It is assumed that the MoD will incur additional costs in adjusting MESAT and other MoD environmental assessment tools in order to consider whether its activities will impact on the conservation objectives of MPAs and also incur additional costs in adjusting electronic charts to consider MPAs. However, these costs will be incurred at national level and hence no site-specific cost assessments have been made.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	
Description of one-off costs				
Description of recurring costs				
Description of non-quantified costs				
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)				
Total costs (2014–2033)	See national costs	See national costs	See national costs	
Average annual costs	See national costs	See national costs	See national costs	
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs	
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>				

Table 4f. Ports and Harbours		SJU	
<p>There are 11 ports/harbours (Ardnamurchan, Balvicar, Cuan, Luing, Oban NLB Base, Oban North Pier, Oban Railway Pier, Salen, Tayvallich, Tobermory and Toberonochy) within the SJU proposed MPA boundary that all overlap with feature extents for common skate under all scenarios. Therefore, management costs may be incurred under the assumption that small ports/harbours will undergo one new development within the relevant time frame (2014-2033), assumed for the year 2024.</p> <p>There are 14 anchorages/mooring areas within the SJU proposed MPA boundary, all of which overlap the feature common skate under all scenarios.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 11 in total). 	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 11 in total). 	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 11 in total).
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Ardnamurchan, Balvicar, Cuan, Luing, Oban NLB Base, Oban North Pier, Oban Railway Pier, Salen, Tayvallich, Tobermory and Toberonochy). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Ardnamurchan, Balvicar, Cuan, Luing, Oban NLB Base, Oban North Pier, Oban Railway Pier, Salen, Tayvallich, Tobermory and Toberonochy). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Ardnamurchan, Balvicar, Cuan, Luing, Oban NLB Base, Oban North Pier, Oban Railway Pier, Salen, Tayvallich, Tobermory and Toberonochy).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.074	0.074	0.074
Average annual costs	0.004	0.004	0.004
Present value of total costs (2014–2033)	0.053	0.053	0.053
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [SJU]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Tourism	Coastal areas are well represented when considering the locations of various tourist related sites within Scotland with a range of site types present in all regions including the West. Where significant impacts to recreational boating or water sports have been identified for the site, there could also be consequential impacts on tourism.	Tourism may benefit from the designation of the MPA as an added attraction to the destination. In addition, there may also be indirect benefits to tourism as a result of benefits to some water sports activities, for example, recreational angling and diving.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Scuba Diving	There are 42 dive locations within the SJU proposed MPA, ten scenic dive sites, ten shore dive sites and 22 wreck dive sites. All 42 dives sites overlap with the 'Common Skate' under all scenarios. No management restrictions upon this activity are required.	The added protection offered by an MPA designation and management measures placed upon sector activities may increase the aesthetic attraction of the dive sites through an improved marine ecosystem and a reduction in degradation to the wreck sites.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN). The SJU proposed MPA is a coastal site and is located wholly within 6nm of the UK coastline. Therefore sea angling overlaps with all features and there corresponding extents within the proposed MPA. No management restrictions upon this activity are required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation and corresponding management restrictions on sector activities including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are present but which would be Unaffected by Designation of the Site as an MPA [SJU]	
Activity	Description
Coastal Defence	There is one artificial coastal protection within the boundary of the SJU proposed MPA which overlaps with the common skate under all scenarios. This development is assessed as having no impact upon this feature and so the activity will be unaffected by the designation of the MPA.
Power Interconnectors	11 existing power interconnectors overlap with the SJU proposed MPA. All power interconnectors overlap with common skate (all scenarios). An additional power interconnector is also within 1km of the common skate feature of the MPA (all scenarios). No cost impacts are foreseen, as it is assumed that there will be no review of the existing consents
Recreational Boating	<p>There are eleven recreational boating cruising routes that intersect the SJU proposed MPA with traffic ranging from light to heavy, although cruising routes are not expected to incur any management or assessment costs.</p> <p>There are 16 recreational boating anchorages and 148 and 26 Crown Estate mooring points and areas respectively within the SJU proposed MPA boundary that overlap with features proposed for protection (feature extents show that all anchorages and associated 100m buffer zones overlap with the common skate under all scenarios). However, no specific management measures are assessed as being necessary. Relocation of anchorages/moorings to another area within the MPA will likely have no significant benefits, as the feature extent for common skate - as a mobile species - encompasses the whole of the proposed MPA site. Common skate are also expected to be sufficiently mobile to avoid any direct impacts arising from recreational boating anchorages such as surface and sub-surface abrasion. Furthermore, there is uncertainty regarding interaction with common skate egg cases and the areas and depths at which they are laid.</p> <p>It should be noted that the number of crown estate mooring points may be an underestimate. A number of additional individual mooring points are located within the larger mooring areas, although it is expected that more will be present that are not represented by the data.</p>
Water Sports – Sea Kayaking	Kayaking is popular around the coast of Mull including areas within SJU proposed MPA. Water sports activities including kayaking are not assessed as requiring any additional management measures. It is also considered that no additional benefit to kayaking from management measures applied to other activities will occur.

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [SJU]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA.	Annual Average Loss in Value of Landings*: Lower: £0.00m Intermediate: £0.23m Upper: £0.47m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: £1.44m Upper: £3.44m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: xx (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 2.6 jobs Upper: 5.3 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Displacement Effects	Not Quantified	Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences: <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing 		xx

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			<p>grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited;</p> <ul style="list-style-type: none"> ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		
Energy Generation	Additional operational costs	Quantified Cost Impact (2014–2033): £0.037 – 0.229m	Future employment opportunities – if increased operational costs associated with management measures render projects unviable or restrict project size there will be a negative impact on economic activity and job creation in this sector.		0
	Costs associated with delays during the consenting process Loss of investor confidence (developments do not proceed)	Not Quantified	<p>Future employment opportunities – if the delays deter investments there will be a negative impact on economic activity and future job creation in this sector.</p> <p>Environment – possible negative impact in relation to climate change and the ability of the Scottish Government to meet its 2020 renewables targets, decarbonisation targets and climate change targets. There would also be consequent financial implications of climate change impacts.</p> <p>This impact is uncertain and is only likely to arise under the upper scenario. JNCC’s current advice is that the intermediate scenario represents their best view on management requirements.</p>		xxx (under the upper scenario only)
<p>Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [SJU]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries Reduction in landed value, GVA and employment	xx West	xx Largest employment impacts in: Oban (84%), Campbeltown (4%)	xx Coastal Urban and Rural	xxx Potentially significant negative effect if parent loses job/becomes unemployed.	xxx Potentially significant negative effect if individuals lose job/become unemployed.	xx Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	xxx 0-5 job losses Potentially significant negative effect on individuals that lose job/become unemployed.	xxx Potentially significant negative effect if member of household loses job/becomes unemployed.
Fish Processors Reduction in local landings at landing ports	x West North-West	x Oban Crinan Cuan Tobermory Luig Mallaig Ardnamurchan	x Coastal Urban and Rural	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [SJU]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: >15m	Nephrops trawls Dredges	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Fish Processors Reduction in local landings at landing ports		Shellfish: xxx Demersal: xx Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

Potential Contribution of the Site to an Ecologically-Coherent Network

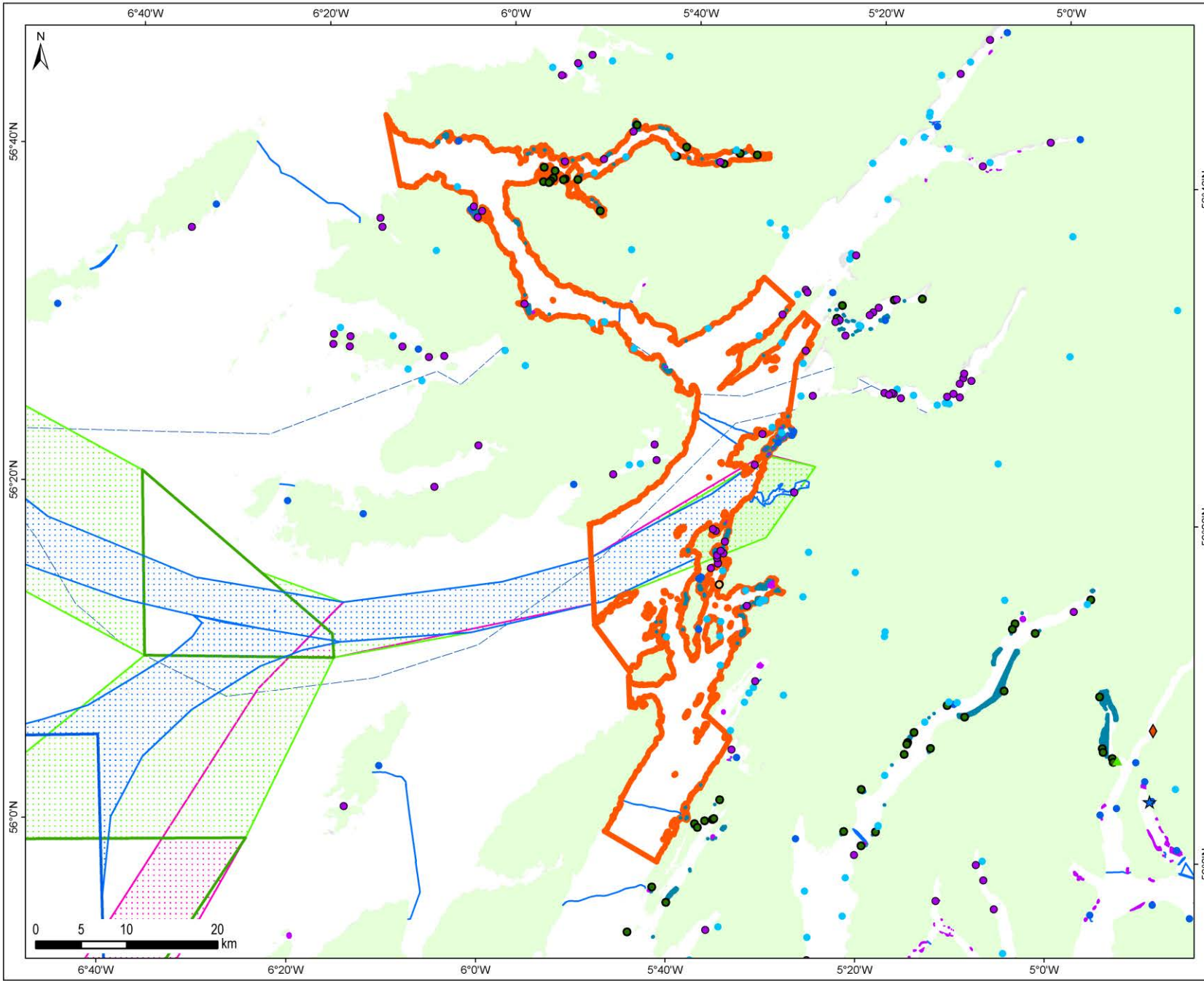
Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [SJU]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Common skate	Provides representation for the only MPA search area identified for common skate in OSPAR Region III; where large, mature individuals are believed to be resident.	Represents the only area in which common skate have been identified.		Represents the only MPA search area in which common skate are believed to reside.	Listed by OSPAR as threatened and/or declining. The MPA area may increase resilience.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ⁶ [SJU]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Stocks not at MSY, Skate endangered	Nil	Low, impact of preventing bycatch on populations of Skate and other species uncertain		Moderate. Common Skate is potentially a commercial species	Nil - Low	Low
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Nil - Low	Nil - Low	Nil	Low	Low	Moderate	Nil - Minimal	High
Natural hazard protection	Low	Low	Nil, would not affect stability of coastline			Low	Nil	High
Regulation of pollution	Low	Low	Nil	Nil - Low, maintained by protecting seabed features		Low - Moderate, for recreational use of waters	Nil - Minimal	High
Non-use value of natural environment	Moderate – protected feature is endangered species, wrecks (designated under future Historic MPAs) and contribution of the site to MPA network, have non-use value.	Non-use value of the site may decline	Minimal, no change in key characteristics of site	Low - Moderate, protection of key characteristics of site from decline, and/or allowing some recovery of values		Moderate	Minimal - Moderate	Low
Recreation	Moderate	42 active dive sites, boating anchorages, sea angling	Nil	Low, slightly higher biodiversity encountered by divers and boating		Moderate, important contribution to halting loss of one species	Nil - Low	Moderate

⁶ This tables is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ⁶ [SJU]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Research and Education	Moderate	Biological feature has research value, and has few substitutes	Nil, no change in characteristics of site	Low - Moderate, protection of key characteristics of site from decline, improving future research opportunities		Low	Nil - Low	Low
Total value of changes in ecosystem services			Nil for lower scenario, Low - Moderate for upper scenario				Nil - Low	Low



Proposed Marine Protected Area

Aquaculture

- Existing Shellfish Installations
- Existing Finfish Installations
- Finfish Installations Under Application

Coast Protection

- Artificial Protections (Dykes)

Military Coastal Locations

- Explosives Jetty
- Naval Base
- Noise Range

Ports & Harbours

- Port Locations
- Anchorage Areas

Power Interconnectors

- Existing Power Interconnectors

Energy Generation

- Draft Plan Option Areas - Wind
- Indicative Cable Routes - Wind
- Draft Plan Option Areas - Wave
- Indicative cable routes - Wave
- Indicative cable routes - Tidal
- Potential Cable Route

Recreational Boating

- Recreational Anchorages
- Mooring Areas

Date	By	Size	Version
Jul 13	TAP	A4	1

Coordinate System	WGS 1984 UTM Zone 30N
Projection	Transverse Mercator
Scale	1:570,000
QA	FMM

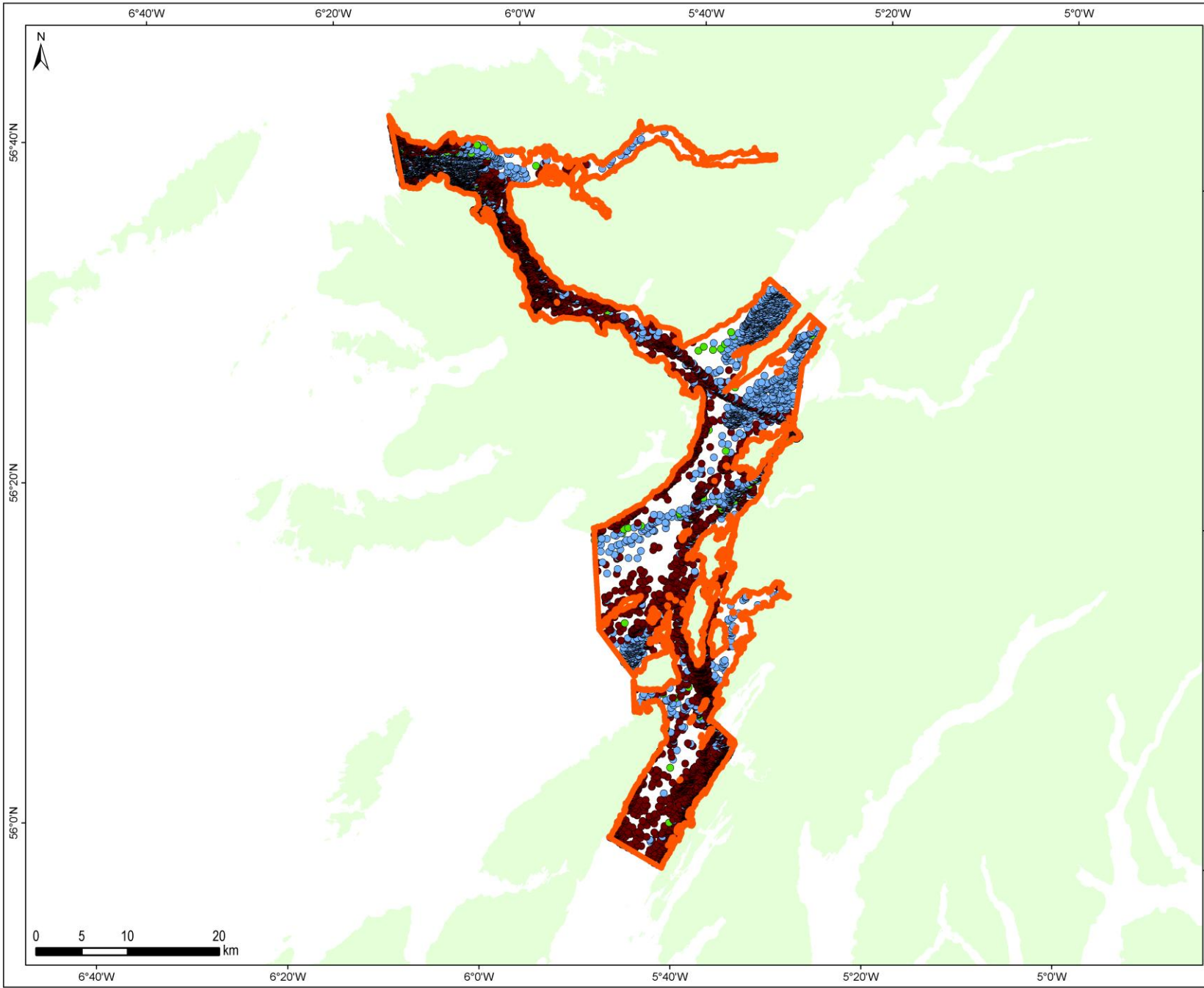
4136-MPA_HA_Sunart_Sound_Jura.mxd

Produced by ABPmer

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Human Activities which Occur within the Proposed MPA:
Loch Sunart to the Sound of Jura



- Proposed Marine Protected Area
- VMS Fishing Ping Data (2007 to 2011)
 - Nephrops Trawls
 - Dredges
 - Pots
 - Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:570,000	
QA		FMM	
4136-MPA_Fish_Sunart_Sound_Jura.mxd			
Produced by ABPmer			



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 Data Source: Scottish Government, 2013
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Fishing Activities which Occur within the Proposed MPA:
Loch Sunart to the Sound of Jura

Loch Sween (LSW)

Site Area (km²): 40

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [LSW]					
Proposed protected features					
<p><i>Biodiversity Features</i> Burrowed mud, maerl beds, native oysters, sublittoral mud and mixed sediment communities.</p> <p><i>Geodiversity Features</i> None.</p> <p><i>Site Description</i> The Loch Sween MPA proposal encompasses Loch Sween and the tide-swept waters around the mouth of the Sound of Jura that surround the Island of Danna and the McCormaig Isles. Loch Sween is a typical fjordic loch orientated from south-west to north-east.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Burrowed mud	*Lower: 16.62 Intermediate: 16.62 Upper: 21.80	Yes (SEPA surveys, 2009 & 2010)	Yes	Not known	Conserve
Maerl beds	Lower: 0.37 Intermediate: 0.37 Upper: 1.49	Yes (SNH video survey, 2008)	Yes	Not known	Conserve
Native oysters	Lower: 1.92 Intermediate: 1.92 Upper: 1.92	Yes (SNH funded PhD surveys, 2004 & 2005)	Yes	Not known	Conserve
Sublittoral mud and mixed sediment communities	Included with Burrowed mud feature extent	Yes (Nature Conservancy Council surveys, 1980s)	Yes	Not known	Conserve
Geodiversity Features					
N/A					
<p>Key: * Estimated area based on best available data References: Area of Feature: GeMs Confidence in feature presence and extent: SNH (2012h)</p>					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [LSW]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries*	0.018	0.051	0.126
Military	See national costs	See national costs	See national costs
Ports and Harbours	0.000	0.000	0.005
Total Quantified Economic Costs	0.018	0.051	0.131
Non-Quantified Economic Costs			
Commercial Fisheries	▪ Displacement impacts.	▪ Displacement impacts.	▪ Displacement impacts.
Military	▪ See national assessment.	▪ See national assessment.	▪ See national assessment.
Ports and Harbours	▪ Relocation of anchorages/ mooring areas away from features of high sensitivity.	▪ Relocation of anchorages/ mooring areas away from features of high and medium sensitivity.	▪ Relocation of anchorages/ mooring areas away from features of high and medium sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Recreational Boating	○ Cost of anchorage relocation.	○ Cost of anchorage relocation.	○ Cost of anchorage relocation.
Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [LSW]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	0.004	0.004	0.004
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	None	None	<0.001
Total Quantified Public Sector Costs	0.004	0.004	0.004
Non-Quantified Public Sector Costs			
None			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [LSW]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 0 jobs Upper: 0 jobs	West West Isle of Man	Oban Campbeltown Douglas	Impacts concentrated in urban and rural coastal areas	Nephrops trawls	Lower: N/A Upper: <15m	No Impact.	No Impact	No employment data but unlikely to be employed in fisheries.

Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [LSW]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use value of natural environment	Moderate - High. Variety of protected features and contribution of the site to MPA network has non-use values.	Low - Moderate
Recreation	Moderate - High. Including 1 active dive site, angling and recreational boating routes.	Low - Moderate
Research and Education	Moderate. Site contains accessible examples of unusual marine features.	Low - Moderate
Other Benefits		
Tourism	Higher biodiversity due to designation, and presence of designations, may attract more tourism activity to local economy.	
Contribution to ecologically coherent network	See report Section 7.5.	
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [LSW]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Burrowed mud	-	-	-	-	-	-	L/I/U	-	L/I/U	-	L/I/U	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Maerl beds	-	-	-	-	-	-	L/I/U	-	L/I/U	-	U	U	L/I/U	-	-	L/I/U	L/I/U
Native oysters	-	-	-	-	-	-	L/I/U	-	L/I/U	-	-	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Geodiversity Features																	
N/A																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity)	[LSW]
<p>According to VMS-based estimates and ICES rectangle landings statistics, dredges and nephrops trawls (over-15m) and nephrops trawls, pots, dredges and other gears (under-15m vessels) operate within the LSW proposed MPA. The value of landings from the LSW area was £36,100 (over-15m vessels) and £62,000 (under-15m vessels, indicated from ICES rectangle landings data) (average for 2007–2011, 2012 prices). Landings from the over-15m vessels are made predominantly into Oban (40% by value), Tayinloan (19%), West Loch Tarbert (18%), Tayvallich (12%) and Crinan (9%). For the over-15m fleet, there was sparse activity by dredgers and nephrops trawlers across the proposed MPA.</p> <p>Provisional ScotMap data indicate that the annual average earnings from the LSW proposed MPA was £74,900, predominantly from pots and diving, which will not be impacted by management measures. The spatial distribution of value from Nephrops trawls indicates that the area is only lightly fished by Nephrops trawls and not fished by dredges and therefore the ICES rectangle estimates for the cost impact on <15m Nephrops trawls and on dredges are over-estimates. The coverage for ScotMap interviews in the region was 63.8% (total value of reported landings from the Fisheries Information Network for those vessels included in the ScotMap value analysis expressed as a percentage of the total reported landings for all vessels <15m). Therefore the ScotMap estimate is likely to under-represent the value of fishing by under-15m vessels, and the spatial representation of the value of fishing is less robust than in regions where coverage is higher.</p> <p>VMS data indicate that there are no foreign vessels fishing within the LSW proposed MPA. Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and SNH recommendations.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>	

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across maerl beds and native oyster. 	<ul style="list-style-type: none"> ▪ Reduce mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) pressure by 50% across burrowed mud; 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gears (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across burrowed mud; ▪ Closure to hand collection of native oyster across the feature extent; and

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
		<ul style="list-style-type: none"> ▪ Closure to hand collection of native oyster across the feature extent; and ▪ Limit further expansion of static gear. 	<ul style="list-style-type: none"> ▪ Limit further expansion of static gears.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (<0.001); ▪ Dredges (<0.001). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.002); ▪ Dredges (<0.001); ▪ Other gear (<0.001). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Dredges (0.001); ▪ Nephrops trawls (<0.001). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.005); ▪ Dredges (0.001); ▪ Other gear (<0.001). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Dredges (0.003); ▪ Nephrops trawls (0.001). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.012); ▪ Dredges (0.001); ▪ Other gear (<0.001).
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.040	0.137	0.357
Average annual costs	0.002	0.007	0.018
Present value of total costs (2014–2033)	0.030	0.101	0.263
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.024	0.069	0.171
Average annual change to GVA	0.001	0.003	0.009
Present value of total change in GVA (2014–2033)	0.018	0.051	0.126
Direct and Indirect reduction in Employment	0.0 jobs	0.1 jobs	0.2 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers</p>			

Table 4b. Military				[LSW]
<p>Three military practice areas (Jura Sound (X5623) and two submarine exercise areas) overlap with the LSW proposed MPA.</p> <p>The military practice area Jura Sound (X5623) overlaps with burrowed mud (all scenarios), maerl beds (all scenarios) and native oyster (all scenarios).</p> <p>The two submarine exercise areas overlap with the features of the LSW proposed MPA to varying degrees under the different extent scenarios.</p> <p>The features and associated habitats which overlap with military activities have not been described as vulnerable to MoD activities in this proposed MPA. It is assumed that management relating to MoD activity will be coordinated through the MoD's Maritime Environmental Sustainability Appraisal Tool (MESAT) which the MoD uses to assist in meeting its environmental obligations. This process will include operational guidance to reduce significant impacts of military activities on MPAs. It is assumed that the MoD will incur additional costs in adjusting MESAT and other MoD environmental assessment tools in order to consider whether its activities will impact on the conservation objectives of MPAs and also incur additional costs in adjusting electronic charts to consider MPAs. However, these costs will be incurred at national level and hence no site-specific cost assessments have been made.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	
Description of one-off costs				
Description of recurring costs				
Description of non-quantified costs				
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)				
Total costs (2014–2033)	See national costs	See national costs	See national costs	
Average annual costs	See national costs	See national costs	See national costs	
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs	
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>				

Table 4c. Ports and Harbours				LSW
<p>There is one port/harbour (Tayvallich) within the LSW proposed MPA boundary. Tayvallich overlaps with burrowed mud and maerl beds under the upper scenario only. Therefore, management costs may be incurred under the assumption that small ports/harbours will undergo one new development within the relevant time frame (2014-2033), assumed for the year 2024.</p> <p>There are three anchorages/mooring areas within the LSW proposed MPA boundary, all of which overlap burrowed mud under all scenarios. Costs may be expected to relocate anchorages/mooring areas to less sensitive areas, although any associated costs are non-quantifiable.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Relocate anchorages/mooring areas away from all features with a high sensitivity. 	<ul style="list-style-type: none"> ▪ Relocate anchorages/mooring areas away from all features with a high or medium sensitivity. If not possible to relocate away from medium-sensitivity features, relocate to more representative areas. 	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 1 in total); and ▪ Relocate anchorages/mooring areas away from all features with a high or medium sensitivity. If not possible to relocate away from medium-sensitivity features, relocate to more representative areas. 	
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Tayvallich). 	
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high sensitivity. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high and medium sensitivity. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high and medium sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)				
Total costs (2014–2033)	0.000	0.000	0.007	
Average annual costs	0.000	0.000	0.000	
Present value of total costs (2014–2033)	0.000	0.000	0.005	
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>				

Table 4d. Recreational Boating **[LSW]**

One medium traffic cruising route for recreational boating intersects the LSW proposed MPA boundary, although vessels transiting cruising routes are not expected to require any additional management measures.

Under the upper scenario, eight recreational boating anchorages overlap with proposed protected features. Five of the anchorages (and associated 100m buffer zones) overlap with all feature extents for burrowed mud, and three with upper feature extents for burrowed mud. Three of the anchorages also overlap with feature extents for maerl beds. There are also 26 Crown Estate mooring points within the proposed MPA boundary and five mooring areas. The data does not indicate any individual mooring points within any of the five mooring areas, although it is expected that this is an underestimate and additional moorings will be present that are not represented by the data. The Crown Estate's moorings overlap with burrowed mud, maerl beds and native oyster.

Under the intermediate and lower scenarios, SNH have identified seven recreational boating anchorages that overlap with proposed protected features. Four anchorages overlap with sublittoral mud and mixed sediment communities; one within the 100m buffer zone and three within the 200m buffer zones. Another anchorage overlaps with sublittoral mud and mixed sediment communities within 200m and burrowed mud within 100m and 200m buffer zones. One further anchorage overlaps with burrowed mud in the 100m buffer zone and one more with a maerl bed point record on the boundary of 100m zone. A further two moorings owned by The Crown Estate overlaps with point records of sublittoral mud and mixed sediment communities.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No additional management required for burrowed mud or sublittoral mud and mixed sediment communities. Burrowed mud has medium sensitivity to surface abrasion associated with anchoring although effects are highly localised and mostly relate to demersal fishing activity. Sublittoral mud and mixed sediment communities maybe more mobile in nature and therefore more tolerant to such pressures, and the effect of anchoring pressures is also very localised; and ▪ Relocate anchorage away from the mouth of Caol Scotnish due to overlap with maerl bed, which has high sensitivity to surface abrasion associated with anchoring. If not possible to relocate away from feature, relocate to less sensitive or more representative area of maerl within MPA. 	<ul style="list-style-type: none"> ▪ No additional management required for burrowed mud or sublittoral mud and mixed sediment communities. Burrowed mud has medium sensitivity to surface abrasion associated with anchoring although effects are highly localised and mostly relate to demersal fishing activity. Sublittoral mud and mixed sediment communities maybe more mobile in nature and therefore more tolerant to such pressures, and the effect of anchoring pressures is also very localised; and ▪ Relocate anchorage away from the mouth of Caol Scotnish due to overlap with maerl bed, which has high sensitivity to surface abrasion associated with anchoring. If not possible to relocate away from feature, relocate to less sensitive or more representative area of maerl within MPA. 	<ul style="list-style-type: none"> ▪ Relocate all anchorages/moorings away from all features with a high or medium sensitivity to surface abrasion pressure associated with anchoring: maerl beds; native oysters; burrowed mud. If not possible to relocate away from features, relocate to less sensitive or more representative area.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Cost of anchorage relocation. 	<ul style="list-style-type: none"> ▪ Cost of anchorage relocation. 	<ul style="list-style-type: none"> ▪ Cost of anchorage relocation.

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [LSW]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Tourism	Coastal areas are well represented when considering the locations of various tourist related sites within Scotland with a range of site types present in all regions including the West. Where significant impacts to recreational boating or water sports have been identified for the site, there could also be consequential impacts on tourism.	Tourism may benefit from the designation of the MPA as an added attraction to the destination. In addition, there may also be indirect benefits to tourism as a result of benefits to some water sports activities, for example, recreational angling and diving.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Scuba Diving	There is one shore dive location within the LSW proposed MPA (Castle Sween Reef). This site overlaps with 'Burrowed Mud' under the upper scenario only. No management restrictions upon this activity are required.	The added protection offered by an MPA designation and management measures placed upon sector activities may increase the aesthetic attraction of the dive sites through an improved marine ecosystem and a reduction in degradation to the wreck sites.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN). LSW proposed MPA is a coastal site and is located wholly within 6nm of the UK coastline. Therefore, sea angling overlaps with all features and there corresponding extents within the proposed MPA. No management restrictions upon this activity are required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation and corresponding management restrictions on sector activities including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA		[LSW]
Activity	Description	
Power Interconnectors	One interconnector is within 1km of the LSW proposed MPA. The interconnector is within 1km of burrowed mud (all scenarios), native oyster (all scenarios) and maerl beds (upper scenario only). No cost impacts are foreseen, as it is assumed that there will be no review of the existing consents.	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [LSW]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: <£0.01m Intermediate: <£0.01m Upper: £0.02m Annual Average Loss in GVA (direct and indirect)*: Lower: <£0.01m Intermediate: <£0.01m Upper: £0.01m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: x (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 0.1 jobs Upper: 0.2 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Displacement Effects	Not quantified	Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences: <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing 		x

			<p>grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited;</p> <ul style="list-style-type: none"> ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		
<p>Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [LSW]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries Reduction in landed value, GVA and employment	x West	x Largest employment impacts in: Oban (57%), Campbeltown (37%), Douglas (5%)	x Coastal Urban	0	0	xx Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0 0.04-0.2 job losses	0
Fish Processors Reduction in local landings at landing ports	x West	x West Loch Tarbet Tayvallich Tayinloan Oban	x Coastal Rural and Urban	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [LSW]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: <15m	Nephrops trawls	0	0	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	0	0
Fish Processors Reduction in local landings at landing ports		Shellfish: xxx Demersal: 0 Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

Potential Contribution of the Site to an Ecologically-Coherent Network

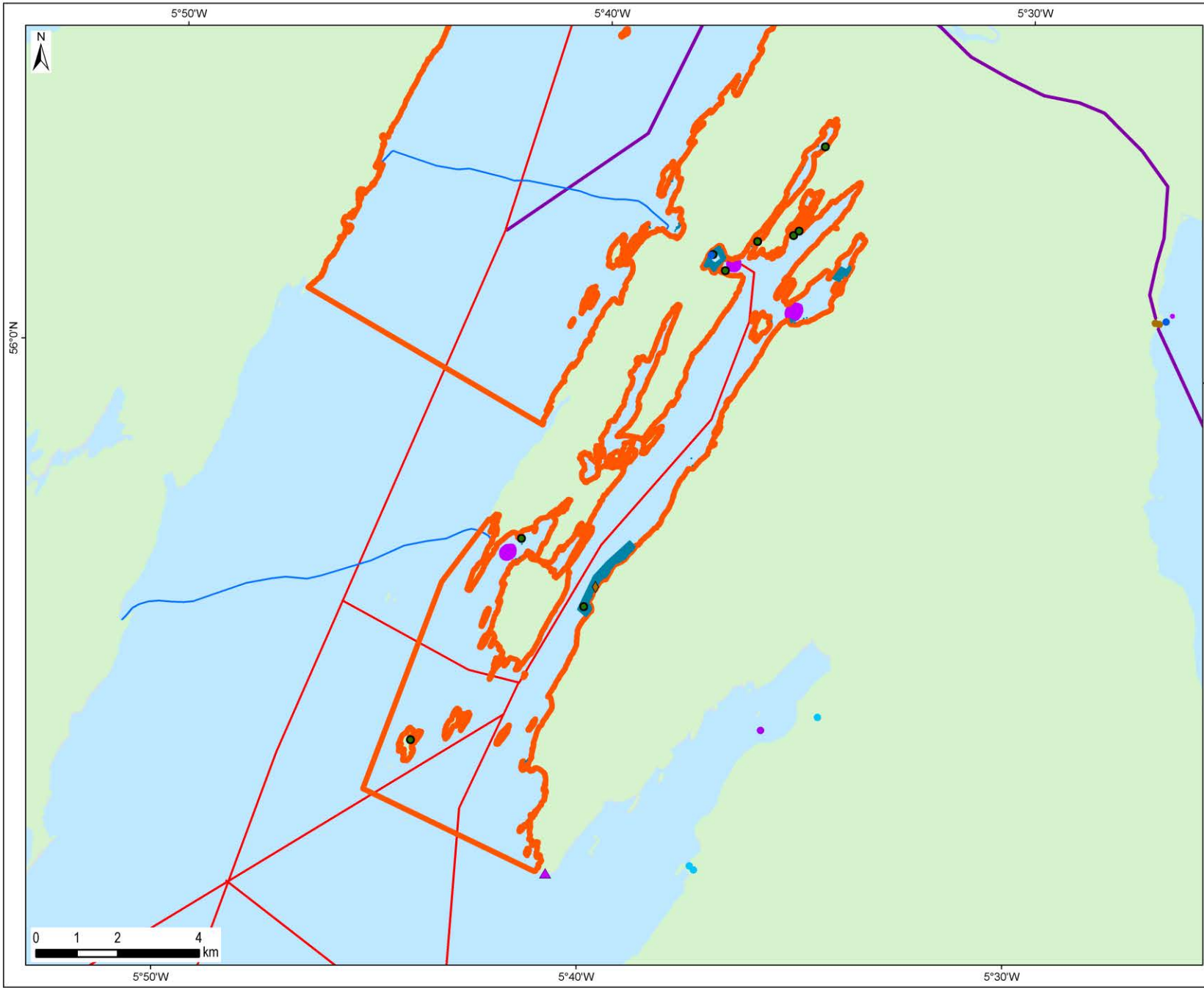
Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [LSW]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Burrowed mud	Provides representation of burrowing megafauna and mud volcano worm in OSPAR Region III.	Represents one of two areas of burrowing megafauna and mud volcano worm in OSPAR Region III.	Not currently understood for burrowed mud.	Burrowed mud occurs within a range of environments. All records of this feature of burrowed mud are from OSPAR Region III. The recommended MPA areas would provide representation for the geographic range of the firework anemone type of burrowed mud.	
Maerl beds,	Provides representation of maerl beds in OSPAR Region III.	Represents one of three areas of maerl bed within OSPAR Region III and one of five in the Scottish seas.			Maerl beds are listed by OSPAR as threatened and/or declining. The MPA may increase resilience.
Native oysters	Provides representation of native oysters in OSPAR Region III.	Represents one of two areas of native oysters within OSPAR Region III.			Native oysters are listed as threatened and/or declining by OSPAR. The MPA may increase resilience.
Sublittoral mud and mixed sediment communities	No information available				
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ⁷ [LSW]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	High. Support food web and contain nursery habitats.	Stocks not at MSY, some vulnerable habitats	Low	Low, Protection of shellfish beds can contribute to maintenance and recovery of stocks – benefits may be higher under stronger protection measures but ecosystem response is uncertain.	High: Commercially valuable species supported.	Low	Moderate, uncertainty mainly in response of habitats to management measures.	
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Low	Uncertain	Nil	Minimal	Moderate, social cost of carbon	Nil - Minimal	Low - Moderate	
Natural hazard protection	Minimal	Low	Nil	Minimal	Low	Nil - Minimal	High	
Regulation of pollution	Moderate, benthic communities regulate pollution	Low, major water quality issues to be dealt with through WFD	Nil	Minimal	Low, water quality in this area not affecting human welfare	Minimal	High	
Non-use value of natural environment	Moderate - High, variety of protected features, and contribution of the site to MPA network, have non-use value.	Non-use value of the site may decline	Low	Moderate – protection of features of site from decline, and/or allowing some recovery	Moderate – range of features means strong contribution to halting decline of marine biodiversity.	Low - Moderate	Low - Moderate, extent of features, responses to management measures, and value to society all uncertain	
Recreation	Moderate - High, including 1 active dive site, angling and recreational boating routes	Moderate - High, including tourism activities. Angling may be reduced by damage to features	Low	Low - Moderate, Angling benefits and biodiversity encountered by divers and recreational boaters are protected from possible decline, and could recover under upper scenario. Designation could enhance tourism activity.	Moderate, extensive activities, but substitutes are available.	Low - Moderate, enhancement of activities through improved angling and visitor experiences.	Nil - Moderate, extent of change from management measures uncertain	

⁷ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ¹ [LSW]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Research and Education	Moderate, site contains some accessible examples of unusual marine features.	Moderate, biological features used for research, but there are substitutes	Low	Low, some aspects of research value are not at risk, some aspects protected from possible decline, and could increase.		Moderate due to existing activity at this site	Low - Moderate	Low - Moderate, extent to which research uses site in future uncertain
Total value of changes in ecosystem services			Low for lower scenario, Moderate for upper scenarios				Low - Moderate	Low



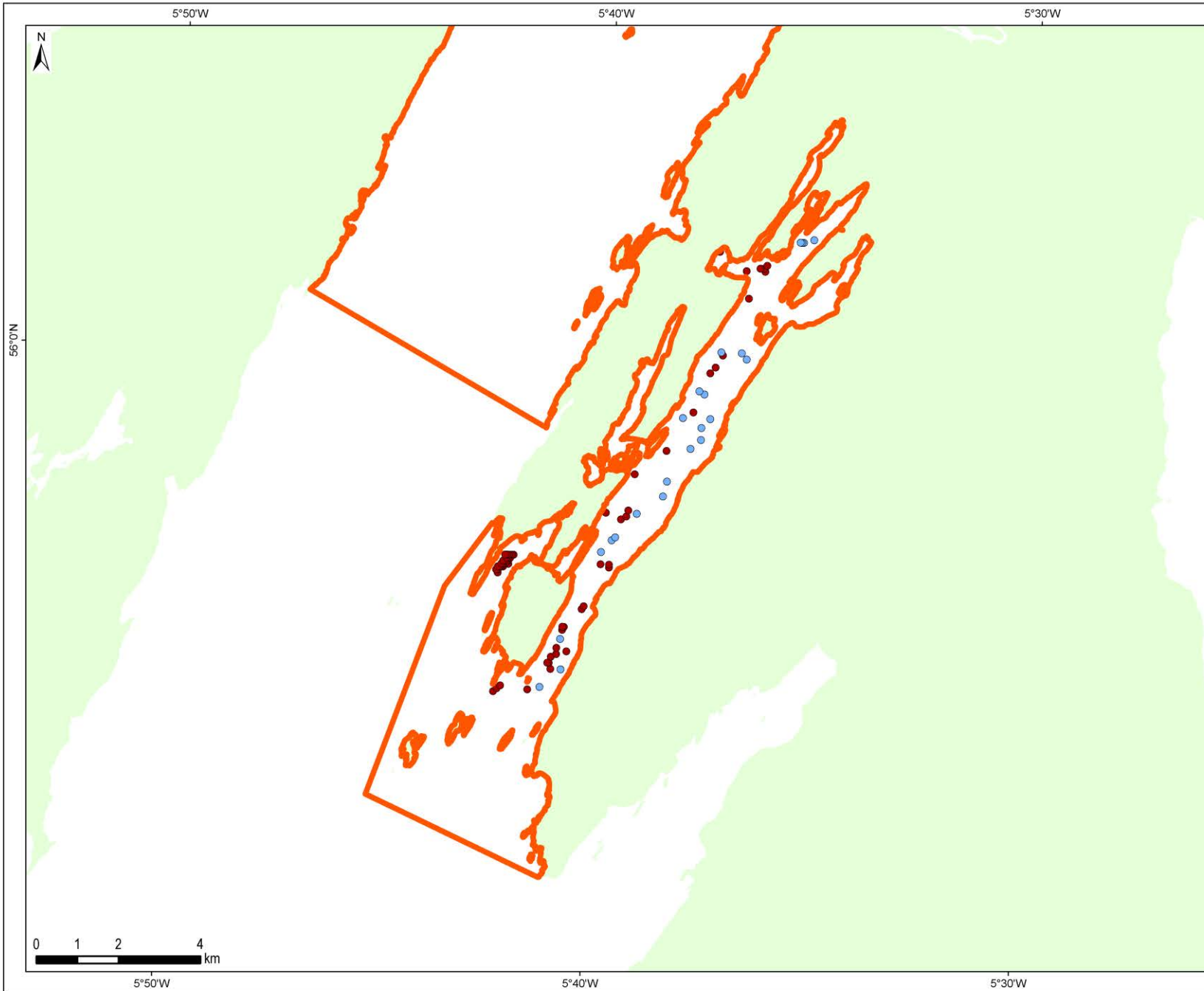
- Proposed Marine Protected Area
- Ports & Harbours**
- Port Locations
- Anchorage Areas
- Aquaculture**
- Existing Shellfish Installations
- Existing Finfish Installations
- Power Interconnectors**
- Existing Power Interconnectors
- Recreational Boating**
- RYA Cruising Routes
- Light
- Medium
- Heavy
- Recreational Anchorages
- Recreational Marinas
- Mooring Areas
- Watersports**
- ◆ Shore Dive Sites
- ▲ Wreck Dive Sites
- Sea Angling (6 nm from coast)

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System	WGS 1984 UTM Zone 30N		
Projection	Transverse Mercator		
Scale	1:128,000		
QA	FMM		
4136-MPA_HA_Loch_Sween.mxd			
Produced by ABPmer			




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**Human Activities which Occur
within the Proposed MPA:
*Loch Sween***



 Proposed Marine Protected Area

VMS Fishing Ping Data (2007 to 2011)

 Nephrops Trawls

 Dredges

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:128,000	
QA		FMM	
4136-MPA_Fish_Loch_Sween.mxd			
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Data Source: Scottish Government, 2013
NOT TO BE USED FOR NAVIGATION

Fishing Activities which Occur within the Proposed MPA:
Loch Sween

Lochs Duich, Long and Alsh (DLA)

Site Area (km²): 43

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [DLA]					
Proposed protected features					
<i>Biodiversity Features</i> Burrowed mud, flame shell beds.					
<i>Geodiversity Features</i> None.					
<i>Site Description</i> The MPA proposal in Lochs Duich, Long and Alsh builds on the existing SAC in the area and covers three fjordic sea lochs in the north-west of Scotland.					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Burrowed mud	*Lower: 16.06 Intermediate: 16.06 Upper: 42.96	Yes (MNCR surveys, 1989; Seasearch dive surveys)	Partial	Not known	Conserve
Flame shell beds	Lower: 0.75 Intermediate: 0.75 Upper: 0.75	Yes	Yes	Not known	Conserve
Geodiversity Features					
N/A					
Key: * Estimated area based on best available data References: Area of Feature: GeMs Confidence in feature presence and extent: SNH (2012e)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [DLA]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Aquaculture (Finfish)	0.003	0.012	0.012
Commercial Fisheries*	0.000	0.052	0.179
Military	See national costs	See national costs	See national costs
Ports and Harbours	0.005	0.005	0.005
Total Quantified Economic Costs	0.008	0.069	0.196
Non-Quantified Economic Costs			
Aquaculture (Finfish)	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Commercial Fisheries	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts.
Military	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment.
Recreational Boating	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Cost of anchorage relocation.
Ports and Harbours	<ul style="list-style-type: none"> ▪ Relocation of anchorages/ mooring areas away from features of high sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/ mooring areas away from features of high and medium sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/ mooring areas away from features of high and medium sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
<p>Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [DLA]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	0.024	0.024	0.024
Preparation of Statutory Instruments	0.004	0.004	0.004
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	<0.001*	<0.001*	<0.001*
Total Quantified Public Sector Costs	0.028	0.028	0.028
Non-Quantified Public Sector Costs			
None			

* Regulatory and advisory costs of finfish and shellfish aquaculture assessed at national level.

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [DLA]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 0 jobs Upper: 0 jobs	North West West North West Isle of Man	Mallaig Oban Stornoway Douglas	Impacts concentrated in rural, urban and island coastal areas	Dredges	Lower: N/A Upper: >15m	No Impact.	No Impact	No employment data but unlikely to be employed in fisheries.

Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [DLA]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use value of natural environment	Low - Moderate. Wrecks and the protected features, and a contribution of the site to MPA network, has non-use values.	Low - Moderate
Other Benefits		
Tourism	Higher biodiversity due to designation, and presence of designations, may attract more tourism activity to local economy.	
Contribution to ecologically coherent network	See report Section 7.5.	
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [DLA]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Burrowed mud	-	L/U	-	-	-	-	L/U	L/U	L/U	-	L/U	L/U	L/U	-	-	L/U	L/U
Flame shell beds	-	-	-	-	-	-	L/U	L/U	-	-	L/U	-	L/U	-	-	L/U	L/U
Geodiversity Features																	
N/A																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Aquaculture (Finfish) [DLA]			
<p>There are three finfish farms (Ardintoul, Loch Alsh (Sron) and Loch Duich) within the boundary of the DLA proposed MPA. Two of the three sites, Ardintoul and Loch Alsh (Sron) (located in the centre and western sections of the proposed MPA respectively), directly overlap with the Burrowed Mud feature under all scenarios.. The third, Loch Duich, overlaps with the Burrowed Mud feature under the upper scenario only. A fourth finfish farm, Mill Burn (Old Mill), is also located within a 1km buffer zone from the proposed MPA.</p> <p>The aquaculture sites have been placed over the burrowed mud feature as part of current management measures in place to avoid impacts on the SAC reefs within the area. As burrowed mud is not an OSPAR or BAP feature it is therefore possible that additional management measures may be required for new planning or CAR licence applications should the feature be designated within an MPA. Any management measures put in place as part of the designation of the MPA would need to consider the management of the reefs and the possible distribution of firework anemone which will be confirmed after further survey work in May 2013.</p> <p>There is no public information on potential future development within the proposed MPA. In the absence of information on potential future developments, the assessment has focused on the costs associated with obtaining new CAR licences. A national assessment of the costs of obtaining planning permission for new developments is provided separately.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features; and ▪ Additional survey costs incurred once every 10 years (2019 & 2029) to inform new CAR licence applications. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features; and ▪ Additional survey costs incurred once every 10 years (2019 & 2029) to inform new CAR licence applications.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application; and ▪ Additional baseline visual survey costs -£1.6k per CAR licence application. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application; and ▪ Additional baseline visual survey costs - £1.6k per CAR licence application.
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
	investment.	investment.	
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.004	0.017	0.017
Average annual costs	<0.001	0.001	0.001
Present value of total costs (2014–2033)	0.003	0.012	0.012
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period.			
Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20).			
Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4b. Commercial Fisheries (assuming zero displacement of fishing activity)	[DLA]
<p>According to VMS-based estimates and ICES rectangle landings statistics, dredges, nephrops trawls and pelagic trawls (over-15m) and pots, nephrops trawls, hand fishing and other gears (under-15m vessels) operate within the DLA proposed MPA. The value of catches from the DLA area was £21,000 (over-15m vessels) and £40,000 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels were made predominantly into Kyle (45% by value), Mallaig (34%), Stornoway (7%) and South Uist and Eriskay (7%). For the over-15m fleet, dredgers operated in particular in the west and central part of the proposed MPA over the area of burrowed mud.</p> <p>Provisional ScotMap data indicate that the annual average earnings from the DLA proposed MPA was £7,700, with over 60% from Nephrops pots. ScotMap data indicate very little fishing activity by under-15m vessels within the proposed MPA area. The cost impact estimate for <15m nephrops trawls is likely to be an over-estimate. The coverage for ScotMap interviews in the region was 71.9% (total value of reported landings from the Fisheries Information Network for those vessels included in the ScotMap value analysis expressed as a percentage of the total reported landings for all vessels <15m). Therefore the ScotMap estimate is likely to under-represent the value of fishing by under-15m vessels, and the spatial representation of the value of fishing is less robust than in regions where coverage is higher.</p> <p>VMS data indicated that 2 Irish vessels and 1 Norwegian vessel were present within the DLA proposed MPA in 2012. However, it is more likely that these vessels were transiting to a port than actively fishing.</p> <p>Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and SNH recommendations. The flame shell bed recorded in 2012 was within the existing Harbour Area, where restrictions are already in place on fishing activity, therefore no additional cost impacts for flame shell beds are expected.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p>	

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Developing the Evidence Base for Impact Assessments
and the Sustainability Appraisal**

It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No cost impacts expected. 	<ul style="list-style-type: none"> ▪ Reduce mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) pressure by 50% across burrowed mud feature. 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gears (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across burrowed mud feature.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (<0.001); ▪ Dredges (0.006). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.001); ▪ Dredges (<0.001); ▪ Other affected gears (<0.001). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.001); ▪ Dredges (0.020). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.004); ▪ Dredges (<0.001); ▪ Other affected gears (<0.001).
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	0.133	0.506
Average annual costs	0.000	0.007	0.025
Present value of total costs (2014–2033)	0.000	0.098	0.372
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.000	0.071	0.244
Average annual change to GVA	0.000	0.004	0.012
Present value of total change in GVA (2014–2033)	0.000	0.052	0.179
Direct and Indirect reduction in Employment	0.0 jobs	0.1 jobs	0.1 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20).</p>			

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%.			
Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.			

Table 4c. Military			[DLA]
One military practice area (submarine exercise area X5721) overlaps with burrowed mud (all scenarios) within the DLA proposed MPA.			
The features and associated habitats which overlap with military activities have not been described as vulnerable to MoD activities in this proposed MPA. It is assumed that management relating to MoD activity will be coordinated through the MoD's Maritime Environmental Sustainability Appraisal Tool (MESAT) which the MoD uses to assist in meeting its environmental obligations. This process will include operational guidance to reduce significant impacts of military activities on MPAs. It is assumed that the MoD will incur additional costs in adjusting MESAT and other MoD environmental assessment tools in order to consider whether its activities will impact on the conservation objectives of MPAs and also incur additional costs in adjusting electronic charts to consider MPAs. However, these costs will be incurred at national level and hence no site-specific cost assessments have been made.			

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	▪ See National Assessment.	▪ See National Assessment.	▪ See National Assessment.
Description of one-off costs			
Description of recurring costs			
Description of non-quantified costs			
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	See national costs	See national costs	See national costs
Average annual costs	See national costs	See national costs	See national costs
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period.			
Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20).			
Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4d. Ports and Harbours				[DLA]
<p>There is one port/harbour (Kyle) within the DLA proposed MPA boundary. Kyle overlaps the MPA features burrowed mud and flame shell beds under all scenarios. Therefore, management costs may be incurred under the assumption that small ports/harbours will undergo one new development within the relevant time frame (2014-2033), assumed for the year 2024.</p> <p>There are four anchorages/mooring areas within the DLA proposed MPA boundary, three of which overlap burrowed mud under all scenarios. The remaining anchorage/mooring area overlaps burrowed mud under the intermediate and upper scenarios only. Costs may be expected to relocate anchorages/mooring areas to less sensitive areas, although any associated costs are non-quantifiable.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 1 in total); and ▪ Relocate anchorages/mooring areas away from all features with a high sensitivity. 	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 1 in total); and ▪ Relocate anchorages/mooring areas away from all features with a high or medium sensitivity. If not possible to relocate away from medium-sensitivity features, relocate to more representative areas. 	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 1 in total); and ▪ Relocate anchorages/mooring areas away from all features with a high or medium sensitivity. If not possible to relocate away from medium-sensitivity features, relocate to more representative areas. 	
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Kyle). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Kyle). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Kyle). 	
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high and medium sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high and medium sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)				
Total costs (2014–2033)	0.007	0.007	0.007	
Average annual costs	0.000	0.000	0.000	
Present value of total costs (2014–2033)	0.005	0.005	0.005	
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>				

Table 4e. Recreational Boating				[DLA]
<p>There are two cruising routes that intersect with the DLA proposed MPA boundary; one with heavy cruising traffic and one with light traffic. Under all scenarios, the heavy traffic cruising route overlaps with burrowed mud and flame shell beds, while the low traffic route overlaps with burrowed mud only.</p> <p>Under the upper scenario there are 15 anchorages for recreational boating present within the DLA proposed MPA boundary that overlap with feature extents for burrowed mud. The Crown Estate also has a number of mooring points and mooring areas within the proposed MPA. Three large mooring areas are present: one with nine mooring points within it, one with five and one with a single mooring point present. It is noted, however, that this may be an underestimate and additional mooring points may be present within the areas that are not represented by the data. A further nine individual mooring points are also located within the proposed MPA. All Crown Estate moorings present within the DLA proposed MPA overlap with burrowed mud.</p> <p>Under the intermediate and lower scenarios, SNH have identified two recreational anchorages and one mooring area owned by The Crown Estate that overlap with proposed protected features. One anchorage overlaps with burrowed mud within a 100m buffer zone, and one with records of fireworks anemone within a 200m buffer zone. The Crown Estate mooring area is in close proximity (20m) to a flame shell bed.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No additional management required. Fireworks anemone is sensitive to anchorage pressures although is within 200m buffer zone and detailed spatial data on its presence is lacking. Burrowed mud has medium sensitivity to surface abrasion associated with anchoring although effects are highly localised and mostly relate to demersal fishing activity. Flame shell beds are highly sensitive to pressures associated with anchorages, although there is no physical overlap with the mooring area. Any future expansion of the mooring area should not encroach on flame shell beds. 	<ul style="list-style-type: none"> ▪ No additional management required. Fireworks anemone is sensitive to anchorage pressures although is within 200m buffer zone and detailed spatial data on its presence is lacking. Burrowed mud has medium sensitivity to surface abrasion associated with anchoring although effects are highly localised and mostly relate to demersal fishing activity. Flame shell beds are highly sensitive to pressures associated with anchorages, although there is no physical overlap with the mooring area. Any future expansion of the mooring area should not encroach on flame shell beds. 	<ul style="list-style-type: none"> ▪ Relocate anchorages/moorings away from burrowed mud as it has medium sensitivity to surface abrasion pressure associated with anchoring. If not possible to relocate away from burrowed mud, relocate to less sensitive or more representative areas of burrowed mud within MPA. 	
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Cost of anchorage relocation. 	

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [DLA]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Tourism	Coastal areas are well represented when considering the locations of various tourist related sites within Scotland with a range of site types present in all regions including the North West. Where significant impacts to recreational boating or water sports have been identified for the site, there could also be consequential impacts on tourism.	Tourism may benefit from the designation of the MPA as an added attraction to the destination. In addition, there may also be indirect benefits to tourism as a result of benefits to some water sports activities, for example, recreational angling and diving.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN). DLA proposed MPA is a coastal site and is located wholly within 6nm of the UK coastline. Therefore, sea angling overlaps with all features and there corresponding extents within the proposed MPA. No management restrictions upon this activity are required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation and corresponding management restrictions on sector activities including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Scuba diving	There are seven dive sites located within DLA proposed MPA, two are wreck dive sites (HMS Port Napier and Golden harvest) and 5 are shore dive sites (Inverinate Slip, Duich point skerry, Old car park, Totaig and Jacobite Bay). The seven dive sites overlap with Burrowed mud under the upper scenario however they do not overlap within any other features under the intermediate and lower scenarios. No management restrictions upon this activity are required.	The added protection offered by an MPA designation and management measures placed upon sector activities may increase the aesthetic attraction of the dive sites through an improved marine ecosystem and a reduction in degradation to the wreck sites.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA [DLA]	
Activity	Description
Energy Generation	The Kyle Rhea Tidal Stream Array (SeaGeneration (Kyle Rhea) Ltd, up to 8MW capacity) is a potential tidal energy generation development, for which an application has been submitted to Marine Scotland. The proposed site of the tidal array is between the Isle of Skye and the Scottish mainland and, subsequently, the 5km buffer of the development could overlap the DLA proposed MPA boundary. Under all scenarios (i.e. lower, intermediate and upper feature extent), the Kyle Rhea Tidal Stream Array (5km buffer) overlaps the MPA features 'burrowed mud' and 'flame shell beds', neither of which are OSPAR nor BAP designated. Flame shell beds are of high sensitivity to the permanent change of one marine habitat type to another (through changes in substratum), damage to species living on or within the seabed and changes in peak mean spring tide flow. Burrowed Muds are of medium sensitivity to physical change (to another seabed type) and sub-surface abrasion/penetration. Therefore, it is feasible that additional costs would be incurred in assessing the potential impacts of the development on the MPA features. However, this assessment is likely to be completed before 2014 and, therefore, no additional costs are anticipated (i.e. costs effectively sunk) following any decision to designate the site an MPA in 2014.
Power Interconnectors	Two existing power interconnectors overlap with the DLA proposed MPA. Both power interconnectors overlap with burrowed mud (upper scenario). Within a 1km buffer the power interconnectors also overlap with burrowed mud under the lower and intermediate scenarios. No cost impacts are foreseen, as it is assumed that there will be no review of the existing consents.
Water Sports - Kayaking	Kayaking is popular around the coast of Mull including areas within DLA proposed MPA. Water sports activities including kayaking are not assessed as requiring any additional management measures. It is also considered that no additional benefit to kayaking from management measures applied to other activities will occur.

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [DLA]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.00m Intermediate: <0.01m Upper: £0.03m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: <£0.01m Upper: £0.01m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: x (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 0.1 jobs Upper: 0.1 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Displacement Effects	Not quantified	Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences: <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs). ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear 		x

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [DLA]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
			types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited; <ul style="list-style-type: none"> ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas. ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption. ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [DLA]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries Reduction in landed value, GVA and employment	x North-West West	x Largest employment impacts in: Mallaig (38%), Oban (37%), Stornoway (17%), Douglas (6%)	x Coastal Rural and Urban	0	0	xx Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0 0-0.1 job losses	0
Fish Processors Reduction in local landings at landing ports	0	0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [DLA]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: >15m	Dredges	0	0	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	0	0
Fish Processors Reduction in local landings at landing ports		Shellfish: xxx Demersal: 0 Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

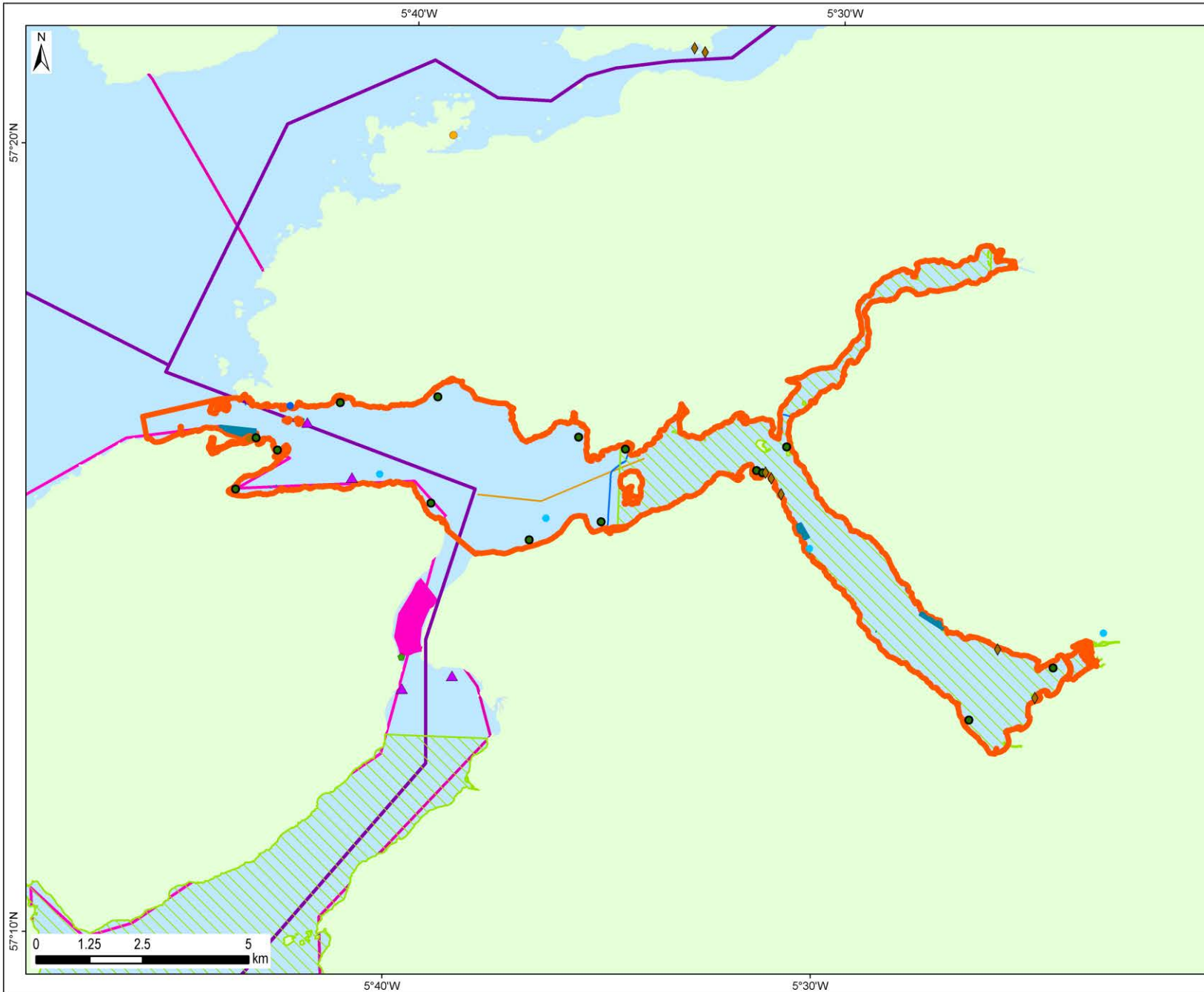
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [DLA]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Burrowed mud	Provides representation for the firework anemone type of burrowed mud in OSPAR Region III.	Represents one of two recommended areas for this feature of burrowed mud in OSPAR Region III.	Not currently understood for burrowed mud.	Burrowed mud occurs within a range of environments. All records of this feature of burrowed mud are from OSPAR Region III. The recommended MPA areas would provide representation for the geographic range of the firework anemone type of burrowed mud.	
Flame shell beds	Provides representation for flame shell beds in OSPAR Region III.	Represents one of five recommended areas for flame shell beds in OSPAR Region III.	Not currently understood for flame shell beds.	All records of flame shell beds are from OSPAR Region III. The recommended MPA areas would to some extent reflect the geographic range of flame shell beds in Scottish seas.	Not listed by OSPAR as threatened and/or declining, although there is evidence of decline. The MPA may increase resilience.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ⁸ [DLA]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Stocks not at MSY	Nil	Low – some recovery of benthic species possible.		Low. Site fishing grounds have low value	Nil - Low	Moderate
Fish for non-human consumption		Stocks reduced from potential maximum	Nil					
Gas and climate regulation	Nil - Low	Nil - Low	Nil	Nil	Minimal	Moderate	Nil	High
Natural hazard protection	Low	Low	Nil, would not affect stability of coastline			Moderate, Clyde is valuable for marine activities	Nil	High
Regulation of pollution	Low	Low	Nil	Minimal – Low, maintained by protecting seabed features		Low - Moderate, for recreational use of waters	Nil - Low	High
Non-use value of natural environment	Low - Moderate. Wrecks and protected features, and contribution of the site to MPA network, have non-use value.	Non-use value of the site may decline	Nil, no change in key characteristics of site	Low – protection of key characteristics of site from minor decline	Moderate – protection of key characteristics of site from decline, and/or allowing some recovery of values	Moderate	Low - Moderate	Low
Recreation	Moderate	7 active dive sites, boating anchorages, sea angling	Nil	Low – slightly higher biodiversity encountered by divers and boating		Moderate	Low	Moderate
Research and Education	Moderate	Biological features have research value but there are substitutes	Nil, no change in key characteristics of site	Low – protection of key characteristics of site from decline, improving future research opportunities		Low	Nil - Low	Low
Total value of changes in ecosystem services			Low for lower scenario, moderate for upper scenarios				Low - Moderate	Low

⁸ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



Proposed Marine Protected Area

Military Practice Areas

- Submarine Exercise Area

Energy Generation

- Tidal Lease Area

Power Interconnectors

- Existing Power Interconnectors

Aquaculture

- Existing Finfish Installations

Ports & Harbours

- Port Locations

Watersports

- Scenic Boat Dive Sites
- Shore Dive Sites
- Dinghy Sailing Sites
- Wreck Dive Sites
- Sea Kayak Locations
- Sea Angling (6 nm from coast)

Recreational Boating

RYA Cruising Routes

- Light
- Heavy
- Recreational Marinas
- Recreational Anchorages
- Mooring Areas

Date	By	Size	Version
Jul 13	TAP	A4	1

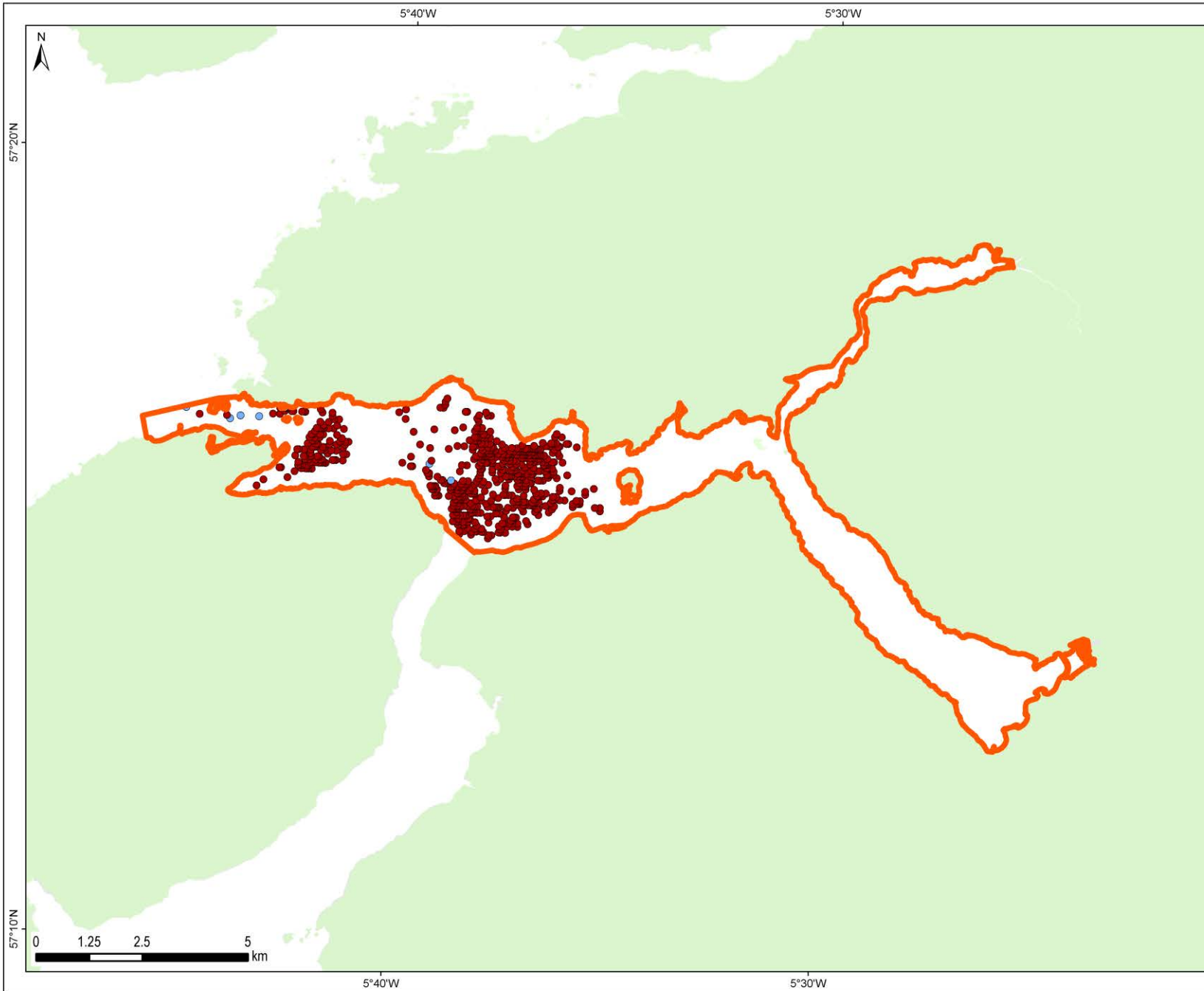
Coordinate System	WGS 1984 UTM Zone 30N
Projection	Transverse Mercator
Scale	1:124,000
QA	FMM

4136MPA_HA_Duich_Long_Alsh.mxd

Produced by ABPmer

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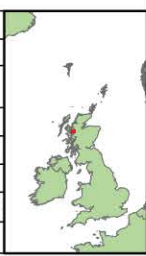
Human Activities which Occur within the Proposed MPA:
Lochs Duich, Long and Alsh



- Proposed Marine Protected Area
- VMS Fishing Ping Data (2007 to 2011)
- Nephrops Trawls
- Dredges

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:124,000	
QA		FMM	
4136MPA_Fish_Duich_Long_Alsh.mxd			
Produced by ABPmer			



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 Data Source: Scottish Government, 2013
 NOT TO BE USED FOR NAVIGATION

Fishing Activities which Occur within the Proposed MPA:
Lochs Duich, Long and Alsh

Monach Isles (MOI)

Site Area (km²): 68

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [MOI]					
Proposed protected features					
<i>Biodiversity Features</i> Black guillemot.					
<i>Geodiversity Features</i> Quaternary of Scotland – landscape of areal glacial scour, Marine Geomorphology of Scottish Shelf – components to be confirmed by SNH.					
<i>Site Description</i> The Monach Isles site proposal boundary includes all of the islands of the archipelago and waters out to 2km from the coastline. The site derives from the Monach Isles SSSI, and its outer boundary represents a 2km extension of the existing SSSI boundary.					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Black guillemot	*Lower: 57.14 Intermediate: 57.14 Upper: 57.14	Yes (Seabird 2000 census)	Yes (Seabird 2000, 2002)	Not known	Conserve
Geodiversity Features					
Quaternary of Scotland – landscape of areal glacial scour	67.80	Yes (SNH & JNCC review)	Partial – additional work required to map individual features	Not known	
Marine Geomorphology of Scottish Shelf - components to be confirmed by SNH		Yes (SNH & JNCC review)	Partial – additional work required to map individual features	Not known	
Key: * Estimated area based on best available data References: Area of Feature: GeMs Confidence in feature presence and extent: SNH (2012i)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [MOI]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Military	See national costs	See national costs	See national costs
Total Quantified Economic Costs	N/A	N/A	N/A
Non-Quantified Economic Costs			
Military	▪ See national assessment.	▪ See national assessment.	▪ See national assessment.

Note: For detailed information on economic cost impacts on activities, see Table 4.

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [MOI]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	None	None
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	None	None	None
Total Quantified Public Sector Costs	0.000	0.000	0.000
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [MOI]									
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis						
			Location			Fishing Groups Predominantly Affected		Social Groups Affected	
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities
None identified (Commercial Fisheries).									

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [MOI]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use value of natural environment	Low	Nil - Moderate
Other Benefits		
Tourism	Higher biodiversity due to designation, and presence of designations, may attract more tourism activity to local economy.	
Contribution to ecologically coherent network	See report Section 7.5.	
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [MOI]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Black guillemot	-	-	-	-	-	-	L/I/U	-	L/I/U	-	-	-	-	-	-	L/I/U	L/I/U
Geodiversity Features																	
Quaternary of Scotland – landscape of areal glacial scour																	
Marine Geomorphology of Scottish Shelf – components to be confirmed by SNH	Not considered to be sensitive at the levels of exposure expected from human activities; thus, not considered in the context of management.																
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Military				[MOI]
<p>Three military practice areas (Hebrides (D701; D701A; D701C - Missile Firing/Pilotless Target Aircraft)) overlap with the Black Guillemot feature of the MOI proposed MPA under all scenarios (lower, intermediate and upper).</p> <p>The features and associated habitats which overlap with military activities have not been described as vulnerable to MoD activities in this proposed MPA. It is assumed that management relating to MoD activity will be coordinated through the MoD's Maritime Environmental Sustainability Appraisal Tool (MESAT) which the MoD uses to assist in meeting its environmental obligations. This process will include operational guidance to reduce significant impacts of military activities on MPAs. It is assumed that the MoD will incur additional costs in adjusting MESAT and other MoD environmental assessment tools in order to consider whether its activities will impact on the conservation objectives of MPAs and also incur additional costs in adjusting electronic charts to consider MPAs. However, these costs will be incurred at national level and hence no site-specific cost assessments have been made.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	
Description of one-off costs				
Description of recurring costs				
Description of non-quantified costs				
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)				
Total costs (2014–2033)	See national costs	See national costs	See national costs	
Average annual costs	See national costs	See national costs	See national costs	
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs	
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>				

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [MOI]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Tourism	Coastal areas are well represented when considering the locations of various tourist related sites within Scotland with a range of site types present in all regions including the North West. Where significant impacts to recreational boating or water sports have been identified for the site, there could also be consequential impacts on tourism.	Tourism may benefit from the designation of the MPA as an added attraction to the destination. In addition, there may also be indirect benefits to tourism as a result of benefits to some water sports activities, for example, recreational angling.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN). The MOI proposed MPA is a coastal site with the majority of the site being located within 6nm of the UK coastline. Therefore sea angling overlaps with the 'Black Guillemot' feature under all scenarios. No management restrictions upon this activity are required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation and corresponding management restrictions on sector activities including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA		[MOI]
Activity	Description	
Commercial Fisheries	<p>Pots (over-15m) and pots, dredges and other gears (under-15m vessels) operate within the MOI proposed MPA and across the black guillemot feature extent. The value of landings from the MOI area was £17,500 (over-15m vessels) and £23,100 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Provisional Scotmap data indicate the value of landings from the MOI proposed MPA was £31,000, from pots. Landings from the over-15m vessels were predominantly into Snizort (35% by value), North Uist (18%), Uig (16%), Ullapool (9%) and Grimsay (8%). Black guillemot are not thought to be sensitive or vulnerable to pressures from fishing gears, therefore no management measures for fisheries are proposed and no cost impacts are anticipated.</p>	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [MOI]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
None identified.					
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [MOI]								
Sector/Impact	Location			Age			Gender	
	Region	Ports	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
None identified.								
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [MOI]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m	Gear Types/Sector	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long-term Sick
None identified.								
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

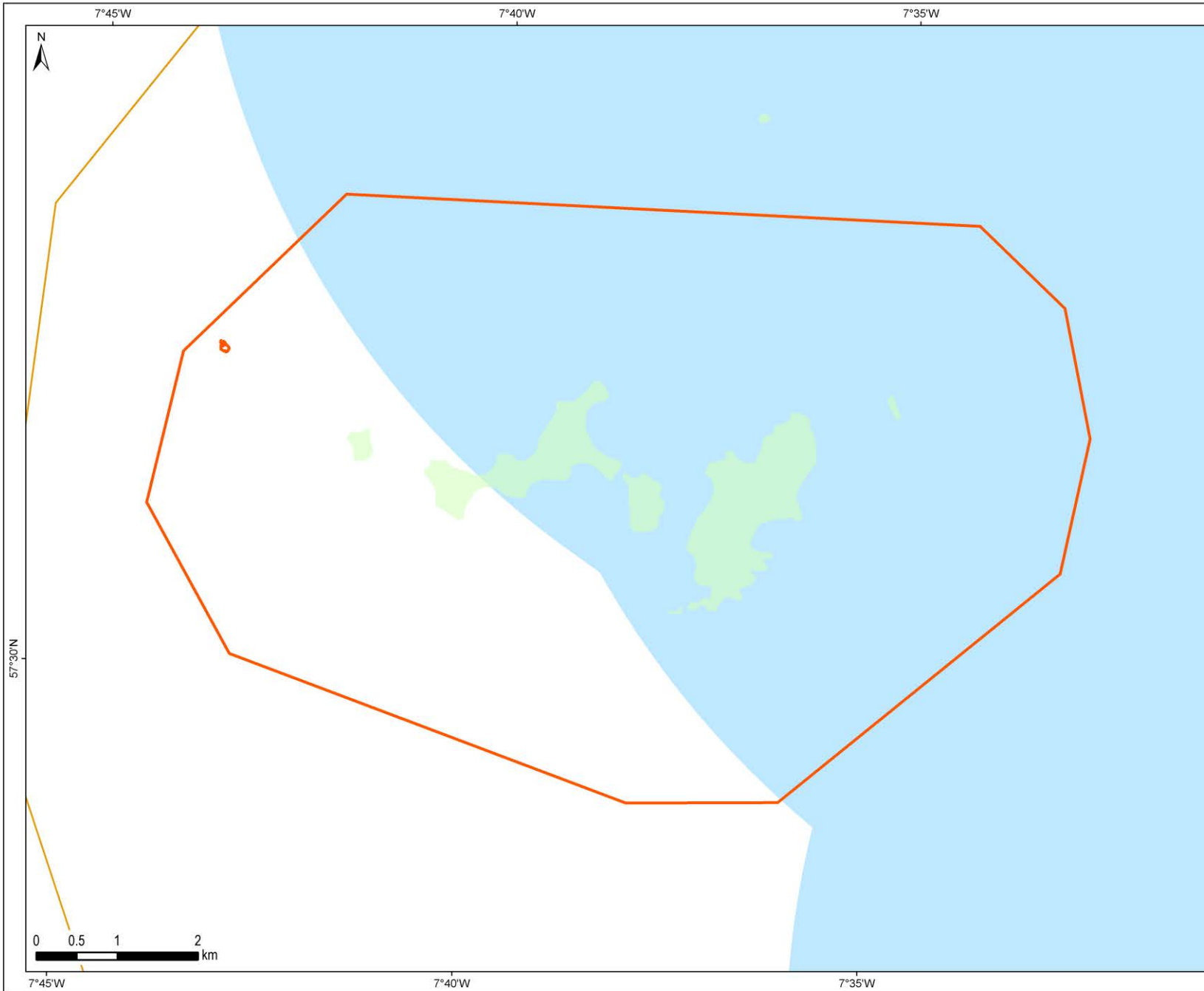
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [MOI]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Black Guillemot	Provides representation of black guillemot in OSPAR Region II.	Represents one of six areas representing black guillemot.	Not currently understood for black guillemot.	MPA area is relatively exposed example of black guillemot and extends coverage of the geographic range to the west.	Although not listed by OSPAR as threatened and/or declining, there is evidence of decline. The potential MPA areas may increase resilience.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

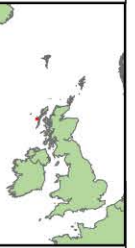
Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ⁹ [MOI]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Stocks not at MSY	Nil	Nil	Nil	Low. Site fishing grounds have low value	Nil	High
Fish for non-human consumption		Stocks reduced from potential maximum	Nil	Nil	Nil			
Gas and climate regulation	Nil	Nil	Nil	Nil	Nil	Moderate	Nil	High
Natural hazard protection	Minimal	Low	Nil	Nil	Nil	Low	Nil	High
Regulation of pollution	Minimal	Low	Nil	Nil	Nil	Low	Nil	High
Non-use value of natural environment	Low – protected feature, and contribution of the site to MPA network, have non-use value.	Non-use value of the site may decline, but probably stable	Nil, no change in key characteristics of site	Low – protection of feature of site from minor decline		Low, although black guillemot is charismatic species, it is site's only feature	Nil - Moderate	Moderate
Recreation	Low	Minimal	Nil	Minimal		Low	Minimal	Moderate
Research and Education	Minimal	Nil - Low	Nil	Minimal		Low	Minimal	Moderate
Total value of changes in ecosystem services			Nil for lower scenario, Minimal for upper scenarios				Minimal	Moderate

⁹ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



- Proposed Marine Protected Area
- Recreational Boating**
- RYA Cruising Routes
- Light
- Watersports**
- Sea Angling (6 nm from coast)

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:65,000	
QA		FMM	
4136-MPA_HA_Monach_Isles.mxd			
Produced by ABPmer			



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 Sources: RYA, 2008; Marine Scotland, 2012
 NOT TO BE USED FOR NAVIGATION

**Human Activities which Occur
 within the Proposed MPA:
 Monach Isles**

Mousa to Boddam (MTB)

Site Area (km²): 13

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [MTB]					
Proposed protected features					
<p><i>Biodiversity Features</i> Sandeels.</p> <p><i>Geodiversity Features</i> Marine Geomorphology of the Scottish Shelf Seabed – components to be confirmed by SNH</p> <p><i>Site Description</i> The Mousa to Boddam MPA proposal covers two areas around the island of Mousa and off the coast of Boddam in the south-east Shetland region.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Sandeels	*Lower: 10.352 Intermediate: 10.32 Upper: 13.36	Yes (Marine Science Scotland survey data, 1985 – 2007)	Yes	Not known	Conserve
Geodiversity Features					
Marine Geomorphology of the Scottish Shelf Seabed - components to be confirmed by SNH		Yes	Partial – additional work needed to map features	Not known	Conserve
Key: * Estimated area based on best available data References: Area of Feature: GeMs Confidence in feature presence and extent: SNH (2012k)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [MTB]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Energy Generation	0.009	0.009	0.037
Total Quantified Economic Costs	0.009	0.009	0.037
Non-Quantified Economic Costs			
Energy Generation	▪ Costs of project delays during consenting; risk of deterrent to investment.	▪ Costs of project delays during consenting; risk of deterrent to investment.	▪ Costs of project delays during consenting; risk of deterrent to investment.
Note: For detailed information on economic cost impacts on activities, see Table 4.			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [MTB]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	0.004	0.004
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.001	0.001	0.001
Total Quantified Public Sector Costs	0.001	0.005	0.005
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [MTB]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
None identified (Commercial Fisheries).										
If any energy generation developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [MTB]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use value of natural environment	Low	Nil - Moderate
Other Benefits		
Tourism	Higher biodiversity due to designation, and presence of designations, may attract more tourism activity to local economy.	
Contribution to ecologically coherent network	See report Section 7.5.	
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [MTB]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Sandeels	-	-	-	-	-	-	L/I/U	L/I/U	-	-	-	-	U	-	L/I/U	L/I/U	L/I/U
Geodiversity Features																	
Marine Geomorphology of the Scottish Shelf Seabed – components to be confirmed by SNH	Not considered to be sensitive at the levels of exposure expected from human activities; thus, not considered in the context of management.																
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Energy Generation [MTB]			
<p>There are no energy generation activities currently operating within the MTB proposed MPA boundary or corresponding buffer zones. Thus, economic costs and management measures associated with energy generation in this proposed MPA are described in light of known possible future developments.</p> <p>Within the MTB proposed MPA boundary, one potential future export cable route for a wind energy generation Area of Search (AoS) overlaps the BAP designated mobile species feature Sandeels under all scenarios (i.e. lower, intermediate and upper extent). Therefore, additional management costs may be incurred.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to Sandeels within 1km of proposed activities. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to Sandeels within 1km of proposed activities. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to Sandeels within 1km of proposed activities; and ▪ Additional survey costs incurred to inform new licence applications.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k. Application estimated to be submitted in 2024 (wind energy AoS export cable route). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k. Application estimated to be submitted in 2024 (wind energy AoS export cable route). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k. Application estimated to be submitted in 2024 (wind energy AoS export cable route); and ▪ Additional survey costs - £5k per linear km of development (8km).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.012	0.012	0.052
Average annual costs	0.001	0.001	0.003
Present value of total costs (2014–2033)	0.009	0.009	0.037
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [MTB]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Tourism	Coastal areas are well represented when considering the locations of various tourist related sites within Scotland with a range of site types present in all regions including the North. Where significant impacts to recreational boating or water sports have been identified for the site, there could also be consequential impacts on tourism.	Tourism may benefit from the designation of the MPA as an added attraction to the destination. In addition, there may also be indirect benefits to tourism as a result of benefits to some water sports activities, for example, recreational angling.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN). MTB proposed MPA is a coastal site and is located wholly within 6nm of the UK coastline. Therefore, sea angling overlaps with all features and there corresponding extents within the proposed MPA. No management restrictions upon this activity are required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation and corresponding management restrictions on sector activities including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA [MTB]	
Activity	Description
Commercial Fisheries	Whitefish trawls and other trawls (over-15m) and dredges, pots and other gears (under-15m vessels) operate within the MTB proposed MPA. The value of landings from the MTB area was £15,600 (over-15m vessels) and £4,620 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Provisional ScotMap data coverage does not extend as far as Shetland and therefore there are no data for the MTB proposed MPA. Landings from the over-15m vessels were into Lerwick (87% by value) and Sandwick (12%). The targeted sandeel fishery is not currently active. There is some evidence that the use of scallop dredges can kill sandeels buried in sediment but further research is required to determine whether it poses a risk to achieving the conservation objectives. Therefore, no cost impacts on fisheries are expected.
Recreational Boating	There is one anchorage within the MTB proposed MPA boundary that overlaps with the feature extent for sandeels, under the upper scenario only. No additional management measures are anticipated as being required, as whilst the feature is sensitive to surface abrasion the substrate it inhabits is mobile and dynamic in nature. Therefore, the localised pressures associated with anchoring are felt to be minimal in such an environment.
Telecom Cables	One telecom cable (Shefa-2 Seg 8) is within 1km of the sandeels feature (all scenarios) of the MTB proposed MPA. No additional costs are foreseen in relation to the existing cable. The cable was installed in 2008 and would not be expected to require replacement within the assessment period.

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Identification of Social Impacts from Designation of the Site as an MPA and their significance (over 2014 to 2033 inclusive) [MTB]					
Sector	Economic Impacts	Economic Costs and GVA (PV)	Consequent Social Impacts	Mitigation	Significance of Social impact
Energy Generation	Additional operational costs	Quantified Economic Costs (2014–2033): £0.009 – 0.037m	Future employment opportunities – if increased operational costs associated with management measures render projects unviable or restrict project size there will be a negative impact on economic activity and job creation in this sector.		0
	Costs associated with delays during the consenting process Loss of investor confidence (developments do not proceed)	Not quantified	Future employment opportunities – if the delays deter investments there will be a negative impact on economic activity and future job creation in this sector. Environment – possible negative impact in relation to climate change and the ability of the Scottish Government to meet its 2020 renewables targets, decarbonisation targets and climate change targets. There would also be consequent financial implications of climate change impacts. This impact is uncertain and is only likely to arise under the upper scenario. JNCC's current advice is that the intermediate scenario represents their best view on management requirements.		xxx (under the upper scenario only)
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [MTB]								
Sector/Impact	Location			Age			Gender	
	Region	Ports	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
None identified.								
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [MTB]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m	Gear Types/Sector	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long-term Sick
None identified.								
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

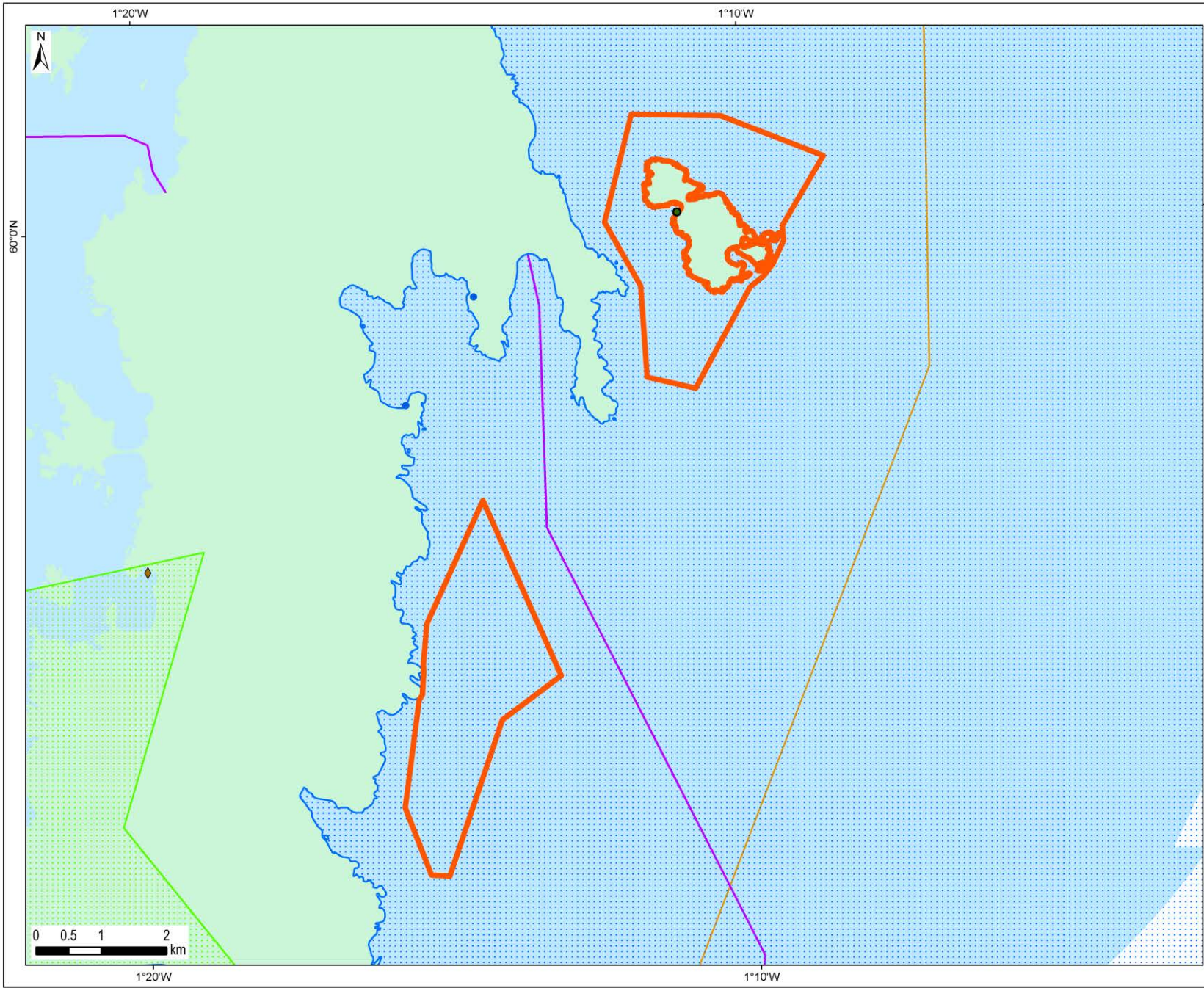
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [MTB]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Sandeels	Provides representation for sandeels in OSPAR Region II. MPA proposal covers preferred site for young sandeels in the Shetland region.	Represents one of three MPA areas for the protection of sandeels in OSPAR Region II.	Replication and representation of areas of importance for sandeels exist in both OSPAR Regions it is present (II and III), based on current knowledge of connectivity between populations.	Areas considered to be of importance to sandeel life history are recorded in OSPAR Regions II and III. MPA proposal covers preferred site for young sandeels in the Shetland region.	Sandeels in Scotland have declined and are considered vulnerable. The MPA area may increase resilience.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services


Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ¹⁰ [MTB]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Low - Moderate. Habitats make contribution to food webs.	Stocks not at MSY	Nil	Low, uncertain if management measures will have impact		Low. Site fishing grounds have low value, but had former sandeel fishery	Nil - Low	Low
Fish for non-human consumption		Stocks reduced from potential maximum	Nil	Nil	Nil			
Gas and climate regulation	Nil	Nil	Nil	Nil	Nil	Moderate	Nil	High
Natural hazard protection	Minimal	Low	Nil	Nil	Nil	Low	Nil	High
Regulation of pollution	Minimal	Low	Nil	Nil	Nil	Low	Nil	High
Non-use value of natural environment	Low – protected feature, and contribution of the site to MPA network, have non-use value.	Non-use value of the site may decline, but probably stable	Nil, no change in key characteristics of site	Low – protection of feature of site from uncertain risks		Low, although sandeel is key part of food webs, it is site's only feature	Nil - Moderate	Moderate
Recreation	Low	Minimal	Nil	Minimal		Low	Minimal	Moderate
Research and Education	Minimal	Nil - Low	Nil	Minimal		Low	Minimal	Moderate
Total value of changes in ecosystem services			Nil for lower scenario, Minimal for upper scenarios				Minimal - Low	Moderate

¹⁰ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



- Proposed Marine Protected Area
- Ports & Harbours**
- Port Locations
- Energy Generation**
- Indicative Cable Routes - Wind
- Indicative Cable Routes - Wave
- Telecommunication Cables**
- Subsea Telecomms Cables**
- Active
- Recreational Boating**
- RYA Cruising Routes
- Light
- Recreational Anchorages
- Watersports**
- ◆ Shore Dive Sites
- Sea Angling (6 nm from coast)

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:80,000	
QA		FMM	
4136-MPA_HA_Mousa_Boddam.mxd			
Produced by ABPmer			



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 Sources: Marine Scotland, 2012; RYA, 2008; Finstrokes, 2011; SNH, 2013; Kingfisher (KIS-CA), 2012

**Human Activities which Occur
 within the Proposed MPA:
 Mousa to Boddam**

North-west sea lochs and Summer Isles (NWS)

Site Area (km²): 612

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [NWS]					
Proposed protected features					
<p><i>Biodiversity Features</i> Burrowed mud, flame shell beds, kelp and seaweed communities on sublittoral sediments, maerl beds, maerl or coarse shell gravel with burrowing sea cucumbers, native oysters, northern feather star aggregations on mixed substrata, circalittoral muddy sand communities.</p> <p><i>Geodiversity Features</i> Quaternary of Scotland – glaciated channels/troughs, megascale glacial lineations, moraines; Submarine Mass Movement – slide scars; Seabed Fluid and Gas Seep – pockmarks; Marine Geomorphology of the Scottish Shelf Seabed – banks of unknown substrate.</p> <p><i>Site Description</i> The North-west sea lochs and Summer Isles MPA proposal covers a series of sea lochs, bays and nearshore islands on the north-west coast of Scotland. The boundary covers a classic glacial landscape and the geodiversity features hold valuable information on Scotland's glacial past.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Burrowed mud	*Lower: 306.50 Intermediate: 611.68 Upper: 611.68	Yes (SNH survey, 1995)	Partial – age of data	Not known	Conserve
Flame shell beds	Lower: 0.07 Intermediate: 0.18 Upper: 0.18	Yes (SNH survey, 2010)	Yes	Not known	Conserve
Kelp and seaweed communities on sublittoral sediments	Lower: 89.73 Intermediate: 164.40 Upper: 164.40	Yes (surveys in 1989 & 1996)	Partial – age of data	Not known	Conserve
Maerl beds	Lower: 1.58 Intermediate: 1.58 Upper: 142.23	Yes (SNH survey, 2010)	Partial – requires validation	Not known	Recover
Maerl or coarse shell gravel with burrowing sea cucumbers	Lower: 1.58 Intermediate: 1.58 Upper: 142.23	Yes	No – requires validation	Not known	Conserve
Native oysters	Lower: 0.0004 Intermediate: 0.0004 Upper: 0.0004	Yes (records in 1978, 1984 & 2010)	Partial – age of data	Not known	Conserve

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and the Sustainability Appraisal**

Northern feather star aggregations on mixed substrata	Lower: 0.06 Intermediate: 0.06 Upper: 16.40	Yes (SNH survey, 2010)	Yes	Not known	Conserve
Circolittoral muddy sand communities	Lower: 164.52 Intermediate: 201.82 Upper: 201.82	Yes (SNH survey, 2010)	Partial	Not known	Conserve
Geodiversity Features					
Quaternary of Scotland – glaciated channels/troughs, megascale glacial lineations, moraines	Glaciated channels/troughs: 20.72 Megascale Glacial Lineations: 19.33 Moraines: 50.46	Yes (Defra-led research, 2009; SNH & JNCC review, 2012)	Yes	Not known	
Submarine Mass Movement – slide scars	3.15	Yes (Defra-led research, 2009; SNH & JNCC review, 2012)	Yes	Not known	
Seabed Fluid and Gas Seep – pockmarks	0.02	Yes (Defra-led research, 2009; SNH & JNCC review, 2012)	Yes	Not known	
Marine Geomorphology of the Scottish Shelf Seabed – banks of unknown substrate	1.04	Yes (Defra-led research, 2009; SNH & JNCC review, 2012)	Yes	Not known	
Key: * Estimated area based on best available data References: Area of Feature: GeMs Confidence in feature presence and extent: SNH (2012j)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [NWS]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Aquaculture (Finfish)	0.005	0.021	0.021
Aquaculture (Shellfish)	See national costs	See national costs	See national costs
Commercial Fisheries*	0.000	1.558	3.117
Energy Generation	0.009	2.173	2.308
Military	See national costs	See national costs	See national costs
Ports and Harbours	0.032	0.032	0.032
Total Quantified Economic Costs	0.046	3.785	5.478
Non-Quantified Economic Costs			
Aquaculture (Finfish)	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment
Aquaculture (Shellfish)	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment
Commercial Fisheries	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Displacement impacts.
Energy Generation	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.
Military	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment.
Ports and Harbours	<ul style="list-style-type: none"> ▪ Relocation of anchorages/ mooring areas away from features of high sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/ mooring areas away from features of high and medium sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/ mooring areas away from features of high and medium sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Recreational Boating	<ul style="list-style-type: none"> ○ Cost of anchorage/mooring relocation. 	<ul style="list-style-type: none"> ○ Cost of anchorage/mooring relocation. 	<ul style="list-style-type: none"> ○ Cost of anchorage/mooring relocation.
<p>Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [NWS]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	0.024	0.024	0.024
Preparation of Statutory Instruments	None	0.004	0.004
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.002*	0.002*	0.002*
Total Quantified Public Sector Costs	0.027	0.031	0.031
Non-Quantified Public Sector Costs			
None identified.			

* Regulatory and advisory costs of finfish and shellfish aquaculture assessed at national level.

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [NWS]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 3 jobs Upper: 6 jobs	North west North west West North east North North West North east	Ullapool Stornoway Campbeltown Buckie Kirkwall Scrabster Oban Peterhead	Impacts concentrated in urban, rural and island coastal areas	Nephrops trawls Dredges	Lower: N/A Upper: >15m	No Impact.	No breakdown of fisherman employment by ethnic origin.	No employment data but unlikely to be employed in fisheries.
If any energy generation developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).										
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [NWS]		
Benefit	Description	Scale of Benefits
Ecosystem Services Benefits (Moderate and High Benefits)		
Fish for human consumption	High. The site provides supporting services, including contribution to food webs and nursery habitats.	Nil - Moderate
Fish for non-human consumption		
Non-use value of natural environment	Moderate - High. Variety of protected features and contribution of the site to MPA network has non-use values.	Nil - Moderate
Recreation	Moderate - High. Including active dive sites, angling and recreational boating routes.	Low - Moderate
Other Benefits		
Tourism	Higher biodiversity due to designation, and presence of designations, may attract more tourism activity to local economy.	
Contribution to ecologically coherent network	See report Section 7.5.	
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [NWS]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Burrowed mud	-	L/I/U	L/I/U	-	-	-	L/I/U	L/I/U	L/I/U	-	L/I/U	L/I/U	U	-	-	L/I/U	L/I/U
Flame shell beds	-	-	-	-	-	-	L/I/U	L/I/U	L/I/U	-	-	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Kelp and seaweed communities on sublittoral sediments	-	L/I/U	L/I/U	-	-	-	L/I/U	L/I/U	L/I/U	-	L/I/U	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Maerl beds	-	U	L/I/U	-	-	-	L/I/U	L/I/U	L/I/U	-	L/I/U	U	L/I	-	-	L/I/U	L/I/U
Maerl or coarse shell gravel with burrowing sea cucumbers	-	U	L/I/U	-	-	-	L/I/U	L/I/U	L/I/U	-	L/I/U	U	-	-	-	L/I/U	L/I/U
Native oysters	-	-	-	-	-	-	L/I/U	-	L/I/U	-	-	-	L/I	-	-	L/I/U	L/I/U
Northern feather star aggregations on mixed substrata	-	-	U	-	-	-	L/I/U	U	L/I/U	-	-	U	-	-	-	L/I/U	L/I/U
Circalittoral muddy sand communities	-	L/I/U	I/U	-	-	-	L/I/U	L/I/U	L/I/U	-	L/I/U	L/I/U	U	-	-	L/I/U	L/I/U
Geodiversity Features																	
Quaternary of Scotland – glaciated channels/troughs	Not considered to be sensitive at the levels of exposure expected from human activities; thus, not considered in the context of management.																
Quaternary of Scotland - megascale glacial lineations																	
Quaternary of Scotland - moraines																	
Submarine Mass Movement – slide scars																	
Seabed Fluid and Gas Seep – pockmarks																	
Marine Geomorphology of the Scottish Shelf Seabed – banks of unknown substrate																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Aquaculture (Finfish) [NWS]			
<p>There are seven finfish farms (Ardessie A, Ardessie B, Ardmair, Corry Farm, Fada, Isle Ewe and Tanera) within the boundary of the NWS proposed MPA. All sites, apart from Fada, directly overlap with the Burrow Mud feature under all scenarios. Fada directly overlaps with Burrowed Mud under the intermediate and upper scenarios only.</p> <p>Ardessie A, Ardmair and Isle Ewe directly overlap with the Circalittoral muddy sand communities under all scenarios. In addition, Ardessie B and Fada are within 1km of this feature under all scenarios. Corry Farm and Isle Ewe are within 1km of this feature in the intermediate and upper scenarios.</p> <p>Three sites, Fada, Isle Ewe and Tanera, directly overlap with the Maerl beds and Maerl or coarse shell gravel with burrowing sea cucumbers features under the upper scenario. In addition, Fada and Tanera are within 1km of the features under all scenarios. Ardmair and Isle of Ewe are within 1km of the features in the upper scenario.</p> <p>Ardessie A, Ardessie B, Corry Farm and Isle Ewe directly overlap with the feature sublittoral kelp and seaweed communities on sediment under all scenarios and Fada and Tanera directly overlaps under the intermediate and upper scenarios only. Ardessie A, Ardessie B, Corry Farm, Fada and Isle Ewe are within 1km of the feature under all scenarios and Ardmair and Tanera are within 1km of the feature under the intermediate and upper scenarios only.</p> <p>There is no public information on potential future development within the proposed MPA. In the absence of information on potential future developments, the assessment has focused on the costs associated with obtaining new CAR licences. A national assessment of the costs of obtaining planning permission for new developments is provided separately.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features; and ▪ Additional survey costs incurred once every 10 years (2019 & 2029) to inform new CAR licence applications. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features; and ▪ Additional survey costs incurred once every 10 years (2019 & 2029) to inform new CAR licence applications.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application; and ▪ Additional baseline visual survey costs -£1.6k per CAR licence application 	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application; and ▪ Additional baseline visual survey costs -£1.6k per CAR licence application
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
	potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.	potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.	potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.007	0.029	0.029
Average annual costs	<0.001	0.001	0.001
Present value of total costs (2014–2033)	0.005	0.021	0.021
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4b. Aquaculture (Shellfish)			
[NWS]			
<p>There are two shellfish farms (Loch Ewe and Loch Kanaird) within the boundary of the NWS proposed MPA.</p> <p>Loch Ewe directly overlaps with Burrowed Mud under all scenarios. Loch Kanaird directly overlaps with this feature under the intermediate and upper scenarios only. Both sites are within 1km of this feature under all scenarios. . There is an additional shellfish farm (Badluarach) within 1km of the proposed MPA boundary which is within 1km of the Burrowed Mud feature under all scenarios.</p> <p>Loch Ewe and Loch Kanaird directly overlap with the Maerl Bed and Maerl or coarse shell gravel with burrowing sea cucumber features under the upper scenario. There is an additional shellfish farm (Badluarach) within 1km of the proposed MPA boundary which is within 1km of the features under all scenarios.</p> <p>Loch Ewe directly overlaps with the Sublittoral kelp and seaweed communities on sediment under all scenarios. Loch Kanaird directly overlaps with this feature under the intermediate and upper scenarios only. Loch Ewe is within 1km of the feature under all scenarios. Loch Kanaird overlaps with this feature under the intermediate and upper scenarios. . There is an additional shellfish farm (Badluarach) within 1km of the proposed MPA boundary which is within 1km of this feature under all scenarios.</p> <p>Badluarach is within 1km of Circalittoral muddy sand communities under intermediate and upper scenarios and Loch Ewe for all scenarios respectively.</p> <p>Badluarach is also located within 1km of the Northern feather star aggregation feature under the upper scenario.</p> <p>There is no public information on potential future development within the proposed MPA. In the absence of information on potential future developments, no site specific assessment has been possible. A national assessment of the costs of obtaining planning permission for new developments is provided separately.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	▪ N/A	▪ N/A	▪ N/A
Description of one-off costs	▪ N/A	▪ N/A	▪ N/A
Description of recurring costs	▪ N/A	▪ N/A	▪ N/A
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	See national costs	See national costs	See national costs
Average annual costs	See national costs	See national costs	See national costs
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>			

Table 4c. Commercial Fisheries (assuming zero displacement of fishing activity) [NWS]

According to VMS-based estimates and ICES rectangle landings statistics, Nephrops trawls, dredges, whitefish trawls, lines and other gears (over-15m), and other gears, nephrops trawls and dredges (under-15m) operate within the NWS proposed MPA. The value of catches from the NWS area was £380,000 (over-15m vessels) and £510,500 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels were predominantly into Lochinver (28% by value), and Ullapool (35%). For the over-15m fleet, nephrops trawlers operated in particular in the western part of the proposed MPA and across areas of burrowed mud. There was also dredger activity in the central area in areas of circalittoral muddy sand communities.

Provisional ScotMap data indicate that the annual average earnings from the NWS proposed MPA was £996,200, with 65% of this from nephrops pots and 19% from nephrops trawls. The spatial distribution of value from nephrops trawls indicates that the majority of value in the NWS proposed MPA and surrounding area is derived from close to the shore. ScotMap data would indicate an annual cost impact of around £0.19 million on <15m nephrops trawls under the Upper Scenario, the estimate from ICES rectangle data may be a slight under-estimate. However, ScotMap data indicate no dredge activity within the NWS area, therefore the estimated impact on dredges from ICES rectangle data is likely to be an over-estimate. The coverage for ScotMap interviews in the region was 71.9% (total value of reported landings from the Fisheries Information Network for those vessels included in the ScotMap value analysis expressed as a percentage of the total reported landings for all vessels <15m). Therefore the ScotMap estimate is likely to under-represent the value of fishing by under-15m vessels, and the spatial representation of the value of fishing is less robust than in regions where coverage is higher.

VMS data indicate that there were 12 non-UK vessels within the NWS proposed MPA (3 French, 3 Irish, 3 Spanish, 2 German and 1 Norwegian), but these vessels will not have been actively fishing within the proposed MPA, which is within 6nm, and are more likely to have been transiting to Ullapool port.

Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and SNH recommendations. No cost impacts are anticipated under the lower scenario because the features that would be protected (flame shell beds, maerl beds and native oysters) cover very small areas in which trawling and dredging are unlikely to be taking place.

Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.

GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.

It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No cost impacts expected. 	<ul style="list-style-type: none"> ▪ Reduce mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) pressure by 50% across burrowed mud feature (full extent of MPA); ▪ Closure to hand collection of native oyster across feature extent; and 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gears (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across full extent of MPA; and ▪ Limit further expansion of static gears.

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Description of one-off costs	▪ None.	▪ Limit further expansion of static gears. ▪ None.	▪ None.
Description of recurring costs	▪ None.	▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): ▪ Nephrops trawls (0.156); ▪ Dredges (0.026); ▪ Other affected gears (0.006). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): ▪ Nephrops trawls (0.067); ▪ Dredges (0.001); ▪ Other affected gears (0.001).	▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): ▪ Nephrops trawls (0.313); ▪ Dredges (0.052); ▪ Other affected gears (0.012). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): ▪ Nephrops trawls (0.133); ▪ Dredges (0.002); ▪ Other affected gears (0.001).
Description of non-quantified costs	▪ None.	▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.	▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	5.141	10.282
Average annual costs	0.000	0.257	0.514
Present value of total costs (2014–2033)	0.000	3.781	7.562
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.000	2.116	4.238
Average annual change to GVA	0.000	0.106	0.212
Present value of total change in GVA (2014–2033)	0.000	1.558	3.117
Direct and Indirect reduction in Employment	0.0 jobs	2.9 jobs	5.9 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4d. Energy Generation			
[NWS]			
<p>There are no energy generation activities currently operating within the NWS proposed MPA boundary or corresponding buffer zones. Thus, economic costs and management measures associated with energy generation in this proposed MPA are described in light of known possible future developments.</p> <p>Within the NWS proposed MPA boundary, one potential future export cable route for a wave energy Area of Search (AoS) could overlap the MPA features burrowed mud, circalittoral muddy sand communities, flame shell beds, sublittoral kelp and seaweed communities on sediment, maerl beds, maerl or coarse shell gravel with burrowing sea cucumbers and northern feather star aggregations on mixed substrata under all scenarios (i.e. lower, intermediate and upper extent), with the exception of northern feather star aggregations on mixed substrata which only overlaps this energy generation activity under the upper scenario.</p> <p>The MPA feature burrowed mud is sensitive to permanent change of one marine habitat type to another (through changes in substratum) and physical damage to species living on or within the seabed. Therefore, it is possible that mitigation costs could be incurred.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to all MPA features within 1km of proposed activities. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to all MPA features within 1km of proposed activities. ▪ Additional survey costs incurred to inform new licence applications; and ▪ Re-routing of cables. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to all MPA features within 1km of proposed activities; ▪ Additional survey costs incurred to inform new licence applications; ▪ Re-routing of cables; and ▪ Additional post-licence monitoring of any features within 1km of development footprint in year 3 following construction.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k. Application estimated for submission in 2024 (wave energy AoS export cable route). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k. Application estimated for submission in 2024 (wave energy AoS export cable route); ▪ Additional survey costs - £5k per linear km of development (45km); and ▪ Re-routeing of cable (2026) - £1.01m per km (burrowed mud, 10% of 30km = 3km). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k. Application estimated for submission in 2024 (wave energy AoS export cable route); ▪ Additional survey costs - £5k per linear km of development (45km); ▪ Re-routeing of cable (2026) - £1.01m per km (burrowed mud, 10% of 30km = 3km); and ▪ Additional post-licence monitoring costs - £5k per linear km of development in year 3 following construction (45km).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.012	3.267	3.492
Average annual costs	0.001	0.163	0.175
Present value of total costs (2014–2033)	0.009	2.173	2.308
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4e. Military				[NWS]
<p>One coastal military location (Loch Ewe fuel jetty) overlaps with the NWS proposed MPA. The Loch Ewe fuel jetty overlaps with sublittoral kelp and seaweed communities on sediment (all scenarios). The Loch Ewe fuel jetty also overlaps with burrowed mud (intermediate and upper scenarios), maerl beds (upper scenario) and maerl or coarse shell gravel with burrowing sea cucumbers (upper scenario).</p> <p>Nine military practice areas (Ewe (X5813) and Minch South (X5814), and seven submarine exercise areas) overlap with the NWS proposed MPA.</p> <p>The two military practice areas Ewe (X5813) and Minch South (X5814) overlap with the burrowed mud feature (all scenarios). In addition the military practice area Ewe (X5813) overlaps with circalittoral muddy sand communities (all scenarios), flame shell beds (all scenarios), maerl beds (all scenarios), maerl or coarse shell gravel with burrowing sea cucumbers (all scenarios), Northern feather star aggregations on mixed substrata (all scenarios) and sublittoral kelp and seaweed communities on sediment (all scenarios).</p> <p>The seven submarine exercise areas overlap with the features of the NWS proposed MPA to varying degrees under the different extent scenarios. In addition, one submarine exercise area overlaps with native oyster (all scenarios).</p> <p>The features and associated habitats which overlap with military activities have not been described as vulnerable to MoD activities in this proposed MPA. It is assumed that management relating to MoD activity will be coordinated through the MoD's Maritime Environmental Sustainability Appraisal Tool (MESAT) which the MoD uses to assist in meeting its environmental obligations. This process will include operational guidance to reduce significant impacts of military activities on MPAs. It is assumed that the MoD will incur additional costs in adjusting MESAT and other MoD environmental assessment tools in order to consider whether its activities will impact on the conservation objectives of MPAs and also incur additional costs in adjusting electronic charts to consider MPAs. However, these costs will be incurred at national level and hence no site-specific cost assessments have been made.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	
Description of one-off costs				
Description of recurring costs				
Description of non-quantified costs				
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)				
Total costs (2014–2033)	See national costs	See national costs	See national costs	
Average annual costs	See national costs	See national costs	See national costs	
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs	
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>				

Table 4f. Ports and Harbours **NWS**

There are five ports/harbours (Achiltibuie, Gruinard, Rhu Coigach, Ullapool and Poolewe) within the NWS proposed MPA boundary. All five ports/harbours overlap the MPA feature burrow mud under all scenarios within the 1km buffer. In addition to burrowed mud, all five ports/harbours overlap sublittoral kelp and seaweed communities on sediment under all scenarios, with the exception of Achiltibuie (intermediate and upper only). Three of these ports/harbours overlap circalittoral muddy sand communities (Achiltibuie, Gruinard and Rhu Coigach). Rhu Coigach (all scenarios), Achiltibuie, Gruinard, and Poolewe (upper scenario only) overlap maerl beds (and maerl or coarse shell gravel with burrowing sea cucumbers). Therefore, management costs may be incurred under the assumption that small ports/harbours will undergo one new development within the relevant time frame (2014-2033), assumed for the year 2024.

There are two anchorages/mooring areas within the NWS proposed MPA boundary. Both anchorages/mooring areas overlap the MPA feature burrowed mud under the intermediate and upper scenarios, with one of the two also overlapping burrowed mud under the lower scenario as well. Costs may be expected to relocate anchorages/mooring areas to less sensitive areas, although any associated costs are non-quantifiable.

There is one small active disposal site (approximately 500m³ per dredge) within the NWS proposed MPA boundary associated with the port/harbour Ullapool. The disposal site overlaps the MPA feature burrowed mud under all scenarios. Therefore, management costs may be incurred under the assumption that a disposal licence will be applied for every ten years within the relevant time frame (2014-2033). Given that the most recent application is being submitted in 2013, it is assumed that future licence application will occur in the years 2023 and 2033.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 7 in total); and ▪ Relocate anchorages/mooring areas away from all features with a high sensitivity. 	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 7 in total); and ▪ Relocate anchorages/mooring areas away from all features with a high or medium sensitivity. If not possible to relocate away from medium-sensitivity features, relocate to more representative areas. 	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 7 in total); and ▪ Relocate anchorages/mooring areas away from all features with a high or medium sensitivity. If not possible to relocate away from medium-sensitivity features, relocate to more representative areas.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Achiltibuie, Gruinard, Rhu Coigach, Ullapool and Poolewe). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Achiltibuie, Gruinard, Rhu Coigach, Ullapool and Poolewe). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Achiltibuie, Gruinard, Rhu Coigach, Ullapool and Poolewe).
Description of recurring costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for disposal site licence application - £6.75k per licence application. Application estimated for submission in 2023 and 2033 (Ullapool disposal site). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for disposal site licence application - £6.75k per licence application. Application estimated for submission in 2023 and 2033 (Ullapool disposal site). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for disposal site licence application - £6.75k per licence application. Application estimated for submission in 2023 and 2033 (Ullapool disposal site).
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high sensitivity; and 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high and medium sensitivity; and 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high and medium sensitivity; and

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.047	0.047	0.047
Average annual costs	0.002	0.002	0.002
Present value of total costs (2014–2033)	0.032	0.032	0.032
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4g. Recreational Boating				[NWS]
<p>There are five cruising routes for recreational boating that intersect the NWS proposed MPA; three light traffic and two medium traffic, although vessels transiting these cruising routes are not assessed as requiring any additional management measures.</p> <p>Under the upper scenario, there are 27 recreational boating anchorages (and associated 100m buffer zones) that overlap with features proposed for protection within the MPA proposal boundary. Twenty anchorages overlap with kelp and seaweed communities, one overlaps with flame shell beds and six overlap with burrowed mud. Also under the upper scenario are four Crown Estate mooring points and two mooring areas. One additional mooring point lies within one of the mooring areas, although it is expected that this is an underestimate and that additional mooring points are present within the mooring areas that are not represented by the data. The Crown Estate moorings overlap with burrowed mud, circalittoral muddy sand communities, sublittoral kelp and seaweed communities, maerl beds, maerl or coarse shell gravel with burrowing sea cucumbers, flame shell beds and northern feather star aggregations on mixed substrata.</p> <p>Under the intermediate and lower scenarios, SNH have identified four recreational anchorages that overlap with proposed protected features and one mooring area owned by The Crown Estate. One anchorage in Loch Ewe overlaps with kelp and seaweed communities and native oyster point data records. An anchorage in Loch Broom overlaps with flameshell bed records; one in the 100m zone and two in the 200m zone. Another anchorage in Loch Broom overlaps with flameshell bed point records and kelp and seaweed communities in the 200m zone. Also of note in Loch Broom are clustered flameshell beds around the area. At Tanera Beg, Summer Isles, one anchorage overlaps with a point record of kelp and seaweed communities and a polygon record of maerl beds within 200m.</p> <p>There is uncertainty as to the exact location of The Crown Estate's mooring within the MPA proposal area and therefore the degree of interaction with proposed protected features. Of most concern is the concentration of flame shell beds in the narrows of Loch Broom.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No additional management required for Ob na Ba Ruaidhe, (Loch Ewe), Isle of Ewe and Tanera Beg. Sensitivity of kelp and seaweed communities on sublittoral sediment to surface abrasion is low. The maerl bed at Tanera Beg is further north and away from bay where anchoring would occur so don't believe there would be actual overlap between anchoring and feature; and ▪ Relocate anchorages/moorings away from the narrows of Loch Broom due to overlap with flameshell beds. If not possible to relocate away from feature, relocate to less sensitive or more representative area. 	<ul style="list-style-type: none"> ▪ No additional management required for Ob na Ba Ruaidhe, (Loch Ewe), Isle of Ewe and Tanera Beg. Sensitivity of kelp and seaweed communities on sublittoral sediment to surface abrasion is low. The maerl bed at Tanera Beg is further north and away from bay where anchoring would occur so don't believe there would be actual overlap between anchoring and feature; and ▪ Relocate anchorages/moorings away from the narrows of Loch Broom due to overlap with flameshell beds. If not possible to relocate away from feature, relocate to less sensitive or more representative area. 	<ul style="list-style-type: none"> ▪ Relocate all anchorages/moorings away from all features with a high or medium sensitivity to surface abrasion pressure associated with anchoring: flame shell beds; maerl beds; maerl or coarse shell gravel with burrowing sea cucumbers; northern feather star aggregations; burrowed mud. If not possible to relocate away from features, relocate to less sensitive or more representative area. 	
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Cost of anchorage/mooring relocation. 	<ul style="list-style-type: none"> ▪ Cost of anchorage/mooring relocation. 	<ul style="list-style-type: none"> ▪ Cost of anchorage/mooring relocation. 	

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [NWS]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Tourism	Coastal areas are well represented when considering the locations of various tourist related sites within Scotland with a range of site types present in all regions including the North West. Where significant impacts to recreational boating or water sports have been identified for the site, there could also be consequential impacts on tourism.	Tourism may benefit from the designation of the MPA as an added attraction to the destination. In addition, there may also be indirect benefits to tourism as a result of benefits to some water sports activities, for example, recreational angling and diving.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Scuba Diving	There are four dive locations which overlap with the NWS proposed MPA, one shore dive location (Badentarbet pier) and three wreck dive sites (Fairweather V, Innisjura and Jambo). All locations, apart from Jambo, overlap with 'Burrowed Mud' under all scenarios, whereas Jambo overlaps under the intermediate and upper scenarios only. All sites excluding Innisjura overlap with Maerl Beds and 'Maerl or coarse shell gravel with burrowing sea cucumbers' under the upper scenario. Badentarbet pier and Fairweather V overlap with 'Sublittoral kelp and seaweed communities on sediment' under the intermediate and upper scenarios, Jambo overlaps under all scenarios. Innisjura overlaps with 'circalittoral muddy sands communities' under all scenarios. No management restrictions upon this activity are required.	The added protection offered by an MPA designation and management measures placed upon sector activities may increase the aesthetic attraction of the dive sites through an improved marine ecosystem and a reduction in degradation to the wreck sites.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN). The NWS proposed MPA is a coastal site with the majority of the site being located within 6nm of the UK coastline. Therefore sea angling overlaps with all features and there corresponding extents within the proposed MPA. No management restrictions upon this activity are required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation and corresponding management restrictions on sector activities including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are present but which would be Unaffected by Designation of the Site as an MPA		[NWS]
Activity	Description	
Power Interconnectors	One consented power interconnector (Western Isles HVDC Link) overlaps with the NWS proposed MPA. The consented power interconnector overlaps with burrowed mud (all scenarios), circalittoral muddy sand communities (all scenarios) and sublittoral kelp and seaweed communities on sediment (all scenarios). In addition the future power interconnector overlaps with maerl beds (upper scenario), maerl or coarse shell gravel with burrowing sea cucumbers (upper scenario) and northern feather star aggregations on mixed substrata (upper scenario). The future power interconnector is also within 1km of flame shell beds (all scenarios). No cost impacts are foreseen, as it is assumed that there will be no review of the existing consents.	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [NWS]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.00m Intermediate: £0.26m Upper: £0.51m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: £0.11m Upper: £0.21m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: xx (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 2.9 jobs Upper: 5.9 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Displacement Effects	Not quantified	Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences: <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing 		xx

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [NWS]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
			<p>grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited;</p> <ul style="list-style-type: none"> ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		
Energy Generation	Additional operational costs	Quantified Cost Impact (2014–2033): £0.009 – 2.308m	Future employment opportunities – if increased operational costs associated with management measures render projects unviable or restrict project size there will be a negative impact on economic activity and job creation in this sector.		xx (under intermediate and upper scenarios)
	<p>Costs associated with delays during the consenting process</p> <p>Loss of investor confidence (developments do not proceed)</p>	Not quantified	<p>Future employment opportunities – if the delays deter investments there will be a negative impact on economic activity and future job creation in this sector.</p> <p>Environment – possible negative impact in relation to climate change and the ability of the Scottish Government to meet its 2020 renewables targets, decarbonisation targets and climate change targets. There would also be consequent financial implications of climate change impacts.</p> <p>This impact is uncertain and is only likely to arise under the upper scenario. JNCC’s current advice is that the intermediate scenario represents their best view on management requirements.</p>		xxx (under the upper scenario only)
<p>Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [NWS]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries Reduction in landed value, GVA and employment	xx North-West West North-East North	xx Largest employment impacts in: Ullapool (43%), Stornoway (13%), Campbeltown (13%), Buckie (9%), Kirkwall (5%), Scrabster (4%), Oban (4%), Peterhead (3%).	xx Coastal and Island Rural and Urban	xxx Potentially significant negative effect if parent loses job/becomes unemployed.	xxx Potentially significant negative effect if individuals lose job/become unemployed.	xx Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	xxx 0-6 job losses Potentially significant negative effect on individuals that lose job/become unemployed.	xxx Potentially significant negative effect if member of household loses job/becomes unemployed.
Fish Processors Reduction in local landings at landing ports	x North-West	x Lochinver Ullapool Gruinard- Aultbea Stornoway Gairloch	x Coastal and Island Rural and Urban	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [NWS]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: >15m	Nephrops trawls Dredges	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin	0 No employment data but unlikely to be employed in fisheries
Fish Processors Reduction in local landings at landing ports		Shellfish: xxx Demersal: xx Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [NWS]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Burrowed mud	Provides representation of the tall sea pen in burrowing mud in OSPAR Region III.	One of two areas of tall sea pen in burrowing mud in OSPAR Region III and one of three in Scottish seas.	Not currently understood for burrowed mud.	Burrowed mud occurs within a range of environments. It occurs in OSPAR Regions II, III and V. The proposed MPA and others within the network will represent the different components of burrowed mud and its geographic range and variation.	Seapens and burrowing megafauna are listed by OSPAR as threatened and/or declining. The MPA area may increase resilience.
Flame shell beds	Provides representation for flame shell beds in OSPAR Region III.	Represents one of five recommended areas for flame shell beds in OSPAR Region III.	Not currently understood for flame shell beds.	All records of flame shell beds are from OSPAR Region III. The recommended MPA areas would to some extent reflect the geographic range of flame shell beds in Scottish seas.	Not listed by OSPAR as threatened and/or declining, although there is evidence of decline. The MPA may increase resilience.
Kelp and seaweed communities on sublittoral sediments	Provides representation for kelp and seaweed communities on sublittoral sediment in OSPAR Region III.	No information available	No information available.	No information available.	No information available.
Maerl beds	Provides representation for maerl beds in OSPAR Region III.	Represents one of three areas of maerl bed within OSPAR Region III and one of five in the Scottish seas.	No information available.	No information available.	Maerl beds are listed by OSPAR as threatened and/or declining. MPA area may increase resilience.
Maerl or coarse shell gravel with burrowing sea cucumbers	Provides representation for maerl beds in OSPAR Region III.	Represents one of two areas recommended for the protection of maerl or coarse shell gravel with burrowing sea cucumbers.	No information available.	No information available.	No information available.

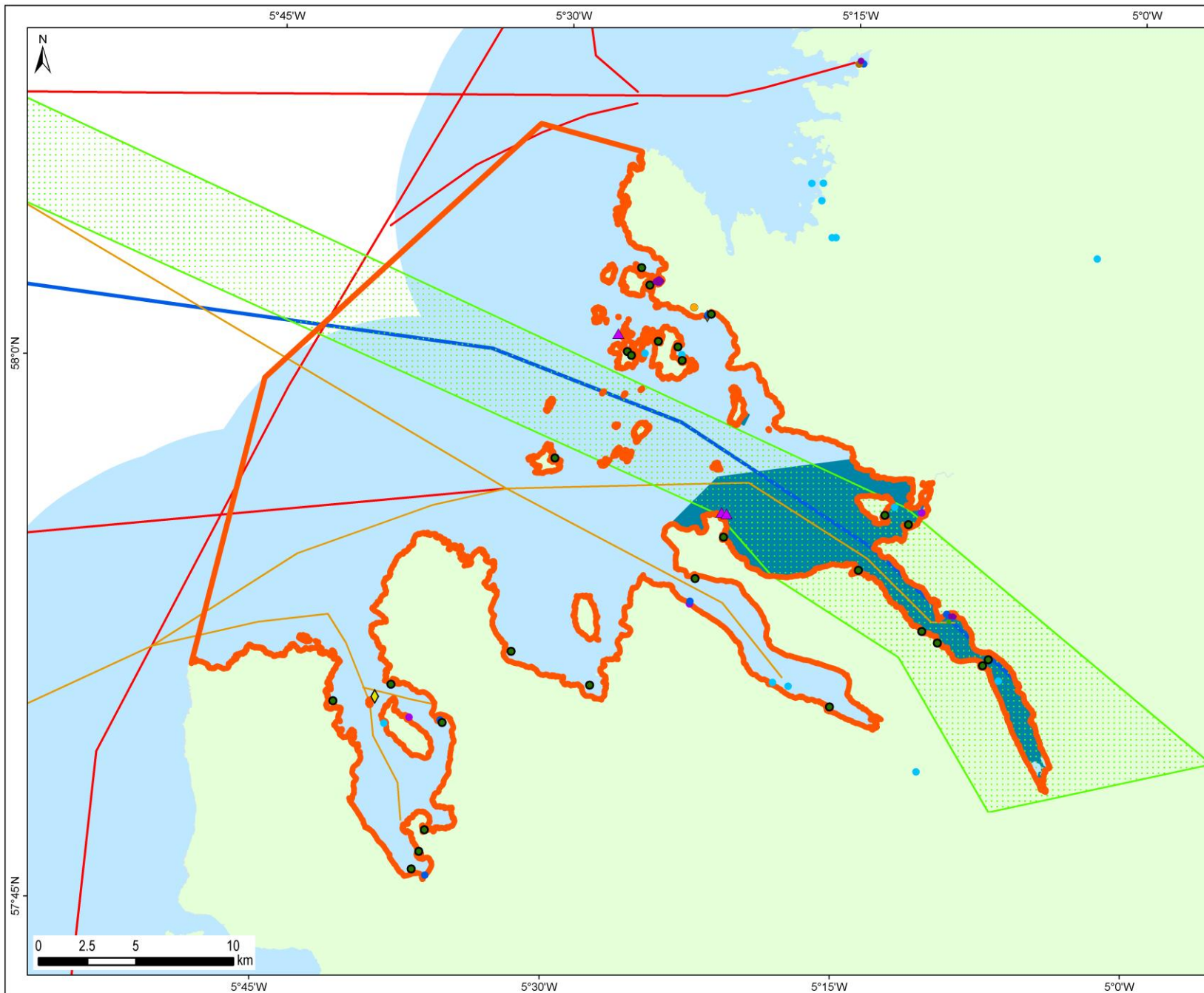
Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [NWS]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Native oysters	Provides representation of native oysters in OSPAR Region III.	Represents one of two areas of native oysters within OSPAR Region III.	No information available.	No information available.	Native oysters are listed as threatened and/or declining by OSPAR. The MPA may increase resilience.
Northern feather star aggregations on mixed substrata	Provides representation of northern feather star aggregations on mixed substrata in OSPAR Region III.	Represents one of three recommended areas for northern feather star aggregations on mixed substrata in OSPAR Region III.	Not currently understood for Northern feather star aggregations on mixed substrata.	All records of Northern feather star aggregations on mixed substrata are from OSPAR Region III.	No information available
Circalittoral muddy sand communities	No information available.				
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ¹¹ [NWS]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	High. Site fishing grounds are valuable, and contain nursery habitats.	Stocks not at MSY, maerl beds extent needs to recover	Nil	Moderate, protection of shellfish beds can contribute to maintenance and recovery of stocks – benefits are higher under stronger protection measures, but ecosystem response is uncertain.		High, significant commercial landings from site. Commercially valuable species supported.	Nil - Moderate, extent of ecosystem service and response to management are both unpredictable	Low, uncertainty in extent of habitats and their response to management measures.
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Low	Low	Nil	Minimal - Low, from restoring habitats.		Moderate, social cost of carbon	Minimal	Moderate
Natural hazard protection	Low	Low	Nil			Low	Nil	High
Regulation of pollution	Moderate, benthic communities regulate pollution	Low, major water quality issues to be dealt with through WFD	Nil	Low, protection could allow recovery of species that provide this service		Low, water quality in this area not affecting human welfare	Nil - Low	Moderate
Non-use value of natural environment	Moderate - High, variety of protected features, and contribution of the site to MPA network, have non-use value.	Non-use value of the site may decline	Nil	Low - Moderate. Protection of features of site from minor decline	Moderate – protection of features of site from decline, and allowing recovery	Moderate – range of features means strong contribution to halting decline of marine biodiversity.	Nil - Moderate	Low - Moderate, extent of features recovery in response to management measures, and value to society, are uncertain

¹¹ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ¹¹ [NWS]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Recreation	Moderate - High, active dive sites, angling and recreational boating routes	Moderate - High, including tourism activities. Angling may be reduced by damage to features	Nil	Low - Moderate, Angling benefits and biodiversity encountered by divers and recreational boaters are protected from possible decline, and could recover. Designation could enhance tourism activity.		Moderate, extensive activities, but substitutes are available.	Low - Moderate, enhancement of activities through improved angling and visitor experiences.	Low - Moderate, extent of change from management measures uncertain
Research and Education	Moderate	Low, small number of biological features have research value and there are substitutes	Nil	Low, protection of key characteristics of site from decline, possible recovery, improving future research opportunities.		Low for individual features. Moderate for opportunity to understand response of wide range of features to management	Low	Low - Moderate, extent to which research uses site in future uncertain
Total value of changes in ecosystem services			Nil for low scenario, moderate for upper scenarios				Nil - Moderate	Low



Proposed Marine Protected Area

Aquaculture

- Existing Shellfish Installations
- Existing Finfish Installations

Military Coastal Locations

- Fuel Jetty

Ports & Harbours

- Port Locations
- Anchorage Areas

Power Interconnectors

- Future Proposed Interconnectors

Recreational Boating

RYA Cruising Routes

- Light
- Medium
- Recreational Anchorages
- Recreational Marinas

Mooring Areas

Energy Generation

- Indicative Cable Routes - Wave

Waste Disposal

- Disposal Sites (Open)

Watersports

- Shore Dive Sites
- Wreck Dive sites
- Dinghy Sailing Sites
- Sea Angling (6 nm from coast)

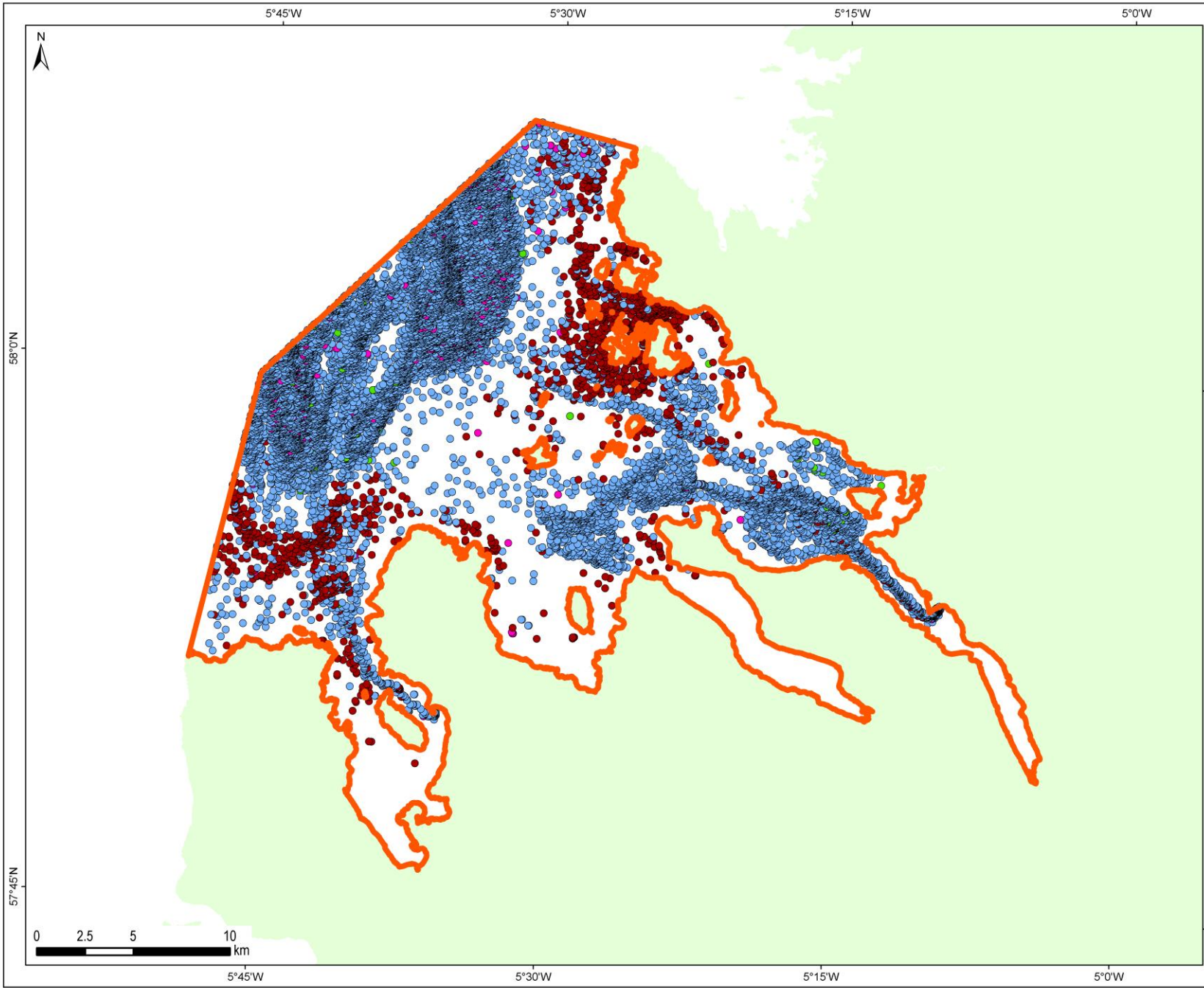
Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:270,000	
QA		FMM	
4136MPA_HA_NW_Summer_islands.mxd			

Produced by ABPmer

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Human Activities which Occur within the Proposed MPA:
NW Sea Lochs and Summer Isles



- Proposed Marine Protected Area
- VMS Fishing Ping Data (2007 to 2011)
 - Whitefish Trawls
 - Nephrops Trawls
 - Dredges
 - Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:270,000	
QA		FMM	
4136MPA_Fish_NW_Summer_islands.mxd			



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 Data Source: Scottish Government, 2013
 NOT TO BE USED FOR NAVIGATION

**Fishing Activities which Occur within the Proposed MPA:
 NW Sea Lochs and Summer Isles**

Noss Head (NOH)

Site Area (km²): 9

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [NOH]					
Proposed protected features					
<i>Biodiversity Features</i> Horse mussel beds.					
<i>Geodiversity Features</i> None.					
<i>Site Description</i> Noss Head is a small inshore site extending from the coast just south of Sinclair's Bay in Caithness, north east Scotland. The site runs roughly parallel to the shore in depths up to 50m.					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Horse mussel beds	Lower: 2.99 Intermediate: 2.99 Upper: 8.72	Yes (SSE survey data, 2010; Marine Scotland Science survey data, 2011)	Yes (SSE survey data, 2010; Marine Scotland Science data, 2011)	Not known	Conserve
Geodiversity Features					
N/A					
Key: * Estimated area based on best available data References: Area of Feature: GeMs Confidence in feature presence and extent: SNH (2012)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [NOH]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries*	0.002	0.003	0.012
Energy Generation	0.012	0.018	0.018
Total Quantified Economic Costs	0.014	0.021	0.030
Non-Quantified Economic Costs			
Commercial Fisheries	▪ Displacement impacts.	▪ Displacement impacts.	▪ Displacement impacts.
Energy Generation	▪ Costs of project delays during consenting; risk of deterrent to investment.	▪ Costs of project delays during consenting; risk of deterrent to investment.	▪ Costs of project delays during consenting; risk of deterrent to investment.
Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [NOH]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	None	None
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.001	0.001	0.001
Total Quantified Public Sector Costs	0.001	0.001	0.001
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [NOH]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 0 jobs Upper: 0 jobs	N/A	Unknown	Impacts concentrated in rural coastal areas	Cannot be identified for confidentiality reasons.	Lower: <15m Upper: <15m	No Impact.	No Impact.	No employment data but unlikely to be employed in fisheries.
If any energy generation developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).										
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [NOH]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use value of natural environment	Low. Protected features and contribution of the site to MPA network has non-use values.	Low - Moderate
Other Benefits		
Tourism	Higher biodiversity due to designation, and presence of designations, may attract more tourism activity to local economy.	
Contribution to ecologically coherent network	See report Section 7.5.	
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [NOH]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Horse mussel beds	-	-	-	-	-	-	L/I/U	L/I/U	-	-	-	-	L/I/U	-	-	L/I/U	L/I/U
Geodiversity Features																	
N/A																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity) [NOH]			
<p>According to VMS-based estimates and ICES rectangle landings statistics, dredges (over-15m) and pots and other gears (under-15m vessels) operate within the NOH proposed MPA. The value of landings from the NOH area was £1,400 (over-15m vessels) and £7,340 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels were made predominantly into Wick (94% by value). For the over-15m fleet, there was sparse activity predominantly by dredgers in the southern part of the proposed MPA across the area of horse mussel beds.</p> <p>Provisional ScotMap data indicate that the annual average earnings from the NOH proposed MPA was £8,000, almost all from pots (predominantly for brown crab and lobster). The coverage for ScotMap interviews in the region was 66.4% (total value of reported landings from the Fisheries Information Network for those vessels included in the ScotMap value analysis expressed as a percentage of the total reported landings for all vessels <15m). Therefore the ScotMap estimate is likely to under-represent the value of fishing by under-15m vessels, and the spatial representation of the value of fishing is less robust than in regions where coverage is higher.</p> <p>VMS data indicate that there are no non-UK vessels fishing within the NOH proposed MPA.</p> <p>Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and SNH recommendations.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Remove 50% of mobile bottom-contact gear pressure (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across horse mussel beds. 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gears (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across horse mussel beds. 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gears (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across horse mussel beds.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Description of recurring costs	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Dredges (<0.001). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (<0.001); ▪ Other trawls (<0.001); ▪ Dredges (<0.001). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Dredges (<0.001). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (<0.001); ▪ Other trawls (<0.001); ▪ Dredges (<0.001). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish seines (<0.001); ▪ Dredges (0.001). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (<0.001); ▪ Other trawls (<0.001); ▪ Dredges (<0.001).
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.005	0.010	0.040
Average annual costs	<0.001	<0.001	0.002
Present value of total costs (2014–2033)	0.004	0.008	0.030
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.003	0.004	0.017
Average annual change to GVA	<0.001	<0.001	<0.001
Present value of total change in GVA (2014–2033)	0.002	0.003	0.012
Direct and Indirect reduction in Employment	0.0 jobs	0.0 jobs	0.0 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4b. Energy Generation				[NOH]
<p>There are no energy generation activities currently operating within the NOH proposed MPA boundary or corresponding buffer zones. Thus, economic costs and management measures associated with energy generation in this proposed MPA are described in light of known possible future developments.</p> <p>Within the NOH proposed MPA boundary, one potential future export cable route for numerous tidal energy generation developments (Brough Ness, Ness of Duncansby, Inner Sound and Cantick Head) could overlap the OSPAR and BAP designated habitat feature 'horse mussel beds' under the upper scenario. However, the 1km buffer of this cable route could overlap horse mussel beds under all scenarios (i.e. lower, intermediate and upper extent). The conservation objective for this habitat feature is to conserve and, in turn, SNH management options suggest reducing the activity in such areas. Horse mussel beds are of high sensitivity to physical change (to another seabed type); therefore, mitigation costs may be associated with re-routing the export cable around the feature, whereby it should not be trenched because this is likely to affect the integrity of the bed. Given the number of energy generation projects the export cable route could be incorporated, it is estimated that management costs may be applicable as early as the year 2014.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to horse mussel beds within 1km of proposed activities. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to horse mussel beds within 1km of proposed activities; and ▪ Additional survey costs incurred to inform new licence applications. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to horse mussel beds within 1km of proposed activities; and ▪ Additional survey costs incurred to inform new licence applications. 	
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k. Application estimated for submission in 2014 (see description above). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k. Application estimated for submission in 2014 (see description above); and ▪ Additional survey costs - £5k per linear km of development (1.2km). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k. Application estimated for submission in 2014 (see description above); and ▪ Additional survey costs - £5k per linear km of development (1.2km). 	
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)				
Total costs (2014–2033)	0.012	0.018	0.018	
Average annual costs	0.001	0.001	0.001	
Present value of total costs (2014–2033)	0.012	0.018	0.018	
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>				

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [NOH]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Tourism	Coastal areas are well represented when considering the locations of various tourist related sites within Scotland with a range of site types present in all regions including the North. Where significant impacts to recreational boating or water sports have been identified for the site, there could also be consequential impacts on tourism.	Tourism may benefit from the designation of the MPA as an added attraction to the destination. In addition, there may also be indirect benefits to tourism as a result of benefits to some water sports activities, for example, recreational angling.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN). The NOH proposed MPA is a coastal site and is located wholly within 6nm of the UK coastline. Therefore, sea angling overlaps with all features and there corresponding extents within the proposed MPA. No management restrictions upon this activity are required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation and corresponding management restrictions on sector activities including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA		[NOH]
Activity	Description	
Recreational Boating	One cruising route with medium traffic intersects with the NOH proposed MPA boundary. Although it overlaps with horse mussel beds under all scenarios, it is not considered that the vessels transiting the cruising route will require any additional management measures.	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [NOH]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.01m Intermediate: <£0.01m Upper: <£0.01m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: <£0.01m Upper: <£0.01m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: 0 (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 0.0 jobs Upper: 0.0 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Displacement Effects	Not Quantified	Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences: <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); 		0

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			<ul style="list-style-type: none"> ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited; ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		
Energy Generation	Additional operational costs	Quantified Cost Impact (2014–2033): £0.012 – 0.018m	Future employment opportunities – if increased operational costs associated with management measures render projects unviable or restrict project size there will be a negative impact on economic activity and job creation in this sector.		0
	Costs associated with delays during the consenting process Loss of investor confidence (developments do not proceed)	Not Quantified	<p>Future employment opportunities – if the delays deter investments there will be a negative impact on economic activity and future job creation in this sector.</p> <p>Environment – possible negative impact in relation to climate change and the ability of the Scottish Government to meet its 2020 renewables targets, decarbonisation targets and climate change targets. There would also be consequent financial implications of climate change impacts.</p> <p>This impact is uncertain and is only likely to arise under the upper scenario. JNCC’s current advice is that the intermediate scenario represents their best view on management requirements.</p>		xxx (under the upper scenario only)
<p>Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [NOH]								
Sector/Impact	Location			Age			Gender	
	Region	Ports	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
None identified.								
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [NOH]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long-term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: <15m Upper: <15m	Cannot be identified for confidentiality reasons.	0	0	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	0	0
Fish Processors Reduction in local landings at landing ports		Shellfish: xx Demersal: x Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								
* Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

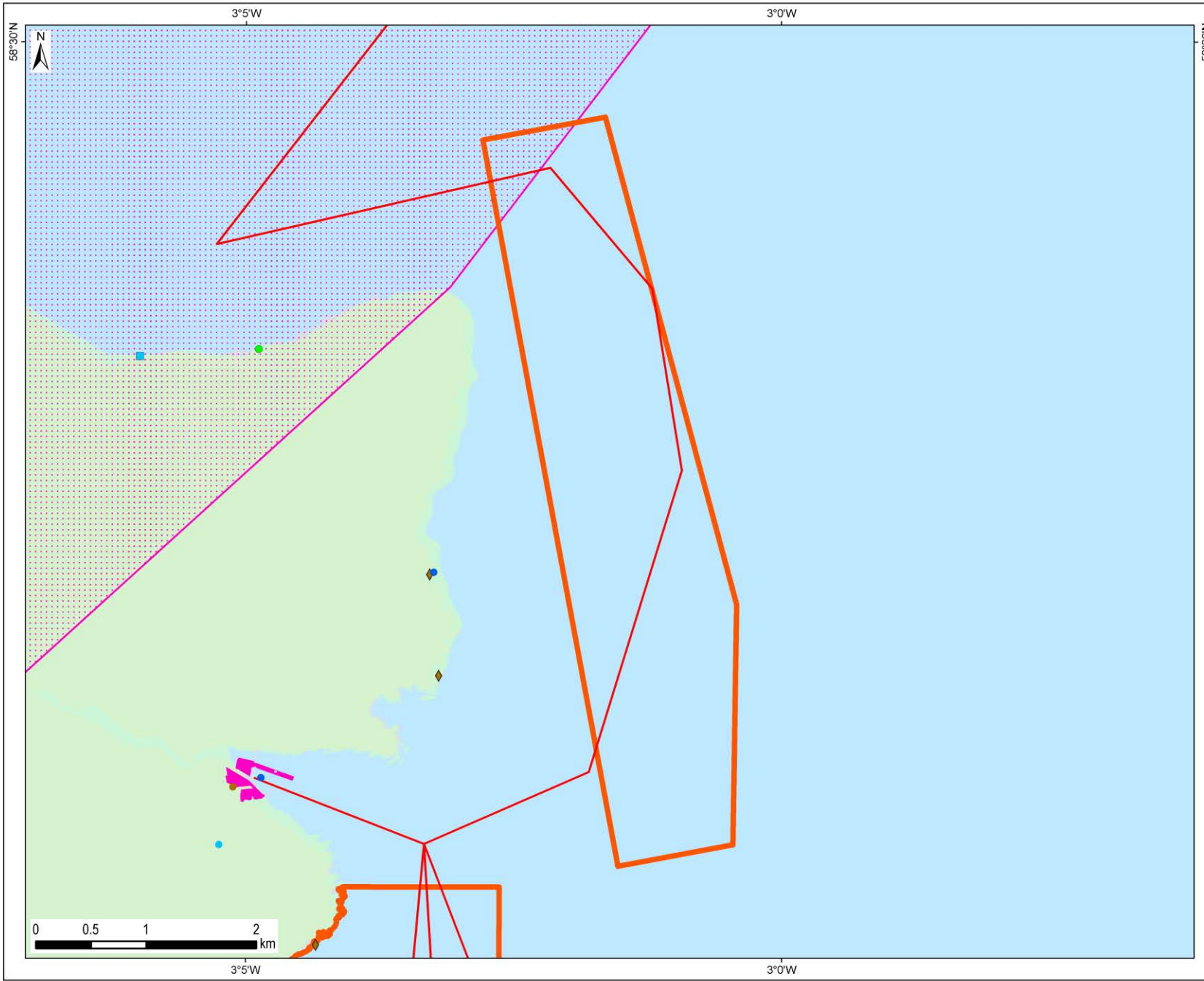
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [NOH]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Horse mussel beds	Provides representation of horse mussel beds in OSPAR Region II. Noss Head is the largest horse mussel bed in Scotland's seas.	Represents one of four MPA areas recommended for protection of horse mussel beds.	Not currently understood for horse mussel beds.	The MPA area covers the largest horse mussel bed in Scotland's seas.	Horse mussel beds are listed by OSPAR as threatened and/or declining. The MPA may increase resilience.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ¹² [NOH]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Low. Habitats make contribution to food webs.	Stocks not at MSY	Nil	Low. Some recovery of benthic species possible.		Low – Moderate. Feature is productive for food webs, but site is small	Nil - Low	Moderate
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Nil	Nil	Nil	Nil	Low	Moderate	Nil	High
Natural hazard protection	Nil	Nil	Nil, would not affect stability of coastline			Low	Nil	High
Regulation of pollution	Moderate	Moderate	Low	Low - Moderate, may be maintained by protecting seabed features		Low	Low	Low, uncertain extent of feature
Non-use value of natural environment	Low – protected feature and contribution of the site to MPA network, have non-use value.	Non-use value of the site may decline	Low - Moderate, depending on extent of feature, intermediate and upper scenarios more likely to allow some recovery			Moderate	Low - Moderate	Low, uncertain extent of feature
Recreation	Minimal	Low	Minimal - Low, slightly higher biodiversity encountered by boating			Moderate	Minimal	Moderate
Research and Education	Low	Biological features have research value but there are substitutes	Minimal - Low, depending on extent of feature, intermediate and upper scenarios more likely to allow some recovery			Low	Nil - Minimal	Low
Total value of changes in ecosystem services			Minimal for lower scenario, low for upper scenarios				Minimal - Low	Low

¹² This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



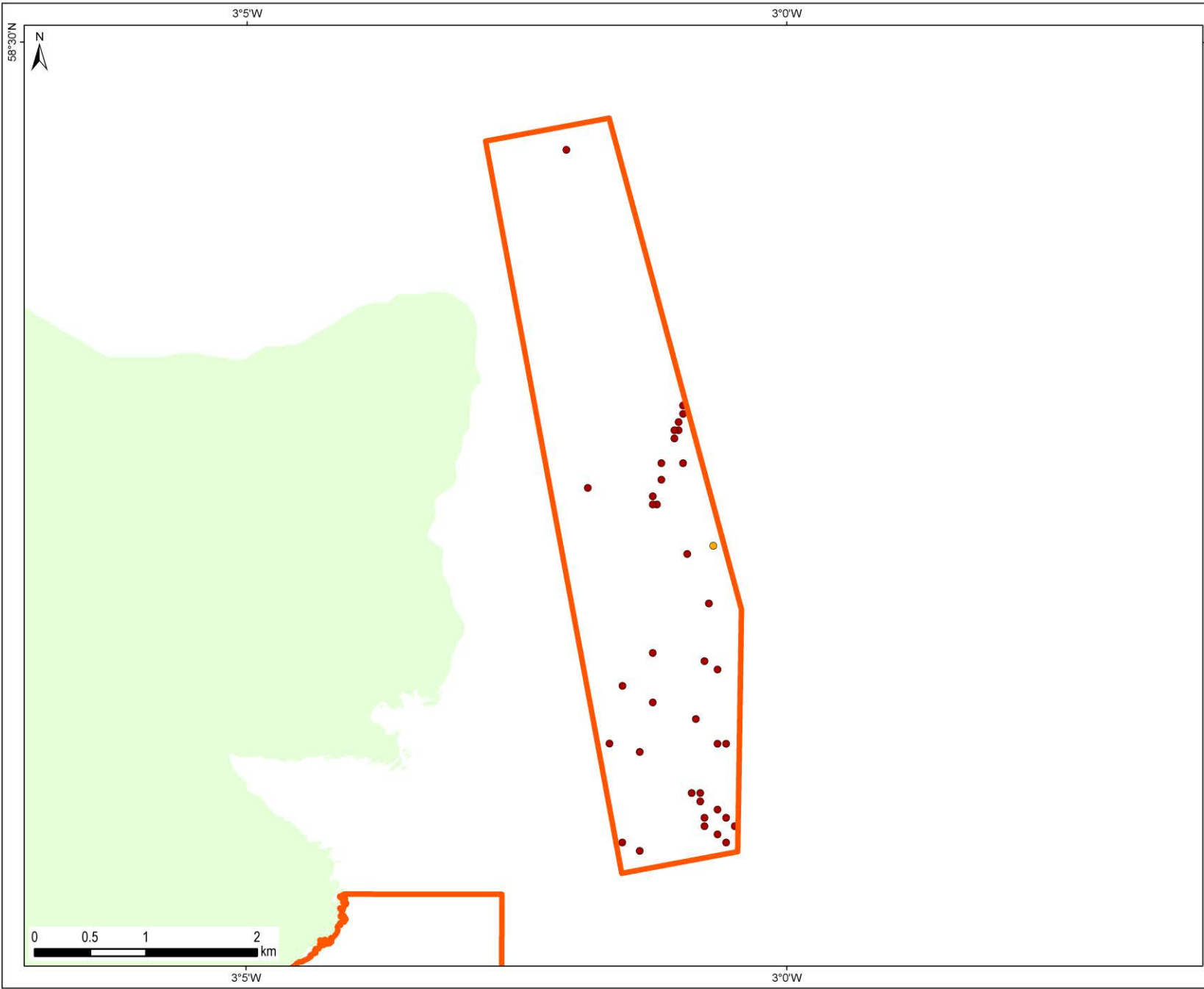
- Proposed Marine Protected Area
- Ports & Harbours**
- Port Locations
- Maintained Channels
- Energy Generation**
- Indicative Cable Routes - Tidal
- Aquaculture**
- Existing Finfish Installations
- Watersports**
- Wind Surfing Sites
- Surfing Sites
- ◆ Shore Dive Sites
- Sea Angling (6 nm from coast)
- Recreational Boating**
- RYA Cruising Routes**
- Medium
- Recreational Marinas

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:47,000	
QA		FMM	
4136-MPA_HA_Noss_head.mxd			
Produced by ABPmer			



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**Human Activities which Occur
within the Proposed MPA:
Noss Head**



Proposed Marine Protected Area

VMS Fishing Ping Data (2007 to 2011)

- Whitefish Seines
- Dredges

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:47,000	
QA		FMM	
4136-MPA_Fish_Noss_head.mxd			
Produced by ABPmer			



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 Data Source: Scottish Government, 2013
 NOT TO BE USED FOR NAVIGATION

**Fishing Activities which Occur within the Proposed MPA:
 Noss Head**

Papa Westray (PWY)

Site Area (km²): 35

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [PWY]					
Proposed protected features					
<i>Biodiversity Features</i> Black guillemot.					
<i>Geodiversity Features</i> Marine Geomorphology of the Scottish Shelf Seabed – sand wave field.					
<i>Site Description</i> The Papa Westray MPA proposal in Orkney, far north of Scotland, covers the existing SSSIs and SPA in the region that protect breeding seabird species. The MPA proposal is a 2km marine extension of the existing terrestrial SSSI boundaries.					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Black guillemot	*Lower: 32.93 Intermediate: 32.93 Upper: 32.93	Yes (Seabird 2000 census)	Yes	Not known	Conserve
Geodiversity Features					
Marine Geomorphology of the Scottish Shelf Seabed – sand wave field	0.64	Yes (Defra – led research, 2009)	Partial – data is coarse resolution	Not known	Conserve
Key: * Estimated area based on best available data References: Area of Feature: GeMs Confidence in feature presence and extent: SNH (2012m)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [PWY]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Energy Generation	0.009	0.009	0.107
Total Quantified Economic Costs	0.009	0.009	0.107
Non-Quantified Economic Costs			
Energy Generation	▪ Costs of project delays during consenting; risk of deterrent to investment.	▪ Costs of project delays during consenting; risk of deterrent to investment.	▪ Costs of project delays during consenting; risk of deterrent to investment.
Note: For detailed information on economic cost impacts on activities, see Table 4.			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [PWY]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	None	None
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.001	0.001	0.003
Total Quantified Public Sector Costs	0.001	0.001	0.003
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [PWY]									
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis						
			Location			Fishing Groups Predominantly Affected		Social Groups Affected	
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities
None identified (Commercial Fisheries).									
If any energy generation developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).									

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [PWY]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use value of natural environment	Low	Nil - Moderate
Other Benefits		
Tourism	Higher biodiversity due to designation, and presence of designations, may attract more tourism activity to local economy.	
Contribution to ecologically coherent network	See report Section 7.5.	
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [PWY]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Black guillemot	-	-	-	-	-	-	L/I/U	L/I/U	-	-	-	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Geodiversity Features																	
Marine Geomorphology of the Scottish Shelf Seabed – sand wave field	Not considered to be sensitive at the levels of exposure expected from human activities; thus, not considered in the context of management.																
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Energy Generation [PWY]			
<p>There are no energy generation activities currently operating within the PWY proposed MPA boundary or corresponding buffer zones. Thus, economic costs and management measures associated with energy generation in this proposed MPA are described in light of known possible future developments.</p> <p>Within the PWY proposed MPA boundary, a tidal energy generation Area of Search (AoS) overlaps the MPA feature 'black guillemot' under the upper extent scenario only. One potential future export cable route for a different tidal energy generation AoS overlaps the black guillemot MPA feature under all scenarios. The 5km buffer zone of a wave energy generation AoS also overlaps the black guillemot MPA feature under the upper extent scenario only.</p> <p>Given black guillemot are of medium sensitivity to barrier to species movement, death or injury by collision, sub-surface abrasion/penetration, underwater noise and changes in water clarity and water flow (tidal current), it is feasible that additional management costs will be incurred as a result of this MPA designation. The region encompasses an existing RSPB reserve, specifically assessing black guillemot populations. Annual bird counts and occasional guided walks through the breeding season are undertaken by RSPB, who also manage the reserve to support conservation of breeding seabirds.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts black guillemot within 1km of proposed activities. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts black guillemot within 1km of proposed activities. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to black guillemot within 5km of proposed activities; and ▪ Additional survey costs incurred to inform new licence applications.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k. Application estimated for submission in 2024 (tidal energy AoS export cable). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k. Application estimated for submission in 2024 (tidal energy AoS export cable). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k per licence application (up to 3 in total). Application(s) estimated for submission in 2024 (tidal energy AoS, tidal energy AoS export cable and wave energy AoS); and ▪ Additional survey costs £5k per km² of development (tidal energy AoS, 22km²) and per linear km of development (tidal energy AoS export cable, 1km).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.012	0.012	0.151
Average annual costs	0.001	0.001	0.008
Present value of total costs (2014–2033)	0.009	0.009	0.107
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [PWY]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Tourism	Coastal areas are well represented when considering the locations of various tourist related sites within Scotland with a range of site types present in all regions including the North. Where significant impacts to recreational boating or water sports have been identified for the site, there could also be consequential impacts on tourism.	Tourism may benefit from the designation of the MPA as an added attraction to the destination. In addition, there may also be indirect benefits to tourism as a result of benefits to some water sports activities, for example, recreational angling and diving.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Scuba Diving	One wreck dive location overlaps with the PWY proposed MPA (Tomalina). This site overlaps with 'Black Guillemot' under all scenarios. No management restrictions upon this activity are required.	The added protection offered by an MPA designation and management measures placed upon sector activities may increase the aesthetic attraction of the dive sites through an improved marine ecosystem and a reduction in degradation to the wreck sites.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN). The PWY proposed MPA is a coastal site and is located wholly within 6nm of the UK coastline. Therefore sea angling overlaps with all features and there corresponding extents within the proposed MPA. No management restrictions upon this activity are required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation and corresponding management restrictions on sector activities including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA [PWY]	
Activity	Description
Commercial Fisheries	Otter trawls and pots (over-15m vessels) and pots, hand fishing, dredges and other gears (under-15m vessels) operate within the PWY proposed MPA. The value of landings from the PWY area was £600 (over-15m vessels) and £27,700 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Provisional ScotMap data indicate that the annual average earnings from the PWY proposed MPA was £26,500, with 95% of this from pots (predominantly for lobster and velvet crab). Landings from the over-15m vessels were into Peterhead (51% by value) and Scrabster (49%). Black guillemot, other proposed designated biodiversity feature for the site, are not thought to be sensitive or vulnerable to pressures from fishing gears, therefore no management measures for fisheries are proposed and no cost impacts are anticipated.
Power Interconnectors	One interconnector is within 1km of the PWY proposed MPA. The interconnector is within 1km of Black Guillemot (all scenarios). No cost impacts are foreseen, as it is assumed that there will be no review of the existing consents.
Recreational Boating	One Crown Estate mooring is present within the PWY proposed MPA that overlaps with feature extents for black guillemot under all scenarios. Black guillemot is not, however, considered sensitive to pressures associated with anchoring and therefore no management costs are expected.

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Identification of Social Impacts from Designation of the Site as an MPA and their significance (over 2014 to 2033 inclusive) [PWY]					
Sector	Economic Impacts	Economic Costs and GVA (PV)	Consequent Social Impacts	Mitigation	Significance of Social impact
Energy Generation	Additional operational costs	Quantified Economic Costs (2014–2033): £0.009 – 0.107m	Future employment opportunities – if increased operational costs associated with management measures render projects unviable or restrict project size there will be a negative impact on economic activity and job creation in this sector.		xx (under the upper scenario only)
	Costs associated with delays during the consenting process Loss of investor confidence (developments do not proceed)	Not Quantified	Future employment opportunities – if the delays deter investments there will be a negative impact on economic activity and future job creation in this sector. Environment – possible negative impact in relation to climate change and the ability of the Scottish Government to meet its 2020 renewables targets, decarbonisation targets and climate change targets. There would also be consequent financial implications of climate change impacts. This impact is uncertain and is only likely to arise under the upper scenario. JNCC's current advice is that the intermediate scenario represents their best view on management requirements.		xxx (under the upper scenario only)
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [PWY]								
Sector/Impact	Location			Age			Gender	
	Region	Ports	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
None identified.								
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [PWY]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m	Gear Types/Sector	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long-term Sick
None identified.								
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

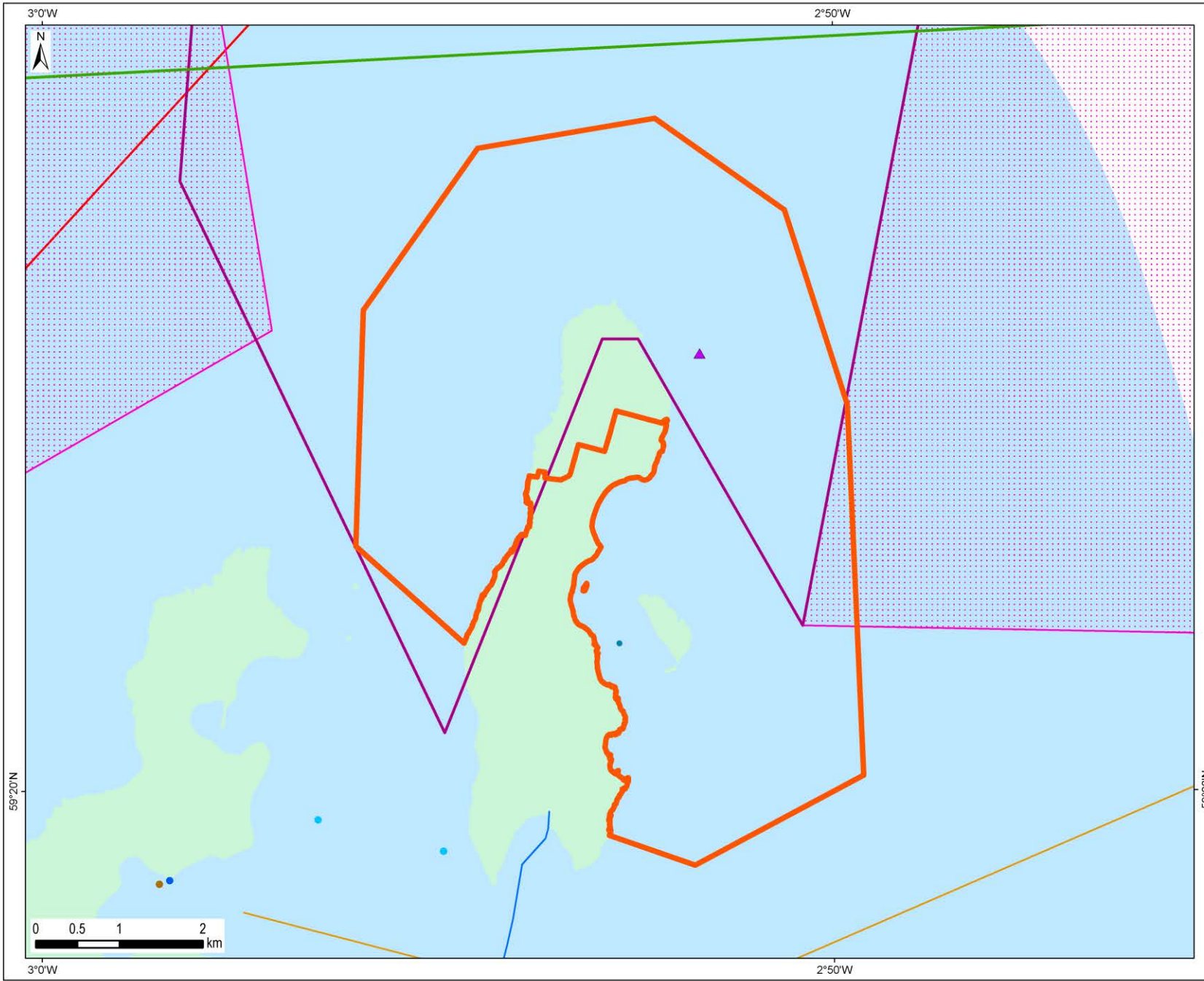
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [PWY]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Black guillemot	Provides representation of black guillemot in OSPAR Region II.	Represents one of six areas representing black guillemot.	Not currently understood for black guillemot.	The MPA area is within the core range of the black guillemot.	Although not listed by OSPAR as threatened and/or declining, there is evidence of decline. The potential MPA areas may increase resilience.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ¹³ [PWY]									
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence	
			Lower	Intermediate	Upper				
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Stocks not at MSY	Nil	Nil	Nil	Low. Site fishing grounds have low value	Nil	High	
Fish for non-human consumption		Stocks reduced from potential maximum	Nil	Nil	Nil				
Gas and climate regulation	Nil	Nil	Nil	Nil	Nil	Moderate	Nil	High	
Natural hazard protection	Minimal	Low	Nil			Low	Nil	High	
Regulation of pollution	Minimal	Low	Nil	Nil		Low - Moderate, for recreational use of waters	Nil	High	
Non-use value of natural environment	Low – protected feature and contribution of the site to MPA network, have non-use value.	Non-use value of the site may decline, but probably stable	Nil, no change in key characteristics of site	Low – protection of feature of site from minor decline	Moderate – protection of feature of site from decline, possibly allowing some recovery	Low, although black guillemot is charismatic species, it is site's only feature	Nil - Moderate	Moderate	
Recreation	Low	1 active dive site	Nil	Minimal – slightly higher biodiversity encountered by divers and boating		Low	Minimal	Moderate	
Research and Education	Minimal	Nil - Low	Nil	Minimal		Low	Minimal	Moderate	
Total value of changes in ecosystem services			Nil for lower scenario, Minimal for upper scenario				Low		Moderate

¹³ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



- Proposed Marine Protected Area
- Aquaculture**
- Existing Finfish Installations
- Ports & Harbours**
- Port Locations
- Power Interconnectors**
- Existing Power Interconnectors
- Recreational Boating**
- RYA Cruising Routes
- Light
- Medium
- Recreational Marinas
- Mooring Areas
- Energy Generation**
- Draft Plan Option Areas - Wave
- Draft Plan Option Areas - Tidal
- Indicative Cable Routes - Tidal
- Watersports**
- ▲ Wreck Dive Sites
- Sea Angling (6 nm from coast)

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:62,000	
QA		FMM	
4136MPA_HA_Papa_Westray.mxd			
Produced by ABPmer			



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Human Activities which Occur within the Proposed MPA:
Papa Westray

Small Isles (SMI)

Site Area (km²): 922

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [SMI]					
Proposed protected features					
<p><i>Biodiversity Features</i> Burrowed mud, horse mussel beds, northern sea fan and sponge communities, fan mussel aggregations, northern feather star aggregations on mixed substrata, black guillemot, shelf deeps, white cluster anemone, circalittoral sand and mud communities.</p> <p><i>Geodiversity Features</i> Quaternary of Scotland – glaciated channels/troughs, glacial lineations.</p> <p><i>Site Description</i> The Small Isles MPA proposal encompasses most of the marine extensions of the existing Rum, Canna and Sanday SPAs; covering the sea area used for foraging by breeding black guillemots in the area. The proposal boundary covers complex geological features, including an example of a shelf deep glaciated channel/trough extending northwards from the Sound of Canna.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Burrowed mud	*Lower: 246.95 Intermediate: 246.95 Upper: 922.76	Yes (Marine Scotland Science surveys, 2008 – 2010;)	Yes	Not known	Conserve
Horse mussel beds	Lower: 2.16 Intermediate: 2.16 Upper: 2.82	Yes (SNH nature conservation surveys, 2012)	Partial – need to establish southern limit	Not known	Conserve
Northern sea fan and sponge communities	Lower: 5.17 Intermediate: 5.17 Upper: 300.85	Yes (SNH nature conservation surveys, 2012)	Yes	Not known	Conserve
Fan mussel aggregations	Lower: 4.71 Intermediate: 4.71 Upper: 4.95	Yes (SNH nature conservation surveys, 2012)	Yes	Not known	Conserve
Northern feather star aggregations on mixed substrata	Lower: 1.36 Intermediate: 1.36 Upper: 2.23	Yes (SNH nature conservation surveys, 2012)	Partial – need to define distribution	Not known	Conserve
Black guillemot	Lower: 246.95 Intermediate: 246.95	Yes (Seabird 2000 census)	Yes	Not known	Conserve

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	Upper: 246.95				
Shelf deeps	Lower: 97.30 Intermediate: 97.30 Upper: 97.30	Yes (SNH nature conservation surveys, 2012)	Yes	Not known	Conserve
White cluster anemone	Lower: 1.18 Intermediate: 1.18 Upper: 1.18	Yes (SNH nature conservation surveys, 2012)	Yes	Not known	Conserve
Circalittoral sand and mud communities	Lower: 310.85 Intermediate: 323.78 Upper: 323.78	Yes (SNH nature conservation surveys, 2012)	Partial	Not known	Conserve
Geodiversity Features					
Quaternary of Scotland – glaciated channels/troughs, glacial lineations	Glaciated Channel Trough: 35.62	Yes (Defra research, 2009; SNH & JNCC review, 2012)	Yes	Not known	Conserve
Key: * Estimated area based on best available data References: Area of Feature: GeMs Confidence in feature presence and extent: SNH (2012n)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [SMI]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries*	0.000	1.685	6.154
Military	See national costs	See national costs	See national costs
Ports and Harbours	0.005	0.005	0.005
Total Quantified Economic Costs	0.005	1.690	6.159
Non-Quantified Economic Costs			
Commercial Fisheries	▪ None.	▪ Displacement impacts.	▪ Displacement impacts.
Military	▪ See national assessment.	▪ See national assessment.	▪ See national assessment.
Ports and Harbours	▪ Costs of project delays during consenting; risk of deterrent to investment.	▪ Costs of project delays during consenting; risk of deterrent to investment.	▪ Costs of project delays during consenting; risk of deterrent to investment.
Recreational Boating	○ None.	○ None	○ Cost of anchorage relocation.
Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [SMI]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	0.004	0.004
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	<0.001	<0.001	<0.001
Total Quantified Public Sector Costs	<0.001	0.004	0.004
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [SMI]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 3 jobs Upper: 12 jobs	North west North West West West	Mallaig Stornoway Oban Campbeltown Ayr.	Impacts concentrated in rural, urban and island coastal areas	Whitefish trawls Nephrops trawls Dredges	Lower: N/A Upper: >15m	No Impact.	No breakdown of fisherman employment by ethnic origin.	No employment data but unlikely to be employed in fisheries..
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [SMI]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Fish for human consumption	High. The site provides supporting services, including contribution to food webs and nursery habitats.	Nil - Moderate
Fish for non-human consumption		
Non-use value of natural environment	Moderate. High variety of protected features and contribution of the site to MPA network has non-use values.	Nil - Moderate
Recreation	Moderate - High. 1 active dive site, angling and recreational boating routes.	Nil - Moderate
Research and Education	Moderate. Site contains some examples of unusual marine features.	Nil - Moderate
Other Benefits		
Tourism	Higher biodiversity due to designation, and presence of designations, may attract more tourism activity to local economy.	
Contribution to ecologically coherent network	See report Section 7.5.	
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [SMI]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Burrowed mud	-	-	-	-	-	-	L/I/U	-	L/I/U	-	I/U	-	I/U	-	-	L/I/U	L/I/U
Horse mussel beds	-	-	-	-	-	-	L/I/U	-	L/I/U	-	-	-	-	-	-	L/I/U	L/I/U
Northern sea fan and sponge communities	-	-	-	-	-	-	L/I/U	-	L/I/U	-	L/I/U	-	U	-	-	L/I/U	L/I/U
Fan mussel aggregations	-	-	-	-	-	-	L/I/U	-	L/I/U	-	-	-	-	-	-	L/I/U	L/I/U
Northern feather star aggregations on mixed substrata	-	-	-	-	-	-	L/I/U	-	L/I/U	-	-	-	-	-	-	L/I/U	L/I/U
Black guillemot	-	-	-	-	-	-	L/I/U	-	L/I/U	-	L/I/U	-	L/I/U	-	-	L/I/U	L/I/U
Shelf deeps	-	-	-	-	-	-	L/I/U	-	L/I/U	-	L/I/U	-	-	-	-	L/I/U	L/I/U
White cluster anemone	-	-	-	-	-	-	L/I/U	-	L/I/U	-	L/I/U	-	-	-	-	L/I/U	L/I/U
Circalittoral sand and mud communities	-	-	-	-	-	-	L/I/U	-	L/I/U	-	L/I/U	-	-	-	-	L/I/U	L/I/U
Geodiversity Features																	
Quaternary of Scotland – glaciated channels/troughs	Not considered to be sensitive at the levels of exposure expected from human activities; thus, not considered in the context of management.																
Quaternary of Scotland – glacial lineations	Not considered to be sensitive at the levels of exposure expected from human activities; thus, not considered in the context of management.																
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity)	[SMI]
<p>According to VMS-based estimates and ICES rectangle landings statistics, Nephrops trawls, whitefish trawls, dredges, pots and other trawls (over-15m) and pots, whitefish and nephrops trawls, dredges and other gears (under-15m vessels) operate within the SMI proposed MPA. The value of catches from the SMI area was £1.07 million (over-15m vessels) and £722,000 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels are predominantly into Mallaig (89%), with a small amount to Oban (4%), Northbay (2%) and Barra (2%). For the over-15m fleet, nephrops trawlers, whitefish trawlers and dredgers in particular operated across the whole proposed MPA over areas of burrowed mud and circalittoral sand and mud communities, while pots operated across the western part mainly over areas of northern sea fan and sponge communities.</p> <p>Provisional ScotMap data indicate that the annual average earnings from the SMI proposed MPA was £720,600, with 65% of this from pots and over 30% from Nephrops trawls. The ICES rectangle estimate for the cost impact on <15m nephrops trawls is comparable to the estimated value of earnings from the area from ScotMap (£0.23 million), and for dredges is likely to be an over-estimate (ScotMap value is £0.01 million). The coverage for ScotMap interviews in the region was 71.9% (total value of reported landings from the Fisheries Information Network for those vessels included in the ScotMap value analysis expressed as a percentage of the total reported landings for all vessels <15m). Therefore the ScotMap estimate is likely to slightly under-represent the value of fishing by under-15m vessels, and the spatial representation of the value of fishing is less robust than in regions where coverage is higher.</p> <p>VMS data indicate that there are no foreign vessels fishing within the SMI proposed MPA. Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and SNH recommendations.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>	

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No cost impacts expected. 	<ul style="list-style-type: none"> ▪ Reduce mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) pressure by 50% across burrowed mud; ▪ Closure to mobile bottom-contact gears (see above) across horse mussel beds, northern feather star, white cluster 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gears (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across burrowed mud and circalittoral sand and mud; ▪ Closure mobile bottom-contact gears (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
		anemone, fan mussel aggregations and northern sea fan features; and ▪ Limit further expansion of static gears.	horse mussel beds, northern feather star, white cluster anemone, fan mussel aggregations and northern sea fan; and ▪ Limit further expansion of static gears.
Description of one-off costs	▪ None.	▪ None.	▪ None.
Description of recurring costs	▪ None.	▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): ▪ Nephrops trawls (0.158); ▪ Whitefish trawls (0.063); ▪ Other affected gears (0.012). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): ▪ Whitefish & Nephrops trawls (0.047); ▪ Dredges (0.047); ▪ Other gears (<0.001).	▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): ▪ Nephrops trawls (0.464); ▪ Whitefish trawls (0.197); ▪ Other affected gears (0.049). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): ▪ Whitefish & Nephrops trawls (0.276); ▪ Dredges (0.021); ▪ Other gears (<0.001).
Description of non-quantified costs	▪ None.	▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.	▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	5.705	20.159
Average annual costs	0.000	0.285	1.008
Present value of total costs (2014–2033)	0.000	4.196	14.827
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.000	2.290	8.367
Average annual change to GVA	0.000	0.115	0.418
Present value of total change in GVA (2014–2033)	0.000	1.685	6.154
Direct and Indirect reduction in Employment	0.0 jobs	3.3 jobs	11.5 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4b. Military				[SMI]
<p>Nine military practice areas (Hawes (X5635), Eigg (X5636), Rhum (X5707) and Canna (X5708), and five submarine exercise areas) overlap with the SMI proposed MPA.</p> <p>The military practice areas Hawes (X5635), Eigg (X5636), Rhum (X5707) and Canna (X5708) overlap with Black Guillemot (all scenarios), burrowed mud (all scenarios), circalittoral sand and mud communities (all scenarios), northern feather star aggregations on mixed substrate (all scenarios) and shelf deeps (all scenarios). Rhum (X5707) and Canna (X5708) also overlap with northern sea fan and sponge communities (all scenarios), fan mussel aggregations (all scenarios), white cluster anemone (all scenarios) and horse mussel beds (Canna - all scenarios, Rhum – high scenario only). Hawes (X5635) also overlaps with northern sea fan and sponge communities (all scenarios).</p> <p>The five submarine exercise areas overlap with the features of the SMI proposed MPA to varying degrees under the different extent scenarios.</p> <p>The features and associated habitats which overlap with military activities have not been described as vulnerable to MoD activities in this proposed MPA. It is assumed that management relating to MoD activity will be coordinated through the MoD's Maritime Environmental Sustainability Appraisal Tool (MESAT) which the MoD uses to assist in meeting its environmental obligations. This process will include operational guidance to reduce significant impacts of military activities on MPAs. It is assumed that the MoD will incur additional costs in adjusting MESAT and other MoD environmental assessment tools in order to consider whether its activities will impact on the conservation objectives of MPAs and also incur additional costs in adjusting electronic charts to consider MPAs. However, these costs will be incurred at national level and hence no site-specific cost assessments have been made.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	
Description of one-off costs				
Description of recurring costs				
Description of non-quantified costs				
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)				
Total costs (2014–2033)	See national costs	See national costs	See national costs	
Average annual costs	See national costs	See national costs	See national costs	
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs	
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>				

Table 4c. Ports and Harbours			
[SMI]			
<p>There is one port/harbour (Canna) within the SMI proposed MPA boundary. Canna (1km buffer) overlaps with feature extents for black guillemot, circalittoral sand and mud communities, northern sea fan and sponge communities, shelf deeps and the white cluster anemone under all scenarios. The MPA feature burrowed mud overlaps the 1km buffer of Canna under the intermediate and upper scenarios only. Therefore, management costs may be incurred under the assumption that small ports/harbours will undergo one new development within the relevant time frame (2014-2033), assumed for the year 2024.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 1 in total). 	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 1 in total). 	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 1 in total).
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Canna). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Canna). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Canna).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.007	0.007	0.007
Average annual costs	0.000	0.000	0.000
Present value of total costs (2014–2033)	0.005	0.005	0.005
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>			

Table 4d. Recreational Boating			
			[SMI]
<p>There are nine recreational boating cruising routes that intersect with the SMI proposed MPA; four light traffic and five medium traffic routes. Vessels transiting cruising routes are not assessed as requiring any additional management measures.</p> <p>Under the upper scenario, there are seven anchorages for recreational boating that overlap with features proposed for protection within the MPA proposal boundary, overlapping with black guillemot, burrowed mud and northern sea fan and sponge communities. Ten Crown Estate mooring points are also present that overlap with the feature extent for black guillemot.</p> <p>Under the intermediate and lower scenarios, SNH have identified some overlaps between anchorages at Canna harbour and basking sharks, although generally the interaction between basking sharks and anchorages is not deemed significant.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No additional management required because interaction not deemed to be significant between basking sharks and anchoring more generally. 	<ul style="list-style-type: none"> ▪ No additional management required because interaction not deemed to be significant between basking sharks and anchoring more generally. 	<ul style="list-style-type: none"> ▪ Relocate anchorages away from all features with a medium or high sensitivity to surface abrasion pressure associated with anchoring: burrowed mud; northern sea fan and sponge communities. If not possible to relocate away from features, relocate to less sensitive or more representative areas.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None 	<ul style="list-style-type: none"> ▪ Cost of anchorage relocation.

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [SMI]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Tourism	Coastal areas are well represented when considering the locations of various tourist related sites within Scotland with a range of site types present in all regions including the North West. Where significant impacts to recreational boating or water sports have been identified for the site, there could also be consequential impacts on tourism.	Tourism may benefit from the designation of the MPA as an added attraction to the destination. In addition, there may also be indirect benefits to tourism as a result of benefits to some water sports activities, e.g. recreational angling and diving.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Scuba Diving	There is one scenic boat dive location within the SMI proposed MPA (Sgeir a Phuirt). This site overlaps with 'Black guillemot' under all scenarios and 'Burrowed mud' under the intermediate and upper scenarios. No management restrictions upon this activity are required.	The added protection offered by an MPA designation and management measures placed upon sector activities may increase the aesthetic attraction of the dive sites through an improved marine ecosystem and a reduction in degradation to the wreck sites.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN). The SMI proposed MPA is a coastal site with less than 50% of the site is located within 6nm of the UK coastline. The features that which overlap with this activity are 'Black Guillemot', 'Burrowed Mud', 'Circalittoral sand and mud communities', 'Northern Feature start aggregations on mixed substrata', 'Northern Sea fan and sponge communities' and 'Shelf deeps' under all scenarios. No management restrictions upon this activity are required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation and corresponding management restrictions on sector activities including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA		[SMI]
Activity	Description	
None identified.		

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [SMI]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.00m Intermediate: £0.29m Upper: £1.01m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: £0.12 Upper: £0.42m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: xx (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 3.3 jobs Upper: 11.5 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Displacement Effects	Not quantified	Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences: <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or 		xx

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			<p>damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited;</p> <ul style="list-style-type: none"> ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		
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Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.

* These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [SMI]

Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries	xx	xx	xx	xxx	xxx	xx	xxx	xxx
Reduction in landed value, GVA and employment	North-West West East	Largest employment impacts in: Mallaig (76%), Stornoway (6%), Oban (6%), Campbeltown (4%), Ayr (3%).	Coastal and Island Rural and Urban	Potentially significant negative effect if parent loses job/becomes unemployed.	Potentially significant negative effect if individuals lose job/become unemployed.	Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0-11.5 job losses Potentially significant negative effect on individuals that lose job/become unemployed.	Potentially significant negative effect if member of household loses job/becomes unemployed.
Fish Processors	xx	xx	xx	xx	xx	0	xx	xx
Reduction in local landings at landing ports	North-West West	Mallaig Oban Barra Northbay Castlebay	Coastal and Island Rural and Urban					

Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.

* Based on value of landings by home port affected under intermediate scenario.

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [SMI]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: >15m	Whitefish trawls Nephrops trawls Dredges	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Fish Processors Reduction in local landings at landing ports		Shellfish: xxx Demersal: xx Pelagic: 0	xx	xx	0	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [SMI]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Burrowed mud	Provides representation of seapens and burrowing megafauna and tall seapen in burrowing mud in OSPAR Region III.	Represents one of five areas of seapens and burrowing megafauna and one of three areas of tall seapen in Scottish seas.	Not currently understood for burrowed mud.	Burrowed mud occurs within a range of environments. It occurs in OSPAR Regions II, III and V. The proposed MPA and others within the network will represent the different components of burrowed mud and its geographic range and variation.	Seapens and burrowing megafauna are listed by OSPAR as threatened and/or declining. The MPA area may increase resilience.
Horse mussel beds	Provides representation for horse mussel beds in OSPAR Region III.	Represents one of four recommended areas for horse mussel beds in Scottish seas.	Not currently understood for horse mussel beds.	No information available.	Horse mussel beds are listed as threatened and/or declining by the OSPAR commission. The MPA may increase resilience.
Northern sea fan and sponge communities	Provides representation of northern sea-fan and sponge communities in OSPAR Region III.	No information available.	No information available.	No information available.	
Fan mussel aggregations	Provides representation for the only known fan mussel aggregation in Scottish seas and the largest in UK waters, found in OSPAR Region III.	Represents the only known fan mussel aggregation in Scottish seas.	Not currently understood for fan mussel aggregations.	The MPA area contains the only known example of this habitat in Scotland's seas.	Considered to be threatened and declining in Scotland's seas. The MPA area may increase resilience. The implementation of one more example should be aimed for.
Northern feather star aggregations on mixed substrata	Provides representation of northern feather star aggregations on mixed substrata in OSPAR Region III.	Represents one of three recommended areas for northern feather star aggregations on mixed substrata in OSPAR Region III.	Not currently understood for Northern feather star aggregations on mixed substrata.	All records of Northern feather star aggregations on mixed substrata are from OSPAR Region III.	No information available.

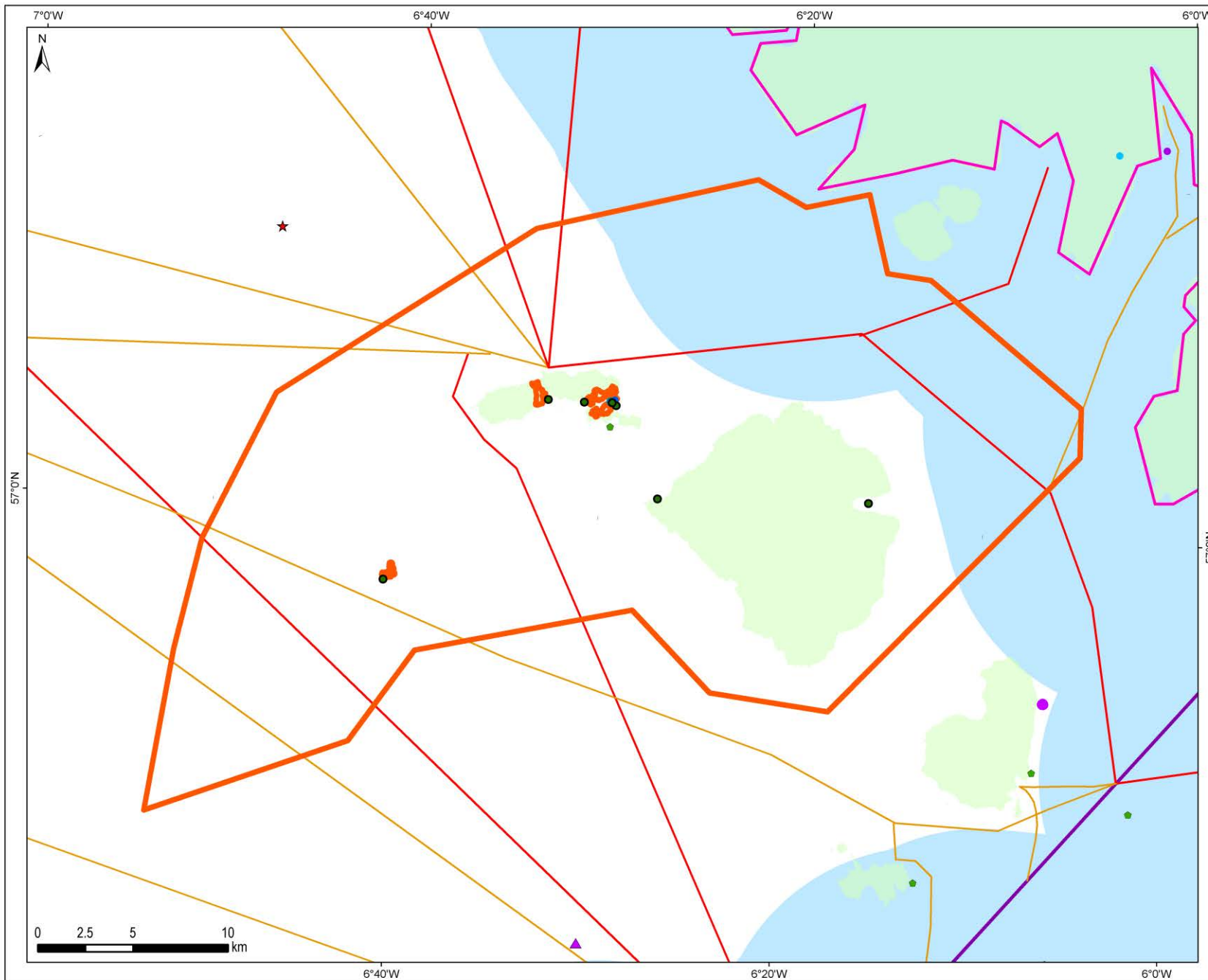
Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [SMI]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Black guillemot	Provides representation of black guillemot in OSPAR Region II.	Represents one of six areas representing black guillemot.	Not currently understood for black guillemot.	The MPA area represents a relatively sheltered example of black guillemot within the most southerly part of it's range.	Although not listed by OSPAR as threatened and/or declining, there is evidence of decline. The potential MPA areas may increase resilience.
Shelf deeps	Provides a functionally significant representation of shelf deeps in OSPAR Region III.	Represents one of two areas representing shelf deeps; the other located in the Southern Trench in OSPAR Region II.	Not currently understood for shelf deeps.	The MPA area represents a functionally significant example of shelf deeps. There is at least one example of shelf deeps in each of the OSPAR Regions in which it has been recorded.	Not considered threatened and/or in decline.
White cluster anemone	No information available.	Represents the only known example of white cluster anemones in Scottish seas	No information available.	No information available.	No information available.
Circalittoral sand and mud communities	No information available.				
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ¹⁴ [SMI]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	High. Support food web and contains nursery habitats.	Stocks not at MSY, some vulnerable habitats	Nil	Low - Moderate. Protection of shellfish beds can contribute to maintenance and recovery of stocks – benefits are higher under stronger protection measures but ecosystem response is uncertain.	High. Commercially valuable species supported.	Nil - Moderate	Moderate, uncertainty mainly in response of habitats to management measures.	
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Low	Uncertain	Nil	Minimal	Moderate, social cost of carbon	Low	Low - Moderate	
Natural hazard protection	Minimal	Low	Nil	Minimal	Low	Minimal	High	
Regulation of pollution	Moderate, benthic communities regulate pollution	Low, major water quality issues to be dealt with through WFD	Nil	Minimal	Low, water quality in this area not affecting human welfare	Minimal	High	
Non-use value of natural environment	Moderate - High, variety of protected features, and contribution of the site to MPA network, have non-use value.	Non-use value of the site may decline	Nil	Moderate – protection of features of site from decline, and/or allowing some recovery	Moderate – range of features means strong contribution to halting decline of marine biodiversity	Nil - Moderate	Low - Moderate, extent of features, responses to management measures, and value to society all uncertain	
Recreation	Moderate - High, including 1 active dive site, angling and recreational boating routes	Moderate - High, including tourism activities. Angling may be reduced by damage to features	Nil	Low - Moderate, Angling benefits and biodiversity encountered by divers and recreational boaters are protected from possible decline, and could recover under upper scenario. Designation could enhance tourism activity.	Moderate, extensive activities, but substitutes are available.	Nil - Moderate, enhancement of activities through improved angling and visitor experiences.	Nil - Moderate, extent of change from management measures uncertain	

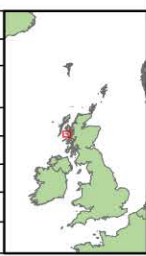
¹⁴ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ¹⁴ [SMI]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Research and Education	Moderate, site contains some examples of unusual marine features.	Moderate, biological features used for research, but there are substitutes	Nil	Low, some aspects of research value are not at risk, some aspects protected from possible decline, and could increase.		Low - Moderate	Nil - Moderate	Low - Moderate, extent to which research uses site in future uncertain
Total value of changes in ecosystem services			Nil for lower scenario, Moderate for upper scenarios				Nil - Moderate	Low



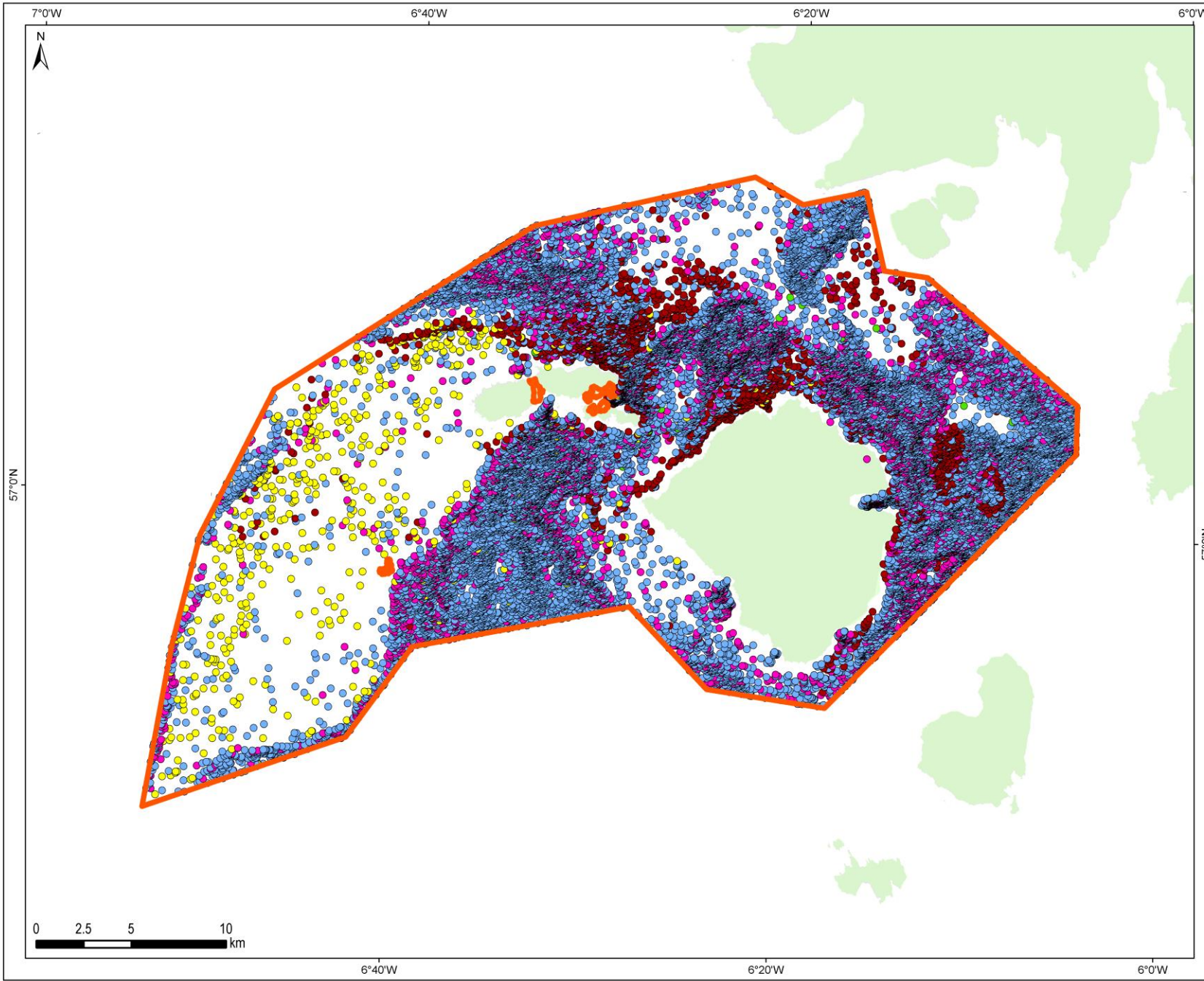
- Proposed Marine Protected Area
- Aquaculture**
 - Existing Shellfish Installations
 - Existing Finfish Installations
- Ports & Harbours**
 - Port Locations
 - Anchorage Areas
- Recreational Boating**
 - RYA Cruising Routes
 - Light
 - Medium
 - Heavy
 - Recreational Anchorages
 - Mooring Areas
- Watersports**
 - Scenic Boat Dive Sites
 - ★ Submarine Dive Sites
 - ▲ Wreck Dive Sites
 - Sea Angling (6 nm from coast)
 - Sea Kayak Locations

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:273,000	
QA		FMM	
4136MPA_HA_Small_Isles.mxd			
Produced by ABPmer			



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Human Activities which Occur within the Proposed MPA:
Small Isles



- Proposed Marine Protected Area
- VMS Fishing Ping Data (2007 to 2011)
 - Whitefish Trawls
 - Nephrops Trawls
 - Dredges
 - Pots
 - Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:273,000	
QA		FMM	
4136MPA_Fish_Small_Isles.mxd			
Produced by ABPmer			



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Data Source: Scottish Government, 2013
NOT TO BE USED FOR NAVIGATION

Fishing Activities which Occur within the Proposed MPA: Small Isles

South Arran (ARR)

Site Area (km²): 286

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [ARR]					
Proposed protected features					
<p><i>Biodiversity Features</i> Burrowed mud, kelp and seaweed communities, maerl beds, maerl or coarse shell gravel with burrowing sea cucumbers, seagrass beds, shallow tide-swept coarse sands with burrowing bivalves, ocean quahog, herring spawning grounds.</p> <p><i>Geodiversity Features</i> None.</p> <p><i>Site Description</i> The South Arran MPA proposal is located around the southern half of the Isle of Arran in the Clyde Sea. The outer boundary line is 3nm from the coast and incorporates Holy Isle, Pladda Island and an existing NTZ in Lamlash Bay.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Burrowed mud	*Lower: 103.71 Intermediate: 103.71 Upper: 157.27	Yes (SNH & Marine Scotland surveys, 2010 & 2012)	Partial	Not known	Conserve
Kelp and seaweed communities	Lower: 0.63 Intermediate: 0.63 Upper: 5.06	Yes (SNH & Marine Scotland surveys, 2010 & 2012)	Partial	Not known	Conserve
Maerl beds	Lower: 0.61 Intermediate: 3.90 Upper: 14.96	Yes (SNH & Marine Scotland surveys, 2010 & 2012)	Partial	Not known	Recover
Maerl or coarse shell gravel with burrowing sea cucumbers	Lower: 0.61 Intermediate: 3.90 Upper: 14.96	Yes (SNH & Marine Scotland surveys, 2010 & 2012)	Partial	Not known	Recover
Seagrass beds	Lower: 0.43 Intermediate: 0.61 Upper: 68.51	Yes (COAST data; Seasearch, 2005 & 2012)	Yes	Not known	Conserve

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Shallow tide-swept coarse sands with burrowing bivalves	Lower: 0.18 Intermediate: 1.77 Upper: 25.90	Yes (SNH & Marine Scotland surveys, 2010 & 2012)	Partial	Not known	Conserve
Ocean quahog	Lower: 214.63 Intermediate: 214.63 Upper: 214.63	Yes (SNH & Marine Scotland surveys, 2010 & 2012)	Partial	Not known	Conserve
Herring Spawning Grounds	Lower: 1.32 Intermediate: 1.32 Upper: 1.32	Yes - dive surveys	Partial – age of data	Not known	Conserve (uncertain)
Geodiversity Features					
N/A					
Key: * Estimated area based on best available data References: Area of Feature: GeMs Confidence in feature presence and extent: SNH (2012o)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [ARR]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Aquaculture (Finfish)	0.001	0.003	0.003
Aquaculture (Shellfish)	See national costs	See national costs	See national costs
Commercial Fisheries*	0.009	1.674	4.839
Energy Generation	0.009	0.040	1.054
Military	See national costs	See national costs	See national costs
Telecom Cables	0.007	0.007	0.707
Total Quantified Economic Costs	0.025	1.724	6.603
Non-Quantified Economic Costs			
Aquaculture (Finfish)	<ul style="list-style-type: none"> ▪ Costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Aquaculture (Shellfish)	<ul style="list-style-type: none"> ▪ Costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Commercial Fisheries	<ul style="list-style-type: none"> ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Displacement impacts.
Energy Generation	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.
Military	<ul style="list-style-type: none"> ▪ See national costs. 	<ul style="list-style-type: none"> ▪ See national costs. 	<ul style="list-style-type: none"> ▪ See national costs.
Ports and Harbours	<ul style="list-style-type: none"> ▪ Relocation of anchorages/ mooring areas away from features of high sensitivity. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/ mooring areas away from features of high and medium sensitivity. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/ mooring areas away from features of high and medium sensitivity.
Recreational Boating	<ul style="list-style-type: none"> ▪ Cost of anchorage relocation. 	<ul style="list-style-type: none"> ▪ Cost of anchorage relocation. 	<ul style="list-style-type: none"> ▪ Cost of anchorage relocation.
Telecom Cables	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.

Note: For detailed information on economic cost impacts on activities, see Table 4.

* These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.

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Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [ARR]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	0.024	0.024	0.024
Preparation of Statutory Instruments	0.004	0.004	0.004
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.002*	0.002*	0.002*
Total Quantified Public Sector Costs	0.029	0.029	0.029
Non-Quantified Public Sector Costs			
None identified.			

* Regulatory and advisory costs of finfish and shellfish aquaculture assessed at national level.

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [ARR]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 3 jobs Upper: 9 jobs	West West N. Ireland West	Campbeltown Ayr Belfast Oban	Impacts concentrated in urban and rural coastal areas	Nephrops trawls Other trawls Dredges	Lower: N/A Upper: >15m	No Impact.	No breakdown of fisherman employment by ethnic origin.	No employment data but unlikely to be employed in fisheries.
If any energy generation developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).										
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [ARR]		
Benefit	Description	Scale of Benefits
Ecosystem Services Benefits (Moderate and High Benefits)		
Fish for human consumption	High. Site fishing grounds are valuable, and contain herring spawning grounds and nursery habitats.	Moderate
Fish for non-human consumption		
Non-use value of natural environment	Moderate - High. The variety of protected features, and a contribution of the site to MPA network, has non-use values.	Moderate
Recreation	Moderate - High. Active dive sites, angling and recreational boating routes.	Low - Moderate, enhancement of activities through improved angling and visitor experiences.
Other Benefits		
Tourism	Higher biodiversity due to designation, and presence of designations, may attract more tourism activity to local economy.	
Contribution to ecologically coherent network	See report Section 7.5.	
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [ARR]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Burrowed mud	-	L/I/U	L/I/U	-	-	-	L/I/U	L/I/U	L/I/U	-	-	L/I/U	-	-	L/I/U	L/I/U	L/I/U
Kelp and seaweed communities	-	-	-	-	-	-	L/I/U	-	L/I/U	-	L/I/U	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Maerl beds	-	-	-	-	-	-	L/I/U	L/I/U	L/I/U	-	-	L/I/U	-	-	-	L/I/U	L/I/U
Maerl or coarse shell gravel with burrowing sea cucumbers	-	-	-	-	-	-	L/I/U	L/I/U	L/I/U	-	-	L/I/U	-	-	-	L/I/U	L/I/U
Seagrass beds	-	-	L/I/U	-	-	-	L/I/U	L/I/U	L/I/U	-	L/I/U	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Shallow tide-swept coarse sands with burrowing bivalves	-	L/I/U	L/I/U	-	-	-	L/I/U	L/I/U	L/I/U	-	-	I/U	L/I/U	-	-	L/I/U	L/I/U
Ocean quahog	-	L/I/U	L/I/U	-	-	-	L/I/U	L/I/U	L/I/U	-	L/I/U	L/I/U	L/I/U	-	L/I/U	L/I/U	L/I/U
Herring Spawning Grounds	-	-	-	-	-	-	L/I/U	-	L/I/U	-	-	-	-	-	-	L/I/U	L/I/U
Geodiversity Features																	
N/A																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a Aquaculture (Finfish) [ARR]			
<p>One finfish aquaculture (Lamlash) site is located within the ARR proposed MPA. This aquaculture site directly overlaps with the feature 'ocean quahog aggregations' under all scenarios (lower, intermediate and upper). The site is within 1km of this feature (under all scenarios), tide-swept coarse sands with burrowing bivalves and seagrass beds (under the upper scenario only). There is no public information on potential future development within the proposed MPA. In the absence of information on potential future developments, the assessment has focused on the costs associated with obtaining new CAR licences. A national assessment of the costs of obtaining planning permission for new developments is provided separately.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features; and ▪ Additional survey costs incurred once every 10 years (2019 & 2029) to inform new CAR licence applications. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features; and ▪ Additional survey costs incurred once every 10 years (2019 & 2029) to inform new CAR licence applications.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application; and ▪ Additional baseline visual survey costs -£1.6k per CAR licence application 	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application; and ▪ Additional baseline visual survey costs - £1.6k per CAR licence application
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.001	0.004	0.004
Average annual costs	<0.000	<0.000	<0.000
Present value of total costs (2014–2033)	0.001	0.003	0.003
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4b Aquaculture (Shellfish)	[ARR]
<p>One Shellfish aquaculture site (Lamlash mussel farm) is located within the ARR proposed MPA. This aquaculture site directly overlaps with the feature 'ocean quahog aggregations' under all scenarios (lower, intermediate and upper). The site is within 1km of this feature under all scenarios and within 1km of tide-swept coarse sands with burrowing bivalves, seagrass beds under the upper scenario only.</p> <p>There is no public information on potential future development within the ARR proposed MPA. In the absence of information on potential future developments, no site specific assessment has been possible. A national assessment of the costs of obtaining planning permission for new developments is provided separately.</p>	

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	▪ N/A	▪ N/A	▪ N/A
Description of one-off costs	▪ N/A	▪ N/A	▪ N/A
Description of recurring costs	▪ N/A	▪ N/A	▪ N/A
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	See national costs	See national costs	See national costs
Average annual costs	See national costs	See national costs	See national costs
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4c. Commercial Fisheries (assuming zero displacement of fishing activity) [ARR]

According to VMS-based estimates and ICES rectangle landings statistics, Nephrops trawls, dredges and other gears (over-15m) and nephrops trawls, pots, dredges and hand fishing (under-15m) operate within the ARR proposed MPA. The value of catches from the ARR area was £706,000 (over-15m vessels) and £246,000 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels are predominantly into Campbeltown (58% by value), Troon and Saltcoats (13%) and Troon (10%). For the over-15m fleet, nephrops trawlers operate in particular in the outer part of the ARR proposed MPA (further from the Arran coast), while dredgers operate across the inner part (closer to the Arran coast).

Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and SNH recommendations.

Provisional ScotMap data indicate that the annual average earnings from the ARR proposed MPA was £276,000, with over 70% of this from nephrops trawls. The spatial distribution of value from nephrops trawls indicates that the majority of value in the ARR proposed MPA and surrounding area is derived from the Firth of Clyde in the area north of the southern tip of the Mull of Kintyre and Girvan on the mainland. Since ICES rectangle 39E4 covers a wider area than this, it is likely that the ICES rectangle estimate for the cost impact on <15m nephrops trawls is an under-estimate. ScotMap data would indicate an annual cost impact of around £0.200 million on <15m nephrops trawls under the Upper Scenario. The coverage for ScotMap interviews in the region was 63.8% (total value of reported landings from the Fisheries Information Network for those vessels included in the ScotMap value analysis expressed as a percentage of the total reported landings for all vessels <15m). Therefore the ScotMap estimate is likely to under-represent the value of fishing by under-15m vessels, and the spatial representation of the value of fishing is less robust than in regions where coverage is higher.

VMS data indicate that there are no foreign vessels fishing within the ARR proposed MPA.

Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.

GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.

It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across seagrass beds. 	<ul style="list-style-type: none"> ▪ Reduce mobile bottom-contact gear pressure (whitefish, nephrops and other trawls and seines, beam trawls and dredges) by 50% across burrowed mud; ▪ Closure to mobile bottom-contact gears (see above) across maerl beds 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gears (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across full extent of MPA; and ▪ Limit further expansion of static gears.

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
		and seagrass features; <ul style="list-style-type: none"> ▪ Closure to beam trawls and dredges (gears likely to impact on ocean quahog) across the ocean quahog feature extent and reduce pressure from these gears by 50% across tide-swept coarse sands; and ▪ Limit further expansion of static gears. 	
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.001); ▪ Dredges (<0.001). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (<0.001); ▪ Other trawls (<0.001); ▪ Dredges (<0.001); 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.157); ▪ Dredges (0.051); ▪ Other trawls (0.001). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.029); ▪ Other trawls (<0.001); ▪ Dredges (0.014). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.492); ▪ Dredges (0.099); ▪ Other trawls (0.002). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.150); ▪ Other trawl (<0.001); ▪ Dredges (0.018).
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.029	5.043	15.801
Average annual costs	0.001	0.252	0.790
Present value of total costs (2014–2033)	0.021	3.709	11.622
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.012	2.276	6.580
Average annual change to GVA	0.001	0.114	0.329
Present value of total change in GVA (2014–2033)	0.009	1.674	4.839
Direct and Indirect reduction in Employment	0.0 jobs	2.9 jobs	8.7 jobs

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4d. Energy Generation	[ARR]
<p>There are no energy generation activities currently operating within the ARR proposed MPA boundary or corresponding buffer zones. Thus, economic costs and management measures associated with energy generation in this proposed MPA are described in light of known possible future developments.</p> <p>One cable route for a potential future tidal energy generation within a proposed Area of Search (AoS) could pass through the ARR proposed MPA boundary, overlapping numerous MPA features. Under all scenarios (i.e. lower, intermediate and upper extent), this potential cable route overlaps ocean quahog and burrowed mud features. The features maerl beds, maerl or coarse shell gravel with burrowing sea cucumbers and tide-swept coarse sands with burrowing bivalves also overlap the potential cable route within the MPA under the intermediate and upper scenarios. The MPA feature seagrass beds overlaps the potential cable route, but only under the upper scenario.</p> <p>As a result of the sensitivity of maerl beds and seagrass beds, additional mitigation measures could be required under the intermediate and upper scenarios. For instance, maerl beds (and maerl or coarse shell gravel with burrowing sea cucumbers) are an OSPAR and BAP designated feature are of high sensitivity to physical change (to another seabed type) and sub-surface abrasion/penetration and of medium sensitivity to water clarity changes and changes in water flow (tidal current). Seagrass beds (OSPAR and BAP designated) are of high sensitivity to changes in water clarity and of medium sensitivity to permanent change of one marine habitat type to another (through changes in substratum), sub-surface abrasion/penetration and changes in water flow (tidal current). However, it would be expected that mitigation measures for these features would need to be implemented irrespective of any MPA designation and, therefore, the designation would not result in additional costs being incurred in respect of these features.</p> <p>Under all scenarios (i.e. lower, intermediate and upper), the potential cable route overlaps 'burrowed mud'; a feature which is not OSPAR or BAP designated. It is possible that additional mitigation measures could be necessary to protect burrowed mud features within the ARR proposed MPA boundary. The conservation objective for burrowed mud is currently to recover and, thus, the SNH management option is to 'remove' the activity. Therefore, seasonal restrictions on cable laying and re-routing of cables may be required under the upper scenarios.</p>	

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to features within 1km of proposed activities. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to features within 1km of cable route; and ▪ Additional survey costs incurred to inform new licence applications. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to features within 1km of cable route; ▪ Additional survey costs incurred to inform new licence applications; ▪ Seasonal restrictions on laying cables during the time when ocean quahog larvae are likely to be undergoing settlement (assumed developer could

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
			work around these at no additional cost); and <ul style="list-style-type: none"> ▪ Re-routing of cables to avoid sensitive features.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k. Application estimated to be submitted in 2024 (tidal energy AoS export cable route). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k. Application estimated to be submitted in 2024 (tidal energy AoS export cable route); and ▪ Additional survey costs - £5k per linear km of development (8.9km). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k. Application estimated to be submitted in 2024 (tidal energy AoS export cable route); ▪ Additional survey costs - £5k per linear km of development (12km); and ▪ Re-routeing of cable (2026) - £1.01m per km (burrowed mud, 10% of 15km = 1.5km).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.012	0.057	1.587
Average annual costs	0.001	0.003	0.079
Present value of total costs (2014–2033)	0.009	0.040	1.054
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4e. Military				[ARR]
<p>Ten military practice areas (Brodict (X5510), Lamlash (X5513), Pladda (X5522), Stafnish (X5523) and Arran Lamlash Harbour (X5560); and five submarine exercise areas) overlap with the ARR proposed MPA.</p> <p>The military practice areas Brodict (X5510), Lamlash (X5513) and Arran Lamlash Harbour (X5560) overlap with kelp and seaweed communities on sublittoral sediment (all scenarios), maerl beds (all scenarios), maerl or coarse shell gravel with burrowing sea cucumbers (all scenarios), and ocean quahog (all scenarios). In addition Brodict (X5510) overlaps with burrowed mud (all scenarios) and tide-swept coarse sands with burrowing bivalves (all scenarios), Lamlash (X5513) overlaps with burrowed mud (all scenarios) and seagrass beds (all scenarios), Arran Lamlash Harbour (X5560) overlaps with tide-swept coarse sands with burrowing bivalves (all scenarios), Pladda (X5522) overlaps with burrowed mud (all scenarios) and ocean quahog (all scenarios) and Stafnish (X5523) overlaps with ocean quahog (all scenarios).</p> <p>The five submarine exercise areas overlap with the features of the ARR proposed MPA to varying degrees under the different extent scenarios.</p> <p>The features and associated habitats which overlap with military practice areas have not been described as vulnerable to MoD activities in this proposed MPA. It is assumed that management relating to MoD activity will be coordinated through the MoD's Maritime Environmental Sustainability Appraisal Tool (MESAT) which the MoD uses to assist in meeting its environmental obligations. This process will include operational guidance to reduce significant impacts of military activities on MPAs. It is assumed that the MoD will incur additional costs in adjusting MESAT and other MoD environmental assessment tools in order to consider whether its activities will impact on the conservation objectives of MPAs and also incur additional costs in adjusting electronic charts to consider MPAs. However, these costs will be incurred at national level and hence no site-specific cost assessments have been made.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	
Description of one-off costs				
Description of recurring costs				
Description of non-quantified costs				
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)				
Total costs (2014–2033)	See national costs	See national costs	See national costs	
Average annual costs	See national costs	See national costs	See national costs	
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs	
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>				

Table 4f. Ports and Harbours			
[ARR]			
<p>There are no ports/harbours within the ARR proposed MPA boundary; however, there are five anchorages/mooring areas which overlap features for designation. Three anchorages/mooring areas overlap kelp and seaweed communities under all scenarios, whilst the other two anchorages/mooring areas overlap ocean quahog and seagrass beds, respectively under all scenarios. Costs may be expected to relocate anchorages/mooring areas to less sensitive areas, although any associated costs are non-quantifiable.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Relocate anchorages/mooring areas away from all features with a high sensitivity. 	<ul style="list-style-type: none"> ▪ Relocate anchorages/mooring areas away from features with high or medium sensitivity. If not possible to relocate away from sensitive features, relocate to more representative areas. 	<ul style="list-style-type: none"> ▪ Relocate anchorages/mooring areas away from features with high or medium sensitivity. If not possible to relocate away from sensitive features, relocate to more representative areas.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high sensitivity. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high and medium sensitivity. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high and medium sensitivity.

Table 4g. Recreational Boating **[ARR]**

A number of anchorages and cruise routes for recreational boating overlap with features proposed for designation within the ARR proposed MPA boundary. There are eight cruise routes intersecting the MPA proposal that overlap with proposed designated features under different extent scenarios; three designated as heavy traffic, three as medium and two as low traffic. Cruising routes are not expected to incur any management or assessment costs.

Under the upper scenario there are seven recreational anchorages that overlap with proposed protected features within the MPA proposal boundary. Overlaps with ocean quahog, kelp and seaweed communities, seagrass beds and shallow tide-swept coarse sands with burrowing bivalves have been identified for the anchorages present. Spatial data show three Crown Estate mooring points within the proposed MPA and a larger mooring area with another two mooring points within it. It is noted, however, that this may be an underestimate and additional mooring points may be present within the mooring area that are not represented by the data. Crown Estate moorings overlap with ocean quahog, seagrass beds, maerl beds, maerl or coarse shell gravel with burrowing sea cucumbers, tide-swept coarse sands with burrowing bivalves and kelp and seaweed communities on sublittoral sediment.

Under the intermediate and lower scenarios, SNH have identified two recreational anchorages that overlap with proposed protected features. A recreational anchorage in Lamplash Bay overlaps with point records of shallow-tide swept coarse sands with burrowing bivalves in the 100m zone and kelp and seaweed communities in the 100m and 200m zones. In Whiting Bay, one recreational anchorage overlaps with point records for seagrass beds.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Relocate anchorages from Whiting Bay which overlap with seagrass beds because this feature has medium sensitivity to surface abrasion pressure associated with anchoring. If not possible to relocate from features, relocate to less sensitive or more representative area; and ▪ No additional management required for other anchorages in possible MPA area that overlap with shallow tide-swept coarse sands with burrowing bivalves and kelp and seaweed communities on sublittoral sediment because these features have low sensitivity to surface abrasion associated with anchoring and tend to be more dynamic habitats that can recover quicker from such pressures. 	<ul style="list-style-type: none"> ▪ Relocate anchorages from Whiting Bay which overlap with seagrass beds because this feature has medium sensitivity to surface abrasion pressure associated with anchoring. If not possible to relocate from features, relocate to less sensitive or more representative area; and ▪ No additional management required for other anchorages in possible MPA area that overlap with shallow tide-swept coarse sands with burrowing bivalves and kelp and seaweed communities on sublittoral sediment because these features have low sensitivity to surface abrasion associated with anchoring and tend to be more dynamic habitats that can recover quicker from such pressures. 	<ul style="list-style-type: none"> ▪ Relocate anchorages and moorings away from seagrass, maerl or coarse shell gravel with burrowing sea cucumbers and maerl beds because these features have medium and high sensitivities to surface abrasion pressure associated with anchoring. If not possible to relocate from features, relocate to less sensitive or more representative area.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Cost of anchorage relocation. 	<ul style="list-style-type: none"> ▪ Cost of anchorage relocation. 	<ul style="list-style-type: none"> ▪ Cost of anchorage relocation.

Table 4h. Telecom Cables			
[ARR]			
<p>Two telecom cables overlap with the ARR proposed MPA; Lanis 3 for a distance of 1.9km and Sirius North for a distance of 9.1km. Both cables overlap with burrowed mud and ocean quahog under all scenarios. The possible cost associated with re-routing the cable (upper scenario only) and replacement of existing telecom cables at the end of their working life is provided.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Where cables need replacing, additional licensing costs to assess potential impacts to features within the proposed development footprint. 	<ul style="list-style-type: none"> ▪ Where cables need replacing, additional licensing costs to assess potential impacts to features within the proposed development footprint. 	<ul style="list-style-type: none"> ▪ Where cables need replacing, additional licensing costs to assess potential impacts to features within the proposed development footprint; ▪ Additional survey costs incurred to inform new licence applications; and ▪ Re-routing of telecom cable to avoid burrowed mud.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £10k assumed to be in 2024 (assume only one of existing telecom cables will need replacing over assessment period). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £10k assumed to be in 2024 (assume only one of existing telecom cables will need replacing over assessment period). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £10k assumed to be in 2024 (assume only one of existing telecom cables will need replacing over assessment period); ▪ Additional survey costs (£5k per linear km of development) – £45k (worst case); and ▪ Re-routeing of cable to avoid burrowed mud feature (£1.01m per km – approximately 1km of additional cable required).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None 	<ul style="list-style-type: none"> ▪ None 	<ul style="list-style-type: none"> ▪ None
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.010	0.010	1.065
Average annual costs	0.001	0.001	0.053
Present value of total costs (2014–2033)	0.007	0.007	0.707
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [ARR]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Tourism	Coastal areas are well represented when considering the locations of various tourist related sites within Scotland with a range of site types present in all regions including the West. Where significant impacts to recreational boating or water sports have been identified for the site, there could also be consequential impacts on tourism.	Tourism may benefit from the designation of the MPA as an added attraction to the destination. In addition, there may also be indirect benefits to tourism as a result of benefits to some water sports activities, for example, recreational angling and diving.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN). ARR proposed MPA is a coastal site and is located wholly within 6nm of the UK coastline. Therefore, sea angling overlaps with all features and their corresponding extents within the proposed MPA. No management restrictions upon this activity are required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation and corresponding management restrictions on sector activities including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Scuba diving	There are five recreational dive sites located within ARR proposed MPA, three of which are wrecks (Trygon, Strathdee, unnamed wreck) and two of which are submarine wrecks (U33 and HMS Sealion). Under the lower scenarios, two dive sites overlap with proposed features of Ocean quahog and Burrowed mud. The intermediate scenario has four dive sites overlap with proposed features of Ocean quahog and Burrowed mud. The Upper scenario has all five dive sites overlap with feature extents, four overlap with 'Ocean quahog' and 'Burrowed mud' and one dive site overlaps with 'Seagrass beds' and 'Kelp and seaweed communities on sediment'. No management restrictions upon this activity are required.	The added protection offered by an MPA designation and management measures placed upon sector activities may increase the aesthetic attraction of the dive sites through an improved marine ecosystem and a reduction in degradation to the wreck sites.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are present but which would be Unaffected by Designation of the Site as an MPA		[ARR]
Activity	Description	
Power Interconnectors	<p>One existing power interconnector and one consented power interconnector (Western HVDC Link) overlap with the ARR proposed MPA. The existing power interconnector overlaps with kelp and seaweed communities on sublittoral sediment (all scenarios) and ocean quahog (all scenarios). In addition, the existing power interconnector overlaps with seagrass beds (upper scenario only) and tide-swept coarse sands with burrowing bivalves (upper scenario). Within a 1km buffer, the existing power interconnector also overlaps with maerl beds (all scenarios), maerl or coarse shell gravel with burrowing sea cucumbers (all scenarios), seagrass beds (all scenarios) and tide-swept coarse sands with burrowing bivalves (intermediate and upper scenarios). No cost impacts are foreseen, as it is assumed that there will be no review of the existing consent.</p> <p>The consented power interconnector overlaps with burrowed mud (all scenarios) and ocean quahog (all scenarios). No cost impacts are foreseen as the project is already consented and it is assumed that there will be no review of the existing consent.</p>	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [ARR]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA.	Annual Average Loss in Value of Landings*: Lower: <£0.01m Intermediate: £0.25m Upper: £0.79m Annual Average Loss in GVA (direct and indirect)*: Lower: <£0.01m Intermediate: £0.11m Upper: £0.33m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: xx (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 2.9 jobs Upper: 8.7 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Displacement Effects	Not Quantified	Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences: <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing 		xx

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			<p>grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited;</p> <ul style="list-style-type: none"> ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		
Energy Generation	Additional operational costs	Quantified Cost Impact (2014–2033): £0.009 – 1.054m	Future employment opportunities – if increased operational costs associated with management measures render projects unviable or restrict project size there will be a negative impact on economic activity and job creation in this sector.		xx (under the upper scenario)
	Costs associated with delays during the consenting process Loss of investor confidence (developments do not proceed)	Not Quantified	<p>Future employment opportunities – if the delays deter investments there will be a negative impact on economic activity and future job creation in this sector.</p> <p>Environment – possible negative impact in relation to climate change and the ability of the Scottish Government to meet its 2020 renewables targets, decarbonisation targets and climate change targets. There would also be consequent financial implications of climate change impacts.</p> <p>This impact is uncertain and is only likely to arise under the upper scenario. JNCC’s current advice is that the intermediate scenario represents their best view on management requirements.</p>		xxx (under the upper scenario only)
<p>Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [ARR]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries	xx	xx	xx	xxx	xxx	xx	xxx	xxx
Reduction in landed value, GVA and employment	West North-West (and Belfast)	Largest employment impacts in: Campbeltown (59%), Ayr (22%), Belfast (11%), Oban (7%)	Coastal Urban and Rural	Potentially significant negative effect if parent loses job/becomes unemployed.	Potentially significant negative effect if individuals lose job/become unemployed	Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0.00-8.7 job losses Potentially significant negative effect on individuals that lose job/become unemployed.	Potentially significant negative effect if member of household loses job/becomes unemployed.
Fish Processors	xx	xx	xx	xx	xx	0	xx	xx
Reduction in local landings at landing ports	West	Campbeltown Troon and Saltcoates Tarbet Carradale Ardrossan Girven	Coastal Urban and Rural					

Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.
* Based on value of landings by home port affected under intermediate scenario.

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [ARR]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: >15m	Nephrops trawls Other trawls Dredges	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Fish Processors Reduction in local landings at landing ports		Shellfish: xxx Demersal: xx Pelagic: 0	xx	xx	0	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [ARR]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Burrowed mud	Provides representation for the seapens and burrowing megafauna type of burrowed mud in OSPAR Region III.	Represents one of two recommended areas of this type of burrowed mud within OSPAR Region III and one of five areas within all of Scotland's seas.	Not currently understood for burrowed mud.	Burrowed mud occurs within a range of environments. The recommended MPA areas would provide representation for the geographically diverse firework anemone type of burrowed mud.	Seapens and burrowing megafauna are considered to be threatened and/or declining by the OSPAR commission. MPA is expected to help increase resilience for the feature.
Kelp and seaweed communities	Provides representation for kelp and seaweed communities in OSPAR Region III.	No information available.			
Maerl beds	Provides representation for maerl beds in OSPAR Region III.	No information available.			Maerl beds are listed by OSPAR as threatened and/or declining. MPA area may increase resilience.
Maerl or coarse shell gravel with burrowing sea cucumbers	Provides representation for maerl or coarse shell gravel with burrowing sea cucumbers in OSPAR Region III.	No information available.			
Seagrass beds	Provides representation for seagrass beds in OSPAR Region III, including what is considered to be the largest bed within Firth of Clyde.	No information available.	No information available.	Seagrass bed within Whiting Bay is believed to be the largest within the Firth of Clyde.	No information available.
Shallow tide-swept coarse sands with burrowing bivalves	Provides representation for the shallow tide-swept coarse sands with burrowing bivalves in OSPAR Region III.	Provides representation for one of two potential MPA areas where it is known to occur in Scotland's seas.	Not currently understood for shallow tide-swept coarse sands with burrowing bivalves.	Shallow tide-swept coarse sands with burrowing bivalves occur in OSPAR Regions II and III in Scotland's seas. This MPA represents a distinct	Not considered to be threatened and/or declining by the OSPAR commission. Feature only occurs in OSPAR Regions II and III.

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				contribution to coverage of the feature's geographic range.	
Ocean quahog	Provides representation for ocean quahog in OSPAR Region III.		Not currently understood for ocean quahog.		Ocean quahog is considered to be threatened and/or declining by the OSPAR commission. MPA is expected to help increase resilience for this feature.
Herring spawning grounds	No information available.				
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

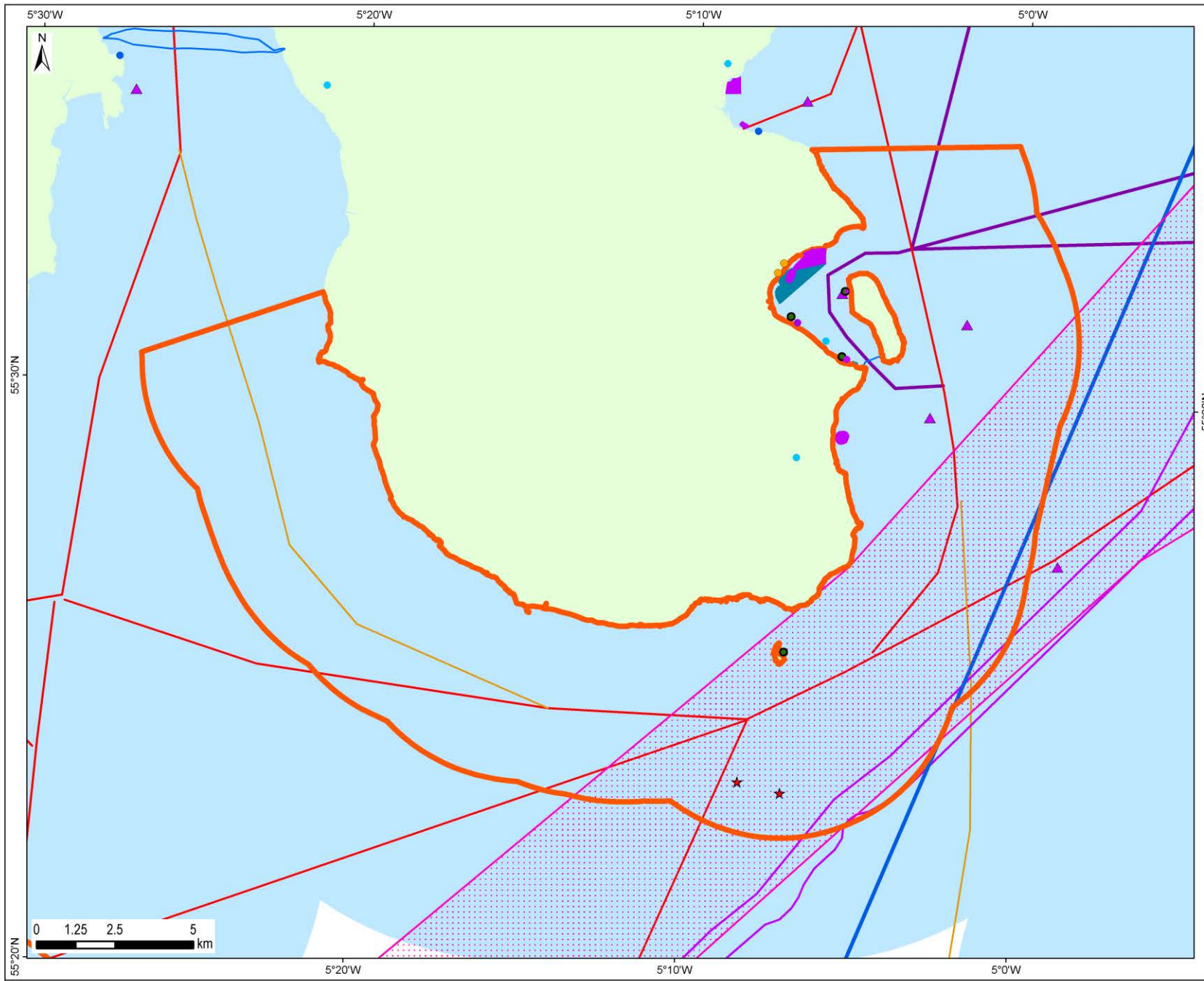
Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ¹⁵ [ARR]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	High. Site fishing grounds are valuable and contain herring spawning grounds and nursery habitats.	Stocks not at MSY, maerl beds need to recover	Low	Moderate	Moderate	High, significant commercial landings from site.	Moderate	Moderate, uncertainty mainly in response of habitats to management measures.
Fish for non-human consumption		Stocks reduced from potential maximum	Protection of herring spawning grounds and shellfish beds can contribute to maintenance and recovery of stocks – benefits are higher under stronger protection measures but ecosystem response is uncertain. Protecting habitats with primary productivity (e.g. seagrass beds) also supports food webs and marine fish stocks.			Commercially valuable species supported.		
Gas and climate regulation	Moderate, extent of relevant benthic communities uncertain	Low - Moderate. Extent of benthic plant communities uncertain	Low - Moderate, protection of seagrass beds under all scenarios.			Moderate, social cost of carbon	Low	Low, due to uncertain extent of seagrass beds and other benthic communities
Natural hazard protection	Low	Low	Nil			Low	Nil	High
Regulation of pollution	Moderate, benthic communities regulate pollution	Low, major water quality issues to be dealt with through WFD	Nil	Low, if protection allows recovery of habitats, service could increase		Low, water quality in this area not affecting human welfare	Minimal, increase in this service unlikely to substitute existing water treatment	High
Non-use value of natural environment	Moderate - High, variety of protected features, and contribution of the site to MPA network, have non-use value.	Non-use value of the site may decline	Low, maintain features of site	Low - Moderate, Protection of features of site from minor decline	Moderate – protection of features of site from decline, and/or allowing some recovery	Moderate – range of features means strong contribution to halting decline of marine	Moderate	Low - Moderate, extent of features, responses to management measures, and value to society

¹⁵ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.

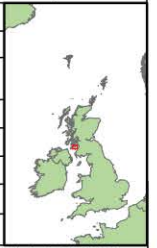
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					biodiversity.		all uncertain
Recreation	Moderate - High, active dive sites, angling and recreational boating routes	Moderate - High, including tourism activities. Angling may be reduced by damage to features	Low - Moderate, Angling benefits and biodiversity encountered by divers and recreational boaters are protected from possible decline, and could recover under upper scenario. Designation could enhance tourism activity.		Moderate, extensive activities, but substitutes are available.	Low - Moderate, enhancement of activities through improved angling and visitor experiences.	Low - Moderate, extent of change from management measures uncertain
Research and Education	Moderate	Low, small number of biological features have research value and there are substitutes	Minimal, no change in most of the characteristics of site	Low, protection of key characteristics of site from decline, improving future research opportunities	Low for individual features. Moderate for opportunity to understand response of wide range of features to management	Low	Low - Moderate, extent to which research uses site in future uncertain
Total value of changes in ecosystem services			Low for lower scenario, moderate for upper scenarios			Moderate	Low



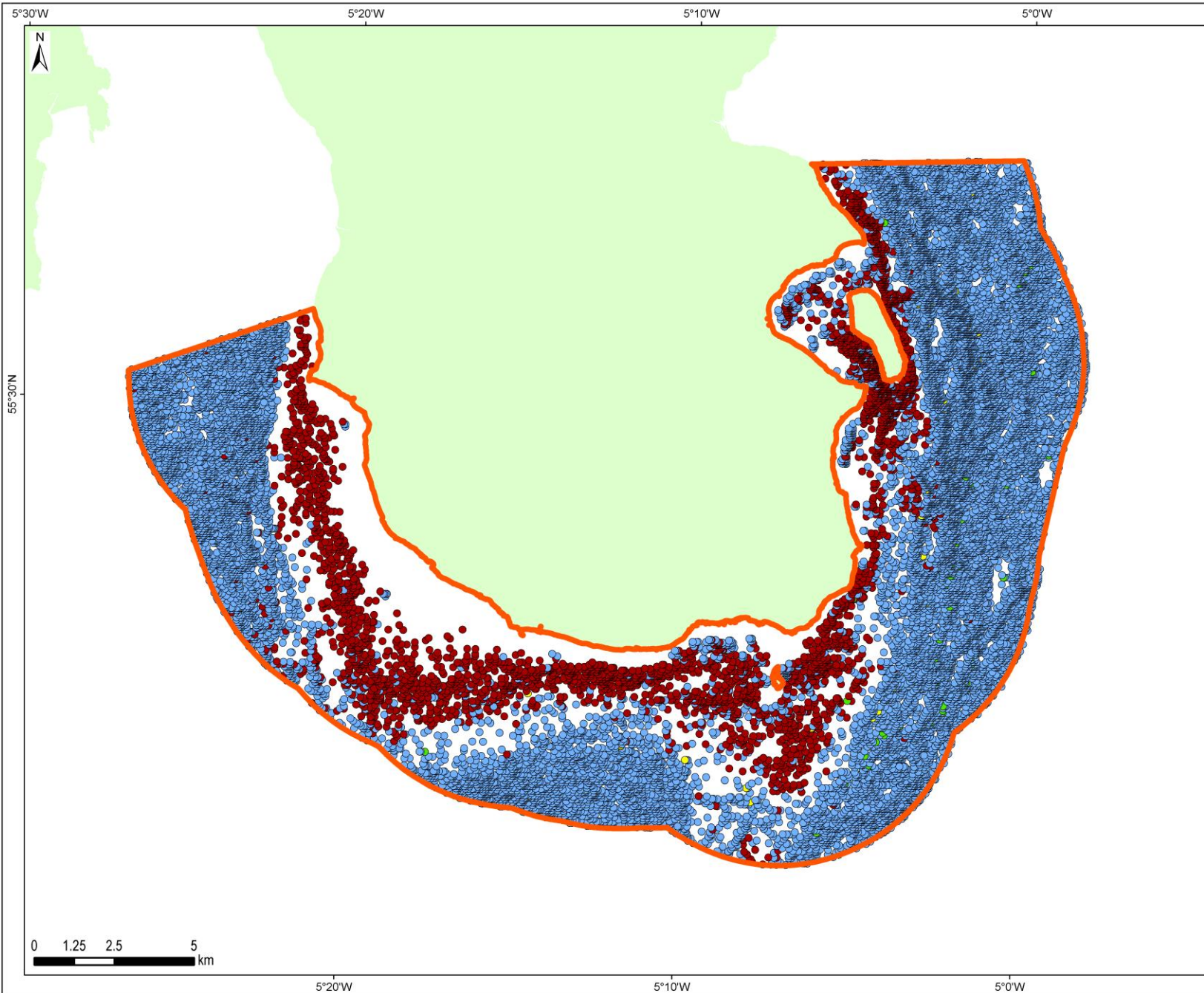
- Proposed Marine Protected Area
- Aquaculture**
 - Existing Shellfish Installations
 - Existing Finfish Installations
- Ports & Harbours**
 - Port Locations
 - Anchorage Areas
- Power Interconnectors**
 - Existing Power Interconnectors
 - Future Proposed Interconnectors
- Recreational Boating**
 - RYA Cruising Routes
 - Light
 - Medium
 - Heavy
 - Recreational Anchorages
 - Mooring Areas
- Energy Generation**
 - Indicative Cable Routes - Tidal
- Subsea Telecommunication Cables**
 - Active
- Watersports**
 - Dinghy Sailing Sites
 - ★ Submarine Dive Sites
 - ▲ Wreck Dive Sites
 - Sea Angling (6 nm from coast)

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:165,000	
QA		FMM	
4136-MPA_HA_SW_South_Arran.mxd			
Produced by ABPmer			



© ABPmer, All rights reserved. 2013. Sources: Marine Scotland, 2012; Kingfisher (KIS-CA), 2012; RYA, 2008; © Crown copyright, 2012, Finstrokes, 2011; © British Crown and SeaZone Solutions Limited. All rights reserved. Products Licence No. 042013.022

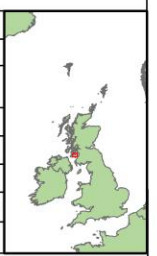
**Human Activities which Occur
within the Proposed MPA:
South Arran**



- Proposed Marine Protected Area
- VMS Fishing Ping Data (2007 to 2011)
- Nephrops Trawls
- Other Trawls
- Dredges
- Pots
- Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:165,000	
QA		FMM	
4136-MPA_Fish_SW_South_Arran.mxd			
Produced by ABPmer			



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Data Source: Scottish Government, 2013
NOT TO BE USED FOR NAVIGATION

**Fishing Activities which Occur
within the Proposed MPA:
South Arran**

Upper Loch Fyne and Loch Goil (LFG)

Site Area (km²): 94

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [LFG]					
Proposed protected features					
<i>Biodiversity Features</i> Burrowed mud, flame shell beds, horse mussel beds, low or variable salinity habitats, sublittoral mud and mixed sediment communities, ocean quahog.					
<i>Geodiversity Features</i> None.					
<i>Site Description</i> The upper Loch Fyne and Loch Goil MPA proposal covers parts of two sea lochs in the inner Firth of Clyde on the west coast of Scotland.					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Burrowed mud	*Lower: 47.13 Intermediate: 47.50 Upper: 93.80	Yes (Seasearch surveys, 2005, 2006, 2011; nature-conservation surveys, 1989 – 2012)	Yes	Not known	Recover
Flame shell beds	Lower: 0.50 Intermediate: 0.50 Upper: 0.50	Yes (Seasearch surveys, 2005, 2006, 2011; nature-conservation surveys, 1989 – 2012; Marine Scotland surveys, 2012)	Yes	Not known	TBC
Horse mussel beds	Lower: 0.005 Intermediate: 0.005 Upper: 0.005	Yes (Seasearch surveys, 2005, 2006, 2011; nature-conservation surveys, 1989 – 2012)	Yes	Not known	Recover

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Low or variable salinity habitats	Lower: 10.41 Intermediate: 10.41 Upper: 10.41	Partial – records from 1989	Partial	Not known	Conserve
Sublittoral mud and mixed sediment communities	Lower: 48.02 Intermediate: 50.22 Upper: 93.80	Partial – records > 12 years old	Partial	Not known	Conserve
Ocean quahog	Lower: 48.15 Intermediate: 93.80 Upper: 93.80	Partial – observations of empty shells, video footage	Partial	Not known	Conserve
Geodiversity Features					
N/A					
<p>Key: * Estimated area based on best available data References: Area of Feature: GeMs Confidence in feature presence and extent: SNH (2012p)</p>					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [LFG]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Aquaculture (Finfish)	0.004	0.015	0.015
Aquaculture (Shellfish)	See national costs	See national costs	See national costs
Commercial Fisheries*	0.000	0.080	0.122
Military	See national costs	See national costs	See national costs
Ports and Harbours	0.010	0.014	0.014
Total Quantified Economic Costs	0.013	0.109	0.151
Non-Quantified Economic Costs			
Aquaculture (Finfish)	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment
Aquaculture (Shellfish)	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment
Commercial Fisheries	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Displacement impacts.
Military	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment.
Ports and Harbours	<ul style="list-style-type: none"> ▪ Relocation of anchorages/ mooring areas away from features of high sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/ mooring areas away from features of high and medium sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/ mooring areas away from features of high and medium sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Recreational Boating	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None, 	<ul style="list-style-type: none"> ▪ Cost of anchorage relocation.
<p>Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [LFG]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	0.024	0.024	0.024
Preparation of Statutory Instruments	None	0.004	0.004
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.001*	0.001*	0.001*
Total Quantified Public Sector Costs	0.025	0.029	0.029
Non-Quantified Public Sector Costs			
None identified.			

* Regulatory and advisory costs of finfish and shellfish aquaculture assessed at national level.

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [LFG]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 0 jobs Upper: 0 jobs	West	Campbeltown	Impacts concentrated in rural coastal areas	Nephrops trawls	Lower: N/A Upper: >15m	No Impact.	No Impact.	No Impact

Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [LFG]		
Benefit	Relevance	Description
Ecosystem Services Benefits (Moderate and High Benefits)		
Non-use value of natural environment	Moderate - High. Variety of protected features and contribution of the site to MPA network has non-use values.	Nil - Moderate
Recreation	Moderate - High. Including active dive sites, angling and recreational boating boats.	Low - Moderate
Other Benefits		
Tourism	Higher biodiversity due to designation, and presence of designations, may attract more tourism activity to local economy.	
Contribution to ecologically coherent network	See report Section 7.5.	
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [LFG]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Burrowed mud	-	L/I/U	L/I/U	-	-	-	L/I/U	-	L/I/U		L/I/U	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Flame shell beds	-	-	-	-	-	-	L/I/U	-	L/I/U		-	-	-	-	-	L/I/U	L/I/U
Horse mussel beds	-	-	-	-	-	-	L/I/U	-	L/I/U		L/I/U	-	-	-	-	L/I/U	L/I/U
Low or variable salinity habitats	-	-	-	-	-	-	L/I/U	-	L/I/U		L/I/U	-	L/I/U	-	-	L/I/U	L/I/U
Sublittoral mud and mixed sediment communities	-	L/I/U	U	-	-	-	L/I/U	-	L/I/U		L/I/U	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Ocean quahog	-	L/I/U	L/I/U	-	-	-	L/I/U	-	L/I/U		L/I/U	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Geodiversity Features																	
N/A																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Aquaculture (Finfish) [LFG]			
<p>There are three finfish farms within the boundary of the LFG proposed MPA, Ardcastle Bay, Furnace Quarry and Quarry Point. Furnace Quarry directly overlaps with the Burrowed Mud feature under all scenarios (lower, intermediate and upper). Ardcastle Bay and Quarry Point overlap with this feature under the upper scenario only. There are two additional finfish farms within 1km of the feature under all scenarios (Evanachan Marine Hatchery and Evanachan Salt Water).</p> <p>Furnace Quarry directly overlaps with Ocean Quahog feature under all scenarios. Ardcastle Bay and Quarry Point overlap with this feature under the intermediate and upper scenarios only.</p> <p>There are two additional finfish farms within 1km of the feature under all scenarios (Evanachan Marine Hatchery and Evanachan Salt Water).</p> <p>Furnace Quarry directly overlaps with the Sublittoral mud and mixed sediment feature under all scenarios. Ardcastle Bay and Quarry Point overlap with this feature under the intermediate and upper scenarios only. There are two additional finfish farms within 1km of the feature under all scenarios (Evanachan Marine Hatchery and Evanachan Salt Water).</p> <p>There is no public information on potential future development within the proposed MPA. In the absence of information on potential future developments, the assessment has focused on the costs associated with obtaining new CAR licences. A national assessment of the costs of obtaining planning permission for new developments is provided separately.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features; and ▪ Additional survey costs incurred once every 10 years (2019 & 2029) to inform new CAR licence applications. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features; and ▪ Additional survey costs incurred once every 10 years (2019 & 2029) to inform new CAR licence applications.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application; and ▪ Additional baseline visual survey costs -£1.6k per CAR licence application. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application; and ▪ Additional baseline visual survey costs -£1.6k per CAR licence application.
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
	provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.	provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.	provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA			
Total costs (2014–2033)	0.005	0.021	0.021
Average annual costs	<0.001	0.001	0.001
Present value of total costs (2014–2033)	0.004	0.015	0.015
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4b. Aquaculture (Shellfish)			[LFG]
<p>There are two shellfish aquaculture sites within the boundary of the LFG proposed MPA, Loch Fyne and 'Site 1'. Both sites overlap with the Burrowed Mud feature under the high scenario only. Burrowed mud is present within 1km of the sites under all scenarios.</p> <p>Both sites directly overlap with the Ocean Quahog feature under the intermediate and upper scenarios. Ocean quahog is within 1km of the sites under all scenarios.</p> <p>Both sites overlap with the Sublittoral mud and mixed sediment communities feature under the high scenario only. This feature is also within 1km of the sites for the high scenario only.</p> <p>There is no public information on potential future development within the proposed MPA. In the absence of information on potential future developments, no site specific assessment has been possible. A national assessment of the costs of obtaining planning permission for new developments is provided separately.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	▪ N/A	▪ N/A	▪ N/A
Description of one-off costs	▪ N/A	▪ N/A	▪ N/A
Description of recurring costs	▪ N/A	▪ N/A	▪ N/A
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Quantified Costs on the Activity of Designation of the Site as an MPA			
Total costs (2014–2033)	See national costs	See national costs	See national costs
Average annual costs	See national costs	See national costs	See national costs
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4c. Commercial Fisheries (assuming zero displacement of fishing activity)	[LFG]
<p>According to VMS-based estimates and ICES rectangle landings statistics, Nephrops trawls, dredges, pelagic trawls and other gears (over-15m) and pots, nephrops trawls, hand fishing and other gears (under-15m vessels) operate within the LFG proposed MPA. The value of catches from the LFG area was £36,900 (over-15m vessels) and £56,100 (under-15m vessels, indicated from ICES rectangle landings data) (average for 2007–2011, 2012 prices). Landings from the over-15m vessels are made predominantly into Tarbet (95% by value). For the over-15m fleet, nephrops trawlers operated in particular in the southern and central and part of the proposed MPA across all the features in this area.</p> <p>Provisional ScotMap data indicate that the annual average earnings from the LFG proposed MPA was £78,200, with over 60% from Nephrops pots and 28% from Nephrops trawls. It is likely that the ICES rectangle estimate for the cost impact on <15m Nephrops trawls is an under-estimate; the value from ScotMap for the whole MPA area is £0.02 million (compared to £0.007 million from ICES rectangle data). The coverage for ScotMap interviews in the region was 63.8% (total value of reported landings from the Fisheries Information Network for those vessels included in the ScotMap value analysis expressed as a percentage of the total reported landings for all vessels <15m). Therefore the ScotMap estimate is likely to under-represent the value of fishing by under-15m vessels, and the spatial representation of the value of fishing is less robust than in regions where coverage is higher.</p> <p>VMS data indicate that there are no foreign vessels fishing within the LFG proposed MPA.</p> <p>Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and SNH recommendations.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>	

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No cost impacts expected. 	<ul style="list-style-type: none"> ▪ Closure to beam trawls and dredges (gears likely to impact on ocean quahog) across the ocean quahog feature extent (full extent of proposed MPA); and ▪ Closure to other mobile bottom-contact gears (whitefish, nephrops and other trawls and seines) across horse mussel and flame shell beds; ▪ Closure to mobile bottom-contact gear across burrowed mud feature (due to recover objective); and ▪ Limit further expansion of static gear. 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gears (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across full extent of MPA; and ▪ Limit further expansion of static gear.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.007). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (<0.001); ▪ Nephrops trawls (0.003); ▪ Other trawls (<0.001); ▪ Dredges (0.002). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.009). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (<0.001); ▪ Nephrops trawls (0.007); ▪ Other trawls (<0.001); ▪ Dredges (0.002).
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA			
Total costs (2014–2033)	0.000	0.230	0.371
Average annual costs	0.000	0.011	0.019
Present value of total costs (2014–2033)	0.000	0.169	0.273
Economic Impacts			
Total change in GVA (2014–2033)	0.000	0.109	0.166
Average annual change to GVA	0.000	0.005	0.008
Present value of total change in GVA	0.000	0.080	0.122

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
(2014–2033)			
Direct and Indirect reduction in Employment	0.0 jobs	0.1 jobs	0.2 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4d. Military **[LFG]**

One coastal military location (Loch Goil noise range) overlaps with the LFG proposed MPA boundary. The Loch Goil noise range overlaps with low or variable salinity habitats (all scenarios), sublittoral mud and mixed sediment communities (intermediate and upper scenarios), ocean quahog (intermediate and upper scenarios) and burrowed mud (upper scenario).

Nine military practice areas (Minard (X5602), Fyne (X5603), Goil (X5604) and Tarbert (X5517); and five submarine exercise areas) overlap with the LFG proposed MPA.

The military practice areas Minard (X5602), Fyne (X5603) and Goil (X5604) overlap with burrowed mud (all scenarios), ocean quahog (all scenarios) and sublittoral mud and mixed sediments (all scenarios). Minard (X5602) also overlaps with flame shell beds (all scenarios) and horse mussel beds (all scenarios), whilst Goil (X5604) overlaps with horse mussel beds (all scenarios) and low or variable salinity habitats (all scenarios).

The military practice area Tarbert (X5517) overlaps with ocean quahog (intermediate and upper scenario), burrowed mud (upper scenario) and sublittoral mud and mixed sediment communities (upper scenario).

The five submarine exercise areas overlap with the features of the LFG proposed MPA to varying degrees under the different extent scenarios.

The features and associated habitats which overlap with military activities have not been described as vulnerable to MoD activities in this proposed MPA. It is assumed that management relating to MoD activity will be coordinated through the MoD's Maritime Environmental Sustainability Appraisal Tool (MESAT) which the MoD uses to assist in meeting its environmental obligations. This process will include operational guidance to reduce significant impacts of military activities on MPAs. It is assumed that the MoD will incur additional costs in adjusting MESAT and other MoD environmental assessment tools in order to consider whether its activities will impact on the conservation objectives of MPAs and also incur additional costs in adjusting electronic charts to consider MPAs. However, these costs will be incurred at national level and hence no site-specific cost assessments have been made.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts			
Description of one-off costs	▪ See National Assessment.	▪ See National Assessment.	▪ See National Assessment.
Description of recurring costs			

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Description of non-quantified costs			
Quantified Costs on the Activity of Designation of the Site as an MPA			
Total costs (2014–2033)	See national costs	See national costs	See national costs
Average annual costs	See national costs	See national costs	See national costs
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4e. Ports and Harbours	[LFG]
<p>There are three ports/harbours (Furnace, Inverary and Portincaple) within the LFG proposed MPA boundary. Furnace overlaps with burrowed mud, ocean quahog aggregations and sublittoral mud and mixed sediment communities under all scenarios. Inverary overlaps with burrowed mud (upper scenario only), ocean quahog (intermediate and upper scenarios) and sublittoral mud and mixed sediment communities (upper scenario). Portincaple overlaps with burrowed mud, horse mussel beds, low or variable salinity habitats, ocean quahog aggregations and sublittoral mud and mixed sediment communities under all scenarios.</p> <p>There are five anchorages/mooring areas within the LFG proposed MPA boundary. Two anchorages/mooring areas overlap burrowed mud under the high scenario whilst two further anchorages/mooring areas overlap ocean quahog and sublittoral mud and mixed sediment communities under all scenarios. The remaining anchorage/mooring area overlaps ocean quahog and burrowed mud under the intermediate and upper scenarios only (i.e. no overlap under lower scenario). Costs may be expected to relocate anchorages/mooring areas to less sensitive areas, although any associated costs are non-quantifiable.</p>	

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 2 in total); and ▪ Relocate anchorages/mooring areas away from all features with a high sensitivity. 	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 3 in total); and ▪ Relocate anchorages/mooring areas away from all features with a high or medium sensitivity. If not possible to relocate away from medium-sensitivity features, relocate to more representative areas. 	<ul style="list-style-type: none"> ▪ Additional licensing costs for small port developments (up to 3 in total); and ▪ Relocate anchorages/mooring areas away from all features with a high or medium sensitivity. If not possible to relocate away from medium-sensitivity features, relocate to more representative areas.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Furnace and Portincaple). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Furnace, Inverary and Portincaple). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £6.75k per licence application. Application estimated for submission in 2024 (Furnace, Inverary and Portincaple).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high and 	<ul style="list-style-type: none"> ▪ Relocation of anchorages/mooring areas away from features of high and

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
	<ul style="list-style-type: none"> sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> medium sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> medium sensitivity; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA			
Total costs (2014–2033)	0.014	0.020	0.020
Average annual costs	0.001	0.001	0.001
Present value of total costs (2014–2033)	0.010	0.014	0.014
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4f. Recreational Boating	[LFG]
<p>There is one medium traffic cruising route within the LFG MPA proposal boundary that overlaps with features proposed for designation, although cruising routes are not expected to incur any management or assessment costs.</p> <p>Under the upper scenario there are 21 anchorages (and associated 100m buffer zones) within the MPA proposal boundary that overlap with proposed protected features. Overlaps with burrowed mud, low and variable salinity habitats, ocean quahog and sublittoral mud and mixed sediment communities have been identified. A further 21 Crown Estate mooring points are present within the proposed MPA under the upper scenario and ten larger mooring areas. A number of individual mooring points are located within these larger mooring areas within the proposed MPA, although it is expected that this may be an underestimate and additional moorings are found within the areas that are not represented by the data. The Crown Estate moorings show overlaps with ocean quahog, burrowed mud, sublittoral mud and mixed sediment communities and low and variable salinity habitats.</p> <p>Under the intermediate and lower scenarios, SNH have identified two recreational anchorages and three mooring areas owned by The Crown Estate that overlap with proposed protected features. Point records of low and variable salinity habitats and horse mussel beds occur between the two anchorages. The Crown Estate's mooring areas also overlap with multiple records of burrowed mud and sublittoral mud and mixed sediment communities, and one overlaps with five records of ocean quahog.</p>	

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No additional management required. Burrowed mud has medium sensitivity to surface abrasion associated with anchoring although effects are highly localised and mostly relate to demersal fishing activity. Sublittoral mud and mixed sediment communities may have some degree of sensitivity to pressures associated with moorings, 	<ul style="list-style-type: none"> ▪ No additional management required. Burrowed mud has medium sensitivity to surface abrasion associated with anchoring although effects are highly localised and mostly relate to demersal fishing activity. Sublittoral mud and mixed sediment communities may have some degree of sensitivity to pressures associated with moorings, 	<ul style="list-style-type: none"> ▪ Relocate all anchorages/moorings away from all features with a high or medium sensitivity to surface abrasion pressure associated with anchoring: burrowed mud and ocean quahog. If not possible to relocate away from features, relocate to less sensitive or more representative areas.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
	although these sediments can be more mobile in nature and therefore more tolerant to such pressures. Ocean quahog has medium sensitivity to subsurface abrasion/penetration associated with mooring activity, although this activity is localised.	although these sediments can be more mobile in nature and therefore more tolerant to such pressures. Ocean quahog has medium sensitivity to subsurface abrasion/penetration associated with mooring activity, although this activity is localised.	
Description of one-off costs	▪ None.	▪ None.	▪ None.
Description of recurring costs	▪ None.	▪ None.	▪ None.
Description of non-quantified costs	▪ None.	▪ None.	▪ Cost of anchorage relocation.

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [LFG]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Tourism	Coastal areas are well represented when considering the locations of various tourist related sites within Scotland with a range of site types present in all regions including the West. Where significant impacts to recreational boating or water sports have been identified for the site, there could also be consequential impacts on tourism.	Tourism may benefit from the designation of the MPA as an added attraction to the destination. In addition, there may also be indirect benefits to tourism as a result of benefits to some water sports activities, for example, recreational angling and diving.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Scuba Diving	There are 18 dive locations within LFG proposed MPA, one wreck dive site (Jacobina), one scenic boat dive site (Eilean Fraoch Wall) and sixteen shore dive locations along the coasts of both Loch Fyne and Loch Goil. All 18 dive locations overlap with one or more features for both the upper and intermediate scenarios. Only three shore dive locations overlap with features ('Low or variable salinity habitats', 'Burrowed Mud', 'Ocean Quahog' and 'Sublittoral mud and mixed sediment communities') under the lower scenario. No management restrictions upon this activity are required.	The added protection offered by an MPA designation and management measures placed upon sector activities may increase the aesthetic attraction of the dive sites through an improved marine ecosystem and a reduction in degradation to the wreck sites.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN). LFG proposed MPA is a coastal site and is located wholly within 6nm of the UK coastline. Therefore sea angling overlaps with all features and there corresponding extents within the proposed MPA. No management restrictions upon this activity are required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation and corresponding management restrictions on sector activities including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA		[LFG]
Activity	Description	
Power Interconnectors	Three existing power interconnectors overlap with the LFG proposed MPA. All three power interconnectors overlap with ocean quahog (all scenarios) and sublittoral mud and mixed sediment communities (all scenarios). In addition the power interconnectors overlap with burrowed mud (upper scenario only) and occur within 1km of burrowed mud under all scenarios. No cost impacts are foreseen, as it is assumed that there will be no review of the existing consents.	
Water Sports – Dinghy Sailing	There is one dinghy sailing centre (The Lochgoilhead Centre) located within LFG proposed MPA. Water sports activities including dinghy sailing are not assessed as requiring any additional management measures. It is also considered that no additional benefit to dinghy sailing from management measures applied to other activities will occur.	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [LFG]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.00m Intermediate: £0.01m Upper: £0.02m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: <£0.01m Upper: <£0.01m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: x (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 0.1 jobs Upper: 0.2 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Displacement Effects	Not quantified	Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences: <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing 		x

			<p>fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited;</p> <ul style="list-style-type: none"> ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		
<p>Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [LFG]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries	x	x	x	0	0	0	0	0
Reduction in landed value, GVA and employment	West	Largest employment impacts in: Campbeltown (100%)	Coastal Rural				0.02-0.2 job losses	
Fish Processors	0	0	0	0	0	0	0	0
Reduction in local landings at landing ports								
<p>Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.</p>								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [LFG]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: >15m	Nephrops trawls	0	0	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	0	0
Fish Processors Reduction in local landings at landing ports		Shellfish: xxx Demersal: xx Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [LFG]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Burrowed mud	Provides representation of fireworks anemone and burrowing megafauna and mud volcano worm in OSPAR Region III.	Represents one of two areas of fireworks anemone within OSPAR Region III and one of two areas of burrowing megafauna and mud volcano worm in OSPAR Region III.	Not currently understood for burrowed mud.	Burrowed mud occurs within a range of environments. All records of this feature of burrowed mud are from OSPAR Region III. The recommended MPA areas would provide representation for the geographic range of the fireworks anemone and burrowing megafauna and mud volcano worm types of burrowed mud.	No information available.
Flame shell beds	Provides representation for flame shell beds in OSPAR Region III.	Represents one of five recommended areas for flame shell beds in OSPAR Region III.	Not currently understood for flame shell beds.	All records of flame shell beds are from OSPAR Region III. The recommended MPA areas would to some extent reflect the geographic range of flame shell beds in Scottish seas.	Not listed by OSPAR as threatened and/or declining, although there is evidence of decline. The MPA may increase resilience.
Horse mussel beds	Provides representation for horse mussel beds in OSPAR Region III.	Represents one of four recommended areas for horse mussel beds in Scottish seas.	Not currently understood for horse mussel beds.		Horse mussel beds are listed as threatened and/or declining by the OSPAR commission. The MPA may increase resilience.
Low or variable salinity habitats	Provides representation for low or variable salinity habitats in OSPAR Region III.	Represents one of two recommended areas for low or variable salinity habitats in OSPAR Region III.	Not currently understood for low or variable salinity habitats.	This MPA represents a distinct contribution to coverage of the geographic range.	Not listed by OSPAR as threatened and/or declining. Not recommended that a greater proportion be included in the MPA network.
Sublittoral mud and mixed sediment communities	No information available.				
Ocean quahog	No information available.				
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

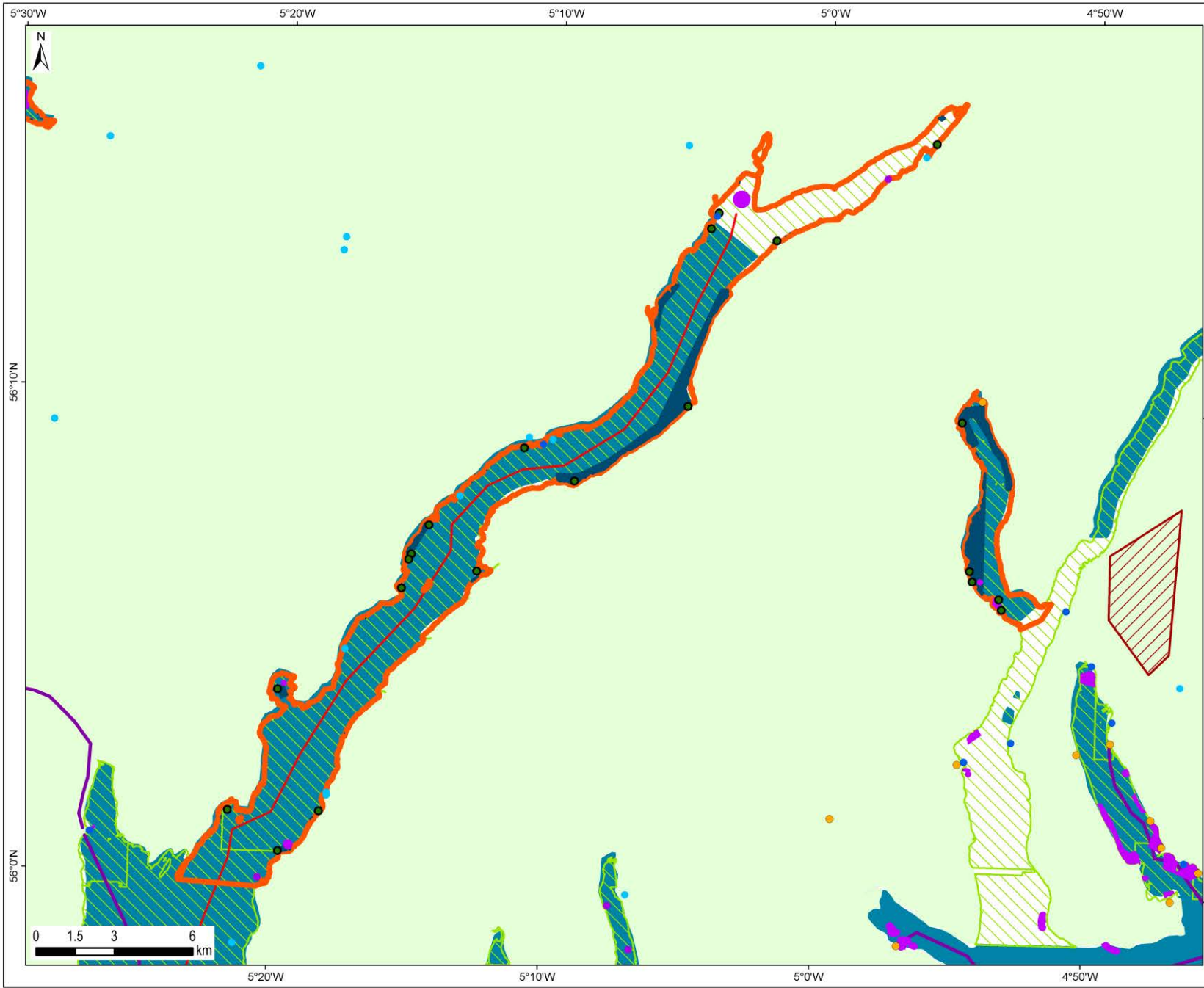
Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ¹⁶ [LFG]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	High. Support food web and contain nursery habitats.	Stocks not at MSY, maerl beds need to recover	Nil	Low, protection of shellfish beds can contribute to maintenance and recovery of stocks – benefits are higher under stronger protection measures but ecosystem response is uncertain.		High. Commercially valuable species supported.	Nil - Low	Moderate, uncertainty mainly in response of habitats to management measures.
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Minimal	Low. No benthic plant communities	Nil	Minimal	Low	Moderate, social cost of carbon	Minimal	Moderate
Natural hazard protection	Low	Low, from low or variable salinity habitats	Nil		Low	Low	Nil - Minimal	High
Regulation of pollution	Moderate, benthic communities regulate pollution	Low, major water quality issues to be dealt with through WFD	Nil		Low, if protection allows recovery of habitats, service could increase	Low, water quality in this area not affecting human welfare	Minimal	High
Non-use value of natural environment	Moderate - High, variety of protected features, and contribution of the site to MPA network, have non-use value.	Non-use value of the site may decline	Nil	Low - Moderate, protection of features of site from minor decline	Moderate – protection of features of site from decline, and/or allowing some recovery	Moderate – range of features means strong contribution to halting decline of marine biodiversity.	Nil - Moderate	Low - Moderate, extent of features, responses to management measures, and value to society all uncertain
Recreation	Moderate - High, including active dive sites, angling and recreational boating routes	Moderate - High, including tourism activities. Angling may be reduced by	Nil	Low - Moderate, Angling benefits and biodiversity encountered by divers and recreational boaters are protected from possible decline, and could recover under upper scenario. Designation could enhance tourism activity.		Moderate, extensive activities, but substitutes are available.	Low - Moderate, enhancement of activities through improved angling and visitor	Nil - Moderate, extent of change from management measures uncertain

¹⁶ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.

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		damage to features				experiences.	
Research and Education	Low	Low, small number of biological features have research value and there are substitutes	Nil	Low, protection of key characteristics of site from decline, improving future research opportunities	Low for individual features. Moderate for opportunity to understand response of wide range of features to management	Low	Low - Moderate, extent to which research uses site in future uncertain
Total value of changes in ecosystem services			Nil for lower scenario, Moderate for upper scenarios			Low - Moderate	Low



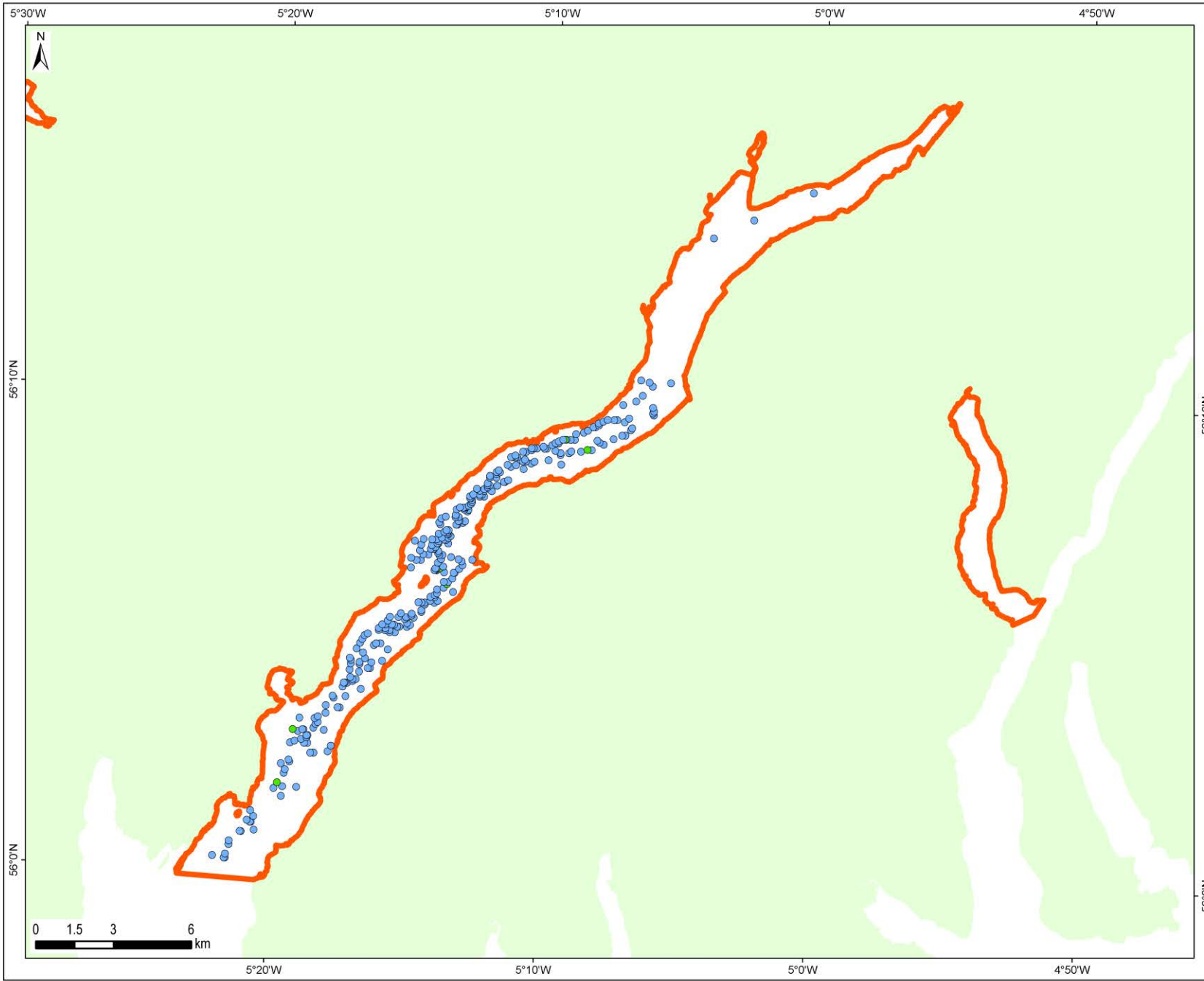
- Proposed Marine Protected Area
- Aquaculture**
- Existing Shellfish Installations
- Existing Finfish Installations
- Ports & Harbours**
- Port Locations
- Anchorage Areas
- Watersports**
- Dinghy Sailing Sites
- Recreational Boating**
- RYA Cruising Routes
- Medium
- Heavy
- Recreational Anchorages
- Mooring Areas
- Military Practice Areas**
- Firing Danger Areas
- Submarine Exercise Area
- Other Exercise Areas

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:200,000	
QA		FMM	
4136 - MPA_HA_Fyne_Goil.mxd			
Produced by ABPmer			



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**Human Activities which Occur within the Proposed MPA:
Upper Loch Fyne and Loch Goil**



 Proposed Marine Protected Area

VMS Fishing Pings (2007 to 2011)

 Nephrops Trawls

 Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:200,000	
QA		FMM	
4136 - MPA_Fish_Fyne_Goil.mxd			
Produced by ABPmer			



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Data Source: Scottish Government, 2013
NOT TO BE USED FOR NAVIGATION

**Fishing Activities which Occur within the Proposed MPA:
Upper Loch Fyne and Loch Goil**

Wyre and Rousay Sounds (WYR)

Site Area (km²): 18

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [WYR]					
Proposed protected features					
<i>Biodiversity Features</i> Kelp and seaweed communities on sublittoral sediment, maerl beds.					
<i>Geodiversity Features</i> Marine Geomorphology of the Scottish Shelf Seabed – components to be confirmed by SNH.					
<i>Site Description</i> The Wyre and Rousay MPA proposal covers the sounds between the islands of Rousay, Wyre and Egilsay in Orkney, north Scotland. The area covers channels swept by the tides of the Atlantic and the North Sea supporting large beds of maerl and kelp and seaweed communities.					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Kelp and seaweed communities on sublittoral sediment	*Lower: 7.71 Intermediate: 17.62 Upper: 17.62	Yes (SNH survey, 1996; Marine Scotland survey, 2011)	Partial – likely to extend further than records suggest	Not known	Conserve (uncertain)
Maerl beds	Lower: 8.88 Intermediate: 8.88 Upper: 14.81	Yes (SNH survey, 1996; Marine Scotland survey, 2011)	Yes	Not known	Conserve (uncertain)
Geodiversity Features					
Marine Geomorphology of the Scottish Shelf Seabed –components to be confirmed by SNH		No	No	Not known	
Key: * Estimated area based on best available data References: Area of Feature: GeMs Confidence in feature presence and extent: SNH (2012q)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [WYR]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Aquaculture (Finfish)	0.002	0.009	0.009
Commercial Fisheries*	<0.001	0.002	0.042
Energy Generation	0.012	0.024	0.068
Total Quantified Economic Costs	0.014	0.035	0.119
Non-Quantified Economic Costs			
Aquaculture (Finfish)	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development; and ▪ Costs of project delays during consenting; risk of deterrent to investment
Commercial Fisheries	<ul style="list-style-type: none"> ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Displacement impacts.
Energy Generation	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.
Recreational Boating	<ul style="list-style-type: none"> ○ Cost of anchorage relocation. 	<ul style="list-style-type: none"> ○ Cost of anchorage relocation. 	<ul style="list-style-type: none"> ○ Cost of anchorage relocation.
Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.			

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Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [WYR]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	0.004	0.004	0.004
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.001*	0.002*	0.003*
Total Quantified Public Sector Costs	0.005	0.006	0.007
Non-Quantified Public Sector Costs			
None identified.			

* Regulatory and advisory costs of finfish and shellfish aquaculture assessed at national level.

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [WYR]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 0 jobs Upper: 0 jobs	North	There is currently no information available, although likely to include Kirkwall.	Impacts concentrated in island coastal areas	Cannot be identified for confidentiality reasons.	Lower: <15m Upper: <15m	No Impact.	No Impact.	No employment data but unlikely to be employed in fisheries..

If any energy generation developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).

Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive)			[WYR]
Benefit	Description		
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits	
Fish for human consumption	High. The site provides supporting services, including contribution to food webs and nursery habitats.	Low - Moderate	
Fish for non-human consumption			
Non-use value of natural environment	Moderate - High. Variety of protected features.	Low - Moderate	
Other Benefits			
Tourism	Higher biodiversity due to designation, and presence of designations, may attract more tourism activity to local economy.		
Contribution to ecologically coherent network	See report Section 7.5.		
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).			

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [WYR]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Kelp and seaweed communities on sublittoral sediment	-	I/U	-	-	-	-	L/I/U	L/I/U	-	-	-	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Maerl beds	-	L/I/U	-	-	-	-	L/I/U	L/I/U	-	-	-	L/I/U	L/I/U	-	-	L/I/U	L/I/U
Geodiversity Features																	
Marine Geomorphology of the Scottish Shelf Seabed – components to be confirmed by SNH	Not considered to be sensitive at the levels of exposure expected from human activities; thus, not considered in the context of management.																
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Aquaculture (Finfish) [WYR]			
<p>Three finfish farms are located within the boundary of the WYR proposed MPA. These are the Bay of Ham, Bay of Vady and Kirk Noust. The Bay of Ham and the Bay of Vady directly overlap with the feature Kelp and seaweed sublittoral communities under the intermediate and upper scenarios. Kirk Noust directly overlaps with this feature under all scenarios. All three sites are within 1km of this feature under all scenarios.</p> <p>The Bay of Ham and Kirk Noust directly overlap with the feature Maerl Bed feature under the upper and all scenarios respectively. All three sites are within 1km of this feature under al scenarios.</p> <p>There is no public information on potential future development within the proposed MPA. In the absence of information on potential future developments, the assessment has focused on the costs associated with obtaining new CAR licences. A national assessment of the costs of obtaining planning permission for new developments is provided separately.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features; and ▪ Additional survey costs incurred once every 10 years (2019 & 2029) to inform new CAR licence applications. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for new CAR licence applications to assess impacts to MPA features; and ▪ Additional survey costs incurred once every 10 years (2019 & 2029) to inform new CAR licence applications.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application. 	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application; and ▪ Additional baseline visual survey costs -£1.6k per CAR licence application 	<ul style="list-style-type: none"> ▪ Additional assessment costs for CAR licence once every 10 years (2019, 2029) of £500 per CAR licence application; and ▪ Additional baseline visual survey costs -£1.6k per CAR licence application
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Possible costs associated with potential future development. A national assessment of additional assessment and survey costs for potential future development is provided separately; and ▪ Costs of project delays during consenting; risk of deterrent to investment.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.003	0.013	0.013
Average annual costs	<0.001	0.001	0.001
Present value of total costs (2014–2033)	0.002	0.009	0.009
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4b. Commercial Fisheries (assuming zero displacement of fishing activity)	[WYR]
<p>According to VMS-based estimates and ICES rectangle landings statistics, pots, hand fishing, dredges and other gears (under-15m vessels) operate within the WYR proposed MPA. There is no over-15m vessel activity within the area. The value of catches from the WYR area was £12,900 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices).</p> <p>Provisional ScotMap data indicate that the annual average earnings from the WYR proposed MPA was £67,500, with over 70% of this from pots and the remainder from diving. No value was indicated for trawls, indicating that the estimates of value of landings from the ICES rectangle data is likely to over-estimate the impact on under-15m trawls. However, the impact on pots may be an under-estimate, with the total value of annual average earnings from pots in the WYR area being £0.05 million (although the whole value would not be impacted by the management measures assessed). The coverage for ScotMap interviews in the region was 90.2% (total value of reported landings from the Fisheries Information Network for those vessels included in the ScotMap value analysis expressed as a percentage of the total reported landings for all vessels <15m). Therefore, the ScotMap estimate is likely to be a good representation the value of fishing by under-15m vessels, and the spatial representation of the value of fishing is fairly robust due to the high level of coverage.</p> <p>VMS data indicate that there are no non-UK vessels fishing within the WYR proposed MPA.</p> <p>Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and SNH recommendations.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>	

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Reduce 50% of mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) pressure across of maerl beds. 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across maerl beds. 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across maerl beds.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (<0.001). 	<ul style="list-style-type: none"> ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (<0.001). 	<ul style="list-style-type: none"> ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.004).
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.002	0.005	0.086
Average annual costs	<0.001	<0.001	0.004
Present value of total costs (2014–2033)	0.002	0.003	0.063
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.001	0.003	0.056
Average annual change to GVA	<0.001	<0.001	0.003
Present value of total change in GVA (2014–2033)	<0.001	0.002	0.042
Direct and Indirect reduction in Employment	0.0 jobs	0.0 jobs	0.0 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4c. Energy Generation	[WYR]
<p>Under intermediate and upper extent scenarios, the Fall of Warness (European Marine Energy Centre (EMEC), up to 4MW capacity) tidal energy generation test site is within 5km of the feature kelp and seaweed sublittoral communities within the WYR proposed MPA boundary. However, given the feature is not sensitive to tidal developments and taking SNH management options into account, no additional cost impacts are anticipated associated with the deployment of prototypes at this location.</p> <p>Planning is currently in progress (i.e. pre-application) for the Westray South (SSE Renewables Developments (UK) Limited, 200MW capacity) tidal energy generation development. Under all scenarios, the Westray South tidal development is located within 5km of the features maerl beds (OSPAR and BAP designated) and kelp and seaweed sublittoral communities within the WYR proposed MPA boundary. Additional assessment of the interaction with these features could be required.</p> <p>A tidal energy generation Area of Search (AoS) overlaps the MPA feature kelp and seaweed sublittoral communities under the upper scenario for the WYR proposed MPA. Additional assessment of the interaction with this feature could be required.</p> <p>In addition, one potential future export cable route for tidal energy generation developments (Fall of Warness and Westray South) overlaps the MPA features maerl beds and kelp and seaweed sublittoral communities for all scenarios. It is possible that re-routing of cables would be necessary to avoid direct overlap with these features, although developers are likely to have taken this into account, especially given the feature's OSPAR and BAP designation. Therefore, only additional survey costs are expected under the upper scenario.</p>	

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to features within 1km of proposed activities. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to features within 5km of proposed activities. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to features within 5km of proposed activities; and ▪ Additional survey costs incurred to inform new licence applications.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k. Application estimated for submission in 2014 (Westray South export cable). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k per licence application (up to 2 in total). Application(s) estimated for submission in 2014 (Westray South and export cable). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k per licence application (up to 3 in total). Application(s) estimated for submission in 2014 (Westray South and export cable) and 2024 (tidal energy AoS); and ▪ Additional survey costs - £5k per linear km of development (Westray South export cable, 7km).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.012	0.024	0.071
Average annual costs	0.001	0.001	0.004
Present value of total costs (2014–2033)	0.012	0.024	0.068
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4d. Recreational Boating		[WYR]
There are no cruising routes for recreational boating that intersect the WYR proposed MPA.		
Under the upper scenario, there are four anchorages for recreational boating that overlap with proposed protected features within the MPA proposal boundary. All four of these anchorages (and associated 100m buffer zones) overlap with feature extents for kelp and seaweed sublittoral communities and maerl beds. Under the intermediate and lower scenarios, SNH have identified two anchorages in Wyre Sound and one commercial anchorage in Rousay Sound overlap with records of maerl beds.		

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Relocate anchorages away from the northern and southern sides of Wyre Sound and in Rousay Sound away from maerl beds. If not possible to relocate away from maerl beds, relocate to less sensitive or more representative areas of maerl within MPA. 	<ul style="list-style-type: none"> ▪ Relocate anchorages away from the northern and southern sides of Wyre Sound and in Rousay Sound away from maerl beds. If not possible to relocate away from maerl beds, relocate to less sensitive or more representative areas of maerl within MPA. 	<ul style="list-style-type: none"> ▪ Relocate all anchorages that overlap with maerl beds. If not possible to relocate away from maerl beds, relocate to less sensitive or more representative areas of maerl within MPA.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Cost of anchorage relocation. 	<ul style="list-style-type: none"> ▪ Cost of anchorage relocation. 	<ul style="list-style-type: none"> ▪ Cost of anchorage relocation.

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [WYR]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Tourism	Coastal areas are well represented when considering the locations of various tourist related sites within Scotland with a range of site types present in all regions including the North. Where significant impacts to recreational boating or water sports have been identified for the site, there could also be consequential impacts on tourism.	Tourism may benefit from the designation of the MPA as an added attraction to the destination. In addition, there may also be indirect benefits to tourism as a result of benefits to some water sports activities, for example, recreational angling.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN). SJU proposed MPA is a coastal site and is located wholly within 6nm of the UK coastline. Therefore sea angling overlaps with all features and there corresponding extents within the proposed MPA. No management restrictions upon this activity are required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation and corresponding management restrictions on sector activities including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA		[WYR]
Activity	Description	
Power Interconnectors	Three existing power interconnectors overlap with the WYR proposed MPA. Two power interconnectors overlap with kelp and seaweed communities (all scenarios) and maerl beds (all scenarios). The third power interconnector overlaps with kelp and seaweed communities (intermediate and upper scenarios) and maerl beds (upper scenario). Two additional power interconnectors are also within 1km of maerl beds (one under all scenarios and one under the upper scenario only) and kelp and seaweed sublittoral communities (both under the intermediate and upper scenarios). No cost impacts are foreseen, as it is assumed that there will be no review of the existing consents.	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [WYR]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: <£0.01m Intermediate: <£0.01m Upper: <£0.01m Annual Average Loss in GVA (direct and indirect)*: Lower: <£0.01m Intermediate: <£0.01m Upper: <£0.01m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: x (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 0.0 jobs Upper: 0.0 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Displacement Effects	Not Quantified	Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences: <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing 		x

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			<p>grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited;</p> <ul style="list-style-type: none"> ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		
Energy Generation	Additional operational costs	Quantified Cost Impact (2014–2033): £0.012 – 0.068m	Future employment opportunities – if increased operational costs associated with management measures render projects unviable or restrict project size there will be a negative impact on economic activity and job creation in this sector.		0
	Costs associated with delays during the consenting process Loss of investor confidence (developments do not proceed)	Not Quantified	<p>Future employment opportunities – if the delays deter investments there will be a negative impact on economic activity and future job creation in this sector.</p> <p>Environment – possible negative impact in relation to climate change and the ability of the Scottish Government to meet its 2020 renewables targets, decarbonisation targets and climate change targets. There would also be consequent financial implications of climate change impacts.</p> <p>This impact is uncertain and is only likely to arise under the upper scenario. JNCC’s current advice is that the intermediate scenario represents their best view on management requirements.</p>		xxx (under the upper scenario only)
<p>Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>					


Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender								[WYR]
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries Reduction in landed value, GVA and employment	x North	x There is currently no information available, although likely to include Kirkwall	x Coastal	0	0	xx Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0 0.002-0.04 job losses	0
Fish Processors Reduction in local landings at landing ports	0	0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [WYR]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: <15m Upper: <15m	Cannot be identified for confidentiality reasons.	0	0	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	0	0
Fish Processors Reduction in local landings at landing ports		0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

Potential Contribution of the Site to an Ecologically-Coherent Network

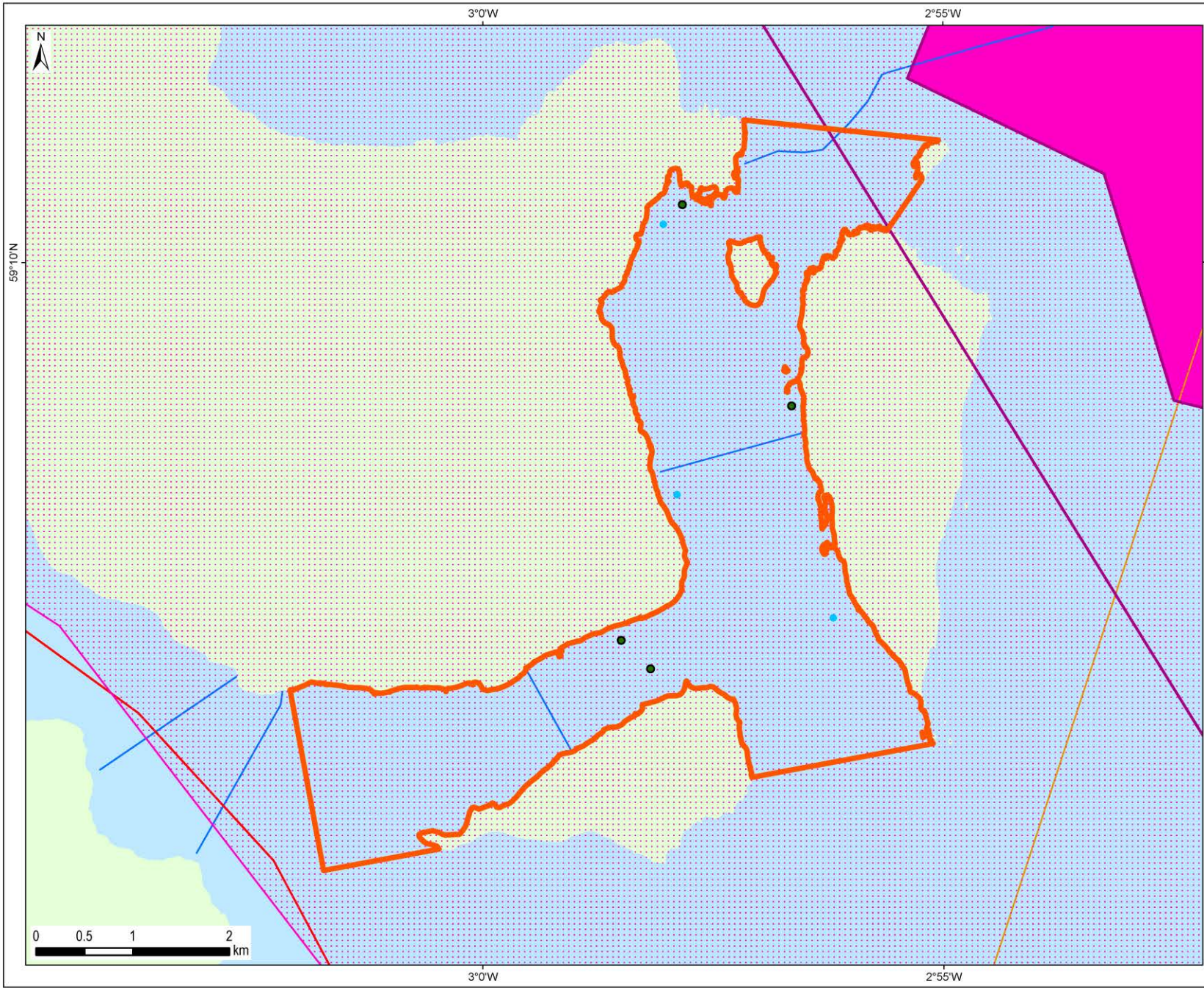
Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [WYR]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Kelp and seaweed communities on sublittoral sediment	Provides representation for kelp and seaweed communities on sublittoral sediment in OSPAR Region II.	Represents one of two areas recommended for protection within OSPAR Region II and one of four in Scottish seas.			
Maerl beds	Provides representation for maerl beds in OSPAR Region II.	Represents one of two areas recommended for the protection of maerl beds in OSPAR Region II and one of five in Scottish waters.			Maerl beds are listed by OSPAR as threatened and/or declining. MPA area may increase resilience.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ¹⁷ [WYR]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption Fish for non-human consumption 	High. Support food web and contain nursery habitats.	Extent of habitats uncertain Uncertain	Low	Low - Moderate. Protection of shellfish beds can contribute to maintenance and recovery of stocks – benefits are higher under stronger protection measures but ecosystem response is uncertain.		Moderate. Commercially valuable species supported.	Low - Moderate	Low, uncertain if habitats need to recover.
Gas and climate regulation	Minimal	From kelp and seaweed communities	Low - Moderate, dependent on avoiding decline or restoring kelp & seaweed communities.	Moderate, social cost of carbon	Minimal	High		
Natural hazard protection	Low	Low	Nil		Low	Nil	High	
Regulation of pollution	Moderate, benthic communities regulate pollution	Low, major water quality issues to be dealt with through WFD	Minimal, if protection avoids damage or allows recovery of habitats.		Low, water quality in this area not affecting human welfare	Minimal, increase in this service unlikely	Moderate	
Non-use value of natural environment	Moderate - High, variety of protected features, and contribution of	Non-use value of the site may be reduced through damage	Low, if protection avoids damage or allows recovery of habitats, service could increase			Low, small site but contribution to halting decline of marine	Low - Moderate	Moderate, value to society uncertain

¹⁷ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ¹⁷ [WYR]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
	the site to MPA network, have non-use value.					biodiversity.		
Recreation	Low	Some angling and recreational boating routes	Low, angling benefits and biodiversity encountered by recreational boaters may avoid deterioration or recover.	Low, some activities, but substitutes are available.		Nil - Low	Moderate	
Research and Education	Low	Low, small number of biological features have research value and there are substitutes	Low, if protection avoids damage or allows recovery of habitats, service could increase	Low		Low	Low - Moderate, extent to which research uses site in future uncertain	
Total value of changes in ecosystem services			Low for lower scenario, Low for upper scenarios				Low	Low



- Proposed Marine Protected Area
- Aquaculture**
- Existing Finfish Installations
- Power Interconnectors**
- Existing Power Interconnectors
- Recreational Boating**
- RYA Cruising Routes
- Light
- Medium
- Recreational Anchorages
- Energy Generation**
- Draft Plan Option Areas - Tidal
- Indicative Cable Routes - Tidal
- Tidal Lease Area
- Watersports**
- Sea Angling (6 nm from coast)

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:54,000	
QA		FMM	
4136-MPA_HA_Wyre_Rousay_Sounds.mxd			
Produced by ABPmer			



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**Human Activities which Occur within the Proposed MPA:
Wyre and Rousay Sounds**

Part 2. Offshore Sites

The Barra Fan and Hebrides Terrace Seamount (BHT)

Site Area (km²): 4,701

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [BHT]					
Proposed protected features					
<p><i>Biodiversity Features</i> Burrowed mud, offshore subtidal sands and gravels, offshore deep sea muds, orange roughy, seamount communities, continental slope, seamount.</p> <p><i>Geodiversity Features</i> Quaternary of Scotland – iceberg ploughmark field, prograding wedges; Submarine Mass Movement – continental slope turbidite canyons, slide deposits; Marine Geomorphology of the Scottish Deep Ocean Seabed – scour moat; Cenozoic Structures of the Atlantic Margin – continental slope, Hebrides Terrace Seamount.</p> <p><i>Site Description</i> The Barra Fan and Hebrides Terrace Seamount MPA proposal lies within offshore waters to the south- west of the Sound of Barra (south of the Outer Hebrides). The MPA proposal boundary has been drawn to focus on the deep sea benthic biodiversity features of the continental slope (burrowed mud, offshore deep-sea muds and offshore subtidal sands and gravels) and on the Hebrides Terrace Seamount (orange roughy and seamount communities).</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Burrowed mud	Lower: 2453.27 Intermediate: 2453.27 Upper: 3079.70	Yes (Marine Scotland Science survey data, 2000 – 2009; SAMS analysis of SEA7, 1988 - 1998)	Partial	Low	Conserve (uncertain)
Offshore subtidal sands and gravels	Lower: 476.17 Intermediate: 476.17 Upper: 695.27	Yes (UK SeaMap, 2010; SAMS analysis of SEA7, 1988 – 1998; BGS PSA data, provided 2012)	Partial	Low	Conserve (uncertain)
Offshore deep sea muds	Lower: 1243.47 Intermediate: 1243.47 Upper: 1776.19	Yes (UK SeaMap, 2010; SAMS analysis of SEA7, 1988 - 1998)	Partial	Low	Conserve (uncertain)

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Continental slope	Not considered as not thought to be sensitive to pressures associated with human activity	Yes (UK SeaMap, 2010)	Partial	Low	Conserve (uncertain)
Orange Roughy	Lower: 117.68 Intermediate: 117.68 Upper: 117.68	Yes (Marine Scotland Science 2009)	Partial	Low	Conserve (uncertain)
Seamount communities	Lower: 544.71 Intermediate: 544.71 Upper: 938.65	Yes (JC073 survey 2011)	Partial	Low	Conserve (uncertain)
Hebrides Terrace Seamount	Not considered as not thought to be sensitive to pressures associated with human activity	Yes (IFERMER multibeam data)	Yes (IFERMER multibeam data)	Low	Conserve (uncertain)
Geodiversity Features					
Quaternary of Scotland – iceberg ploughmark field, prograding wedges	Iceberg Ploughmark Field: 4435.65 Prograding Wedges: 3007.44	Yes	Yes	Low	Conserve (uncertain)
Mass Movement – continental slope turbidite canyons, slide deposits	Continental turbidite canyons: 255.97 Slide deposits: 949.47				
Marine Geomorphology of the Scottish Deep Ocean Seabed – scour moat	Scour moat: 49.62				
Cenozoic Structures of the Atlantic Margin – continental slope, Hebrides Terrace Seamount	Continental slope: 20902.91 Hebrides Terrace seamount: 117.68				
<p>Key: * Estimated area based on best available data References: Area of Features: GeMS Confidence in biodiversity feature presence and extent: JNCC (2013) pers. comm. Confidence in biodiversity feature condition: JNCC (2013) pers. comm. Confidence in geodiversity feature presence and extent: Brooks et al. (2012) Confidence in geodiversity feature condition: Brooks et al. (2012)</p>					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [BHT]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries*	0.043	2.882	3.680
Military	See national costs	See national costs	See national costs
Oil and Gas	0.066	1.563	5.793
Total Quantified Economic Costs	0.109	4.445	9.473
Non-Quantified Economic Costs			
Commercial Fisheries	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts.
Military	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment.
Oil and Gas	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.
Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [BHT]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	0.005	0.005	0.005
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.007	0.007	0.007
Total Quantified Public Sector Costs	0.011	0.011	0.011
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [BHT]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries - Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 4 jobs Upper: 6 jobs	North-East West North-West	Fraserburgh Ayr Lochinver	Impacts concentrated in rural and urban coastal areas	Cannot be identified for confidentiality reasons.	Lower: <15m Upper: <15m (may be over-estimate)	No Impact.	No breakdown of fisherman employment by ethnic origin.	Unlikely to be employed in fisheries.
If any oil and gas developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).										
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [BHT]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use of value of natural environment	Moderate - High. Protected features which make a contribution to MPA network have non-use values.	Nil - Moderate
Research and Education	Moderate	Nil - Moderate
Other Benefits		
None identified.		
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [BHT]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Burrowed mud	-	-	-	-	-	-	L/U	-	L/U	L/U	-	-	-	-	-	-	-
Offshore subtidal sands and gravels	-	-	-	-	-	-	L/U	-	L/U	-	-	-	-	-	-	-	-
Offshore deep sea muds	-	-	-	-	-	-	L/U	-	L/U	L/U	-	-	-	-	-	-	-
Orange Roughy	-	-	-	-	-	-	L/U	-	L/U	-	-	-	-	-	-	-	-
Seamount communities	-	-	-	-	-	-	L/U	-	L/U	-	-	-	-	-	-	-	-
Continental slope	Not considered as not thought to be sensitive to pressures associated with human activity.																
Hebrides Terrace Seamount																	
Geodiversity Features																	
Quaternary of Scotland – iceberg ploughmark field	Considered to have a low sensitivity to the pressures associated with activities they are currently exposed and likely to be exposed to in the future; thus, not considered in the context of management.																
Quaternary of Scotland – prograding wedges																	
Mass Movement – continental slope turbidite canyons																	
Mass Movement – slide deposits																	
Marine Geomorphology of the Scottish Deep Ocean																	
Seabed – scour moat																	
Cenozoic Structures of the Atlantic Margin – continental slope																	
Cenozoic Structures of the Atlantic Margin – Hebrides Terrace Seamount																	
<p>Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed protected feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed protected feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.</p>																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity)

[BHT]

According to VMS-based estimates and ICES rectangle landings statistics, pelagic trawls, otter trawls and lines (over-15m vessels) and whitefish trawls, pelagic trawls, lines and a small amount of pots and nephrops trawls (under-15m vessels) operate within the BHT proposed MPA (UK vessels). The value of catches from the BHT area for over-15m vessels (VMS data) cannot be disclosed as there were fewer than 5 vessels. The value of catches for under-15m vessels was £563,000 (indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). For the over-15m fleet, lines and whitefish trawls operate in particular in the eastern part of the proposed MPA across the area of offshore subtidal sands and gravels. Landings from the over-15m vessels are predominantly made into Peterhead (36% by value), unspecified Norwegian port(s) (13%) and Egersound (12%).

Seamount communities are in the western part of the proposed MPA in the seamount area, with burrowed mud, offshore deep sea muds, offshore subtidal sands and gravels in the central and eastern part. Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and based on JNCC recommendations. A lower scenario which does not exclude static gear use on seamount communities has also been included.

Non-UK VMS ping data indicate that 84 foreign vessels were active in the BHT area in 2012: 32 from Norway; 24 from Ireland; 11 from France; 8 from the Netherlands; 6 from Spain, and 1 from each of Denmark, the Faroe Islands and Germany. The majority are pelagic trawls or purse seines and therefore are unlikely to be affected by management measures under any scenario. There were 6 French vessels fishing with bottom trawl, 4 Irish vessels fishing with bottom trawl or seine; and 1 Danish vessel fishing with bottom trawl, which may be affected by the management measures assessed under all scenarios. Six Spanish vessels fish with nets, and could be impacted under the intermediate and upper scenarios. No information on gear types used by the Norwegian, Greenland or Faroe Islands vessels was available.

Information submitted by the French ministry indicated that 12 vessels in 2008, and 10 vessels in 2011, fished in the proposed MPA area. They were predominantly demersal trawlers, targeting anglerfish, black scabbardfish, grenadiers and hake, with catches worth €1.639 million (in 2011). The vessels originate from Lorient, Concarneau and Fécamp ports, but have their home ports at Lochinver, Lorient, Concarneau, Killybegs and Ijmuiden. 8% of their turnover is dependent on fishing in the proposed MPA area, and they account for 122 FTE jobs on board.

Provisional ScotMap data do not indicate any under-15m vessel activity in the BHT proposed MPA. The cost estimates for the under-15m sector may be overestimates, as the 'under-15m' length group in the ICES rectangle landings data may include cases where information on vessel length and/or administrative port is missing from landings returns.

Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.

GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.

It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Closure to mobile bottom contact gear across the lower scenario feature extent for the seamount. 	<ul style="list-style-type: none"> ▪ Closure to all bottom contact gear (static and mobile) (whitefish, nephrops and other trawls and seines, beam trawls, and dredges, nets, lines and pots) across a portion of the seamount area (down to 1500m) (for seamount communities); and ▪ Closure to mobile bottom contact gears (whitefish, nephrops and other trawls and seines, beam trawls, and dredges) across burrowed mud and offshore subtidal sands and gravels, excluding two depth-based fishing corridors (300-600m and 1200-1400m) where all gears are allowed. 	<ul style="list-style-type: none"> ▪ Closure to all bottom contact gear (static and mobile) (whitefish, nephrops and other trawls and seines, beam trawls, and dredges, nets, lines and pots) across the whole seamount area (for seamount communities); and ▪ Closure to mobile bottom contact gears (whitefish, nephrops and other trawls and seines, beam trawls, and dredges) across burrowed mud and offshore subtidal sands and gravels.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ None. ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.006). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (fewer than 5 vessels; value not presented). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.318) 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (fewer than 5 vessels; value not presented). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.432)
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using mobile bottom-contact gears in the proposed MPA (France (6 vessels), Ireland (4 vessels), Denmark (1 vessel), and possibly Norway (32 vessels) and Faroe Islands (1 vessel)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (France (6 vessels), Spain (6 vessels), Ireland (4 vessels), Denmark (1 vessel), and possibly Norway (32 vessels) and Faroe Islands (1 vessel)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (France (6 vessels), Spain (6 vessels), Ireland (4 vessels), Denmark (1 vessel), and possibly Norway (32 vessels) and Faroe Islands (1 vessel)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Total costs (2014–2033)	*	*	*
Average annual costs	*	*	*
Present value of total costs (2014–2033)	*	*	*
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.059	3.918	5.004
Average annual change to GVA	0.003	0.196	0.250
Present value of total change in GVA (2014–2033)	0.043	2.882	3.680
Direct and Indirect reduction in Employment	0.1 jobs	4.4 jobs	5.7 jobs
<p>* Value for non-VMS vessels only. VMS data represents less than 5 vessels and therefore cannot be disclosed. Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4b. Military			
[BHT]			
Five military practice areas: Fleet Exercise Area (PEXA X5501; miscellaneous fleet exercises) and four submarine exercise areas overlap with the BHT proposed MPA.			
The Fleet Exercise Area overlaps with burrowed mud, offshore deep sea muds, offshore subtidal sands and gravels, orange roughy and seamount communities (all scenarios). All submarine exercise areas overlap with burrowed mud and offshore deep sea muds (all scenarios). One submarine area also overlaps with offshore subtidal sands and gravels (all scenarios) whilst the fourth submarine area overlaps with orange roughy and seamount communities (all scenarios).			
The features proposed for designation which overlap with the military practice areas have not been described as vulnerable to MoD activities in this proposed MPA. It is assumed that management relating to MoD activity will be coordinated through the MoD's Maritime Environmental Sustainability Appraisal Tool (MESAT) which the MoD uses to assist in meeting its environmental obligations. This process will include operational guidance to reduce significant impacts of military activities on MPAs. It is assumed that the MoD will incur additional costs in adjusting MESAT and other MoD environmental assessment tools in order to consider whether its activities will impact on the conservation objectives of MPAs and also incur additional costs in adjusting electronic charts to consider MPAs. However, these costs will be incurred at national level and hence no site-specific cost assessments have been made.			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts			
Description of one-off costs	▪ See National Assessment.	▪ See National Assessment.	▪ See National Assessment.
Description of recurring costs			
Description of non-quantified costs			

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	See national costs	See national costs	See national costs
Average annual costs	See national costs	See national costs	See national costs
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Table 4c. Oil and Gas	[BHT]
The BHT proposed MPA encompasses two abandoned oil wells and a number of oil and gas licence blocks in quadrant 132 that were awarded to the Parkmead Group in the 27 th UKCS licensing round. Licence blocks 8, 9, 13 and 14 are located within the MPA boundary, while a small northerly section of the MPA proposal also overlaps with licence blocks 3 and 4 and blocks 18 and 19 overlap the southern section of the MPA proposal. Under all scenarios, feature extents for burrowed mud and offshore deep sea muds overlap with the awarded licence blocks.	

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks). 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks); ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; ▪ Micro-siting in areas of reduced seapen density using data held by JNCC and collected by operators; and ▪ Treat cuttings that use oil-based muds on site. 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks); ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; ▪ Micro-siting in areas of reduced seapen density using data held by JNCC and collected by operators; ▪ Micro-siting of infrastructure in areas of more representative habitat types for offshore deep sea muds and offshore subtidal sand and gravels using data held by JNCC and collected by operators; and ▪ Skip and ship drill cuttings.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Description of one-off costs	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (8 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (8 wells (2020)); and ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (8 wells (2020)). 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (8 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (8 wells (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (8 wells (2020)); and ▪ Micro-siting survey costs - £230k per well (8 wells (2020)). 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (8 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (8 wells (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (8 wells (2020)); ▪ Micro-siting survey costs - £230k per well (8 wells (2020)); and ▪ Skip and ship drill cuttings - £650k per well (8 wells (2020)).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.080	1.920	7.120
Average annual costs	0.004	0.096	0.356
Present value of total costs (2014–2033)	0.066	1.563	5.793
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA				[BHT]
Activity	Lower Estimate	Intermediate Estimate	Upper Estimate	
None identified.				

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA [BHT]	
Activity	Description
None identified.	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [BHT]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings: Cannot be disclosed for reasons of confidentiality. Annual Average Loss in GVA (direct and indirect*): Lower: <£0.01m Intermediate: £0.20m Upper: £0.25m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: xx (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.1 jobs Intermediate: 4.4 jobs Upper: 5.7 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (France (6 vessels), Spain (6 vessels), Ireland (4 vessels), Denmark (1 vessel), and possibly Norway (32 vessels) and Faroe Islands (1 vessel))	Not quantified		Employment – loss of foreign jobs from reduced landings.	

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [BHT]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
	Displacement Effects	Not quantified	<p>Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences:</p> <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited; ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		xx
Oil and Gas	Additional operational costs associated with licence and permit applications for new exploration development and decommissioning	<p>Quantified Cost Impact (2014–2033): £0.066 – 5.793m</p> <p>Decommissioning assessed at national level</p>	Future employment opportunities – reduced future employment opportunities if increased costs affect the economic viability of projects and lead to some projects not proceeding.		0
	Additional mitigation measures for new developments or decommissioning activities to support achievement of site conservation objectives	Not Quantified	<p>Future employment opportunities – reduced future employment opportunities if costs significant and render development projects unviable.</p> <p>This impact is uncertain and is only likely to arise under the upper scenario. JNCC’s current advice is that the intermediate scenario represents their best view on management requirements.</p>		xxx (under the upper scenario only)

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Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [BHT]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
	Costs associated with delays during the licensing and permitting process Loss of investor confidence (developments do not proceed)	Not Quantified	Employment – reduced future employment opportunities if delays deter investments. This impact is uncertain and is only likely to arise under the upper scenario. JNCC's current advice is that the intermediate scenario represents their best view on management requirements.		xxx (under the upper scenario only)
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [BHT]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries Reduction in landed value, GVA and employment	xx North-East West North-West	xx Largest employment impacts in: Fraserburgh (96%), Ayr (2%), Lochinver (2%)	xx Coastal Urban and Rural	xxx Potentially significant negative effect if parent loses job/becomes unemployed.	xxx Potentially significant negative effect if individuals lose job/become unemployed.	xx Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	xxx 0.1-6 job losses Potentially significant negative effect on individuals that lose job/become unemployed.	xxx Potentially significant negative effect if member of household loses job/becomes unemployed.
Fish Processors Reduction in local landings at landing ports	x North-West	x Kinlochbervie	x Coastal Urban and Rural	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [BHT]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: <15m Upper: <15m (may be over-estimate)	Cannot be identified for confidentiality reasons.	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Fish Processors Reduction in local landings at landing ports		Shellfish: x Demersal: xx Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

Potential Contribution of the Site to an Ecologically-Coherent Network

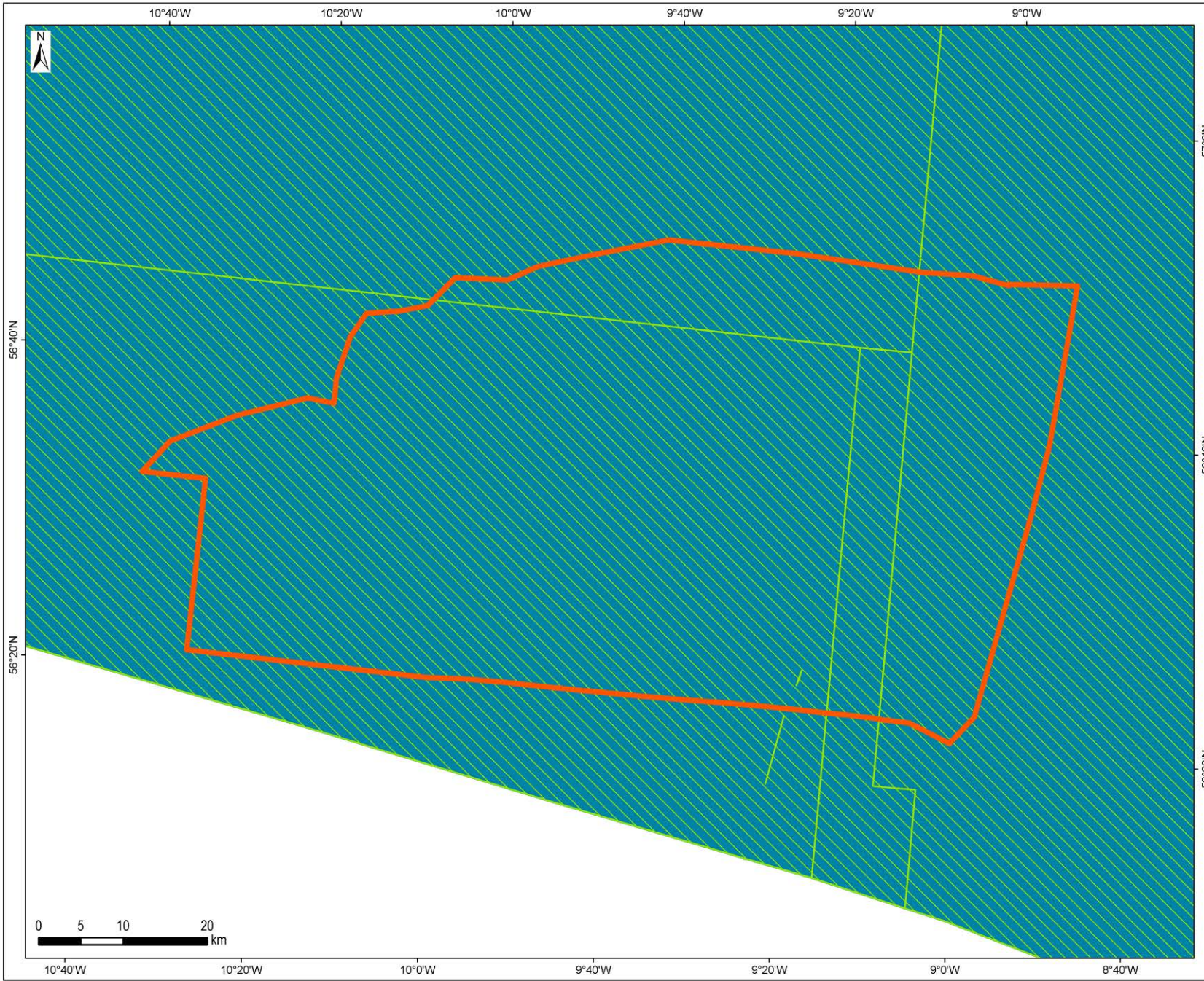
Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [BHT]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Burrowed mud	Provides representation for the seapens and burrowing megafauna type of burrowed mud in OSPAR Region V at the northern extent of its geographical range on the Hebridean slope.	Makes a contribution to one of at least two recommended areas of this type of burrowed mud in OSPAR Region V in Scotland's seas.	Not currently understood for burrowed mud.	Provides representation at the southern extent of its range on the continental slope and off the shelf in OSPAR Region V in Scotland's seas.	Burrowed mud is considered to be Threatened and/or Declining by the OSPAR Commission in OSPAR Region V so the MPA is expected to help increase resilience for the feature.
Offshore deep sea muds	Provides representation for Atlantic-influenced offshore deep sea mud habitats on the slope in OSPAR Region V.	Represents one of at least two examples of slope Atlantic-influenced offshore deep sea mud habitats recommended for protection in OSPAR Region V.	Not currently understood for offshore deep sea muds.	Provides representation of Atlantic influenced offshore deep sea muds at the southern extent of their range in OSPAR Region V.	Offshore deep sea muds are fairly widely recorded across offshore waters in Scotland's seas
Offshore subtidal sands and gravels	Provides representation for Atlantic-influenced offshore subtidal sand and gravel habitats predominantly on the slope in OSPAR Region V, but also to a small extent on the shelf in OSPAR Region III.	It represents one of at least two recommended examples of Atlantic influenced slope and shelf offshore, subtidal sand and gravel habitats to be protected in OSPAR Regions V and III respectively.	Not currently understood for offshore subtidal sands and gravels.	Provides representation at the southern extent of its range on the continental slope and on the shelf in OSPAR Regions V & III respectively in Scotland's seas.	Offshore subtidal sands and gravels are fairly widely recorded across offshore waters in Scotland's seas.
Orange roughy	Provides representation for the only area of significance to the life history of orange roughy in Scotland's seas – The Hebrides Terrace Seamount.	N/a - provides representation for the only area of significance to the life history of orange roughy in Scotland's seas – The Hebrides Terrace Seamount.	The Hebrides Terrace Seamount is considered an important spawning area for orange roughy in Scotland's seas.	N/a - provides representation for the only area of significance to the life history of orange roughy in Scotland's seas – The Hebrides Terrace Seamount.	Orange roughy are considered Threatened and/or Declining by the OSPAR Commission in OSPAR Region V so the MPA is expected to help increase resilience for the feature.

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [BHT]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Continental slope	The possible MPA provides representation for one of two recommended areas of the Scottish continental slope to be included within the MPA network.	The Hebridean slope is considered ecologically and hydrographically distinct to the Faroe-Shetland Channel slope and so the recommendation is for at least one example of each area of the slope to be included.	Not currently understood for the continental slope.	The Hebridean slope is considered ecologically and hydrographically distinct to the Faroe-Shetland Channel slope. This possible MPA represents one example of the Hebridean slope.	The continental slope occurs between Scotland's shelf and off-shelf environment.
Seamount communities	Provides representation for Seamount communities in OSPAR Region V.	Provides one of at least three recommended examples to be protected in Scotland's seas.	Not currently understood for seamount communities.	There are three seamounts recorded in Scotland's seas and these only occur within OSPAR Region V. MPA recommendations, considered alongside the existing MPA network, will mean the inclusion of all three seamounts in Scotland's seas in the resultant MPA network.	Seamount communities are considered to be Threatened and/or Declining by the OSPAR Commission in OSPAR Region V so the MPA is expected to help increase resilience for the feature.
Seamounts	Provides representation for Seamounts in OSPAR Region V.	Provides one of at least two recommended examples to be protected in Scotland's seas.	The Hebrides Terrace Seamount is considered to be of wider functional significance to the health and diversity of Scotland's seas, e.g. enhanced biodiversity resulting from mixing caused by the interaction between the seamount and oceanic currents; increased productivity, and as feeding grounds for fish and marine mammals.	There are three seamounts recorded in Scotland's seas and these only occur within OSPAR Region V. MPA recommendations, considered alongside the existing MPA network, will mean the inclusion of all three seamounts in Scotland's seas in the resultant MPA network.	Seamounts are only distributed in OSPAR Region V in Scotland's seas.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

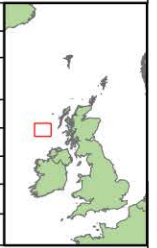
Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ¹⁸ [BHT]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Site fishing grounds are of moderate value.	Stocks not at MSY	Nil	Low – possible recovery of fish stocks in medium to long term. Features provide high level of supporting services to support recovery.	High. Annual landings from site substantial.	Nil - Low	Moderate	
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Nil - Low	Nil - Low	Nil, or at best a very low level of protection of parts of ecosystem providing these services			Low	Nil - Low	High
Natural hazard protection	Nil - Low	Nil - Low				Low	Nil - Low	High
Regulation of pollution	Nil - Low	Nil - Low				Low	Nil - Low	High
Non-use value of natural environment	Moderate - High, significant variety of protected features, and contribution of the site to MPA network, have non-use value	Non-use value of the site may decline	Nil, no change in key characteristics of site	Low – protection of key characteristics of site from minor decline	Moderate – protection of key characteristics of site from decline, and/or allowing some recovery of values	Moderate - High, variety and distinctiveness of features may have high non-use value	Nil - Moderate	Low
Recreation	Low	No activity	Nil			Low	Nil	Moderate
Research and Education	Moderate	Wide range of biological and geological features have research value	Nil, no change in key characteristics of site	Low - Moderate, protection of key characteristics of site from decline, improving future research opportunities		Low - Moderate	Nil - Moderate	Low
Total value of changes in ecosystem services			Low for lower scenario, moderate for upper scenarios				Nil - Moderate	Low

¹⁸ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



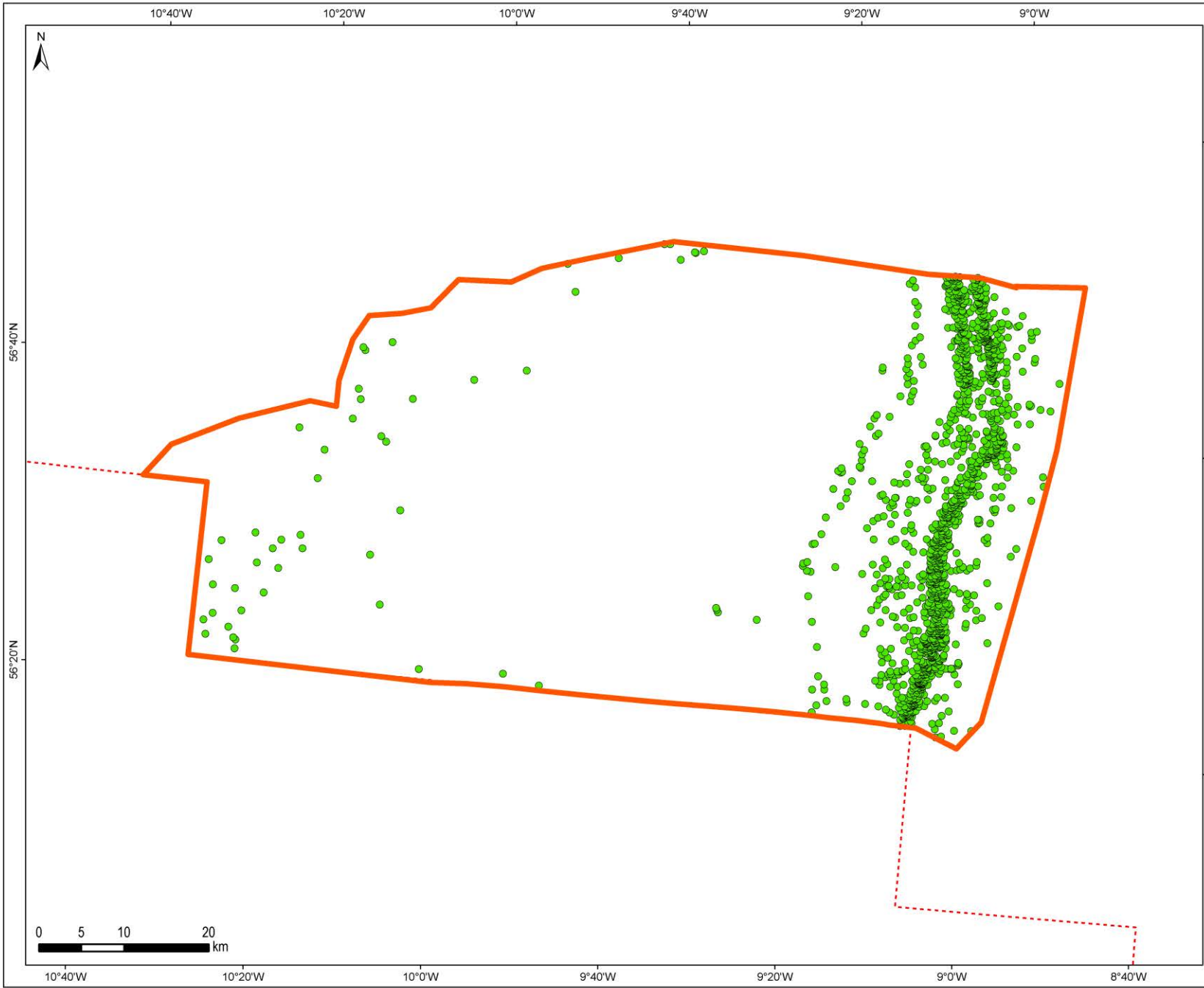
- Proposed Marine Protected Area
- UK Continental Shelf
- Military Practice Areas**
- Submarine Exercise Area
- Other Exercise Areas

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:615,000	
QA		FMM	
4136MPA_HA_Barra_Fan_Terrace.mxd			
Produced by ABPmer			



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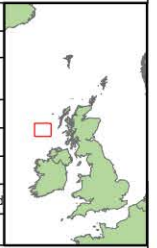
Human Activities which Occur within the Proposed MPA:
The Barra Fan and Hebridean Terrace Seamount



- Proposed Marine Protected Area
- UK Continental Shelf
- VMS Fishing Ping Data (2007 to 2011)
- All Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:615,000	
QA		FMM	
4136MPA_Fish_Barra_Fan_Terrace.mxd			
Produced by ABPmer			



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 Source: Scottish Government, 2013
 NOT TO BE USED FOR NAVIGATION

Fishing Activities which Occur within the Proposed MPA:
The Barra Fan and Hebridean Terrace Seamount

Central Fladen (CFL)

Site Area (km²): 709

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [CFL]					
Proposed protected features					
<p><i>Biodiversity Features</i> Burrowed mud – seapens and burrowing megafauna.</p> <p><i>Geodiversity Features</i> Quaternary of Scotland – sub-glacial tunnel valley.</p> <p><i>Site Description</i> The Central Fladen proposed MPA falls within the Fladen Grounds to the east of Scotland in the offshore waters of the northern North Sea. It encompasses areas of average and higher than average seapen densities by comparison to the wider Fladen Grounds based on available data.</p> <p><i>Potential Alternative Designations</i> JNCC have identified South-east Fladen and Western Fladen as science-based alternatives to the Central Fladen for representation of the seapens and burrowing megafauna burrowed mud habitat type. JNCC recommend that the southern part of the Central Fladen proposed MPA – ‘Central Fladen (core)’ – is still designated as it represents another type of burrowed mud (records of tall seapen).</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Burrowed mud – seapens and burrowing megafauna	All scenarios: 924.79	Yes (Marine Scotland Science surveys, 2001-2010; JNCC & Cefas survey data 2013; BGS data, 1980 & 1985)	Yes (Marine Scotland Science surveys, 2001-2010; JNCC & Cefas survey data 2013; BGS data, 1980 & 1985)	Low	Conserve (uncertain)
Geodiversity Features					
Quaternary of Scotland – sub-glacial tunnel valley	1.69	Yes (UK Admiralty charts; Olex database)	Yes (UK Admiralty charts; Olex database)	Low	Conserve (uncertain)
<p>Key: * Estimated area based on best available data</p> <p>References: Area of Feature: GeMS Confidence in biodiversity feature presence and extent: JNCC (2012a) Confidence in biodiversity feature condition: JNCC (2013) pers. comm. Confidence in geodiversity feature presence and extent: Brooks et al. (2012) Confidence in geodiversity feature condition: Brooks et al. (2012)</p>					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [CFL]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries*	0.000	3.026	6.022
Oil and Gas	0.025	0.600	2.224
Total Quantified Economic Costs	0.025	3.626	8.246
Non-Quantified Economic Costs			
Commercial Fisheries	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts.
Oil and Gas	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.

Note: For detailed information on economic cost impacts on activities, see Table 4.
 * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.

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Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [CFL]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	0.005	0.005
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.003	0.003	0.003
Total Quantified Public Sector Costs	0.003	0.008	0.008
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [CFL]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries - Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 6 jobs Upper: 13 jobs	North-East North-West East	Fraserburgh Peterhead Scarborough	Impacts concentrated in rural and urban coastal areas	Whitefish trawls Whitefish seines Nephrops trawls	Lower: N/A Upper: >15m	No Impact.	No breakdown of fisherman employment by ethnic origin.	Unlikely to be employed in fisheries.
If any oil and gas developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).										
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [CFL]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use value of natural environment	Low	Nil - Moderate
Other Benefits		
None identified.		
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [CFL]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Burrowed mud – seapens and burrowing megafauna	-	-	-	-	-	-	L/U	-	-	L/U	-	-	L/U	-	L/U	-	-
Geodiversity Features																	
Quaternary of Scotland – sub-glacial tunnel valley	Considered to have a low sensitivity to the pressures associated with activities they are currently exposed and likely to be exposed to in the future; thus, not considered in the context of management.																
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed protected feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed protected feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity) [CFL]			
<p>According to VMS-based estimates and ICES rectangle landings statistics, Nephrops trawls, whitefish trawls, whitefish seines, other trawls and pelagic trawls (over-15m) and nephrops trawls, whitefish trawls, pelagic trawls, other seines, and lines (under-15m vessels) operate within the CFL proposed MPA (UK vessels). The value of catches from the CFL area was £1,120,000 (over-15m vessels) and £24,200 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m fleet are predominantly made into Peterhead (48% by value) (demersals and shellfish) and Fraserburgh (45%) (pelagics, shellfish and some demersals). For the over-15m fleet, nephrops and whitefish trawlers operate across the proposed MPA.</p> <p>Information submitted by Copeche indicated that French vessels operate in the CFL proposed MPA, but no information was provided on numbers of vessels or value of catches. Non-UK VMS ping data indicate that 31 non-UK vessels were active in the CFL area in 2012: 11 from Norway; 9 from Denmark; 7 from the Netherlands; 2 from Germany and 2 from France. The Dutch and German vessels fish with pelagic gear (pelagic trawls and purse seines) and therefore are unlikely to be affected by management measures. However, most of the Danish and French vessels fish with mobile bottom contact gear (6 Danish bottom trawl vessels; 1 French bottom trawl vessel) and therefore may be affected by management measures under the intermediate and upper scenarios. No information on gear types used by the Norwegian vessels was available.</p> <p>Provisional ScotMap data do not indicate any under-15m vessel activity in the CFL proposed MPA. The cost estimates for the under-15m sector may be overestimates, as the 'under-15m' length group in the ICES rectangle landings data may include cases where information on vessel length and/or administrative port is missing from landings returns.</p> <p>Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and based on JNCC recommendations.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No additional management. 	<ul style="list-style-type: none"> ▪ Reduce mobile bottom contact gears (whitefish, nephrops and other trawls and seines, beam trawls, and dredges) pressure by 50% across the burrowed mud (seapens and burrowing megafauna) feature. 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom contact gear (whitefish, nephrops and other trawls and seines, beam trawls, and dredges) across the whole proposed MPA extent.

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Description of one-off costs	▪ None.	▪ None.	▪ None.
Description of recurring costs	▪ None.	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (0.257); ▪ Nephrops trawls (0.286); and ▪ Other affected gears (0.006). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.007); and ▪ Other affected gears (0.002). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (0.514); ▪ Nephrops trawls (0.572); and ▪ Other affected gears (0.013). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.015); and ▪ Other affected gears (0.004).
Description of non-quantified costs	▪ None.	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using mobile bottom-contact gears in the proposed MPA (Denmark (6 vessels), France (1 vessel), and possibly Norway (11 vessels)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using mobile bottom-contact gears in the proposed MPA (Denmark (6 vessels), France (1 vessel), and possibly Norway (11 vessels)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	11.172	22.345
Average annual costs	0.000	0.559	1.117
Present value of total costs (2014–2033)	0.000	8.217	16.434
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.000	4.114	8.187
Average annual change to GVA	0.000	0.206	0.409
Present value of total change in GVA (2014–2033)	0.000	3.026	6.022
Direct and Indirect reduction in Employment	0.0 jobs	6.4 jobs	12.7 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4b. Oil and Gas **[CFL]**

Two pipelines (PL6N and PL7N) overlap with feature extents for seapens and burrowing megafauna under all scenarios within the CFL proposed MPA boundary. One well (14/04-1) overlaps with feature extents for seapens and burrowing megafauna under all scenarios.

One licence block, Block 7/30, awarded in the 26th UK oil and gas licensing round, overlaps with seapens and burrowing megafauna under all scenarios (lower, intermediate, upper) within the CFL proposed MPA boundary. Another two blocks were awarded during the 27th licensing round, two of which also overlap with feature extents for seapens and burrowing under all scenarios. None of the awarded blocks are wholly within the MPA proposal boundary.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks). 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks); ▪ Micro-siting in areas of reduced seapen density using data held by JNCC and collected by operators; ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; and ▪ Treat cuttings that use oil-based muds on site. 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks); ▪ Micro-siting in areas of reduced seapen density using data held by JNCC and collected by operators; ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; and ▪ Skip and ship drill cuttings.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (1 well (2016) and 2 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (1 well (2018) and 2 wells (2020)); and ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (1 well (2018) and 2 wells (2020)). 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (1 well (2016) and 2 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (1 well (2018) and 2 wells (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (1 well (2018) and 2 wells (2020)); and ▪ Micro-siting survey costs - £230k per well (1 well (2018) and 2 wells (2020)). 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (1 well (2016) and 2 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (1 well (2018) and 2 wells (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k 4k per well (1 well (2018) and 2 wells (2020)); ▪ Micro-siting survey costs - £230k per well (1 well (2018) and 2 wells (2020)); and

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
			<ul style="list-style-type: none"> ▪ Skip and ship drill cuttings - £650k per well (1 well (2018) and 2 wells (2020)).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.030	0.720	2.670
Average annual costs	0.002	0.036	0.134
Present value of total costs (2014–2033)	0.025	0.600	2.224
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA				[CFL]
Activity	Lower Estimate	Intermediate Estimate	Upper Estimate	
None identified.				

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA		[CFL]
Activity	Description	
Recreational Boating	One RYA cruising route (Kilmelford Yacht Haven) overlaps with the burrowed mud (seapens and burrowing megafauna) feature of the CFL proposed MPA under all scenarios (lower, intermediate and upper) for a length of 15km. It is unlikely there would be a significant interaction between the burrowed mud feature and recreational boating and, therefore, no cost impacts are expected.	
Telecom Cables	One operational telecom cable (TAT 10B East Section) overlaps with the burrowed mud (seapens and burrowing megafauna) feature of the CFL proposed MPA under all scenarios (lower, intermediate and upper)..However, no cost impacts are expected as the proposed MPA is located beyond the 12 nautical mile threshold (within which licences are required for cables).	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [CFL]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.00m Intermediate: £0.56m Upper: £1.12m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: £0.21m Upper: £0.41m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: xx (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 6.4 jobs Upper: 12.7 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (6 vessels), France (1 vessel), and possibly Norway (11 vessels))	Not quantified		Employment – loss of foreign jobs from reduced landings.	

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	Displacement Effects	Not quantified	<p>Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences:</p> <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited; ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		xx
Oil and Gas	Additional operational costs associated with licence and permit applications for new exploration development and decommissioning	<p>Quantified Cost Impact (2014–2033): £0.025 – 2.224m</p> <p>Decommissioning assessed at national level</p>	Future employment opportunities – reduced future employment opportunities if increased costs affect the economic viability of projects and lead to some projects not proceeding.		0
	Additional mitigation measures for new developments or decommissioning activities to support achievement of site conservation objectives	Not Quantified	<p>Future employment opportunities – reduced future employment opportunities if costs significant and render development projects unviable.</p> <p>This impact is uncertain and is only likely to arise under the upper scenario. JNCC's current advice is that the intermediate scenario represents their best view on management requirements.</p>		xxx (under the upper scenario only)
	Costs associated with delays during the	Not Quantified	Employment – reduced future employment opportunities if delays deter investments.		xxx (under the upper scenario only)

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	licensing and permitting process Loss of investor confidence (developments do not proceed)		This impact is uncertain and is only likely to arise under the upper scenario. JNCC's current advice is that the intermediate scenario represents their best view on management requirements.		
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [CFL]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries Reduction in landed value, GVA and employment	xx North-East North-West (and Scarborough, Belfast)	xx Largest employment impacts in: Fraserburgh (48%), Peterhead (33%), Scarborough (6%)	xx Coastal Urban and Rural	xxx Potentially significant negative effect if parent loses job/becomes unemployed.	xxx Potentially significant negative effect if individuals lose job/become unemployed	xx Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	xxx 0-13 job losses Potentially significant negative effect on individuals that lose job/become unemployed.	xxx Potentially significant negative effect if member of household loses job/becomes unemployed.
Fish Processors Reduction in local landings at landing ports	x North-East North	x Peterhead Fraserburgh Lerwick	x Coastal Island and Urban	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [CFL]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: >15m	Whitefish trawls Whitefish seines Nephrops trawls	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Fish Processors Reduction in local landings at landing ports		Shellfish: xxx Demersal: xxx Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario								

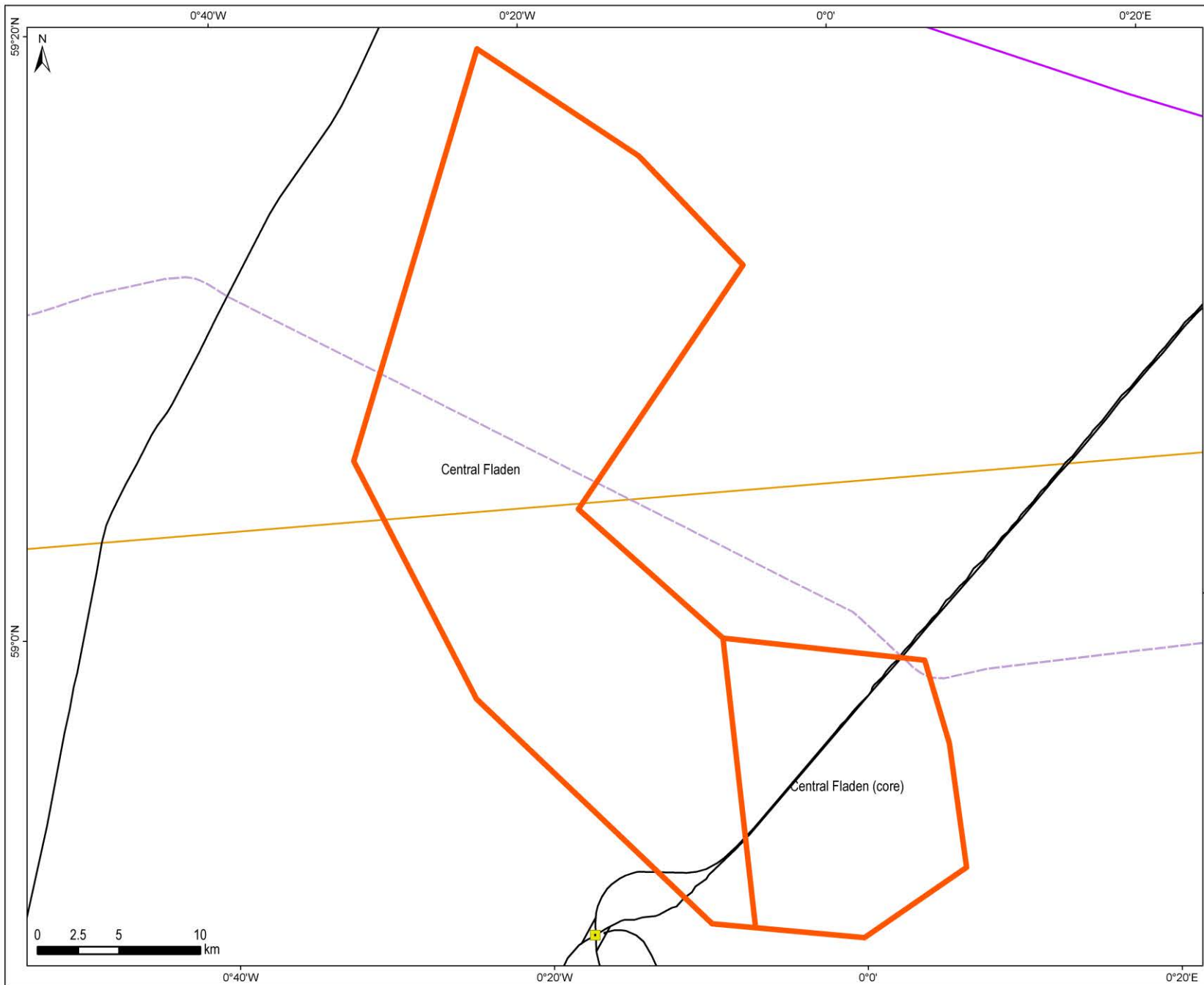
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [CFL]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Burrowed mud	Provides representation of burrowed mud (seapens and burrowing megafauna) in offshore waters of OSPAR Region II in Scotland's seas.	Provides one of at least three examples of these two types of burrowed mud to be protected in Scotland's seas.	Not well understood for burrowed mud.	Provides representation of burrowed mud (seapens and burrowing megafauna) in offshore waters of OSPAR Region II in Scotland's seas.	Burrowed mud is considered to be Threatened and/or Declining by the OSPAR Commission in OSPAR Region II, so the MPA is expected to help increase resilience for the feature.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

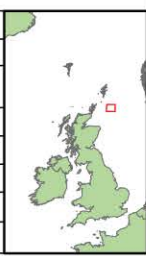
Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ¹⁹ [CFL]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Stocks not at MSY	Nil	Minimal - Low. Potential increase in fish populations in medium/long term. Features provide low level of supporting services to support recovery.	Low – potential increase in fish populations in medium/long term. Features provide low level of supporting services to support recovery.	Moderate	Nil - Low	Low - Moderate
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Nil - Low	Nil - Low	Nil or minimal provision of these services.			Low	Nil - Minimal	High
Natural hazard protection	Nil - Low	Nil - Low				Low	Nil - Minimal	High
Regulation of pollution	Nil - Low	Nil - Low				Low	Nil - Minimal	High
Non-use value of natural environment	Low, burrowed mud provides some non-use value	Low - Moderate, does support marine biodiversity	Nil	Minimal	Low - Moderate	Minimal	Nil - Moderate	High
Recreation	Low	Low	Nil – recreation mainly sailing and will not be affected			Low	Low	High
Research and Education	Minimal	Minimal	Nil, no change in key characteristics of site	Minimal - Low		Minimal	Nil - Low	Low
Total value of changes in ecosystem services			Provides low value of benefits across all services				Low - Moderate	Low

¹⁹ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



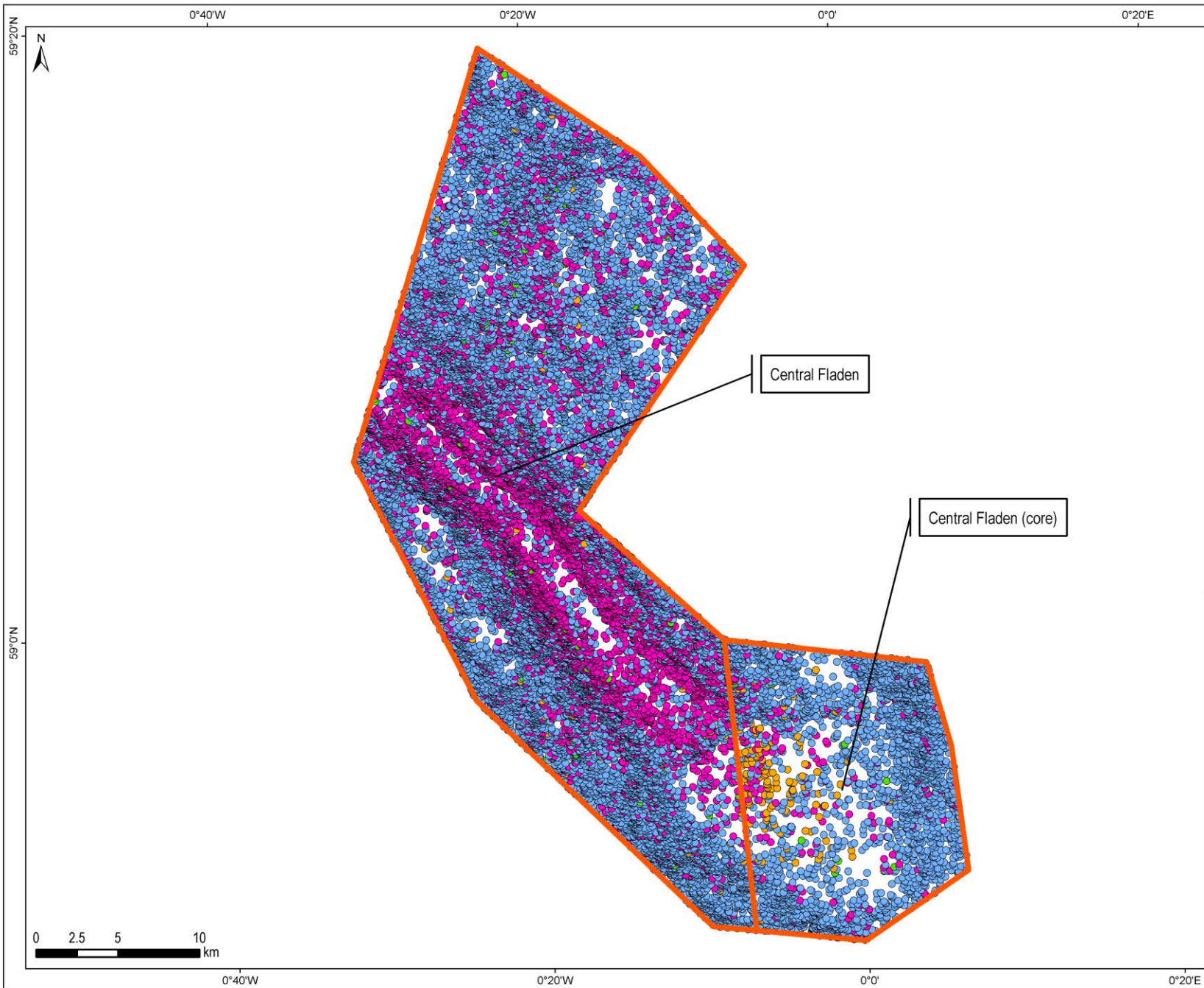
- Proposed Marine Protected Area
- UK Continental Shelf
- Telecommunication Cables**
- Subsea Telecomms Cables
- Active
- Out of Service
- Oil & Gas**
- Platforms
- Pipelines
- Recreational Boating**
- RYA Cruising Routes
- Light

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:320,000	
QA		FMM	
4136MPA_HA_Central_Fladen.mxd			
Produced by ABPmer			



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Human Activities which Occur within the Proposed MPA:
Central Fladen



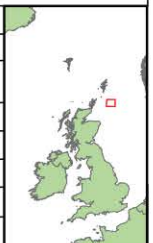
Proposed Marine Protected Area

VMS Fishing Ping Data (2007 to 2011)

- Whitefish Trawls
- Whitefish Seines
- Nephrops Trawls
- Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:320,000	
QA		FMM	
4136MPA_Fish_Central_Fladen.mxd			
Produced by ABPmer			



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Data Source: Scottish Government, 2013
NOT TO BE USED FOR NAVIGATION

Fishing Activities which Occur within the Proposed MPA:
Central Fladen

Central Fladen (core) (CFL(core))

Site Area (km²): 216

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [CFL(core)]					
Proposed protected features					
<p><i>Biodiversity Features</i> Burrowed mud –tall seapen.</p> <p><i>Geodiversity Features</i> Quaternary of Scotland – sub-glacial tunnel valley.</p> <p><i>Site Description</i> The Central Fladen (core) proposed MPA site is a smaller offshore site compared to the Central Fladen proposed MPA within the Fladen Grounds to the east of the Orkney Islands. The site represents a new search location from the Fladen Grounds Broad Search Area.</p> <p><i>Potential Alternative Designations</i> JNCC have identified science-based alternatives to the Central Fladen site as representative of the burrowed mud biodiversity feature within the MPA proposal. JNCC recommend that the southern (core) part of Central Fladen is designated as it represents the tall seapen, a different component of burrowed mud, although the rest of Central Fladen, Western Fladen or South-east Fladen could be designated to represent other burrowed mud components.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Burrowed mud – tall seapen	Lower: 48.64 Intermediate: 48.64 Upper: 215.56	Yes (UK SeaMap, 2010; Marine Scotland Science surveys, 2001-2010; BGS data, 1980 & 1985)	Yes (UK SeaMap, 2010; Marine Scotland Science surveys, 2001-2010; BGS data, 1980 & 1985)	Low	Conserve (uncertain)
Geodiversity Features					
N/A					
<p>Key: * Estimated area based on best available data References: Area of Feature: GeMS Confidence in biodiversity feature presence and extent: JNCC (2012a) Confidence in biodiversity feature condition: JNCC (2013) pers. comm.</p>					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [CFL(core)]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries*	0.000	0.666	1.176
Oil and Gas	0.033	0.781	2.897
Total Quantified Economic Costs	0.033	1.447	4.073
Non-Quantified Economic Costs			
Commercial Fisheries	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts.
Oil and Gas	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.
<p>Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>			

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Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [CFL(core)]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	0.005	0.005
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.003	0.003	0.003
Total Quantified Public Sector Costs	0.003	0.008	0.008
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [CFL(core)]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries - Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 1 job Upper: 2 jobs	North East North East North East East	Peterhead, Fraserburgh, Buckie Scarborough	Impacts concentrated in rural and urban coastal areas	Whitefish trawls, Nephrops trawls, Whitefish seines	Lower: N/A Upper: >15m	No Impact.	No breakdown of fisherman employment by ethnic origin.	Unlikely to be employed in fisheries.
If any oil and gas developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).										
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive)			[CFL(core)]
Benefit	Description		
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits	
Non-use value of natural environment	Low	Nil - Moderate	
Other Benefits			
None identified.			
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).			

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [CFL(core)]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Burrowed mud – tall seapen	-	-	-	-	-	-	L/U	-	-	L/U	-	-	-	-	U	-	-
Geodiversity Features																	
N/A																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity)				[CFL(core)]
<p>According to VMS-based estimates and ICES rectangle landings statistics, Nephrops trawls, whitefish trawls and seines, and pelagic trawls (over-15m) and whitefish trawls, nephrops trawls and other gears (pelagic trawls, other seines, and lines) (under-15m vessels) operate within the CFL (Core) proposed MPA. The value of catches from the CFL (Core) area was £217,000 (over-15m vessels) and £11,000 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m fleet are made predominantly into Fraserburgh (55% by value) and Peterhead (33%), and a smaller amount to Ijmuiden, The Netherlands (8%). For the over-15m fleet, nephrops trawlers operate in particular across the proposed MPA.</p> <p>Information submitted by Copeche indicated that French vessels operate in the CFL proposed MPA, but no information was provided on numbers of vessels or value of catches. Foreign VMS ping data indicate that 25 non-UK vessels were active in the CFL (core) area in 2012: 11 from Denmark; 5 from the Netherlands; 5 from Norway, 2 from Germany, 1 from France and 1 from Sweden. The Swedish, Dutch and German vessels fish with pelagic gear (pelagic trawls and purse seines) and therefore would not be affected by proposed management measures. However, most of the Danish and French vessels fish with mobile bottom gear (beam trawls, bottom trawls) and therefore would be impacted by the management measures assessed under the intermediate and upper scenarios. No information on gear types used by the Norwegian vessels was available.</p> <p>Provisional ScotMap data do not indicate any under-15m vessel activity in the CFL (core) proposed MPA. The cost estimates for the under-15m sector may be overestimates, as the 'under-15m' length group in the ICES rectangle landings data may include cases where information on vessel length and/or administrative port is missing from landings returns.</p> <p>Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and based on JNCC recommendations.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No additional management. 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom contact gear (whitefish, nephrops and other trawls and seines, beam trawls, and dredges) across the tall seapen area; and 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom contact gear (whitefish, nephrops and other trawls and seines, beam trawls, and dredges) across the whole CFL (core) area. 	

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
		<ul style="list-style-type: none"> ▪ Reduce mobile bottom contact gears (whitefish, nephrops and other trawls and seines, beam trawls, and dredges) pressure by 50% across the remaining area. 	
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (0.015); ▪ Whitefish seines (0.012); ▪ Nephrops trawls (0.085). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.004); ▪ Other affected gears (0.001). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (0.027); ▪ Whitefish seines (0.024); ▪ Nephrops trawls (0.147). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.007); ▪ Other affected gears (0.001).
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (8 vessels), France (1 vessel), and possibly Norway (5 vessels)); ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (8 vessels), France (1 vessel), and possibly Norway (5 vessels)); ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	2.344	4.106
Average annual costs	0.000	0.117	0.205
Present value of total costs (2014–2033)	0.000	1.724	3.020
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.000	0.906	1.599
Average annual change to GVA	0.000	0.045	0.080
Present value of total change in GVA	0.000	0.666	1.176

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
(2014–2033)			
Direct and Indirect reduction in Employment	0.0 jobs	1.0 jobs	2.3 jobs
<p>* Due to data confidentiality, the value of catches from some of the affected gear types has been summed together with other gear types that are not expected to be impacted by management measures. The cost impact on 'Other gears' is therefore an overestimate of the actual expected impact from the proposed management measures. Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4b. Oil and Gas	[CFL(core)]
Two pipelines (PL6N and PL7N) overlap with feature extents for tall seapens under the upper scenario only within the CFL(core) proposed MPA boundary.	
Four licence blocks were awarded during the 27 th licensing round, all of which overlap with feature extents for tall seapens under all scenarios. None of the awarded blocks are wholly within the MPA proposal boundary. There are no significant discoveries within the awarded blocks.	

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only(as no significant discoveries present within awarded blocks). 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only(as no significant discoveries present within awarded blocks); ▪ Micro-siting in areas of reduced seapen density using data held by JNCC and collected by operators; ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; and ▪ Treat cuttings that use oil-based muds on site. 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only(as no significant discoveries present within awarded blocks); ▪ Micro-siting in areas of reduced seapen density using data held by JNCC and collected by operators; ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; and ▪ Skip and ship drill cuttings.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (4 wells (2018)); ▪ Assessment Phase 2: drilling and 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (4 wells (2018)); ▪ Assessment Phase 2: drilling and 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (4 wells (2018)); ▪ Assessment Phase 2: drilling and

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
	exploration; consultancy fees and additional operator staff input - £4k per well (4 wells (2020)); and ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (4 wells (2020)).	exploration; consultancy fees and additional operator staff input - £4k per well (4 wells (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (4 wells (2020)); and ▪ Micro-siting survey costs - £230k per well (4 wells (2020)).	exploration; consultancy fees and additional operator staff input - £4k per well (4 wells (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (4 wells (2020)); ▪ Micro-siting survey costs - £230k per well (4 wells (2020)); and ▪ Skip and ship drill cuttings - £650k per well (4 wells (2020)).
Description of recurring costs	▪ None.	▪ None.	▪ None.
Description of non-quantified costs	▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.	▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.	▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.040	0.960	3.560
Average annual costs	0.002	0.048	0.178
Present value of total costs (2014–2033)	0.033	0.781	2.897
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA				[CFL(core)]
Activity	Lower Estimate	Intermediate Estimate	Upper Estimate	
None identified.				

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA		[CFL(core)]
Activity	Description	
Telecom Cables	One operational telecom cable overlaps with burrowed mud – tall seapen under the upper scenario only within the CFL(core) proposed MPA boundary. However, no cost impacts are foreseen as the site is located beyond the 12 nautical mile threshold (within which licences are required for cables).	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs					[CFL(core)]
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.00m Intermediate: £0.12m Upper: £0.21m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: £0.05m Upper: £0.08m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: xx (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and direct)	Job Losses*: Lower: 0.0 jobs Intermediate: 1.0 jobs Upper: 2.3 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas	
	Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (8 vessels), France (1 vessel), and possibly Norway (5 vessels))	Not quantified		Employment – loss of foreign jobs from reduced landings.	

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	Displacement Effects	Not quantified	<p>Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences:</p> <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited; ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption. ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		xx
Oil and Gas	Additional operational costs associated with licence and permit applications for new exploration development and decommissioning	<p>Quantified Cost Impact (2014–2033): £0.033 – 2.897m</p> <p>Decommissioning assessed at national level</p>	Future employment opportunities –reduced future employment opportunities if increased costs affect the economic viability of projects and lead to some projects not proceeding.		0
	Additional mitigation measures for new developments or decommissioning activities to support achievement of site conservation objectives	Not Quantified	<p>Future employment opportunities – reduced future employment opportunities if costs significant and render development projects unviable.</p> <p>This impact is uncertain and is only likely to arise under the upper scenario. JNCC’s current advice is that the intermediate scenario represents their best view on management requirements.</p>		xxx (under the upper scenario only)
	Costs associated with delays during the	Not Quantified	Employment – reduced future employment opportunities if delays deter investments		xxx (under the upper scenario)

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	licensing and permitting process Loss of investor confidence (developments do not proceed)		This impact is uncertain and is only likely to arise under the upper scenario. JNCC's current advice is that the intermediate scenario represents their best view on management requirements.		only)
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [CFL(core)]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries	xx	xx	xx	xxx	xxx	xx	xxx	xxx
Reduction in landed value, GVA and employment	North-East (and Scarborough)	Largest employment impacts in: Fraserburgh (61%), Peterhead (17%), Buckie (11%), Scarborough (6%).	Coastal Urban and Rural	Potentially significant negative effect if parent loses job/becomes unemployed.	Potentially significant negative effect if individuals lose job/become unemployed.	Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0-2 job losses Potentially significant negative effect on individuals that lose job/ become unemployed.	Potentially significant negative effect if member of household loses job/ becomes unemployed.
Fish Processors	x	x	x	0	0	0	0	0
Reduction in local landings at landing ports	North-East	Fraserburgh Peterhead	Coastal Urban					
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [CFL(core)]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: >15m	Whitefish trawls Nephrops trawls Whitefish seines	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Fish Processors Reduction in local landings at landing ports		Shellfish: xx Demersal: xx Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

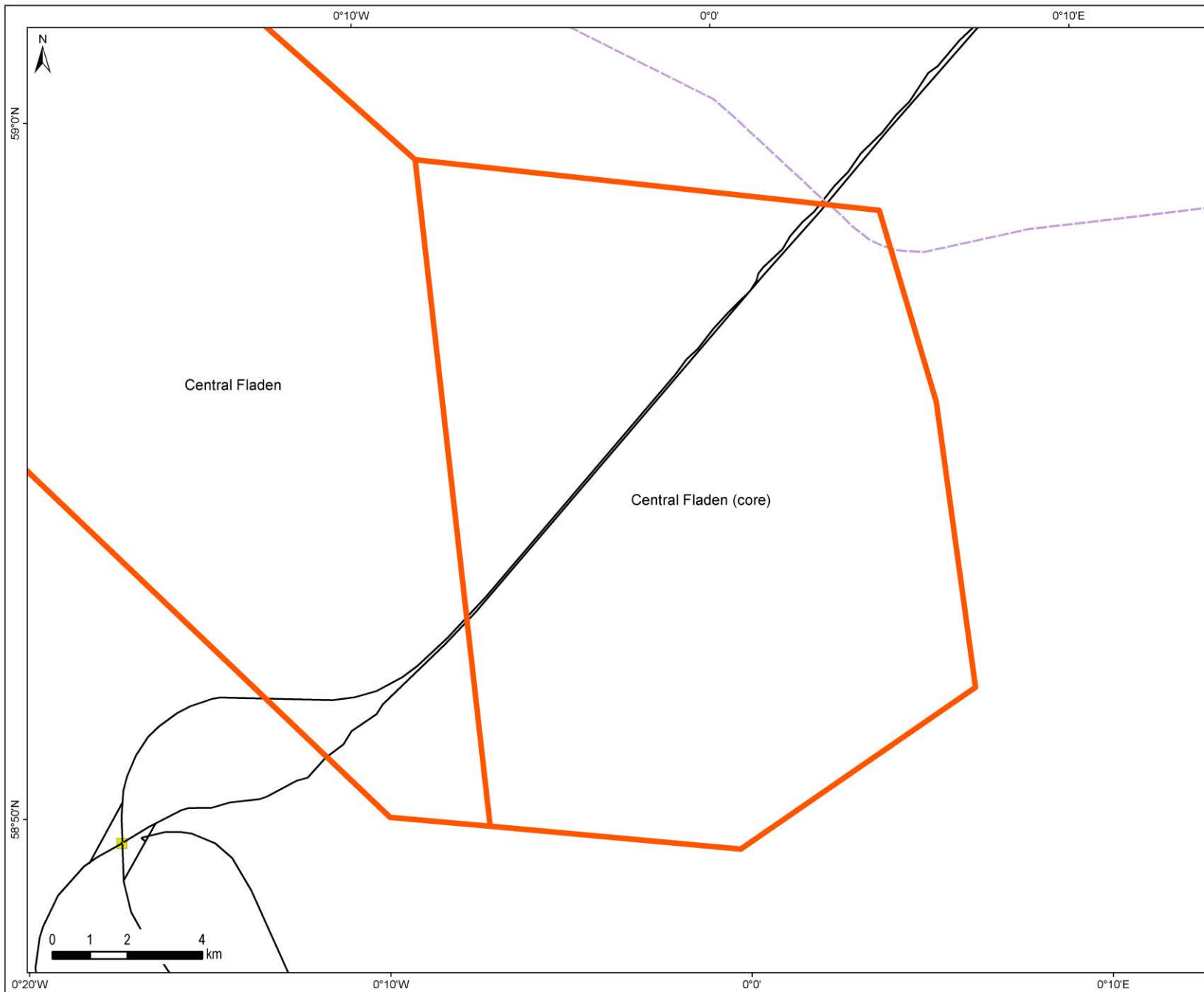
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [CFL(core)]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Burrowed mud	Provides representation of burrowed mud (seapens and burrowing megafauna) in offshore waters of OSPAR Region II in Scotland's seas.	Provides one of at least three examples of these two types of burrowed mud to be protected in Scotland's seas.	Not well understood for burrowed mud.	Provides representation of burrowed mud (seapens and burrowing megafauna) in offshore waters of OSPAR Region II in Scotland's seas.	Burrowed mud is considered to be Threatened and/or Declining by the OSPAR Commission in OSPAR Region II, so the MPA is expected to help increase resilience for the feature.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

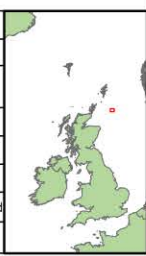
Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ²⁰ [CFL(core)]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Stocks not at MSY	Nil	Low - Small recovery of fish stocks in medium to long term. Features provide low level of supporting services to support recovery.	Moderate recovery of fish stocks in medium to long term. Features provide low level of supporting services to support recovery.	Low – Site fishing grounds are of low value.	Nil - Low	Low
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Nil - Low	Nil - Low	Nil, or at best a very low level of protection of parts of ecosystem providing these services			Low	Nil - Low	High
Natural hazard protection	Nil - Low	Nil - Low				Low	Nil - Low	High
Regulation of pollution	Nil - Low	Nil - Low				Low	Nil - Low	High
Non-use value of natural environment	Low, burrowed mud provides some non-use value	Low - Moderate, does support marine biodiversity	Nil	Minimal	Low - Moderate	Minimal	Nil - Moderate	High
Recreation	Nil	Nil	Nil	Nil		Low	Low	High
Research and Education	Moderate	Biological and geological features have research value but there are substitutes	Nil, no change in key characteristics of site	Low – protection of key characteristics of site from decline, improving future research opportunities		Low	Nil - Low	Low
Total value of changes in ecosystem services			Fishing dominates the values. Likely to deliver low level benefits for intermediate scenario and moderate for upper level scenario				Nil - Low	Low

²⁰ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



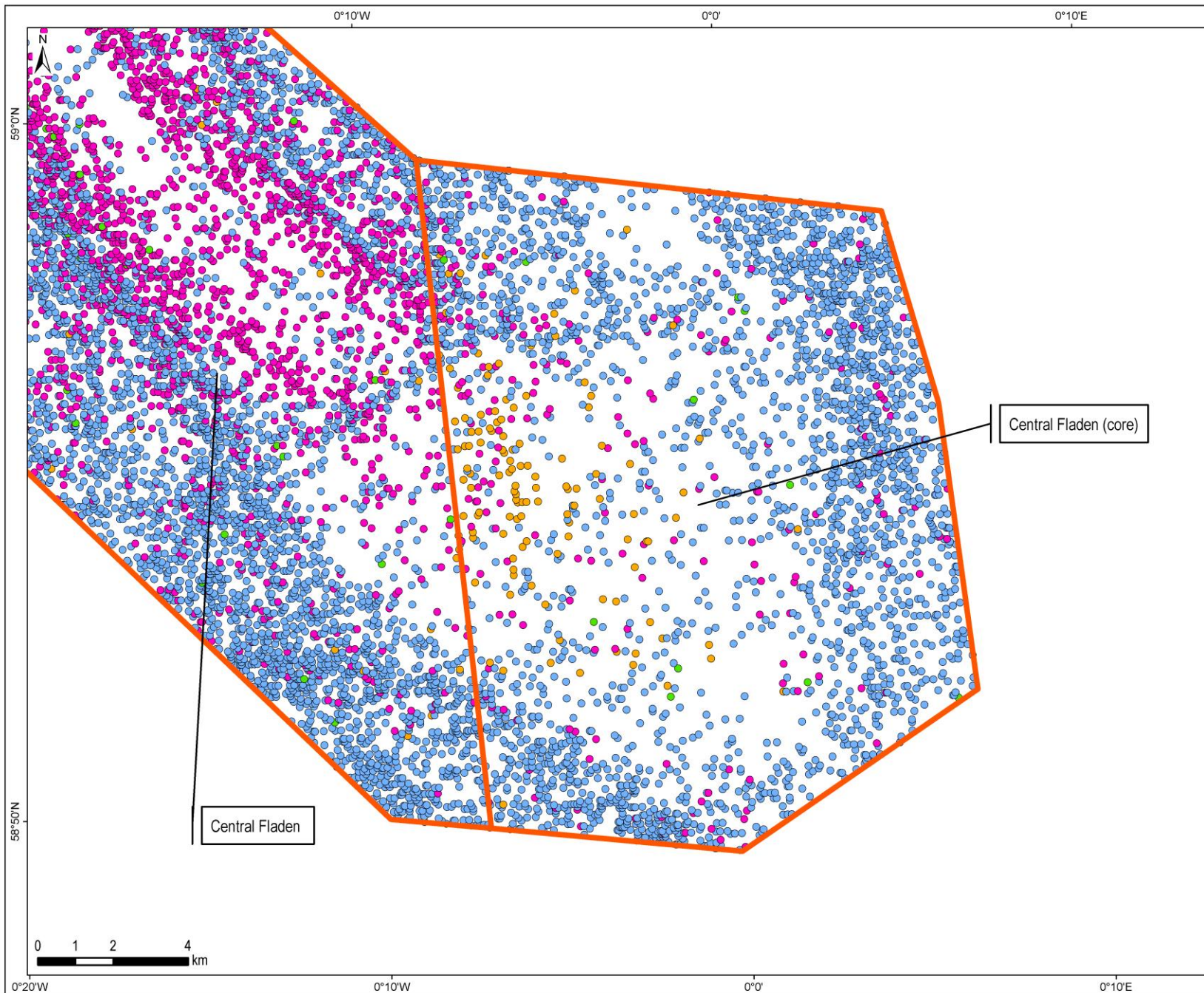
- Proposed Marine Protected Area
- Telecommunication Cables**
- Subsea Telecomms Cables
- Out of Service
- Oil & Gas**
- Pipelines
- Platforms

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:140,000	
QA		FMM	
4136MPA_HA_Central_Fladen_core.mxd			
Produced by ABPmer			



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Human Activities which Occur within the Proposed MPA:
Central Fladen Core



Proposed Marine Protected Area

VMS Fishing Ping Data (2007 to 2011)

- Whitefish Trawls
- Whitefish Seines
- Nephrops Trawls
- Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:140,000	
QA		FMM	
4136MPA_Fish_Central_Fladen_core.mxd			
Produced by ABPmer			



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Data Source: Scottish Government, 2013
NOT TO BE USED FOR NAVIGATION

Fishing Activities which Occur within the Proposed MPA:
Central Fladen Core

East of Gannet & Montrose Fields (EGM)

Site Area (km²): 1,838

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [EGM]					
Proposed protected features					
<i>Biodiversity Features</i> Ocean quahog aggregations (including offshore subtidal sands and gravels), offshore deep sea muds.					
<i>Geodiversity Features</i> None					
<i>Site Description</i> The East of Gannet and Montrose Fields MPA proposal is an offshore site located to the east of Aberdeen, south of the Norwegian Boundary Sediment Plain MPA proposal.					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Ocean quahog aggregations (including offshore subtidal sands and gravels)	All scenarios: 1839.18	Yes (BP and Shell Oil and Gas EIA surveys, 1990-2000)	Partial – Offshore subtidal sand and gravel habitats present considered suitable habitat for ocean quahog	Low	Conserve (uncertain)
Offshore deep sea muds	All scenarios: 230.13	Yes (UK SeaMap, 2010; BGS and Marine Scotland Science PSA, provided 2012 & 2001-2011)	Partial – largely based on predictive habitat mapping information	Low	Conserve (uncertain)
Geodiversity Features					
N/A					
Key: * Estimated area based on best available data References: Area of Features: GeMS Confidence in biodiversity feature presence and extent: JNCC (2012b) Confidence in biodiversity feature condition: JNCC (2013) pers. comm. Confidence in geodiversity feature presence and extent: Brooks et al. (2012) Confidence in geodiversity feature condition: Brooks et al. (2012)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [EGM]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries*	0.000	0.254	1.226
Oil and Gas	0.225	0.225	35.021
Total Quantified Economic Costs	0.225	0.479	36.247
Non-Quantified Economic Costs			
Commercial Fisheries	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts.
Oil and Gas	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.
Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.			

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Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [EGM]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	0.005	0.005
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.022	0.022	0.022
Total Quantified Public Sector Costs	0.022	0.027	0.027
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [EGM]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 0.5 jobs Upper: 3 jobs	North East North East North East	Buckie Peterhead Fraserburgh	Impacts concentrated in rural urban coastal areas	Whitefish trawls Nephrops trawls Whitefish seines	Lower: N/A Upper: >15m	No Impact.	No breakdown of fisherman employment by ethnic origin.	Unlikely to be employed in fisheries.
If any oil and gas developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).										
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive)			[EGM]
Benefit	Description		
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits	
Non-use of natural environment	Low - Moderate. Some features protected by site have non-use values.	Nil - Moderate	
Other Benefits			
None identified.			
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).			

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [EGM]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Ocean quahog aggregations (including offshore subtidal sands and gravels)	-	-	-	-	L/I/U	-	L/I/U	-	-	L/I/U	-	-	-	-	-	-	-
Offshore deep sea muds	-	-	-	-	L/I/U	-	L/I/U	-	-	L/I/U	-	-	-	-	-	-	-
Geodiversity Features																	
N/A																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed protected feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed protected feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity) [EGM]			
<p>According to VMS-based estimates and ICES rectangle landings statistics, Nephrops trawls, whitefish trawls and seines and pelagic trawls (over-15m) and nephrops trawls and whitefish trawls (under-15m vessels] operate within the EGM proposed MPA. The value of catches from the EGM area was £227,000 (over-15m vessels) and £433 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m fleet were made predominantly into Peterhead (66% by value), Fraserburgh (20%) and Aberdeen (9%). For the over-15m fleet, nephrops and whitefish trawlers operate in particular in the south-east corner of the proposed MPA in the area of offshore deep sea muds.</p> <p>Information submitted by Copeche indicated that French vessels operate in the EGM proposed MPA, but no information was provided on numbers of vessels or value of catches. Non-UK VMS ping data indicate that 14 non-UK vessels were active in the EGM area in 2012: 5 from Denmark; 4 from Sweden; 2 from the Netherlands; 1 from Norway, 1 from Germany and 1 from the Faroe Islands. The Swedish, Dutch and German vessels fish with pelagic gear (pelagic trawls and purse seines) and therefore would not be affected by the management scenarios. One Danish vessel fishes with bottom trawl and therefore may be affected by the management measures assessed under the intermediate and upper scenarios. No information on gear types used by the Norwegian vessels was available. Provisional ScotMap data do not indicate any under-15m vessel activity in the EGM proposed MPA.</p> <p>Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and based on JNCC recommendations.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No additional management. 	<ul style="list-style-type: none"> ▪ Closure to beam trawls and dredges (gears likely to impact on ocean quahog) across the ocean quahog feature extent (full extent of proposed MPA); and 	<ul style="list-style-type: none"> ▪ Closure to whitefish trawls, nephrops trawls, other trawls, beam trawls and dredges (gears the could possibly affect ocean quahog) across the ocean quahog feature extent (full extent of proposed MPA); and

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
		<ul style="list-style-type: none"> ▪ Reduce other mobile bottom contact gear (whitefish, nephrops and other trawls and seines) pressure by 50% across the offshore deep sea muds feature. 	<ul style="list-style-type: none"> ▪ Closure to other mobile bottom-contact gears (whitefish seines, nephrops seines and other seines) across the offshore deep sea muds feature.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (0.018); ▪ Whitefish seines (<0.001); ▪ Nephrops trawls (0.028). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All gears (<0.001). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (0.082); ▪ Whitefish seines (<0.001); ▪ Nephrops trawls (0.142). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All gears (<0.001).
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (1 vessel), and possibly Norway (1 vessel) and Faroe Islands (1 vessel)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (1 vessel), and possibly Norway (1 vessel) and Faroe Islands (1 vessel)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	0.924	4.489
Average annual costs	0.000	0.046	0.224
Present value of total costs (2014–2033)	0.000	0.680	3.302
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.000	0.346	1.667
Average annual change to GVA	0.000	0.017	0.083
Present value of total change in GVA	0.000	0.254	1.226

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
(2014–2033)			
Direct and Indirect reduction in Employment	0.0 jobs	0.5 jobs	2.6 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4b. Oil and Gas **[EGM]**

The EGM proposed MPA encompasses 18 known hydrocarbon fields and four oil and gas installations. Under all scenarios, feature extents for ocean quahog aggregations (including offshore subtidal sands and gravels) overlap with all four installations present (Nordic Apollo FPSO; 21/25 GANNET A; 22/17 B and 22/17 A), while offshore deep sea muds overlap with only one (Nordic Apollo FPSO). A further 2 installations outside of the MPA proposal boundary are within 1km of ocean quahog aggregations under all scenarios.

Of the 204 wells present within the EGM proposed MPA, feature extents for ocean quahog aggregations (including offshore subtidal sands and gravels) overlap with all 204 and offshore deep sea muds overlap with 15 under all scenarios.

There are 128 sections of oil and gas pipeline present within the MPA proposal area that overlap with features proposed for designation, all of which overlap with ocean quahog aggregations (including offshore subtidal sands and gravels), and 19 of which overlap with offshore deep sea muds, under all scenarios. Additional lengths of pipeline outside of the MPA are within the 1km buffer area.

A number of licence awards have been granted under the 26th and 27th oil and gas licensing rounds which overlap with features proposed for designation within the MPA proposal boundary. Twelve awards were granted during the 26th UK licensing round and a further 9 during the 27th UK licensing round. Under all scenarios, all 21 of the licence awards overlap with ocean quahog aggregations (including offshore subtidal sands and gravels), while three of the 26th round awards and five of the 27th round awards overlap with offshore deep sea muds. Three of the awarded blocks have significant oil discoveries. Under all scenarios three of the discoveries overlap with ocean quahog aggregations and one with offshore deep sea muds.

Three of the awards from the 26th round and three from the 27th round lie wholly within the MPA proposal, while the rest overlap its boundaries.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 if no significant discoveries present 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 if no significant discoveries present 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 if no significant discoveries present

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
	<p>within award or Assessment and Development Phases 1 – 6 if significant discoveries present (only Phases 2 – 6 anticipated for 26th round awards).</p>	<p>within award or Assessment and Development Phases 1 – 6 if significant discoveries present (only Phases 2 – 6 anticipated for 26th round awards);</p> <ul style="list-style-type: none"> ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; and ▪ Treat cuttings that use oil-based muds on site. 	<p>within award or Assessment and Development Phases 1 – 6 if significant discoveries present (only Phases 2 – 6 anticipated for 26th round awards);</p> <ul style="list-style-type: none"> ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; ▪ Micro-siting of infrastructure in areas of more representative habitat types for offshore deep sea muds and offshore subtidal sand and gravels using data held by JNCC and collected by operators; and ▪ Skip and ship drill cuttings.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (11 wells (2016) and 7 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (3 wells (2016) , 11 wells (2018) and 7 wells (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (3 wells (2016) , 11 wells (2018) and 7 wells (2020)); ▪ Development Phase 4: development; consultancy fees and additional operator staff input - £4k per well (3 wells (2022) and 2 wells (2024)); ▪ Operation and Production Phase 5: annual permits, consultancy fees, additional operator staff input - £20k per well (3 wells (2022) and 2 wells (2024)); and 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (11 wells (2016) and 7 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (3 wells (2016) , 11 wells (2018) and 7 wells (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (3 wells (2016) , 11 wells (2018) and 7 wells (2020)); ▪ Development Phase 4: development; consultancy fees and additional operator staff input - £4k per well (3 wells (2022) and 2 wells (2024)); ▪ Operation and Production Phase 5: annual permits, consultancy fees, additional operator staff input - £20k per well (3 wells (2022) and 2 wells (2024)); and 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (11 wells (2016) and 7 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (3 wells (2016) , 11 wells (2018) and 7 wells (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (3 wells (2016) , 11 wells (2018) and 7 wells (2020)); ▪ Development Phase 4: development; consultancy fees and additional operator staff input - £4k per well (3 wells (2022) and 2 wells (2024)); ▪ Operation and Production Phase 5: annual permits, consultancy fees, additional operator staff input - £20k per well (3 wells (2022) and 2 wells (2024));

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
	<ul style="list-style-type: none"> ▪ Maintenance Phase 6: consultancy fees; additional operator staff input – £2k per well (3 wells (2022) and 2 wells (2024)). 	<ul style="list-style-type: none"> ▪ Maintenance Phase 6: consultancy fees; additional operator staff input – £2k per well (3 wells (2022) and 2 wells (2024)). 	<ul style="list-style-type: none"> ▪ Maintenance Phase 6: consultancy fees; additional operator staff input – £2k per well (3 wells (2022) and 2 wells (2024)); ▪ Micro-siting survey costs - £230k per well (3 wells (2016), 11 wells (2018), 7 wells (2020), 3 wells (2022) and 2 wells (2024)); ▪ Re-routing of new pipelines for Phases 4 – 6 - £2m per additional km of pipeline (10% of distance); ▪ Survey costs for additional pipeline length - £580k per well; and ▪ Skip and ship drill cuttings - £650k per well (3 wells (2016), 11 wells (2018), 7 wells (2020), 3 wells (2022) and 2 wells (2024)).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.269	0.269	44.049
Average annual costs	0.013	0.013	2.202
Present value of total costs (2014–2033)	0.225	0.225	35.021
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA				[EGM]
Activity	Lower Estimate	Intermediate Estimate	Upper Estimate	
None identified.				

Human activities that would be unaffected by designation of the site as an MPA

Table 6. Human Activities that would be Unaffected by Designation of the Site as an MPA		[EGM]
Activity	Description	
Carbon Capture and Storage	There is currently no CCS activity which occurs within the boundaries of the EGM proposed MPA, nor within a 1km buffer zone. Two potential saline aquifers (Tay and Forties) overlap with the northern component of the 'ocean quahog aggregation extent (including offshore subtidal sands and gravels)' and 'offshore deep sea muds' features of the EGM proposed MPA under all scenarios (lower, intermediate and upper). However, in the timescales of the project (2014-2033) it is considered that CCS will utilise existing oil and gas pipelines, where possible, between St Fergus and the Goldeneye hydrocarbon field and that possible new infrastructure (pipeline or shipping) will link the Firth of Forth to St Fergus and Teesside to an offshore hub at Goldeneye. None of these possible future CCS developments occur within the boundaries of the EGM proposed MPA, nor within a 1km buffer zone. Therefore, no cost impacts are expected.	
Military	There is currently no military activity within the EGM proposed MPA boundary. No future activity is expected and, therefore, no cost assessments have been made.	
Power Interconnectors	No power interconnectors occur within the EGM proposed MPA boundary or within a 1 km buffer zone. No future activity is expected.	
Telecom Cables	No telecom cables occur within the EGM proposed MPA boundary or within a 1 km buffer zone. No future activity is expected.	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [EGM]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.00m Intermediate: £0.05m Upper: £0.22m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: £0.02m Upper: £0.08m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: xx (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 0.5 jobs Upper: 2.6 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (1 vessel), and possibly Norway (1 vessel) and Faroe Islands (1 vessel))	Not quantified		Employment – loss of foreign jobs from reduced landings.	

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	Displacement Effects	Not quantified	<p>Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences:</p> <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited; ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		xx
Oil and Gas	Additional operational costs associated with licence and permit applications for new exploration development and decommissioning	<p>Quantified Cost Impact (2014–2033): £0.225 – 35.021m</p> <p>Decommissioning assessed at national level</p>	Future employment opportunities – reduced future employment opportunities if increased costs affect the economic viability of projects and lead to some projects not proceeding.		xxx (under the upper scenario only)
	Additional mitigation measures for new developments or decommissioning activities to support achievement of site conservation objectives	Not Quantified	<p>Future employment opportunities – reduced future employment opportunities if costs significant and render development projects unviable.</p> <p>This impact is uncertain and is only likely to arise under the upper scenario. JNCC’s current advice is that the intermediate scenario represents their best view on management requirements.</p>		xxx (under the upper scenario only)
	Costs associated with	Not Quantified	Employment – reduced future employment		xxx (under the

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	delays during the licensing and permitting process Loss of investor confidence (developments do not proceed)		opportunities if delays deter investments. This impact is uncertain and is only likely to arise under the upper scenario. JNCC's current advice is that the intermediate scenario represents their best view on management requirements.		upper scenario only)
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [EGM]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries	xx	xx	xx	xxx	xxx	xx	xxx	xxx
Reduction in landed value, GVA and employment	North-East North-West	Largest employment impacts in: Buckie (51%), Peterhead (26%), Fraserburgh (11%)	Coastal Rural and Urban	Potentially significant negative effect if parent loses job/becomes unemployed.	Potentially significant negative effect if individuals lose job/become unemployed.	Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0-2.6 job losses Potentially significant negative effect on individuals that lose job/become unemployed.	Potentially significant negative effect if member of household loses job/becomes unemployed.
Fish Processors	x	x	x	0	0	0	0	0
Reduction in local landings at landing ports	North-East North-West	Peterhead Fraserburgh Aberdeen Grimsby	Coastal Urban					
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [EGM]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: >15m	Whitefish trawls Nephrops trawls Whitefish seines	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Fish Processors Reduction in local landings at landing ports		Shellfish: xxx Demersal: xx Pelagic: 0	0	0	0	0	0	0

Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.
 * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.

Potential Contribution of the Site to an Ecologically-Coherent Network

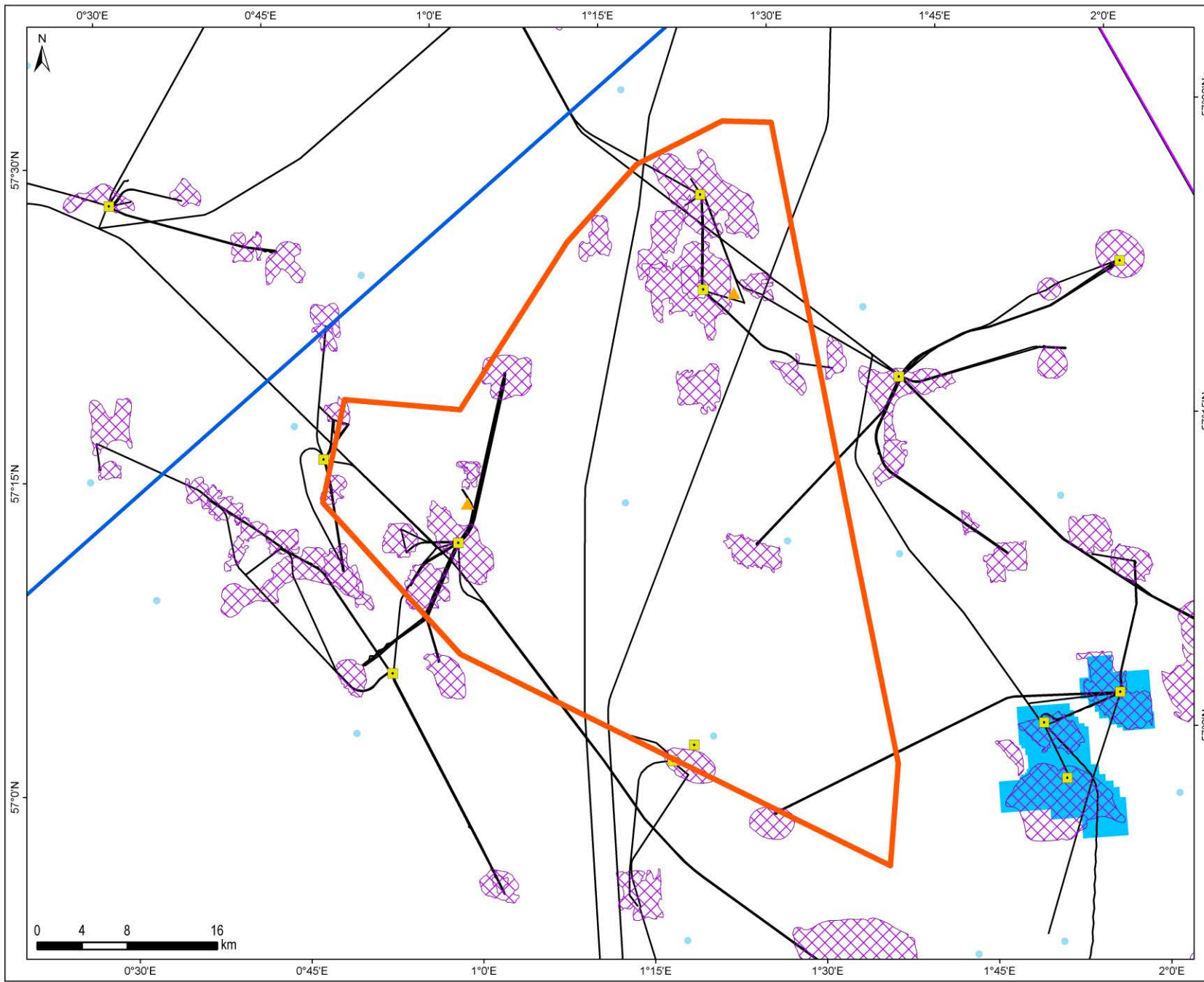
Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [EGM]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Ocean quahog aggregations (including offshore subtidal sands and gravels)	Provides representation for an area of the species in the only OSPAR Region it is recorded within in offshore waters adjacent to Scotland – OSPAR Region II. East of Gannet and Montrose Fields is a relatively data-rich area for the species.	Provides one of at least three recommended examples to be protected in Scotland’s seas.	Not currently understood for ocean quahog.	Provides representation at the south-eastern extent of its range in OSPAR Region II in Scotland’s seas.	Ocean quahog is listed as Threatened and/or Declining by the OSPAR Commission in OSPAR Region II so the MPA is expected to help increase resilience for the feature.
Offshore deep sea muds	Provides representation for offshore deep sea muds in one of very few areas it occurs on the continental shelf in OSPAR Region II.	Provides one of at least two recommended examples to be protected on the continental shelf in OSPAR Region II in Scotland’s seas, although no other areas represent what would be considered viable areas of the habitat and so the possible MPA is the only recommendation for the feature on the continental shelf in OSPAR Region II.	Not currently understood for offshore deep sea muds.	Provides representation for one of the only viable examples of offshore deep sea muds in offshore waters in OSPAR Region II.	Offshore deep sea muds are fairly widely recorded across offshore waters in Scotland’s seas, but less frequently observed in OSPAR Region II. In OSPAR Region II offshore deep sea mud tends to be the burrowed mud sub-type e.g. that comprising the Fladen Grounds.

JNCC (pers. comm.); SNH and JNCC. (2012). *Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.*
Available online from: <http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612>.

Anticipated Benefits to Ecosystem Services

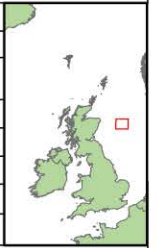
Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ²¹ [EGM]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Stocks not at MSY	Nil	Low - Small recovery of fish stocks in medium to long term. Features provide low level of supporting services to support recovery.	Moderate recovery of fish stocks in medium to long term. Features provide low level of supporting services to support recovery.	Low - Moderate. Site fishing grounds are of moderate value.	Nil - Low	Moderate
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Nil - Low	Nil - Low	Nil, or at best a very low level of protection of parts of ecosystem providing these services			Low	Nil - Low	High
Natural hazard protection	Nil - Low	Nil - Low				Low	Nil - Low	High
Regulation of pollution	Nil - Low	Nil - Low				Low	Nil - Low	High
Non-use value of natural environment	Low - Moderate. Features protected by site have low/moderate non-use value.	Non-use value of the site may decline	Nil, no change in key characteristics of site	Low – protection of key characteristics of site from minor decline	Moderate – protection of key characteristics of site from decline, and/or allowing some recovery of values	Moderate	Nil - Moderate	Low
Recreation	Nil	Nil	Nil			Nil	Nil	Moderate
Research and Education	Low - Moderate	Biological and geological features have research value but there are substitutes	Nil, no change in key characteristics of site	Low – protection of key characteristics of site from decline, improving future research opportunities		Low	Nil - Low	Low
Total value of changes in ecosystem services			Nil for lower scenario, low for intermediate scenarios and moderate from upper scenario				Low - Moderate	Low

²¹ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



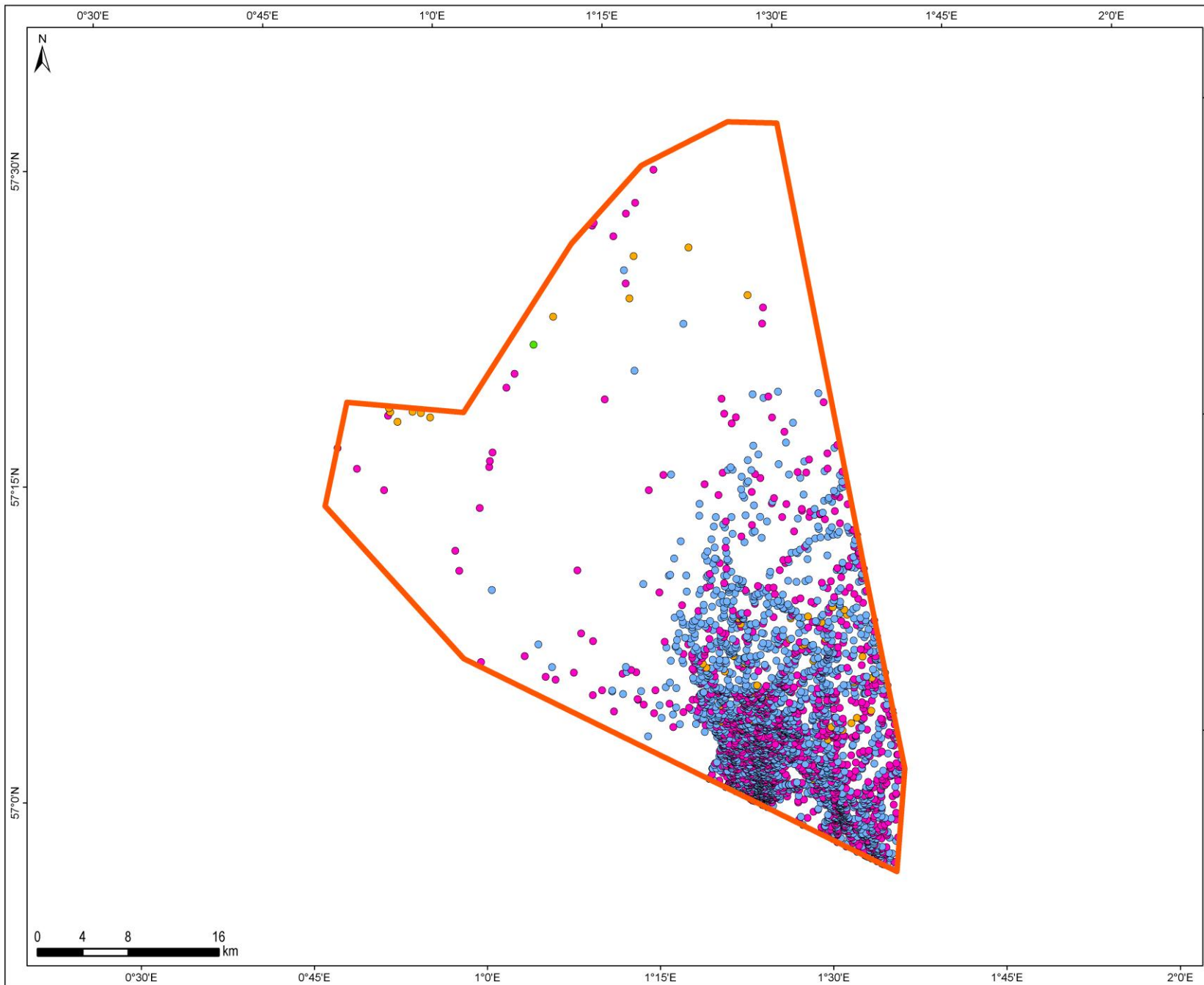
- Proposed Marine Protected Area
- Power Interconnectors**
- Future Proposed Interconnectors
- Telecommunication Cables**
- Subsea Telecomms Cables
- Active
- Out of Service
- Oil & Gas**
- Hydrocarbon Fields
- Pipelines
- Significant Discoveries
- Platforms
- Carbon Capture & Storage**
- ▲ Potential Saline Aquifers
- Potential Hydrocarbon Reservoirs

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:460,000	
QA		FMM	
4136-MPA_HA_Gannet_Montrose.mxd			
Produced by ABPmer			



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Human Activities which Occur within the Proposed MPA:
East of Gannet and Montrose Fields



Proposed Marine Protected Area

VMS Fishing Pings (2007 to 2011)

- Whitefish Trawls
- Whitefish Seines
- Nephrops Trawls
- Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:460,000	
QA		FMM	
4136-MPA_Fish_Gannet_Montrose.mxd			
Produced by ABPmer			



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Data Source: Scottish Government, 2013
NOT TO BE USED FOR NAVIGATION

Fishing Activities which Occur within the Proposed MPA:
East of Gannet and Montrose Fields

Faroe-Shetland Sponge Belt (FSS)

Site Area (km²): 6,503

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [FSS]					
Proposed protected features					
<p><i>Biodiversity Features</i> Continental slope, deep sea sponge aggregations; ocean quahog aggregations; offshore subtidal sands and gravels.</p> <p><i>Geodiversity Features</i> Marine Geomorphology of the Scottish Deep Ocean Seabed – sand wave field, sediment wave field; Quaternary of Scotland – continental slope channels; iceberg plough mark fields, prograding wedges; Submarine Mass Movement – slide deposits.</p> <p><i>Site Description</i> The Faroe-Shetland Sponge Belt is a relatively large offshore site situated to the north-west of the Shetland Islands towards the boundary of the MPA Project Area and the UK continental shelf, and within OSPAR Region II. The site follows the 400 and 800m isobaths in the Faroe-Shetland Channel.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Deep sea sponge aggregations	Lower: 867.17 Intermediate: 867.17 Upper: 2769.82	Yes (survey data, 2006; supported by Marine Scotland Science data, 2012)	Yes – assumes no disturbance since 2006; modelling suggests proposal encompasses feature extent	Low	Conserve (uncertain)
Ocean quahog aggregations	All scenarios: 2769.82	Yes (BP survey data, 1998-1999)	No – knowledge limited due to survey design;	Low	Conserve (uncertain)
Offshore subtidal sands and gravels	All scenarios: 6374.62	Yes (UK SeaMap, 2010; AFEN & SEA surveys, 1996 – 2006)	Yes – good number, distribution and age of evidence	Low	Conserve (uncertain)
Continental slope		Yes (UK SeaMap, 2010)	Partial	Low	Conserve (uncertain)

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Geodiversity Features					
Marine Geomorphology of the Scottish Shelf Seabed - sand wave field, sediment wave field	Sand Wave Field: 345.35 Sediment Wave Field: 334.66	Yes	Yes	Low	Conserve (uncertain)
Quaternary of Scotland – continental slope channels, iceberg plough mark fields, prograding wedges	Continental slope channels: 29.14 Iceberg plough mark fields: 4435.65 Prograding wedges: 3180.96	Yes Yes (TOBI sidescan data, 1996 & 2000) Yes Yes	Yes		
Submarine Mass Movement – slide deposits	358.71				
Key: * Estimated area based on best available data References: Area of Features: GeMS Confidence in biodiversity feature presence and extent: JNCC (2012c) Confidence in biodiversity feature condition: JNCC (2013) pers. comm. Confidence in geodiversity feature presence and extent: Brooks et al. (2012) Confidence in geodiversity feature condition: Brooks et al. (2012)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [FSS]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries*	0.450	1.730	5.600
Oil and Gas	0.493	0.493	27.927
Total Quantified Economic Costs	0.943	2.223	33.527
Non-Quantified Economic Costs			
Commercial Fisheries	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts.
Oil and Gas	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.
<p>Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>			

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and the Sustainability Appraisal*

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [FSS]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	0.005	0.005	0.005
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.049	0.049	0.049
Total Quantified Public Sector Costs	0.054	0.054	0.054
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [FSS]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage.	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 1 jobs Intermediate: 4 jobs Upper: 10 jobs	North East North	Fraserburgh Kirkwall	Impacts concentrated in island and urban coastal areas	Whitefish trawls Other affected gears	Lower: <15m Upper: >15m	No Impact	No breakdown of fisherman employment by ethnic origin.	Unlikely to be employed in fisheries.
If any oil and gas developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).										
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive)			[FSS]
Benefit	Description		
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits	
Fish for human consumption	Moderate. The site provides supporting services, including contribution to food webs.	Low - Moderate	
Fish for non-human consumption			
Non-use value of natural environment	Nil - Low	Low - Moderate	
Other Benefits			
None identified.			
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).			

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [FSS]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Deep sea sponge aggregations	-	-	-	-	U	-	L/I/U	-	-	L/I/U	-	-	L/I/U	-	L/I/U	-	-
Ocean quahog aggregations	-	-	-	-	L/I/U	-	L/I/U	-	-	L/I/U	-	-	L/I/U	-	L/I/U	-	-
Offshore subtidal sands and gravels	-	-	-	-	L/I/U	-	L/I/U	-	-	L/I/U	-	-	L/I/U	-	L/I/U	-	-
Continental slope	Not considered as not thought to be sensitive to pressures associated with human activity and so not considered in the context of management.																
Geodiversity Features																	
Marine Geomorphology of the Scottish Shelf Seabed - sand wave field, sediment wave field	Not considered as thought to have a low sensitivity/not be exposed to pressures associated with human activity and also considered from a geodiversity context.																
Quaternary of Scotland – continental slope channels, iceberg plough mark fields, prograding wedges																	
Submarine Mass Movement – slide deposits																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed protected feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed protected feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity)	[FSS]
<p>According to VMS-based estimates and ICES rectangle landings statistics, whitefish trawls, nets, lines and pelagic trawls (over-15m) and whitefish trawls and other gear (pots, nets, lines, pelagic trawl, other trawl and pots) (under-15m vessels) operate within the FSS proposed MPA. The value of catches from the FSS area was £947,000 (over-15m vessels) and £657,000 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels are predominantly into Scrabster (41% by value), Kinlochbervie (20%), Ullapool (14%), Peterhead (8%) and Lochinver (6%). For the over-15m fleet, nets operate in particular along the south east edge of the proposed MPA in the area of subtidal sands and gravels, while whitefish trawlers operate mainly in a central belt towards the south west of the proposed MPA over areas of ocean quahog and deep sea sponge aggregations.</p>	
<p>Non-UK VMS ping data indicate that 59 non-UK vessels were active in the FSS area in 2012: 28 from Norway; 14 from France; 5 from the Faroe Islands; 5 from Spain; 4 from Germany; and 1 from each of Denmark, Greenland and the Netherlands. The Dutch vessel fishes with pelagic gear (pelagic trawls) and therefore is unlikely to be affected by the management scenarios. 5 French vessels and 2 German vessels fish with bottom trawls and therefore may be affected by the proposed management measures under all scenarios; 1 German vessel and 5 Spanish vessels fish with lines, which may be affected under the upper scenario. No information on gear types used by the Norwegian, Faroe Islands or Greenland vessels was available.</p>	
<p>Information submitted by the French ministry indicated that 4 vessels in 2008, and 3 vessels in 2011, fished in the proposed MPA area. In 2008, these were all >40m demersal trawlers, targeting Greenland halibut, blue ling and saithe, with catches worth €0.543 million. In 2011, these comprised >40m demersal and pelagic trawlers, and <12m potters. The vessels originated from Boulange-sur-Mer, Lorient, Fécamp and Cherbourg ports, but had their home ports at Lochinver, Boulogne-sur-Mer, Ullapool, Ijmuiden and Portbail. Between 1 and 4% of their turnover was dependent on fishing in the proposed MPA area, and they accounted for 50–66 FTE jobs on board.</p>	
<p>Provisional ScotMap data coverage does not extend as far as Shetland, therefore there is no indication of possible under-15m vessel activity in the FSS proposed MPA from this source. The cost estimates for the under-15m sector may be overestimates, as the 'under-15m' length group in the ICES rectangle landings data may include cases where information on vessel length and/or administrative port is missing from landings returns.</p>	
<p>Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and based on JNCC recommendations. A lower scenario which excludes mobile bottom-contact gear but not static gear use on deep-sea sponge aggregations has also been included.</p>	
<p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p>	
<p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p>	
<p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>	

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across the deep sea sponge feature extent. 	<ul style="list-style-type: none"> ▪ Closure to all bottom-contact gear (trawls, seines, dredges, nets, lines and pots) across the recorded deep sea sponge feature extent; ▪ Closure to beam trawls and dredges (gears likely to impact on ocean quahog) across the ocean quahog feature extent; and ▪ Reduce other mobile bottom contact gear (whitefish, nephrops and other trawls and seines) pressure by 50% across the offshore subtidal sands and gravels feature. 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gears (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across the offshore subtidal sands and gravels feature (full extent of MPA); and ▪ Closure to all bottom-contact gear (mobile and static) across the likely deep sea sponge feature extent (i.e. 400-600m depth).
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.005). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.057). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.236). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.127). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.527). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.344).
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using mobile bottom contact gears in the proposed MPA (France (5 vessels), Germany (2 vessels), possibly Norway (28 vessels), Greenland (1 vessel), Faroe Islands (5 vessels)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (France (5 vessels), Spain (5 vessels), Germany (3 vessels), possibly Norway (28 vessels), Greenland (1 vessel), Faroe Islands (5 vessels)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (France (5 vessels), Spain (5 vessels), Germany (3 vessels), possibly Norway (28 vessels), Greenland (1 vessel), Faroe Islands (5 vessels)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	1.234	7.265	17.424
Average annual costs	0.062	0.363	0.871
Present value of total costs (2014–2033)	0.908	5.343	12.815

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.612	2.353	7.615
Average annual change to GVA	0.031	0.118	0.380
Present value of total change in GVA (2014–2033)	0.450	1.730	5.600
Direct and Indirect reduction in Employment	0.7 jobs	4.1 jobs	9.9 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4b. Oil and Gas	[FSS]
<p>The FSS proposed MPA boundary encompasses five known hydrocarbon fields that overlap with the proposed protected features. Three of these fields are currently producing (Schiehallion, Foinaven, Loyal) while the other two are under development (Laggan, Tormore). There are 69 licensed oil and gas blocks within the proposal boundary that overlap with offshore subtidal sands and gravels under all scenarios. Feature extents show that 26 of these blocks overlap with ocean quahog aggregations and 35 with offshore subtidal sands and gravels under all scenarios. Nine blocks overlap with deep sea sponge aggregations under all scenarios and 26 in the upper scenario only.</p> <p>Two Floating Production and Storage Offloading Vessels (FSPO) are present in the MPA proposal boundary (Schiehallion and Petrojarl Foinaven) that overlap with offshore subtidal sands and gravels (all scenarios). One of the platforms (Petrojarl Foinaven) overlaps with ocean quahog aggregations under all scenarios and deep sea sponge aggregations under the upper scenario only. However, both platforms are within 1km of ocean quahog aggregations (all scenarios) and deep sea sponge aggregations (upper scenario only). A decommissioning programme for the Schiehallion FPSO has been approved, with work expected to begin in mid-2013.</p> <p>There are 69 pipeline sections within the FSS proposed MPA boundary, all of which overlap with offshore subtidal sands and gravels under all scenarios. Forty-six of the pipeline sections overlap with ocean quahog aggregations under all scenarios and deep sea sponge aggregations under the upper scenario only. A further 19 pipeline sections are present within 1km of the proposed protected features.</p> <p>There are 248 wells within the MPA proposal that overlap with features proposed for designation. Feature extents for deep sea sponge aggregations show overlaps with 142 wells under the upper scenario only and 11 under all scenarios. Under all scenarios all 248 wells overlap with offshore subtidal sands and gravels and 142 with ocean quahog aggregations. An additional three wells outside of the MPA boundary are within 1km of the proposed protected features.</p> <p>A further 16 and 36 licence awards granted under the 26th and 27th UK oil and gas licensing rounds respectively are present within the proposed MPA boundary that overlap with proposed protected features. Of the 26th round awards, all 16 overlap with feature extents for offshore subtidal sands and gravels, 11 also overlap with ocean quahog aggregations and five overlap with deep sea sponge aggregations under all scenarios. Six of the 26th round blocks also overlap with deep sea sponge aggregations under the upper scenario only. Four of the 26th round awards are wholly within the MPA site while the rest overlap the boundary.</p>	

All 36 blocks awarded in the 27th round overlap with offshore subtidal sands and gravels under all scenarios. Twenty-seven overlap with feature extents for ocean quahog aggregations and 16 with deep sea sponge aggregations under all scenarios. Nine of the 27th round blocks overlap with feature extents for deep sea sponge aggregations under the upper scenario only. Eighteen of the 27th round awards lie wholly within the MPA site while the rest overlap the boundary.

There have been four significant discoveries within the FSS proposed MPA boundary; all of which lie within awarded blocks.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 if no significant discoveries present within award or Assessment and Development Phases 1 – 6 if significant discoveries present (only Phases 2 – 6 anticipated for 26th round awards); ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; ▪ Micro-siting of infrastructure in areas of reduced sponge density, drawing on data held by JNCC and collected by operators; and ▪ Treat cuttings that use oil-based muds on site. 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 if no significant discoveries present within award or Assessment and Development Phases 1 – 6 if significant discoveries present (only Phases 2 – 6 anticipated for 26th round awards); ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; ▪ Micro-siting of infrastructure in areas of reduced sponge density, drawing on data held by JNCC and collected by operators; and ▪ Treat cuttings that use oil-based muds on site. 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 if no significant discoveries present within award or Assessment and Development Phases 1 – 6 if significant discoveries present (only Phases 2 – 6 anticipated for 26th round awards); ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; ▪ Micro-siting of infrastructure in areas outside of the area of deep sea sponge aggregations (the 400-600m depth contours); ▪ Micro-siting of infrastructure in areas of more representative habitat types for offshore subtidal sands and gravels and offshore deep sea muds using data held by JNCC and collected by operator; and ▪ Skip and ship drill cuttings.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (16 wells (2016) and 33 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (3 wells (2016), 16 wells (2018) and 33 wells (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (16 wells (2016) and 33 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (3 wells (2016), 16 wells (2018) and 33 wells (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (16 wells (2016) and 33 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (3 wells (2016), 16 wells (2018) and 33 wells (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
	<p>additional operator staff input - £4k 4k per well (3 wells (2016), 16 wells (2018) and 33 wells (2020));</p> <ul style="list-style-type: none"> ▪ Development Phase 4: development; consultancy fees and additional operator staff input - £4k per well (3 wells (2022) and 3 wells (2024)); ▪ Operation and Production Phase 5: annual permits, consultancy fees, additional operator staff input - £20k per well (3 wells (2022) and 3 wells (2024)); and ▪ Maintenance Phase 6: consultancy fees; additional operator staff input – £2k per well (3 wells (2022) and 3 wells (2024)). 	<p>additional operator staff input - £4k per well (3 wells (2016), 16 wells (2018) and 33 wells (2020));</p> <ul style="list-style-type: none"> ▪ Development Phase 4: development; consultancy fees and additional operator staff input - £4k per well (3 wells (2022) and 3 wells (2024)); ▪ Operation and Production Phase 5: annual permits, consultancy fees, additional operator staff input - £20k per well (3 wells (2022) and 3 wells (2024)); and ▪ Maintenance Phase 6: consultancy fees; additional operator staff input – £2k per well (3 wells (2022) and 3 wells (2024)). 	<p>additional operator staff input - £4k per well (3 wells (2016), 16 wells (2018) and 33 wells (2020));</p> <ul style="list-style-type: none"> ▪ Development Phase 4: development; consultancy fees and additional operator staff input - £4k per well (3 wells (2022) and 3 wells (2024)); ▪ Operation and Production Phase 5: annual permits, consultancy fees, additional operator staff input - £20k per well (3 wells (2022) and 3 wells (2024)); and ▪ Maintenance Phase 6: consultancy fees; additional operator staff input – £2k per well (3 wells (2022) and 3 wells (2024)); ▪ Micro-siting survey costs - £230k per well (2 wells (2016), 9 wells (2018), 20 wells (2020) and 2 wells (2022)); ▪ Re-routing of new pipelines for Phases 4 – 6 - £2m per additional km of pipeline (10% of distance, 2 wells (2022)); ▪ Survey costs for additional pipeline length - £580k per well (2 wells (2022)); and ▪ Skip and ship drill cuttings - £650k per well (2 wells (2016), 9 wells (2018), 20 wells (2020) and 2 wells (2022)).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.592	0.592	33.892
Average annual costs	0.030	0.030	1.695
Present value of total costs (2014–2033)	0.493	0.493	27.927
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA				[FSS]
Activity	Lower Estimate	Intermediate Estimate	Upper Estimate	
None identified.				

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA [FSS]	
Activity	Description
Carbon Capture and Storage	<p>There is currently no CCS activity which occurs within the boundaries of the FSS proposed MPA, nor within a 1km buffer zone. One potential hydrocarbon field (Schiehallion) overlaps with the south-western part of the ‘ocean quahog aggregations’ and ‘offshore subtidal sands and gravels’ features of the FSS proposed MPA under all scenarios (lower, intermediate and upper). Additionally, the identified potential hydrocarbon field (Schiehallion) overlaps with the deep sea sponge aggregations feature of the FSS proposed MPA under the high scenario. However, in the timescales of the project (2014-2033), it is considered that CCS will utilise existing oil and gas pipelines, where possible, between St Fergus and the Goldeneye hydrocarbon field and that possible new infrastructure (pipeline or shipping) will link the Firth of Forth to St Fergus and Teesside to an offshore hub at Goldeneye. None of these possible future CCS developments occur within the boundaries of the FSS proposed MPA, nor within a 1km buffer zone. Therefore, no cost impacts are expected.</p>
Recreational Boating	<p>Two light use RYA cruising routes (from Dalgety Bay Sailing Club) overlap the deep sea sponge aggregations, ocean quahog aggregations and offshore subtidal sands and gravels features of the FSS proposed MPA.</p> <p>Under the lower and intermediate scenarios overlap with the deep sea sponge aggregations occurs in the north-eastern extent of the feature (for a distance of 1.7km) and the south-western extent of the feature (for a distance of 9.7km). Under the high scenario, the north-eastern cruising route overlaps the deep sea sponge aggregations for a distance of 13.4km, whilst the second cruising route intersects the centre of the deep sea sponge aggregations for a distance of 14.6km.</p> <p>Under all scenarios overlap with the ocean quahog aggregations feature occurs in the north-eastern extent of the feature (for a distance of 13.4km) and central extent of the feature (for a distance of 14.6km).</p> <p>Under all scenarios overlap with the offshore subtidal sands and gravels feature occurs in the north-eastern extent of the feature (for a distance of 30.1km) and central extent of the feature (for a distance of 34.7km).</p> <p>It is unlikely that there would be a significant interaction between the proposed protected features and recreational boating and so no cost impacts are expected.</p>
Telecom Cables	<p>Three operational telecom cables (FARICE (2)) (in operation since 2004), SHEFA-2 Seg 7-1 and SHEFA-2 Seg5 (in operation since 2008)) overlap with the FSS proposed MPA. Two of the cables overlap with deep sea sponge aggregations (all scenarios), offshore subtidal sands and gravels (all scenarios) and ocean quahog (all scenarios). The third cable overlaps with just offshore subtidal sands and gravels (all scenarios) and ocean quahog (all scenarios). However, no cost impacts are foreseen as the site is located beyond the 12 nautical mile threshold (within which licences are required for cables).</p>

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs					[FSS]
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.06m Intermediate: £0.36m Upper: £0.87m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.03m Intermediate: £0.12m Upper: £0.38m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: xx (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.7 jobs Intermediate: 4.1 jobs Upper: 9.9 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (France (5 vessels), Spain (5 vessels), Germany (3 vessels), possibly Norway (28 vessels), Greenland (1 vessel), Faroe Islands (5 vessels))	Not quantified	Employment – loss of foreign jobs from reduced landings.		

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	Displacement Effects	Not quantified	<p>Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences:</p> <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited; ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		xx
Oil and Gas	Additional operational costs associated with licence and permit applications for new exploration development and decommissioning	<p>Quantified Cost Impact (2014–2033): £0.493 – 27.927m</p> <p>Decommissioning assessed at national level</p>	Future employment opportunities – reduced future employment opportunities if increased costs affect the economic viability of projects and lead to some projects not proceeding.		xxx (under the upper scenario only)
	Additional mitigation measures for new developments or decommissioning activities to support achievement of site conservation objectives	Not Quantified	<p>Future employment opportunities – reduced future employment opportunities if costs significant and render development projects unviable.</p> <p>This impact is uncertain and is only likely to arise under the upper scenario. JNCC’s current advice is that the intermediate scenario represents their best view on management requirements.</p>		xxx (under the upper scenario only)

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	Costs associated with delays during the licensing and permitting process Loss of investor confidence (developments do not proceed)	Not Quantified	Employment – reduced future employment opportunities if delays deter investments. This impact is uncertain and is only likely to arise under the upper scenario. JNCC’s current advice is that the intermediate scenario represents their best view on management requirements.		xxx (under the upper scenario only)
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [FSS]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural,Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries	xx	xx	xx	xxx	xxx	xx	xxx	xxx
Reduction in landed value, GVA and employment	North East North West North-West	Largest employment impacts in: Fraserburgh (72%), Kirkwall (22%)	Coastal and Island Urban and Rural	Potentially significant negative effect if parent loses job/becomes unemployed.	Potentially significant negative effect if individuals lose job/become unemployed.	Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0.7-9.9 job losses Potentially significant negative effect on individuals that lose job/become unemployed.	Potentially significant negative effect if member of household loses job/becomes unemployed.
Fish Processors	x	x	x	0	0	0	0	0
Reduction in local landings at landing ports	North North-West North East	Scrabster Ullapool Kinlochbervie Peterhead Coruna Hanstholm Lochinver Fraserburgh	Coastal Urban and Rural					
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [FSS]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: <15m Upper: >15m	Whitefish trawls, Other affected gears	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Fish Processors Reduction in local landings at landing ports		Shellfish: xx Demersal: xxx Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

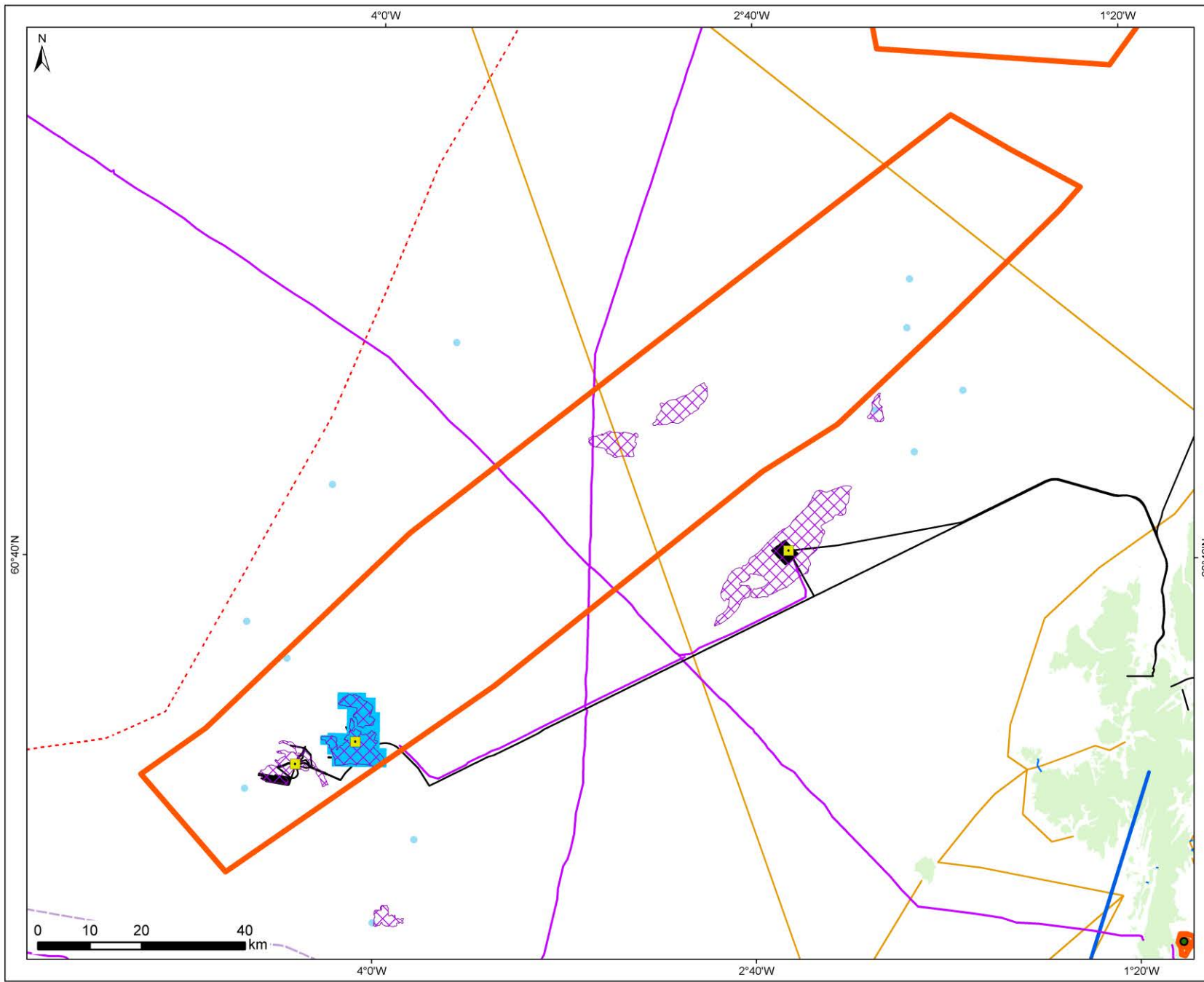
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [FSS]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Deep sea sponge aggregations	Provides representation for deep sea sponge aggregations in OSPAR Region II.	Provides one of at least three recommended examples to be protected in Scotland's seas.	Not currently understood for deep sea sponge aggregations.	Provides representation of an ecologically distinct type of deep sea sponge aggregation - aggregations of Boreal Ostur. This type of deep sea sponge aggregation to date has only been recorded in the Faroe-Shetland Channel in Scotland's seas.	Deep sea sponge aggregations are considered to be Threatened and/or Declining by the OSPAR Commission in OSPAR Region II so the MPA is expected to help increase resilience for the feature.
Ocean quahog aggregations	Provides representation for an area of the species in the only OSPAR Region it is recorded within in offshore waters adjacent to Scotland – OSPAR Region II. Faroe-Shetland sponge belt is not a relatively data-rich area for the species.	Provides one of at least three recommended examples to be protected in Scotland's seas.	Not currently understood for ocean quahog.	Provides representation at the north-western extent of its range in OSPAR Region II in Scotland's seas.	Ocean quahog is listed as Threatened and/or Declining by the OSPAR Commission in OSPAR Region II so the MPA is expected to help increase resilience for the feature.
Offshore subtidal sands and gravels	Provides representation for Atlantic and Arctic influenced slope offshore subtidal sands and gravel habitats in OSPAR Region II.	Represents one of at least two recommended examples of Atlantic and Arctic influenced slope offshore subtidal sands and gravels to be protected in OSPAR Region II.	Not currently understood for offshore subtidal sands and gravels.	Provides representation at the north-western extent of its range on the continental slope in OSPAR Region II in Scotland's seas.	Offshore subtidal sands and gravels are fairly widely recorded across offshore waters in Scotland's seas.
Continental slope	The possible MPA provides representation for one of two recommended areas of the Scottish continental slope to be included within the MPA network.	The Faroe-Shetland Channel slope is considered ecologically and hydrographically distinct to the Hebridean slope and so the recommendation is for at least one example of each area of the slope to be included.	Not currently understood for the continental slope.	The Faroe-Shetland Channel slope is considered ecologically and hydrographically distinct to the Hebridean slope. This possible MPA represents one example of the Faroe-Shetland Channel slope.	The continental slope occurs between Scotland's shelf and off-shelf environment.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

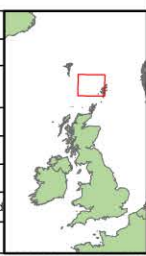
Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ²² [FSS]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Stocks not at MSY	Minimal – unclear of deep sea sponge gives provisioning or supporting services	Low – Allows recovery of stocks in medium/long term. Features provide moderate level of supporting services to support recovery	High – fish landings of high value	Low - Moderate	Moderate	
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Nil - Low	Nil - Low	Nil, or at best a very low level of protection of parts of ecosystem providing these services			Low	Nil - Low	High
Natural hazard protection	Nil - Low	Nil - Low				Low	Nil - Low	High
Regulation of pollution	Nil - Low	Nil - Low				Low	Nil - Low	High
Non-use value of natural environment	Low - Moderate. Low non use value for protected features	Low - Moderate	Minimal - Low	Low	Low - Moderate	Low - Moderate	Low - Moderate	Low
Recreation	Low – boating which will be unaffected by designation	Low	Nil			Low	Nil	Moderate
Research and Education	Moderate – a single feature of interest for research and education	Biological and geological features have research value but there are substitutes	Low – protection of key characteristics of site from decline, improving future research opportunities			Low	Nil - Low	Low
Total value of changes in ecosystem services			Fish and fishery values dominate benefits; these range from low for lower scenario to moderate for upper scenarios.			Low - Moderate	Low - Moderate	Low

²² This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



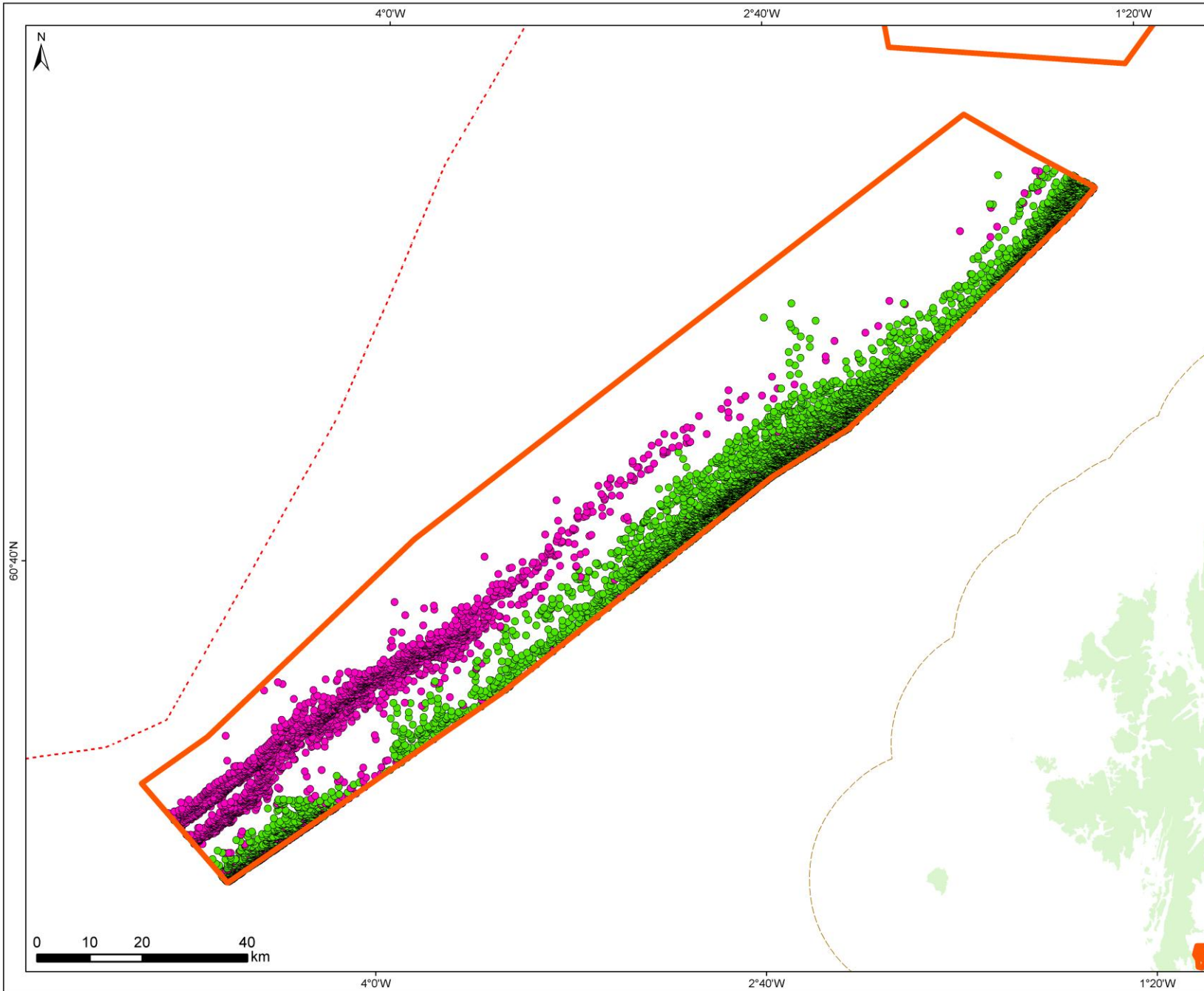
- Proposed Marine Protected Area
- UK Continental Shelf
- Oil & Gas**
- Hydrocarbon Fields
- Platforms
- Pipelines
- Significant Discoveries
- Carbon Capture & Storage**
- Potential Hydrocarbon Reservoirs
- Telecommunication Cables**
- Subsea Telecomms Cables
- Active
- Out of Service
- Power Interconnectors**
- Existing Power Interconnectors
- Future Proposed interconnectors
- Recreational Boating**
- RYA Cruising Routes
- Light
- Recreational Anchorages

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:1,000,000	
QA		FMM	
4136MPA_HA_Faroe_Shetland_Sponge.mxd			
Produced by ABPmer			



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Human Activities which Occur within the Proposed MPA:
Faroe-Shetland Sponge Belt



- Proposed Marine Protected Area
- UK Continental Shelf
- Scottish 12 Nautical Mile Limit
- VMS Ping Data (2007 to 2011)
- Whitefish Trawls
- Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:1,000,000	
QA		FMM	
4136MPA_Fish_Faroe_Shettland_Sponge.mxd			
Produced by ABPmer			



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 Data Source: Scottish Government, 2013
 NOT TO BE USED FOR NAVIGATION

**Fishing Activities which Occur within the Proposed MPA:
 Faroe-Shetland Sponge Belt**

Firth of Forth Banks Complex (FOF)

Site Area (km²): 2130

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [FOF]					
Proposed protected features					
<p><i>Biodiversity Features</i> Ocean quahog aggregations, offshore subtidal sands and gravels, shelf banks and mounds.</p> <p><i>Geodiversity Features</i> Quaternary of Scotland – moraines.</p> <p><i>Site Description</i> The Firth of Forth Banks Complex proposed MPA is in offshore waters and comprises three different parts (northern southern and western) and encompasses four shelf bank and mound features in the Firth of Forth.</p> <p><i>Potential Alternative Designations</i> At the request of Marine Scotland, JNCC have proposed science-based alternatives to the ocean quahog aggregations proposed protected feature (Norwegian Boundary Sediment Plain) and the shelf banks and mounds and offshore subtidal sands and gravels proposed protected features (Turbot Bank) of the Firth of Forth Banks Complex possible MPA.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Ocean quahog aggregations	All scenarios: 2128.71	Yes (Northumberland Coast Marine Biodiversity Project data, 1999 – 2001; JNCC Firth of Forth Banks Complex Survey, 2011)	Partial	Low	Conserve (uncertain)
Offshore subtidal sands and gravels	All scenarios: 2128.71	Yes (UK SeaMap, 2010; BGS PSA, provided 2012; JNCC Firth of Forth Banks Complex Survey, 2011)	Yes	Low	Conserve (uncertain)

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Shelf banks and mounds		Yes (UKHO Admiralty Charts; NOC)	Yes	Low	Conserve (uncertain)
Geodiversity Features					
Quaternary of Scotland – moraines	493.18	Yes	Yes	Low	Conserve (uncertain)
<p>Key: * Estimated area based on best available data</p> <p>References:</p> <p>Area of Features: GeMS</p> <p>Confidence in biodiversity feature presence and extent: JNCC (2012d), JNCC (2011)</p> <p>Confidence in biodiversity feature condition: JNCC (2013) pers. comm.</p> <p>Confidence in geodiversity feature presence and extent: Brooks et al. (2012)</p> <p>Confidence in geodiversity feature condition: Brooks et al. (2012)</p>					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [FOF]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries*	0.000	4.175	4.803
Energy Generation	0.070	0.070	43.440
Military	See national costs	See national costs	See national costs
Total Quantified Economic Costs	0.070	4.245	48.243
Non-Quantified Economic Costs			
Commercial Fisheries	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts.
Energy Generation	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Micro-siting of turbines; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Military	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment.
Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.			

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Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [FOF]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	0.005	0.005
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.007	0.007	0.007
Total Quantified Public Sector Costs	0.007	0.012	0.012
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [FOF]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 6 jobs Upper: 7 jobs	West North East North East South South North West West North	Ayr Buckie Peterhead Poole Brixham Oban Milford Haven Scrabster	Impacts concentrated in rural and urban coastal areas	Whitefish trawls Whitefish seines Dredges Other gears	Lower: N/A Upper: >15m	No Impact.	No Impact.	Unlikely to be employed in fisheries.
If any energy generation developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).										
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [FOF]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use of natural environment	Moderate. Protected features which make a contribution to MPA network have non-use values.	Nil - Moderate
Other Benefits		
None identified.		
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [FOF]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Ocean quahog	-	-	-	-	-	-	L/I/U	L/I/U	L/I/U	L/I/U	-	L/I/U	L/I/U	-	-	-	L/I/U
Offshore subtidal sands and gravels	-	-	-	-	-	-	L/I/U	L/I/U	L/I/U	L/I/U	-	L/I/U	L/I/U	-	-	-	L/I/U
Shelf Banks and Mounds	With the exception of those bank and mound features representative of moraines, the feature is not considered sensitive to pressures associated with marine activities and, therefore, is not considered further.																
Geodiversity Features																	
Quaternary of Scotland – moraines	These overlap with the distribution of offshore subtidal sands and gravels in the MPA proposal and it is considered that the management options presented for offshore subtidal sands and gravels will be similar for this geodiversity interest.																
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed protected feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed protected feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity)		[FOF]	
<p>According to VMS-based estimates and ICES rectangle landings statistics, dredgers, otter trawls (nephrops, whitefish and other) and whitefish seines (over-15m vessels) and nephrops trawls, pots, dredgers, other trawls, whitefish trawls, hand fishing, lines and nets (under-15m vessels) operate within the FOF proposed MPA. The value of catches from the FOF area was £483,000 (over-15m vessels) and £248,000 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). For the over-15m fleet, dredgers operate in particular in the western component of FOF, with whitefish trawls and other trawls operating across the area.</p> <p>The feature extents for ocean quahog and offshore subtidal sands and gravels extend across the whole proposed MPA boundary in the intermediate and upper scenarios. Dredging, trawling, seining and static gear use therefore overlap with both proposed protected features under both the intermediate and upper scenarios. Management scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and based on JNCC advice. Using this information, the potential cost impacts of management measures have been assessed for trawls and dredges.</p> <p>Non-UK VMS ping data indicate that 7 non-UK vessels were active in the FOF area in 2012, all from Denmark. Based on the EU vessel register, it appears that two of these vessels fish with bottom trawls and therefore would be impacted by the management measures assessed under the intermediate and upper scenarios.</p> <p>Provisional ScotMap data indicate that the annual average earnings from the FOF proposed MPA was £191,800, with over 70% of this from pots (predominantly for lobster). The spatial distribution of value from the under-15m ScotMap data indicates that the majority of value in the FOF proposed MPA and surrounding area is derived from closer inshore in the Firth of Forth area, indicating that the estimates of value of landings from the ICES rectangle data is likely to over-estimate the impact on the under-15m sector. The coverage for ScotMap interviews in the region was 85.2% (total value of reported landings from the Fisheries Information Network for those vessels included in the ScotMap value analysis expressed as a percentage of the total reported landings for all vessels <15m). Therefore the ScotMap estimate is likely to slightly under-represent the value of fishing by under-15m vessels, but the spatial representation of the value of fishing is fairly robust due to the high level of coverage.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No additional management. 	<ul style="list-style-type: none"> ▪ Closure to beam trawls and dredges (gears likely to impact on ocean quahog) across the full extent of MPA; 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom contact gears (whitefish, nephrops and other trawls and seines, beam trawls and

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
		<ul style="list-style-type: none"> ▪ Reduce other mobile bottom contact gear (whitefish, nephrops and other trawls and seines) pressure by 50% across MPA. 	dredges) across full extent of MPA.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million): <ul style="list-style-type: none"> ▪ Whitefish trawls (0.001); ▪ Dredges (0.410); ▪ Other affected gears (0.035). ▪ Loss of <15m fishing income (annual values, £ million): <ul style="list-style-type: none"> ▪ All affected gears (0.075). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million): <ul style="list-style-type: none"> ▪ Whitefish trawls (0.003); ▪ Dredges (0.410); ▪ Other affected gears (0.071). ▪ Loss of <15m fishing income (annual values, £ million): <ul style="list-style-type: none"> ▪ All affected gears (0.138).
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (2 vessels)); and ▪ Displacement impacts (additional fishing pressure on other areas, potential conflict with other vessels, additional steaming time/fuel costs). 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (2 vessels)); and ▪ Displacement impacts (additional fishing pressure on other areas, potential conflict with other vessels, additional steaming time/fuel costs).
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	10.425	12.417
Average annual costs	0.000	0.521	0.621
Present value of total costs (2014–2033)	0.000	7.668	9.133
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.000	5.676	6.530
Average annual change to GVA	0.000	0.284	0.327
Present value of total change in GVA (2014–2033)	0.000	4.175	4.803
Direct and Indirect reduction in Employment	0.0 jobs	5.9 jobs	7.1 jobs
<p>Total costs = Sum of one-off costs and recurring costs arising as a result of management measures for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4b. Energy Generation **[FOF]**

There are no energy generation activities currently operating within the FOF proposed MPA boundary or corresponding buffer zones. Thus, economic costs and management measures associated with energy generation in this proposed MPA are described in light of known possible future developments.

In 2012, Seagreen Wind Energy Limited (Seagreen) submitted separate applications to the Scottish Government for consent to construct two offshore wind farms (Project Alpha and Project Bravo, 525MW each) in the Firth of Forth Offshore Wind Zone (Phase 1). Project Alpha and Project Bravo overlap the western and northern parts of the FOF proposed MPA boundary, respectively. Buffer zones (1km) around possible export cable routes from these potential wind farm developments could overlap the FOF proposed MPA boundary. Nevertheless, any associated costs of Phase 1 are considered sunk as the application process has the potential to be concluded prior to 2014. Similarly, the consent application has been submitted for the Neart Na Gaoithe (Mainstream Renewable Power) wind farm development which lies within a 5km buffer zone around the proposed MPA, but any associated costs are effectively sunk (as above).

Seagreen’s plans are ongoing regarding the development of two further areas of the Firth of Forth Offshore Wind Zone (Phases 2 and 3, up to 2.6GW combined capacity). Phase 2 is planned to comprise three wind farms (Seagreen Charlie, Seagreen Delta and Seagreen Echo) and Phase 3 is planned to comprise two wind farms (Seagreen Foxtrot and Seagreen Golf). The areas considered for Phases 2 and 3 overlap the southern and western parts of the FOF proposed MPA. Approximately 57.4km² (6.2%) of Phase 2 would overlap the western and southern parts and approximately 502.8 km² (67.2%) of Phase 3 would overlap the western part. Additional licence application costs may be incurred in order to assess potential impacts to MPA features (ocean quahog aggregations (OSPAR listed) and offshore subtidal sands and gravels (UK BAP listed)) for Phases 2 and 3 under all scenarios, as well as additional survey costs. Therefore, should Seagreen successfully obtain permission(s) to construct Phases 2 and 3 within the FOF proposed MPA boundary, additional management measures may be required. Buffer zones (1km) around possible export cable routes from Firth of Forth Offshore Wind Zone developments overlap ocean quahog aggregations and offshore subtidal sands and gravels within the FOF proposed MPA boundary.

The Inch Cape (Repsol Nuevas Energías UK) wind farm development (pre-application) lies within a 5km buffer zone around the proposed MPA and, therefore, may incur additional costs to assess the potential impacts to the proposed protected features (ocean quahog aggregations and offshore subtidal sands and gravels) under the intermediate and upper scenarios.

It should be noted that additional cost impacts could also arise as a result of consenting delays. The cost impacts and uncertainty associated with MPA designation may affect investor confidence.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to ocean quahog aggregations and offshore subtidal sands and gravels within 1km of proposed activities. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to ocean quahog aggregations and offshore subtidal sands and gravels within 5km of proposed activities. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to ocean quahog aggregations and offshore subtidal sands and gravels within 5km of proposed activities; ▪ Additional survey costs incurred to inform new licence applications; ▪ Use of graded scour protection around turbine foundations; and ▪ Micro-siting of infrastructure in less sensitive areas using data held by JNCC on seabed habitat types and data

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k per licence application (up to 6 in total). Application(s) estimated to be submitted in 2014 (Seagreen Charlie, Seagreen Delta, Seagreen Echo and Inch Cape) and 2016 (Seagreen Foxtrot and Seagreen Golf). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k per licence application (up to 6 in total). Application(s) estimated to be submitted in 2014 (Seagreen Charlie, Seagreen Delta, Seagreen Echo and Inch Cape) and 2016 (Seagreen Foxtrot and Seagreen Golf). 	<p>collected by operators.</p> <ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k per licence application (up to 6 in total). Application(s) estimated to be submitted in 2014 (Seagreen Charlie, Seagreen Delta, Seagreen Echo and Inch Cape) and 2016 (Seagreen Foxtrot and Seagreen Golf); ▪ Additional survey costs - £5k per km² of development; and ▪ Costs of graded scour protection - £0.35m per Gravity Base Structure - Phase 2 (6.2% of 380 = 24) and Phase 3 (67.2% of 169 = 114) for Firth of Forth Offshore Wind Zone – assumed to be incurred in 2016 and 2017 (Phase 2) and 2019 and 2020 (Phase 3).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Micro-siting of turbines; and ▪ Costs of project delays during consenting; risk of deterrent to investment.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.072	0.072	51.173
Average annual costs	0.004	0.004	2.559
Present value of total costs (2014–2033)	0.070	0.070	43.440
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>			

Table 4c. Military				[FOF]
<p>Two military practice areas: St Andrews (D609; sonobuoy, missile and firing) and area D609 (firing danger area) overlap with the northern part of the FOF proposed MPA. Both of these military practice areas overlap with ocean quahog aggregations (all scenarios) and offshore subtidal sands and gravels (all scenarios).</p> <p>Three military practice areas: Firth of Forth (middle) (X5641), Firth of Forth outer (outer) (X5642) and a submarine exercise area overlap with the western component of the FOF proposed MPA. All three military practice areas overlap with ocean quahog aggregations (all scenarios) and offshore subtidal sands and gravels (all scenarios).</p> <p>Five military practice areas: St Andrews (D609, sonobuoy, missile, firing), Firth of Forth (outer) (general practice area), X5642 (firing danger area), D609 (firing danger area) and a submarine exercise area overlap with the southern part of the FOF proposed MPA. All of these military practice areas overlap with ocean quahog aggregations (all scenarios) and offshore subtidal sands and gravels (all scenarios).</p> <p>Although the proposed protected features are vulnerable to certain MoD activities, no management options are proposed. This is because it is assumed that management relating to MoD activity will be coordinated through the MoD's Maritime Environmental Sustainability Appraisal Tool (MESAT) which the MoD uses to assist in meeting its environmental obligations. This process will include operational guidance to reduce significant impacts of military activities on MPAs. It is assumed that the MoD will incur additional costs in adjusting MESAT and other MoD environmental assessment tools in order to consider whether its activities will impact on the conservation objectives of MPAs and also incur additional costs in adjusting electronic charts to consider MPAs. However, these costs will be incurred at national level and hence no site-specific cost assessments have been made.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	
Description of one-off costs				
Description of recurring costs				
Description of non-quantified costs				
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)				
Total costs (2014–2033)	See national costs	See national costs	See national costs	
Average annual costs	See national costs	See national costs	See national costs	
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs	
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>				

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [FOF]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Water Sports - Scuba Diving	There are four dive sites located within the FOF proposed MPA — two wreck dive sites (St Briac and Burnstone) and two submarine wreck dive sites (U1020 and U12). All four dive sites overlap with both biodiversity features within the proposed MPA; No management restrictions upon this activity are considered to be required.	The added protection offered by an MPA designation and management measures placed upon sector activities may increase the aesthetic attraction of the dive sites through an improved marine ecosystem and a reduction in degradation to the wreck sites.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA [FOF]	
Activity	Description
Oil and Gas	Two abandoned oil wells are present in the northern part of the FOF proposed MPA boundary; wells 26/14-01 and 26/08-01. There are no awarded licence blocks currently within any part of the FOF proposed MPA boundary. The feature extents for both ocean quahog aggregations and offshore subtidal sands and gravels under the lower, intermediate and upper scenarios overlap with the abandoned wells and licence blocks, although no cost impacts are foreseen as there is no current or future activity anticipated.
Power Interconnectors	One future power interconnector (Eastern HVDC Link) overlaps with the southern part of the FOF proposed MPA for a distance of 26.2km and one future power interconnector (Norway-England connector) potentially overlaps with the western part of the FOF proposed MPA for a distance of 5.5km. Both these future power interconnectors overlap with ocean quahog aggregations (all scenarios) and offshore subtidal sands and gravels (all scenarios). However no cost impacts are foreseen as the site is located beyond the 12 nautical mile threshold (within which licences are required for cables).
Recreational Boating	Two medium RYA cruising routes (RYA Route/RYA Scotland and RYA North East Region) overlap with the 'ocean quahog aggregations' (all scenarios) and the 'offshore subtidal sands and gravels' (all scenarios) feature extents in the southern and western parts of the FOF proposed MPA for a length of 28km and 66km, respectively. It is unlikely there would be a significant interaction between the ocean quahog aggregations or the offshore subtidal sands and gravels features and recreational boating and so no cost impacts are expected.

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [FOF]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.00m Intermediate: £0.52m Upper: £0.62m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: £0.28m Upper: £0.33m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: x (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 5.9 jobs Upper: 7.1 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Loss of value of catches from non-UK vessels using bottom contact mobile gears in the proposed MPA (Denmark (2 vessels))	Not quantified	Employment – loss of foreign jobs from reduced landings.		
	Displacement Effects	Not quantified	Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences: <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and 		x

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			<p>adaption costs, additional quota costs);</p> <ul style="list-style-type: none"> ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited; ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		
Energy Generation	Additional operational costs	Quantified Cost Impact (2014–2033): £0.070 – 43.440m	Future employment opportunities – if increased operational costs associated with management measures render projects unviable or restrict project size there will be a negative impact on economic activity and job creation in this sector.		xxx (under the upper scenario only)
	Costs associated with delays during the consenting process Loss of investor confidence (developments do not proceed)	Not Quantified	<p>Future employment opportunities – if the delays deter investments there will be a negative impact on economic activity and future job creation in this sector.</p> <p>Environment – possible negative impact in relation to climate change and the ability of the Scottish Government to meet its 2020 renewables targets, decarbonisation targets and climate change targets. There would also be consequent financial implications of climate change impacts.</p> <p>This impact is uncertain and is only likely to arise under the upper scenario. JNCC’s current advice is that the intermediate scenario represents their best view on management requirements.</p>		xxx (under the upper scenario only)
<p>Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [FOF]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries Reduction in landed value, GVA and employment	x North-East North-West East	x Largest employment impacts in: Ayr (56%), Buckie (14%), Peterhead (6%), Poole (5%), Brixham (5%), Oban (4%), Milford Haven (3%), Scrabster (2%)	x Coastal Urban and Rural	0	0	xx Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0 0-7.1 job losses	0
Fish Processors Reduction in local landings at landing ports	x North-East North-West East	x Aberdeen Montrose Peterhead Fraserburgh Buckie Arbroath Eyemouth	x Coastal Urban and Rural	0	0	0	0	0

Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.
 * Based on value of landings by home port affected under intermediate scenario.

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [FOF]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: >15m	Whitefish trawls Whitefish seines Dredges Other gears	0	0	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	0	0
Fish Processors Reduction in local landings at landing ports		Shellfish: xxx Demersal: xx Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

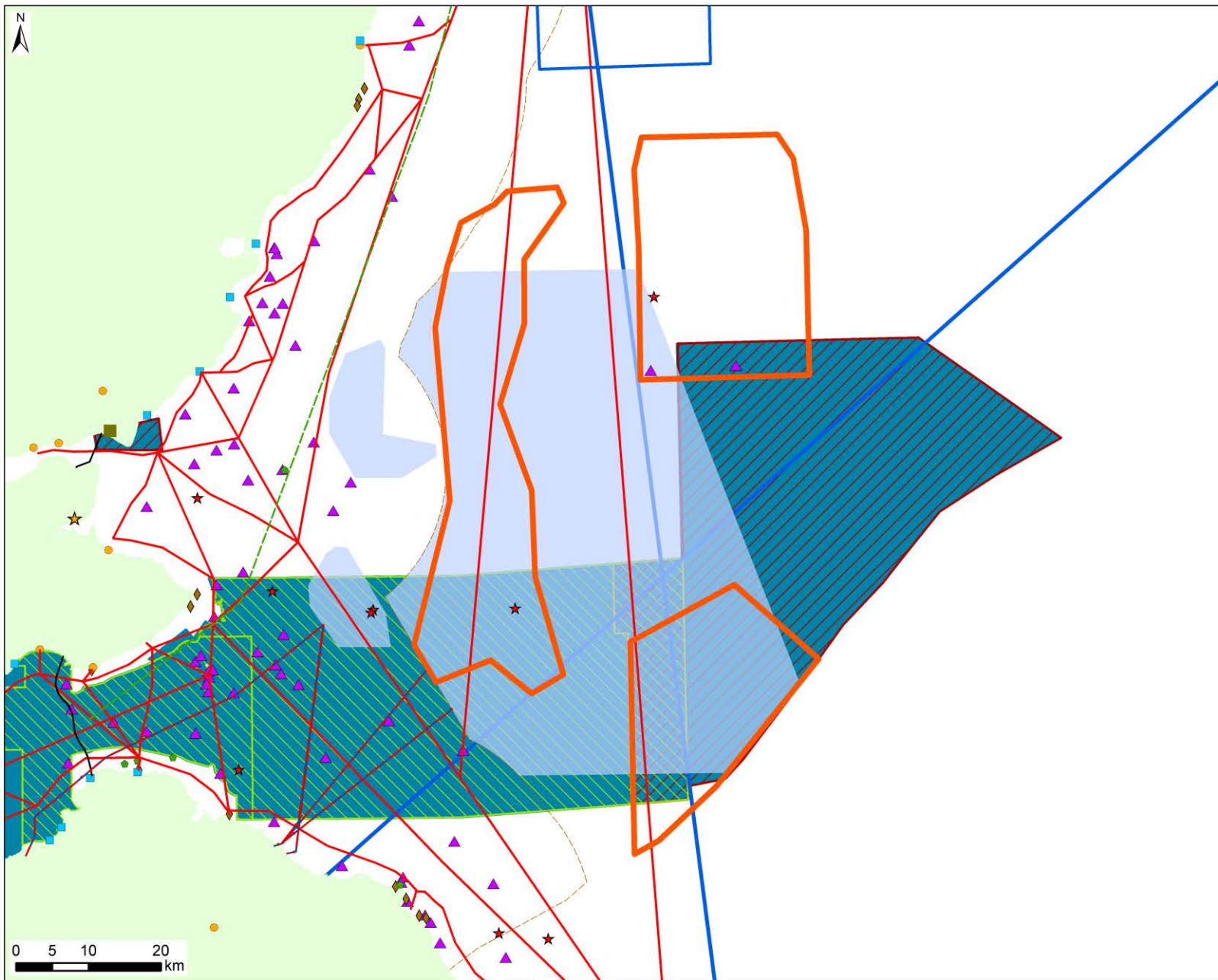
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [FOF]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Ocean quahog aggregations	Provides representation for an area of the species in the only OSPAR Region it is recorded within in offshore waters adjacent to Scotland – OSPAR Region II. Firth of Forth Banks Complex is a relatively data-rich area for the species.	Provides one of at least three recommended examples to be protected in Scotland's seas.	Not currently understood for ocean quahog.	Provides representation at the south-western extent of its range in OSPAR Region II in Scotland's seas.	Ocean quahog is listed as Threatened and/or Declining by the OSPAR Commission in OSPAR Region II so the MPA is expected to help increase resilience for the feature.
Offshore subtidal sands and gravels	Provides representation for a range of different types of offshore subtidal sand and gravel habitats on the continental shelf in OSPAR Region II. Firth of Forth Banks Complex is a relatively data-rich area for the habitat.	Provides one of at least two recommended examples to be protected on the continental shelf in OSPAR Region II in Scotland's seas.	Not currently understood for offshore subtidal sands and gravels.	Provides representation at the south-western extent of its range on the continental shelf in OSPAR Region II in Scotland's seas.	Offshore subtidal sands and gravels are widely distributed across offshore waters in Scotland's seas.
Shelf banks and mounds	Provides representation for shelf bank and mound features considered to be of wider functional significance to the health and diversity of Scotland's seas, e.g. seabird and marine mammal foraging grounds.	Provides representation for one of at least two recommended areas to be included in the MPA network for shelf banks and mounds considered to be of wider functional significance in Scotland's seas.	The shelf banks and mounds in the Firth of Forth Banks area harbour relatively large numbers of sandeel, which are important for foraging seabirds and marine mammals. The banks also impinge on local current systems, increasing mixing in the water column and subsequently primary production in the area.	Provides representation at the south-western extent of the range of the feature in OSPAR Region II in Scotland's seas.	Shelf banks and mounds are fairly widely recorded across Scotland's seas.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ²³ [FOF]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Stocks not at MSY and unlikely to recover	Nil	Low - Small recovery of fish stocks in medium to long term.		Moderate – Site fishing grounds are of moderate value	Nil - Low	Moderate
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Nil - Low	Nil - Low	Nil, or at best a very low level of change to protection of parts of ecosystem providing these services			Low	Nil - Low	High
Natural hazard protection	Nil	Nil				Low	Nil	High
Regulation of pollution	Nil - Low	Nil - Low				Low	Nil - Low	High
Non-use value of natural environment	Moderate – wrecks and protected features, and contribution of the site to MPA network, have non-use value.	Non-use value of the site may decline	Nil, no change in key characteristics of site	Low – protection of key characteristics of site from minor decline	Moderate – protection of key characteristics of site from decline, and/or allowing some recovery of values	Moderate	Nil - Moderate	Low
Recreation	Low - Moderate	4 active dive sites	Nil	Low – slightly higher biodiversity encountered by divers		Low - Moderate	Low	Moderate
Research and Education	Low - Moderate	Biological and geological features have research value but there are substitutes	Nil, no change in key characteristics of site	Low – protection of key characteristics of site from decline, improving future research opportunities		Low	Nil - Low	Low
Total value of changes in ecosystem services			No real impact for lower scenario, low for intermediate and moderate for upper scenarios				Low - Moderate	Low

²³ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



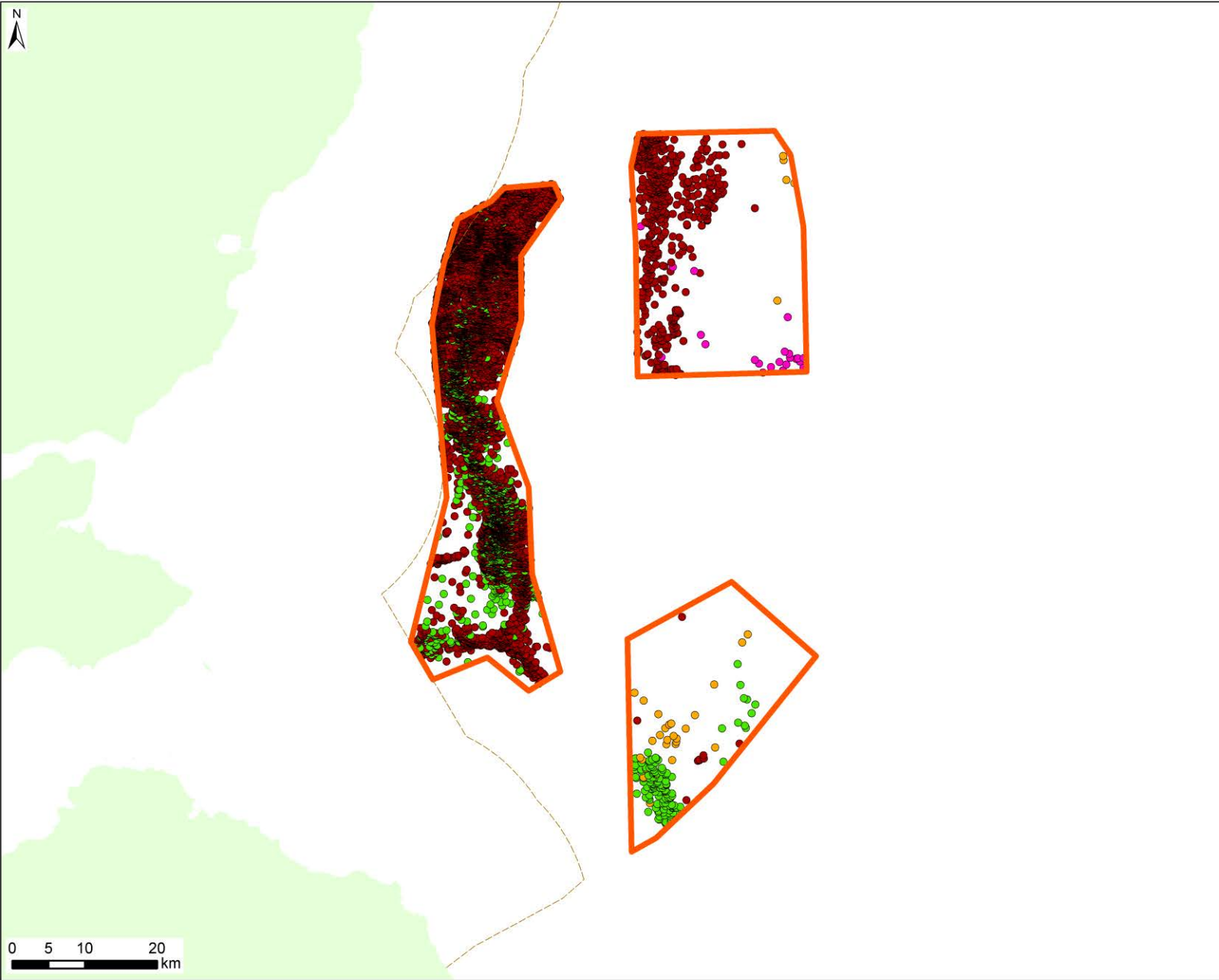
- Proposed Marine Protected Area
- Military Coastal Locations**
- Army base
- ★ RAF base
- Energy Generation**
- Draft Plan Option Areas - Wind
- R1 & R2 Export Cable Routes
- Existing Cable Route
- Power Interconnectors**
- Future Planned Interconnectors
- Oil & Gas**
- Pipelines
- Carbon Capture & Storage**
- Potential Pipeline
- Recreational Boating**
- RYA Cruising Routes
- Medium
- Wind Surfing Sites
- Dinghy Sailing Sites
- Scenic Boat Dive Sites
- ◆ Shore Dive Sites
- ★ Submarine Dive Sites
- ▲ Wreck Dive Sites
- R1, R2 & R3 wind lease areas
- Military Practice Areas**
- Firing Danger Areas
- Submarine Exercise Area
- Other Exercise Areas

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System	WGS 1984 UTM Zone 30N		
Projection	Transverse Mercator		
Scale	1:750,000		
QA	FMM		
4136-MPA_HA_Firth_Forth.mxd			
Produced by ABPmer			



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**Human Activities which Occur within the Proposed MPA:
Firth of Forth Banks Complex**



- Proposed Marine Protected Area
- Scottish 12 Nautical Mile Limit
- VMS Fishing Ping Data (2007 to 2011)
- Whitefish Trawls
- Whitefish Seines
- Dredges
- Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:750,000	
QA		FMM	
4136-MPA_Fish_Firth_Forth.mxd			



Produced by ABPmer
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 Data Source: Scottish Government, 2013
 NOT TO BE USED FOR NAVIGATION

**Fishing Activities which Occur within the Proposed MPA:
 Firth of Forth Banks Complex**

Geikie Slide and Hebridean Slope (GSH)

Site Area (km²): 2,269

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [GSH]					
Proposed protected features					
<p><i>Biodiversity Features</i> Burrowed mud, offshore subtidal sands and gravels, offshore deep sea muds, continental slope.</p> <p><i>Geodiversity Features</i> Submarine Mass Movement – slide deposits, slide scars.</p> <p><i>Site Description</i> The Geikie Slide and Hebridean Slope MPA proposal is an offshore area located to the north west of the Outer Hebrides. The possible MPA extents from the continental shelf, down the Hebridean slope and into the Rockall Trough.</p> <p><i>Potential Alternative Designations</i> The possible MPA is considered to offer an equivalent contribution to the MPA network as the South West Sula Sgeir and Hebridean Slope possible MPA. Only one of these two designations would therefore be required to be designated.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Burrowed mud	Lower: 866.75 Intermediate: 866.75 Upper: 1289.32	Partial (Marine Scotland Science survey data, 2000 – 2009).	Partial (inconsistencies between data records and predicted habitat map)	Low	Conserve (uncertain)
Offshore subtidal sands and gravels	Lower: 608.78 Intermediate: 608.78 Upper: 984.99	Yes (UK SeaMap, 2010; BSG PSA, provided 2012; Marine Scotland Science survey data, 2000 – 2009)	Partial (as above)	Low	Conserve (uncertain)

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Offshore deep sea muds	Lower: 687.72 Intermediate: 687.72 Upper: 1110.3	Yes (UK SeaMap, 2010; BSG PSA, provided 2012; Hughes <i>et al.</i> , 2011; Marine Scotland Science survey data, 2000 – 2009)	Partial (as above)	Low	Conserve (uncertain)
Continental slope	Not considered as not thought to be sensitive to pressures associated with human activity	Yes (UK SeaMap, 2010)	Partial (as above)	Low	Conserve (uncertain)
Geodiversity Features					
Submarine Mass Movement – slide deposits, slide scars	Slide Deposits: 500.86 Slide Scars: 60.92	Yes	Yes	Low	Conserve (uncertain)
<p>Key: * Estimated area based on best available data References: Area of Features: GeMS Confidence in biodiversity feature presence and extent: JNCC (2012e) Confidence in biodiversity feature condition: JNCC (2013) pers. comm. Confidence in geodiversity feature presence and extent: Brooks et al. (2012) Confidence in geodiversity feature condition: Brooks et al. (2012)</p>					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [GSH]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries*	0.000	4.937	7.058
Military	See national costs	See national costs	See national costs
Total Quantified Economic Costs	0.000	4.937	7.058
Non-Quantified Economic Costs			
Commercial Fisheries	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts.
Military	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment. 	<ul style="list-style-type: none"> ▪ See national assessment.
Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [GSH]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	0.005	0.005
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	None	None	None
Total Quantified Public Sector Costs	0.000	0.005	0.005
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [GSH]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 9 jobs Upper: 12 jobs	North East North North West North West North East	Fraserburgh Kirkwall Lochinver Mallaig Peterhead	Impacts concentrated in island, rural and urban coastal areas	Whitefish trawls, Other gears	Lower: N/A Upper: <15m (may be over-estimate)	No Impact.	No breakdown of fisherman employment by ethnic origin.	Unlikely to be employed in fisheries.
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [GSH]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Fish for human consumption	Moderate. The site provides supporting services, including contribution to food webs.	Nil - Moderate
Fish for non-human consumption		
Non-use value of natural environment		
Other Benefits		
None identified		
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [GSH]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Burrowed mud	-	-	-	-	-	-	L/I/U	-	L/I/U	-	-	-	-	-	-	-	-
Offshore subtidal sands and gravels	-	-	-	-	-	-	L/I/U	-	U	-	-	-	-	-	-	-	-
Offshore deep sea muds	-	-	-	-	-	-	L/I/U	-	L/I/U	-	-	-	-	-	-	-	-
Geodiversity Features																	
Submarine Mass Movement – slide deposits	Considered to have a low sensitivity to the pressures associated with human activities they are currently exposed and likely to be exposed to in the future; thus, not considered in the context of management.																
Submarine Mass Movement – slide scars	Considered to have a low sensitivity to the pressures associated with human activities they are currently exposed and likely to be exposed to in the future; thus, not considered in the context of management.																
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed protected feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed protected feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity) [GSH]			
<p>According to VMS-based estimates and ICES rectangle landings statistics, lines, pelagic trawls, whitefish trawls and other trawls (over-15m) and whitefish trawls, lines, pelagic trawls and other gear (under-15m vessels) operate within the GSH proposed MPA. The value of catches from the GSH area was £1.35 million (over-15m vessels) and £1.77 million (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels are predominantly into Peterhead (36% by value), Ullapool (26%), Lochinver (14%) and Kinlochbervie (8%). For the over-15m fleet, lines operate in particular in the central part of the proposed MPA, while whitefish trawlers operate to the north and south of this central area across areas of offshore deep sea mud and offshore subtidal sands and gravels.</p> <p>Non-UK VMS ping data indicate that 75 foreign vessels were active in the GSH area in 2012: 28 from Norway; 18 from France; 13 from Sweden; 9 from Ireland; 3 from the Netherlands; 2 from Germany and 1 from Denmark and from the Faroe Islands. Of the EU vessels fishing with mobile bottom contact gear (bottom trawls and seines, which may be affected by management measures assessed under the intermediate and upper scenarios), there were 6 French vessels, 4 Spanish vessels, 2 Irish vessels and 1 Danish vessel. No information on gear types used by the Norwegian or Faroese vessels was available.</p> <p>Information submitted by the French ministry indicated that 15 vessels in 2008, and 14 vessels in 2011, fished in the proposed MPA area. These were predominantly demersal trawlers and predominantly 24-40m, with some netters, purse seiners and pelagic trawlers. Target species were hake, black scabbardfish, anglerfish, grenadiers and blue ling, with catches worth €1.518 million in 2008 and €1.471 million in 2011. The vessels originated from Lorient, Boulogne-sur-Mer, Bayonne, Fécamp Concarneau and La Rochelle ports, but had their home ports at Lochinver, Lorient, Concarneau, Ullapool, Scrabster, Castletown, Ijmuiden and Calais (in 2011). Between 3 and 5% of their turnover was dependent on fishing in the proposed MPA area, and they accounted for 201 FTE jobs on board in 2011.</p> <p>Provisional ScotMap data do not indicate any under-15m vessel activity in the GSH proposed MPA. The cost estimates for the under-15m sector may be overestimates, as the 'under-15m' length group in the ICES rectangle landings data may include cases where information on vessel length and/or administrative port is missing from landings returns.</p> <p>Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and based on JNCC recommendations.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No additional management. 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls) 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
		and dredges) across the MPA, with the exception of depth corridors where all gears are permitted between 300-600m and 1200-1500m depth.	trawls and dredges) across full extent of MPA.
Description of one-off costs	▪ None.	▪ None.	▪ None.
Description of recurring costs	▪ None.	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.441). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.341). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.480). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.611).
Description of non-quantified costs	▪ None.	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (France (6 vessels), Spain (4 vessels), Ireland (2 vessels), Denmark (1 vessel), and possibly Norway (28 vessels) and Faroe Islands (1 vessel)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (France (6 vessels), Spain (4 vessels), Ireland (2 vessels), Denmark (1 vessel), and possibly Norway (28 vessels) and Faroe Islands (1 vessel)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	15.633	21.807
Average annual costs	0.000	0.782	1.090
Present value of total costs (2014–2033)	0.000	11.498	16.039
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.000	6.713	9.596
Average annual change to GVA	0.000	0.336	0.480
Present value of total change in GVA (2014–2033)	0.000	4.937	7.058
Direct and Indirect reduction in Employment	0.0 jobs	8.9 jobs	12.4 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4b. Military				[GSH]
<p>Three military exercise areas (Hebrides (missile firing, pilotless target aircraft) and two firing danger areas (both labelled D701A but comprising two areas)) overlap with the GSH proposed MPA. The Hebrides military practice area overlaps with burrowed mud (all scenarios), offshore deep sea muds (all scenarios) and offshore subtidal sands and gravels (upper scenario only). Both firing danger areas overlaps with burrowed mud (all scenarios) and offshore deep sea muds (all scenarios). One of the firing ranges also overlaps with offshore subtidal sands and gravels (upper scenario only).</p> <p>The features and associated habitats which overlap with the military practice areas have not been described as vulnerable to MoD activities in this proposed MPA. It is assumed that management relating to MoD activity will be coordinated through the MoD's Maritime Environmental Sustainability Appraisal Tool (MESAT) which the MoD uses to assist in meeting its environmental obligations. This process will include operational guidance to reduce significant impacts of military activities on MPAs. It is assumed that the MoD will incur additional costs in adjusting MESAT and other MoD environmental assessment tools in order to consider whether its activities will impact on the conservation objectives of MPAs and also incur additional costs in adjusting electronic charts to consider MPAs. However, these costs will be incurred at national level and hence no site-specific cost assessments have been made.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	<ul style="list-style-type: none"> ▪ See National Assessment. 	
Description of one-off costs				
Description of recurring costs				
Description of non-quantified costs				
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)				
Total costs (2014–2033)	See national costs	See national costs	See national costs	
Average annual costs	See national costs	See national costs	See national costs	
Present value of total costs (2014–2033)	See national costs	See national costs	See national costs	
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>				

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA				[GSH]
Activity	Lower Estimate	Intermediate Estimate	Upper Estimate	
None identified.				

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA		[GSH]
Activity	Description	
None identified.		

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [GSH]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.00m Intermediate: £0.78m Upper: £1.09m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: £0.34m Upper: £0.48m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: xx (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 8.9 jobs Upper: 12.4 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (France (6 vessels), Spain (4 vessels), Ireland (2 vessels), Denmark (1 vessel), and possibly Norway (28 vessels) and Faroe Islands (1 vessel))	Not quantified		Employment – loss of foreign jobs from reduced landings.	

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [GSH]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
	Displacement Effects	Not quantified	<p>Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences:</p> <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited; ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		xx
<p>Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [GSH]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries	xx	xx	xx	xxx	xxx	xx	xxx	xxx
Reduction in landed value, GVA and employment	North-East North North-West	Largest employment impacts in: Fraserburgh (72%), Kirkwall (8%), Lochinver (8%), Mallaig (8%), Peterhead (3%)	Coastal and Island Urban and Rural	Potentially significant negative effect if parent loses job/becomes unemployed.	Potentially significant negative effect if individuals lose job/become unemployed.	Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0-12 job losses Potentially significant negative effect on individuals that lose job/ become unemployed.	Potentially significant negative effect if member of household loses job/ becomes unemployed.
Fish Processors	xx	xx	xx	xx	xx	0	xx	xx
Reduction in local landings at landing ports	North-East North-West North	Peterhead Kinlochbervie Scrabster Ullapool Lochinver Fraserburgh	Coastal Urban and Rural					
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [GSH]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: <15m (may be over-estimate)	Whitefish trawls Other gears	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Fish Processors Reduction in local landings at landing ports		Shellfish: xx Demersal: xxx Pelagic: 0	xx	xx	0	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

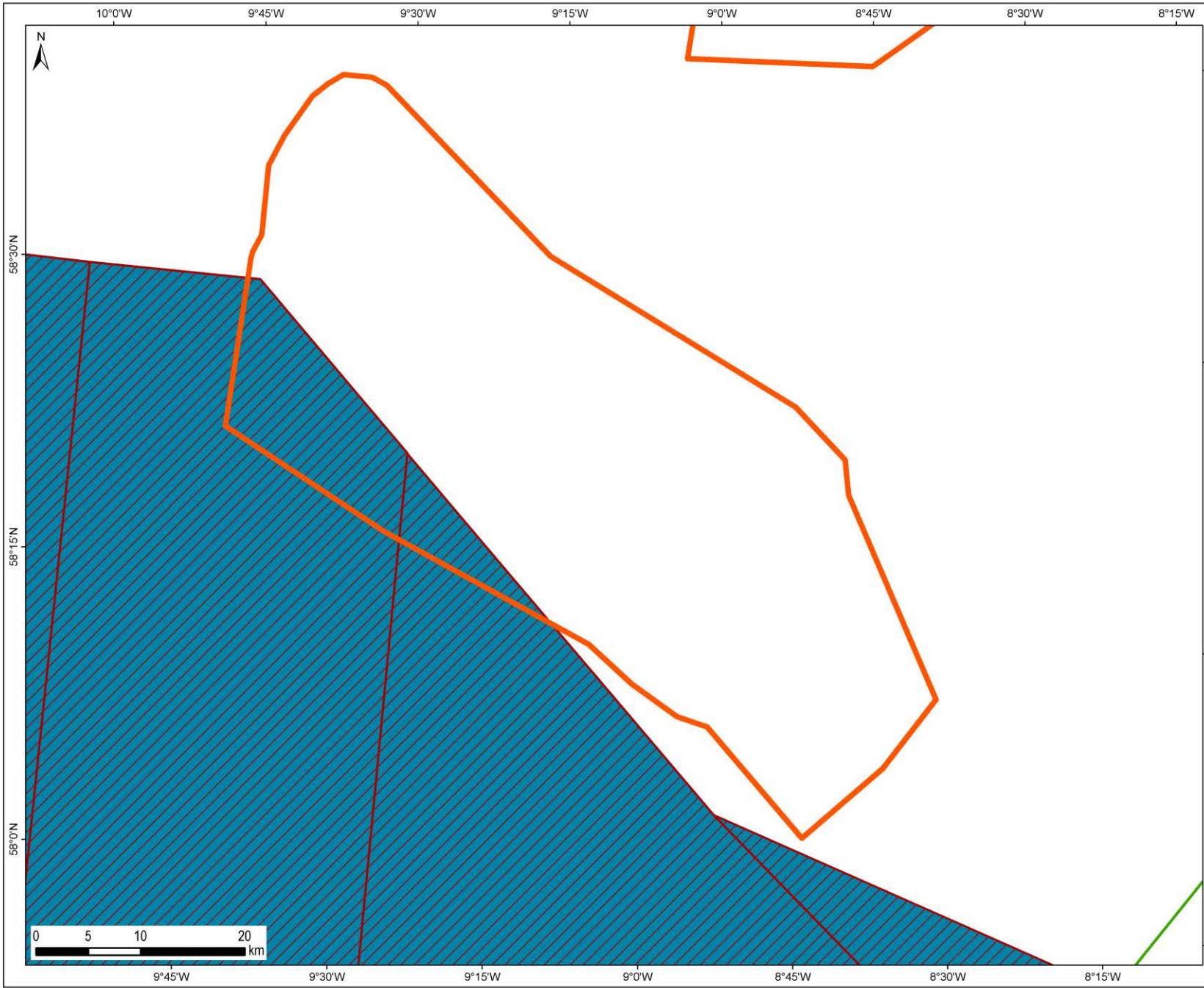
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [GSH]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Burrowed mud	Provides representation for the seapens and burrowing megafauna type of burrowed mud in OSPAR Region V at the northern extent of its geographical range on the Hebridean slope.	Makes a contribution to one of at least two recommended areas of this type of burrowed mud in OSPAR Region V in Scotland's seas.	Not currently understood for burrowed mud.	Provides representation at the northern extent of its range on the continental slope and off the shelf in OSPAR Region V in Scotland's seas.	Burrowed mud is considered to be Threatened and/or Declining by the OSPAR Commission in OSPAR Region V so the MPA is expected to help increase resilience for the feature.
Offshore deep sea muds	Provides representation for Atlantic-influenced offshore deep sea mud habitats on the slope in OSPAR Region V.	Represents one of at least two examples of slope Atlantic-influenced offshore deep sea mud habitats recommended for protection in OSPAR Region V.	Not currently understood for offshore deep sea muds.	Provides representation of Atlantic influenced offshore deep sea muds at the northern extent of their range in OSPAR Region V.	Offshore deep sea muds are fairly widely recorded across offshore waters in Scotland's seas.
Offshore subtidal sands and gravels	Provides representation for Atlantic-influenced offshore subtidal sand and gravel habitats predominantly on the slope in OSPAR Region V, but also to a small extent on the shelf in OSPAR Region III.	It represents one of at least two recommended examples of Atlantic influenced slope and shelf offshore, subtidal sand and gravel habitats to be protected in OSPAR Regions V & III respectively.	Not currently understood for offshore subtidal sands and gravels.	Provides representation at the northern extent of its range on the continental slope and on the shelf in OSPAR Regions V & III respectively in Scotland's seas.	Offshore subtidal sands and gravels are fairly widely recorded across offshore waters in Scotland's seas.
Continental slope	The possible MPA provides representation for one of two recommended areas of the Scottish continental slope to be included within the MPA network.	The Hebridean slope is considered ecologically and hydrographically distinct to the Faroe-Shetland Channel slope and so the recommendation is for at least one example of each area of the slope to be included.	Not currently understood for the continental slope.	The Hebridean slope is considered ecologically and hydrographically distinct to the Faroe-Shetland Channel slope. This possible MPA represents one example of the Hebridean slope.	The continental slope occurs between Scotland's shelf and off-shelf environment.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ²⁴ [GSH]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Stocks not at MSY	Nil	Low - Moderate, promotes stocks in medium/long term. Features provide moderate level of supporting services to support recovery.		High – fishing grounds are of high value	Nil - Moderate	Moderate
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Nil - Low	Nil - Low	Nil, or at best a very low level of protection of parts of ecosystem providing these services.			Low	Nil - Low	High
Natural hazard protection	Nil - Low	Nil - Low				Low	Nil - Low	High
Regulation of pollution	Nil - Low (although does regulate sediment quality)	Nil - Low				Low	Nil - Low	High
Non-use value of natural environment	Low - Moderate	Low - Moderate	Nil - Low	Low	Low - Moderate	Low - Moderate	Low - Moderate	Low
Recreation	Nil	Nil	Nil			Low	Nil	Moderate
Research and Education	Minimal	Minimal	Minimal	Low	Low	Low	Minimal	Low
Total value of changes in ecosystem services			Change in values are dominated by those services that support fish, this is only present for intermediate and upper scenarios.				Moderate	Moderate

²⁴ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



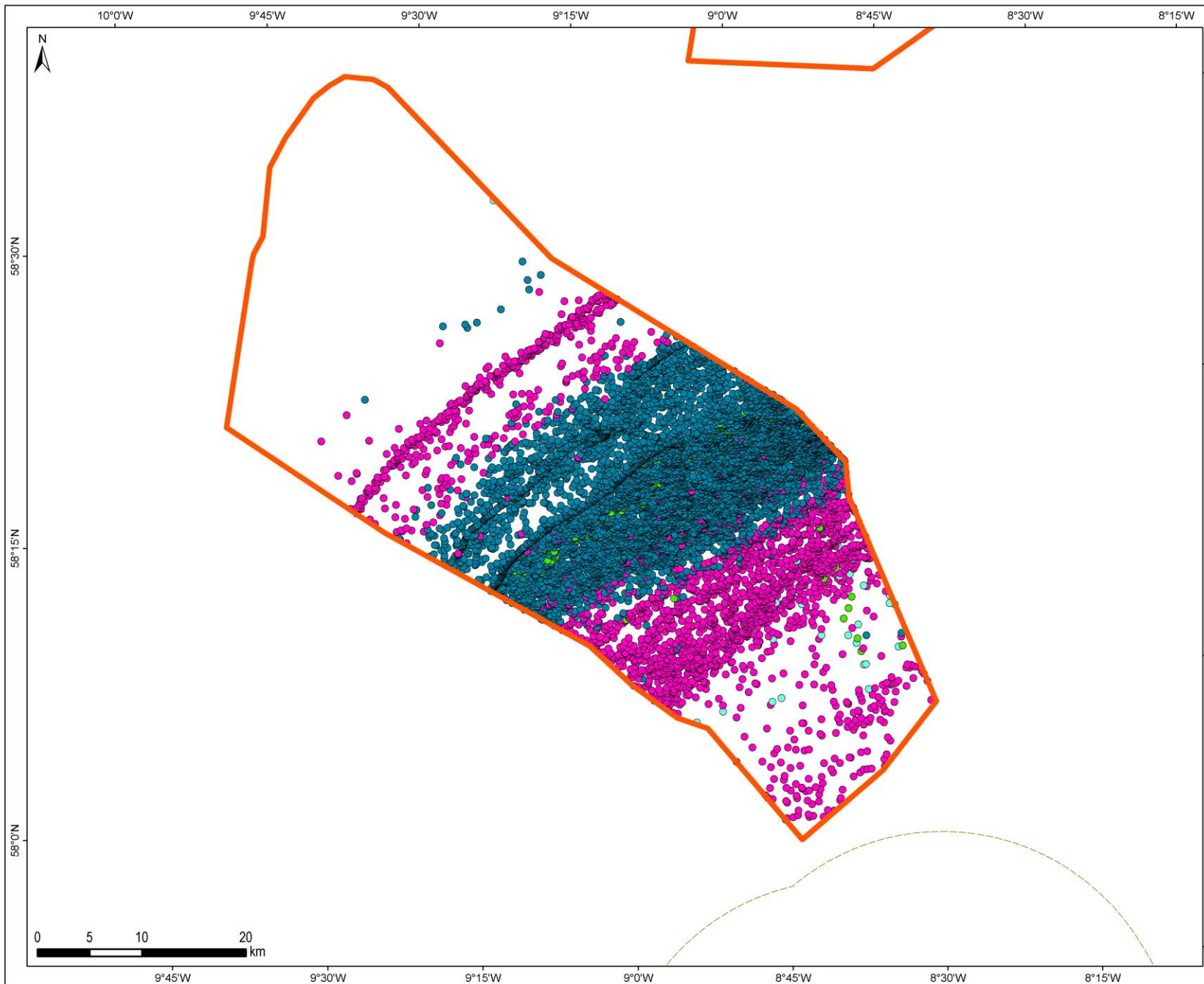
- Proposed Marine Protected Area
- Military Practice Areas**
- Firing Danger Areas
- Other Exercise Areas
- Energy Generation**
- Draft Plan Option Areas - Wave

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:500,000	
QA		FMM	
4136-MPA_HA_Geik_SlideHebridean			
Produced by ABPmer			



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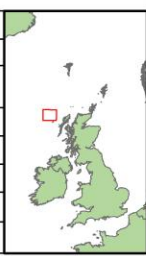
Human Activities which Occur within the Proposed MPA:
Geikie Slide and Hebridean Slope



- Proposed Marine Protected Area
- Scottish 12 Nautical Mile Limit
- VMS Fishing Pings (2007 to 2011)
 - Whitefish Trawls
 - Pelagic Trawls
 - Lines
 - Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:500,000	
QA		FMM	
4136-MPA_HA_Geik_SlideHebridean			
Produced by ABPmer			



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 Data Source: Scottish Government, 2013
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**Fishing Activities which Occur
 within the Proposed MPA:
*Geikie Slide and
 Hebridean Slope***

Hatton-Rockall Basin (HRB)

Site Area (km²): 1,265

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [HRB]					
Proposed protected features					
<i>Biodiversity Features</i> Deep sea sponge aggregations; offshore deep sea muds.					
<i>Geodiversity Features</i> Marine Geomorphology of the Scottish Deep Ocean Seabed – sediment drifts, polygonal faults.					
<i>Other interests</i> Polygonal fault systems.					
<i>Site Description</i> The Hatton-Rockall Basin lies to the far west of Scotland in offshore waters and is aimed at protecting deep sea sponge aggregations and mud habitat. The site boundary encompasses an area of geodiversity interest known as polygonal fault systems and sediment drifts. The site is located offshore to the west of the Outer Hebrides.					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Deep sea sponge aggregations	Lower: 9.33 Intermediate: 9.33 Upper: 1282.88	Yes (NOC survey, 2011; Plymouth University survey, 2006)	Partial	Low	Conserve (uncertain)
Offshore deep sea muds	All scenarios: 1282.88	Yes (UK SeaMap, 2010)	Partial – based on isolated clumps of records	Low	Conserve (uncertain)
Geodiversity Features					
Marine Geomorphology of the Scottish Deep Ocean Seabed – sediment drifts, polygonal fault systems	Sediment Drift: 1282.88 Polygonal Fault Systems: no data available	Yes	Yes for sediment drifts Partial for polygonal fault systems.	Low	Conserve (uncertain)
Key: * Estimated area based on best available data References: Area of Features: GeMS Confidence in biodiversity feature presence and extent: JNCC (2012f) Confidence in biodiversity feature condition: JNCC (2013) pers. comm. Confidence in geodiversity feature presence and extent: Brooks et al. (2012) Confidence in geodiversity feature condition: Brooks et al. (2012)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [HRB]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
None identified.			
Total Quantified Economic Costs			
Non-Quantified Economic Costs			
None identified.			
Note: For detailed information on economic cost impacts on activities, see Table 4.			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [HRB]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	0.005	0.005	0.005
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	None	None	None
Total Quantified Public Sector Costs	0.005	0.005	0.005
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [HRB]									
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis						
			Location			Fishing Groups Predominantly Affected		Social Groups Affected	
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities
No social impacts are expected.									

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [HRB]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use value of natural environment	Nil - Low	Nil - Moderate
Other Benefits		
None identified.		
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [HRB]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Deep sea sponge aggregations	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L/I/U	-	-
Offshore deep sea muds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L/I/U	-	-
Geodiversity Features																	
Marine Geomorphology of the Scottish Deep Ocean Seabed – sediment drifts, polygonal fault systems	Low sensitivity so not considered in the context of management.																
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed protected feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed protected feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity)			
<p>As the proposed MPA is beyond EU fishery limits, the collection and monitoring of VMS data falls under the remit of the North East Atlantic Fisheries Commission (NEAFC) as the relevant Regional Fisheries Management Organisation. Through ICES, JNCC were provided with basic VMS vessel presence/absence data in the vicinity of the proposed MPA from 2001–2006. However, due to the extent of the data available, there was no way to distinguish steaming from fishing events. From the limited VMS evidence available for non-UK fleets, it is likely that the extent of demersal activity in this deep water area (>1000m) is negligible and, based on VMS data from UK vessels (2006 – 2011), there is no evidence of fishing activity in the HRB proposed MPA.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	-	-	-
Description of one-off costs	-	-	-
Description of recurring costs	-	-	-
Description of non-quantified costs	-	-	-
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	-	-	-
Average annual costs	-	-	-
Present value of total costs (2014–2033)	-	-	-
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	-	-	-
Average annual change to GVA	-	-	-
Present value of total change in GVA (2014–2033)	-	-	-
Direct and Indirect reduction in Employment	-	-	-
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA				[HRB]
Activity	Lower Estimate	Intermediate Estimate	Upper Estimate	
None identified.				

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are present but which would be Unaffected by Designation of the Site as an MPA [HRB]	
Activity	Description
Telecom Cables	One operational telecom cable (TAT 10B west section) overlaps with deep sea sponge aggregations (all scenarios) and offshore deep sea muds (all scenarios) within the HRB proposed MPA boundary. However, no cost impacts are foreseen as the site is located beyond the 12 nautical mile threshold (within which licences are required for cables).

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [HRB]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
None identified.					
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [HRB]								
Sector/Impact	Location			Age			Gender	
	Region	Ports	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
None identified.								
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [HRB]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m	Gear Types/Sector	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long-term Sick
None identified.								
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [HRB]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Deep sea sponge aggregations	Provides representation for deep sea sponge aggregations in OSPAR Region V.	Provides one of at least three recommended examples to be protected in Scotland's seas.	Not currently understood for deep sea sponge aggregations.	Provides representation of an ecologically distinct type of deep sea sponge aggregation - aggregations of the bird's nest sponge <i>Pheronema carpentarii</i> . This type of deep sea sponge aggregation is only recorded in this location in OSPAR Region V and not recorded anywhere else in Scotland's seas.	Deep sea sponge aggregations are considered to be Threatened and/or Declining by the OSPAR Commission in OSPAR Region V so the MPA is expected to help increase resilience for the feature.
Offshore deep sea muds	Provides representation for offshore deep-sea muds beyond the continental shelf in OSPAR Region V.	Provides one of at least two recommended examples to be protected beyond the continental shelf in OSPAR Region V in Scotland's seas. Although the existing MPA network already meets this criteria, Hatton-Rockall Basin extends representation of the feature in the network to the far-west of OSPAR Region V in Scotland's seas.	Not currently understood for offshore deep sea muds.	Although fairly well represented and protected by the existing MPA network in Scotland's seas, Hatton-Rockall Basin provides representation for offshore deep-sea muds at the far western extent of the range of the feature off the continental shelf in OSPAR Region V in Scotland's seas.	Offshore deep sea muds are fairly widely recorded across offshore waters in Scotland's seas.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

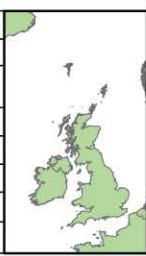
Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ²⁵ [HRB]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Nil	Nil	Nil	Nil	Minimal – no fisheries landing data provided	Nil	Low
Fish for non-human consumption		Nil						
Gas and climate regulation	Nil - Low	Nil - Low	Nil, or at best a very low level of protection of parts of ecosystem providing these services			Low	Nil - Low	High
Natural hazard protection	Nil - Low	Nil - Low				Low	Nil - Low	High
Regulation of pollution	Nil - Low	Nil - Low				Low	Nil - Low	High
Non-use value of natural environment	Moderate – protected feature, and contribution of the site to MPA network, have non-use value.	Non-use value of the site may decline	Nil, no change in key characteristics of site	Low – protection of key characteristics of site from minor decline	Moderate – protection of key characteristics of site from decline, and/or allowing some recovery of values	Moderate	Nil - Moderate	Low
Recreation	Minimal	Minimal	Minimal			Minimal	Minimal	Low
Research and Education	Polygonal faults and biodiversity of the deep sea sponges gives research interest.	Low, may decline	Nil, no change in key characteristics of site	Low – protection of key characteristics of site from minor decline		Minimal	Minimal	Low
Total value of changes in ecosystem services			Very low value partly because of little information				Minimal	Low

²⁵ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



- Proposed Marine Protected Area
- Telecommunication Cables**
- Subsea Telecomms Cables
- Active
- - - Out of Service

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:315,000	
QA		FMM	
4136-MPA_HA_Hatton_Rockall.mxd			
Produced by ABPmer			



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**Human Activities which Occur
 within the Proposed MPA:
 Hatton-Rockall Basin**

North-east Faroe-Shetland Channel (NEF)

Site Area (km²): 26,807

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [NEF]					
Proposed protected features					
<p><i>Biodiversity Features</i> Deep sea sponge aggregations, offshore deep sea muds, offshore subtidal sands and gravels, continental slope.</p> <p><i>Geodiversity Features</i> Quaternary of Scotland – prograding wedge; Submarine Mass Movement - slide deposits; Marine Geomorphology of the Scottish Deep Ocean Seabed– countourite sand/silt; Cenozoic structures of the Atlantic Margin - mud diapirs.</p> <p><i>Site Description</i> The North-east Faroe-Shetland Channel is a large offshore site situated to the north-east of the Shetland Islands towards the boundary of the MPA Project Area and the UK continental shelf, and within OSPAR Regions I & II.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Deep sea sponge aggregations	Lower: 152.59 Intermediate: 152.59 Upper: 2221.75	Yes (survey data, 2006)	Yes – assumes no disturbance since 2006; modelling suggests proposal encompasses feature extent	Low	Conserve (uncertain)
Offshore deep sea muds	All scenarios: 17761.43	Yes (UK SeaMap, 2010; AFEN & SEA surveys, 1996 – 2006)	Yes – good number, distribution and age of evidence	Low	Conserve (uncertain)
Offshore subtidal sands and gravels	All scenarios: 9183.99	Yes (UK SeaMap, 2010; AFEN & SEA surveys, 1996 – 2006)	Yes – good number, distribution and age of evidence	Low	Conserve (uncertain)
Continental slope		Yes (UK SeaMap, 2010)	Partial	Low	Conserve (uncertain)

**The Scottish Marine Protected Area Project –
Developing the Evidence Base for Impact Assessments
and the Sustainability Appraisal**

Geodiversity Features					
Quaternary of Scotland – prograding wedge	14926.93	Yes	Yes	Low	Conserve (uncertain)
Submarine Mass Movement – slide deposits	9738.78	Yes	Yes	Low	Conserve (uncertain)
Marine Geomorphology of the Scottish Deep Ocean Seabed – contourite sand/silt	2159.53	Yes	Yes	Low	Conserve (uncertain)
Cenozoic structures of the Atlantic Margin – mud diapirs	161.89	Yes	Yes	Low	Conserve (uncertain)
Key: * Estimated area based on best available data References: Area of Features: GeMS Confidence in biodiversity feature presence and extent: JNCC (2013) pers. comm. Confidence in biodiversity feature condition: JNCC (2013) pers. comm. Confidence in geodiversity feature presence and extent: Brooks et al. (2012) Confidence in geodiversity feature condition: Brooks et al. (2012)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [NEF]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries*	0.046	1.661	4.302
Oil and Gas	0.438	0.438	37.618
Total Quantified Economic Costs	0.484	2.099	41.920
Non-Quantified Economic Costs			
Commercial Fisheries	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from Non-UK vessels; and ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts.
Oil and Gas	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.
<p>Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>			

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Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [NEF]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	0.005	0.005	0.005
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.049	0.049	0.049
Total Quantified Public Sector Costs	0.054	0.054	0.054
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [NEF]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 3 jobs Upper: 6 jobs	North East North	Fraserburgh Kirkwall	Impacts concentrated in rural, urban and island areas	Cannot be identified for confidentiality reasons.	Lower: <15m Upper: >15m	No Impact.	No breakdown of fisherman employment by ethnic origin.	Unlikely to be employed in fisheries.
If any oil and gas developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).										
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive)			[NEF]
Benefit	Description		
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits	
Non-use value of natural environment	Nil - Low	Low - Moderate	
Other Benefits			
None identified.			
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).			

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [NEF]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Deep sea sponge aggregations	-	-	-	-	-	-	L/U	-	-	L/U	-	-	-	-	-	-	-
Offshore deep sea muds	-	-	-	-	-	-	L/U	-	-	L/U	-	-	-	-	L/U	-	-
Offshore subtidal sands and gravels	-	-	-	-	-	-	L/U	-	-	L/U	-	-	-	-	L/U	-	-
Continental slope	Not considered as not thought to be sensitive to pressures associated with human activity.																
Geodiversity Features																	
Quaternary of Scotland – prograding wedge	Not considered as thought to have a low sensitivity/not be exposed to pressures associated with human activity and also considered from a geodiversity context.																
Submarine Mass Movement – slide deposits																	
Marine Geomorphology of the Scottish Deep Ocean Seabed – countourite sand/silt																	
Cenozoic structures of the Atlantic Margin – mud diapirs																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed protected feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed protected feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity)	[NEF]
<p>According to VMS-based estimates and ICES rectangle landings statistics, whitefish trawls and nets (over-15m) and whitefish trawls, pelagic trawls, nets and lines (under-15m vessels) operate within the NEF proposed MPA. The value of catches from the NEF area for over-15m vessels (VMS data) cannot be disclosed as there were fewer than 5 vessels. The value of catches for under-15m vessels was £383,000 (indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m fleet are predominantly into Scrabster (36% by value), Kinlochbervie (24%), Ullapool (12%), Peterhead (11%) and Corunna, Spain (7%). For the over-15m fleet, trawlers operate in particular along the southern edge of the proposed MPA (along the continental shelf) across the area of deep sea sponge aggregations, and also line fishing occurs in the eastern corner in the area of subtidal sands and gravels.</p> <p>Non-UK VMS ping data indicate that 106 foreign vessels were active in the NEF area in 2012: 78 from Norway; 8 from the Faroe Islands; 8 from Germany; 7 from France; 2 from Spain; and 1 from each of Greenland, Ireland and the Netherlands. 3 French, 5 German and 2 Spanish vessels fish with bottom trawl and therefore would be affected by management measures under all three scenarios. 2 German vessels fish with lines and may be affected under the upper scenario. The Dutch vessel fishes with pelagic trawl and therefore would not be affected by the management scenarios. No information on gear types used by the Norwegian, Irish, Faroe Islands or Greenland vessels was available.</p> <p>Information submitted by the French ministry indicated that 4 vessels fished in the proposed MPA area in 2011. They were predominantly demersal trawlers, with catches worth €0.013 million (in 2011). The vessels originated from Boulogne-sur-Mer and Guilvinec ports, but have their home ports at Boulogne-sur-Mer, Peterhead, Lochinver, Marbella, Hanstholm, Guilvinec and Boulmer. Less than 1% of their turnover is dependent on fishing in the proposed MPA area, and the vessels account for 48 FTE jobs on board.</p> <p>Provisional ScotMap data coverage does not extend as far as Shetland, and therefore this data source does not provide any information on under-15m vessel activity in the NEF proposed MPA. The cost estimates for the under-15m sector may be overestimates, as the 'under-15m' length group in the ICES rectangle landings data may include cases where information on vessel length and/or administrative port is missing from landings returns.</p> <p>Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and based on JNCC recommendations. Additionally, a lower scenario which excludes mobile bottom contact gear, but not static gear, on deep-sea sponge aggregations has also been included.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>	

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across the deep sea sponge feature extent. 	<ul style="list-style-type: none"> ▪ Reduce mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) pressure by 50% across the offshore subtidal sands and gravels and offshore deep sea muds feature extents; and ▪ Closure to all bottom contact gear (mobile and static) across deep sea sponge feature extent. 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gears (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across 50% of the offshore subtidal sands and gravels and offshore deep sea muds feature extents; and ▪ Closure to all bottom contact gear (mobile and static) across deep sea sponge feature extent (400-600m depth).
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (fewer than 5 vessels; value not presented). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.005). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (fewer than 5 vessels; value not presented). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.088). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (fewer than 5 vessels; value not presented). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.225).
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (France (3 vessels), Germany (5 vessels), Spain (2 vessels), and possibly Norway (78 vessels), Ireland (1 vessel), Greenland (1 vessel) and Faroe Islands (1 vessel)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (France (3 vessels), Germany (5 vessels), Spain (2 vessels), and possibly Norway (78 vessels), Ireland (1 vessel), Greenland (1 vessel) and Faroe Islands (1 vessel)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (France (3 vessels), Germany (7 vessels), Spain (2 vessels), and possibly Norway (78 vessels), Ireland (1 vessel), Greenland (1 vessel) and Faroe Islands (1 vessel)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	*	*	*
Average annual costs	*	*	*
Present value of total costs (2014–2033)	*	*	*
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.063	2.258	5.849
Average annual change to GVA	0.003	0.113	0.292
Present value of total change in GVA (2014–2033)	0.046	1.661	4.302
Direct and Indirect reduction in Employment	0.1 jobs	2.6 jobs	6.4 jobs
<p>* Value for non-VMS vessels only. VMS data represents less than 5 vessels and therefore cannot be disclosed. Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4b. Oil and Gas		[NEF]
<p>There are 10 oil and gas wells that overlap with the proposed protected features within the NEF proposed MPA boundary. Three of these overlap with deep sea sponge aggregations under the upper scenario. Four and six wells respectively overlap with offshore deep sea muds and offshore subtidal sands and gravels under all scenarios. One additional well is within 1km of with offshore subtidal sands and gravels under all scenarios.</p> <p>A total of 50 licence awards granted under the 26th and 27th UK oil and gas licensing rounds overlap with features proposed for designation within the NEF proposed MPA boundary. Of the 50 awards, 27 were awarded in the 26th round and 23 in the 27th round. Feature extents show that under all scenarios all 27 of the 26th round awards overlap with offshore deep sea muds, and 8 overlap with offshore subtidal sands and gravels. Of the 27th round awards, 13 and 15 of the awarded blocks overlap with feature extents for offshore deep sea muds and offshore subtidal sands and gravels respectively (under all scenarios). Two of the 27th round awards overlap with deep sea sponge aggregations under all scenarios and seven under the upper scenario only. Twenty-five of the awards from the 26th round and 14 from the 27th round lie wholly within the MPA proposal, while the rest overlap the MPA proposal boundary.</p> <p>One of the licence blocks awarded in the 27th round contains a significant gas discovery.</p>		

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
	<p>27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 if no significant discoveries present within award or Assessment and Development Phases 1 – 6 if significant discoveries present (only Phases 2 – 6 anticipated for 26th round awards);</p> <ul style="list-style-type: none"> ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; ▪ Micro-siting of infrastructure in areas of reduced sponge density, drawing on data held by JNCC and collected by operators ; and ▪ Treat cuttings that use oil-based muds on site. 	<p>27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 if no significant discoveries present within award or Assessment and Development Phases 1 – 6 if significant discoveries present (only Phases 2 – 6 anticipated for 26th round awards);</p> <ul style="list-style-type: none"> ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; ▪ Micro-siting of infrastructure in areas of reduced sponge density, drawing on data held by JNCC and collected by operators; and ▪ Treat cuttings that use oil-based muds on site. 	<p>27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 if no significant discoveries present within award or Assessment and Development Phases 1 – 6 if significant discoveries present (only Phases 2 – 6 anticipated for 26th round awards);</p> <ul style="list-style-type: none"> ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; ▪ Micro-siting of infrastructure in areas outside of the area of deep sea sponge aggregations (the 400-600m depth contours); ▪ Micro-siting of infrastructure in areas of more representative habitat types for offshore subtidal sands and gravels and offshore deep sea muds using data held by JNCC and collected by operators; and ▪ Skip and ship drill cuttings.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (28 wells (2016) and 22 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (28 wells (2018) and 22 wells (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (28 wells (2018) and 22 wells (2020)); ▪ Development Phase 4: development; consultancy fees and additional 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (28 wells (2016) and 22 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (28 wells (2018) and 22 wells (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (28 wells (2018) and 22 wells (2020)); ▪ Development Phase 4: development; consultancy fees and additional 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (28 wells (2016) and 22 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (28 wells (2018) and 22 wells (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (28 wells (2018) and 22 wells (2020)); ▪ Development Phase 4: development; consultancy fees and additional

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
	<ul style="list-style-type: none"> operator staff input - £4k per well (1 well (2024)); ▪ Operation and Production Phase 5: annual permits, consultancy fees, additional operator staff input - £20k per well (1 well (2024)); and ▪ Maintenance Phase 6: consultancy fees; additional operator staff input – £2k per well (1 well (2024)). 	<ul style="list-style-type: none"> operator staff input - £4k per well (1 well (2024)); ▪ Operation and Production Phase 5: annual permits, consultancy fees, additional operator staff input - £20k per well (1 well (2024)); and ▪ Maintenance Phase 6: consultancy fees; additional operator staff input – £2k per well (1 well (2024)). 	<ul style="list-style-type: none"> operator staff input - £4k per well (1 well (2024)); ▪ Operation and Production Phase 5: annual permits, consultancy fees, additional operator staff input - £20k per well (1 well (2024)); ▪ Maintenance Phase 6: consultancy fees; additional operator staff input – £2k per well (1 well (2024)); ▪ Micro-siting survey costs - £230k per well (28 wells (2018), 20 wells (2020) and 1 well (2024)); ▪ Re-routing of new pipelines for Phases 4 – 6 - £2m per additional km of pipeline (10% of distance, 1 well (2024)); ▪ Survey costs for additional pipeline length - £580k per well (1 well (2024)); and ▪ Skip and ship drill cuttings - £650k per well (28 wells (2018), 20 wells (2020) and 1 well (2024)).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.513	0.513	44.713
Average annual costs	0.026	0.026	2.236
Present value of total costs (2014–2033)	0.438	0.438	37.618
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA				[NEF]
Activity	Lower Estimate	Intermediate Estimate	Upper Estimate	
None identified.				

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA		[NEF]
Activity	Description	
Telecom Cables	Two operational telecom cables (DANICE Seg. 1 (in operation since 2008); FARICE(2) (in operation since 2004)) and one disused cable (CANTAT 3 FC3) overlap with offshore deep sea muds (all scenarios) and offshore subtidal sands and gravels (all scenarios) within the NEF proposed MPA boundary. However, no cost impacts are foreseen as the site is located beyond the 12 nautical mile threshold (within which licences are required for cables).	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [NEF]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings: Cannot be disclosed for reasons of confidentiality. Annual Average Loss in GVA (direct and indirect)*: Lower: <£0.01m Intermediate: £0.11m Upper: £0.29m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: xx (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.1 jobs Intermediate: 2.6 jobs Upper: 6.4 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (France (3 vessels), Germany (7 vessels), Spain (2 vessels), and possibly Norway (78 vessels), Ireland (1	Not quantified	Employment – loss of foreign jobs from reduced landings.		

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	vessel), Greenland (1 vessel) and Faroe Islands (1 vessel))				
	Displacement Effects	Not quantified	<p>Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences:</p> <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited; ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		xx
Oil and Gas	Additional operational costs associated with licence and permit applications for new exploration development and decommissioning	<p>Quantified Cost Impact (2014–2033): £0.438 – 37.618m</p> <p>Decommissioning assessed at national level</p>	<p>Future employment opportunities – reduced future employment opportunities if increased costs affect the economic viability of projects and lead to some projects not proceeding.</p>		xxx (under the upper scenario only)
	Additional mitigation measures for new developments or decommissioning activities to support achievement of site conservation objectives	Not Quantified	<p>Future employment opportunities – reduced future employment opportunities if costs significant and render development projects unviable.</p> <p>This impact is uncertain and is only likely to arise under the upper scenario. JNCC’s current advice is that the intermediate scenario represents their best view on</p>		xxx (under the upper scenario only)

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			management requirements.		
	Costs associated with delays during the licensing and permitting process. Loss of investor confidence (developments do not proceed)	Not Quantified	Employment – reduced future employment opportunities if delays deter investments. This impact is uncertain and is only likely to arise under the upper scenario. JNCC’s current advice is that the intermediate scenario represents their best view on management requirements.		xxx (under the upper scenario only)

Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.

* These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [NEF]

Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries	xx	xx	xx	xxx	xxx	xx	xxx	xxx
Reduction in landed value, GVA and employment	North North-East North-West West (and Newlyn)	Largest employment impacts in: Fraserburgh (72%), Kirkwall (22%)	Coastal and Island Urban and Rural	Potentially significant negative effect if parent loses job/becomes unemployed.	Potentially significant negative effect if individuals lose job/become unemployed.	Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0.1-6 job losses Potentially significant negative effect on individuals that lose job/become unemployed.	Potentially significant negative effect if member of household loses job/becomes unemployed.
Fish Processors	x	x	x	xx	xx	xx	0	xx
Reduction in local landings at landing ports	North North-West North East	Scrabster Kinlochbervie Peterhead Ullapool Fraserburgh Lerwick Marin	Coastal and Island Urban and Rural					

Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.

* Based on value of landings by home port affected under intermediate scenario.

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [NEF]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: <15m Upper: >15m	Cannot be identified for confidentiality reasons.	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Fish Processors Reduction in local landings at landing ports		Shellfish: x Demersal: xxx Pelagic: 0	xx	xx	0	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario								

Potential Contribution of the Site to an Ecologically-Coherent Network

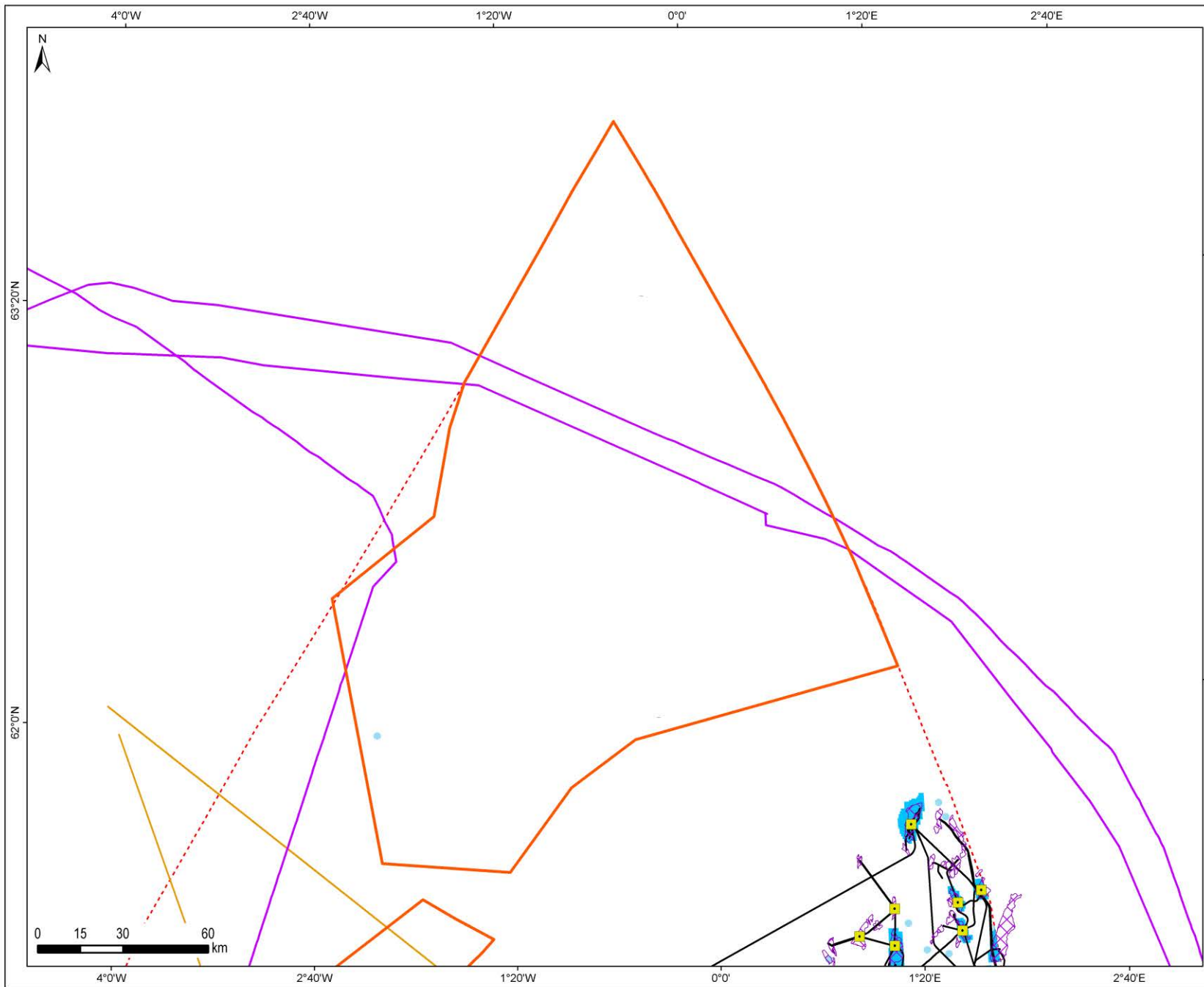
Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [NEF]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Deep sea sponge aggregations	Provides representation for deep sea sponge aggregations in OSPAR Region II.	Provides one of at least three recommended examples to be protected in Scotland's seas.	Not currently understood for deep sea sponge aggregations.	Provides representation of an ecologically distinct type of deep sea sponge aggregation - aggregations of Boreal Ostur. This type of deep sea sponge aggregation to date has only recorded in the Faroe-Shetland Channel in Scotland's seas.	Deep sea sponge aggregations are considered to be Threatened and/or Declining by the OSPAR Commission in OSPAR Region II so the MPA is expected to help increase resilience for the feature.
Offshore deep sea muds	Provides representation for large areas of Arctic and smaller areas of Atlantic influenced slope and off-shelf offshore deep-sea mud habitats predominantly in OSPAR Region I, but also to a lesser extent in OSPAR Region II	It represents one of at least two recommended examples of Atlantic and Arctic influenced slope and off-shelf, offshore, deep-sea mud habitats to be protected in OSPAR Regions I and II.	Not currently understood for offshore deep sea muds.	Provides representation at the north-eastern extent of its range on the continental slope and off the shelf in OSPAR Regions I & II in Scotland's seas and one of the only areas of Arctic influenced offshore deep sea muds in Scotland's seas and across the UK.	Offshore deep sea muds are fairly widely recorded across offshore waters in Scotland's seas.
Offshore subtidal sands and gravels	Provides representation for Arctic and Atlantic influenced continental slope and off-shelf offshore subtidal sand and gravel habitats in OSPAR Regions I and II.	Represents one of at least two recommended examples of Atlantic and Arctic influenced slope and off-shelf, offshore, subtidal sand and gravel habitats to be protected in OSPAR Regions I and II.	Not currently understood for offshore subtidal sands and gravels.	Provides representation at the north-eastern extent of its range on the continental slope and off the shelf in OSPAR Regions I & II in Scotland's seas.	Offshore subtidal sands and gravels are fairly widely recorded across offshore waters in Scotland's seas.
Continental slope	The possible MPA provides representation for one of two recommended areas of the Scottish continental slope to be included within the MPA network.	The Faroe-Shetland Channel slope is considered ecologically and hydrographically distinct to the Hebridean slope and so the recommendation is for at least one example of each area of the slope to be included.	Not currently understood for the continental slope.	The Faroe-Shetland Channel slope is considered ecologically and hydrographically distinct to the Hebridean slope. This possible MPA represents one example of the Faroe-Shetland Channel slope.	The continental slope occurs between Scotland's shelf and off-shelf environment.

JNCC (pers. comm.); SNH and JNCC. (2012). *Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.*
Available online from: <http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612>.

Anticipated Benefits to Ecosystem Services

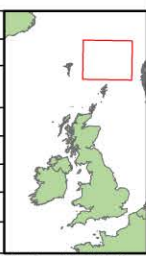
Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ²⁶ [NEF]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Low - Moderate	Stocks not at MSY	Minimal – unclear of deep sea sponge gives provisioning or supporting services	Low – allows recovery of stocks in medium/long term. Features provide moderate level of supporting services to support recovery	Moderate	Low	Moderate	
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Nil - Low	Nil - Low	Nil, or at best a very low level of protection of parts of ecosystem providing these services			Low	Nil - Low	High
Natural hazard protection	Nil - Low	Nil - Low				Low	Nil - Low	High
Regulation of pollution	Nil - Low	Nil - Low				Low	Nil - Low	High
Non-use value of natural environment	Low - Moderate	Low - Moderate	Nil - Low	Low	Low - Moderate	Low - Moderate	Low - Moderate	Low
Recreation	Minimal	Minimal	Minimal			Minimal	Minimal	Moderate
Research and Education	Low – features protected of research interest.	Minimal	Minimal - Low	Low	Low	Low	Low	Low
Total value of changes in ecosystem services			Change in values are dominated by those services that support fish, this is only present for intermediate and upper scenarios.			Moderate	Moderate	

²⁶ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



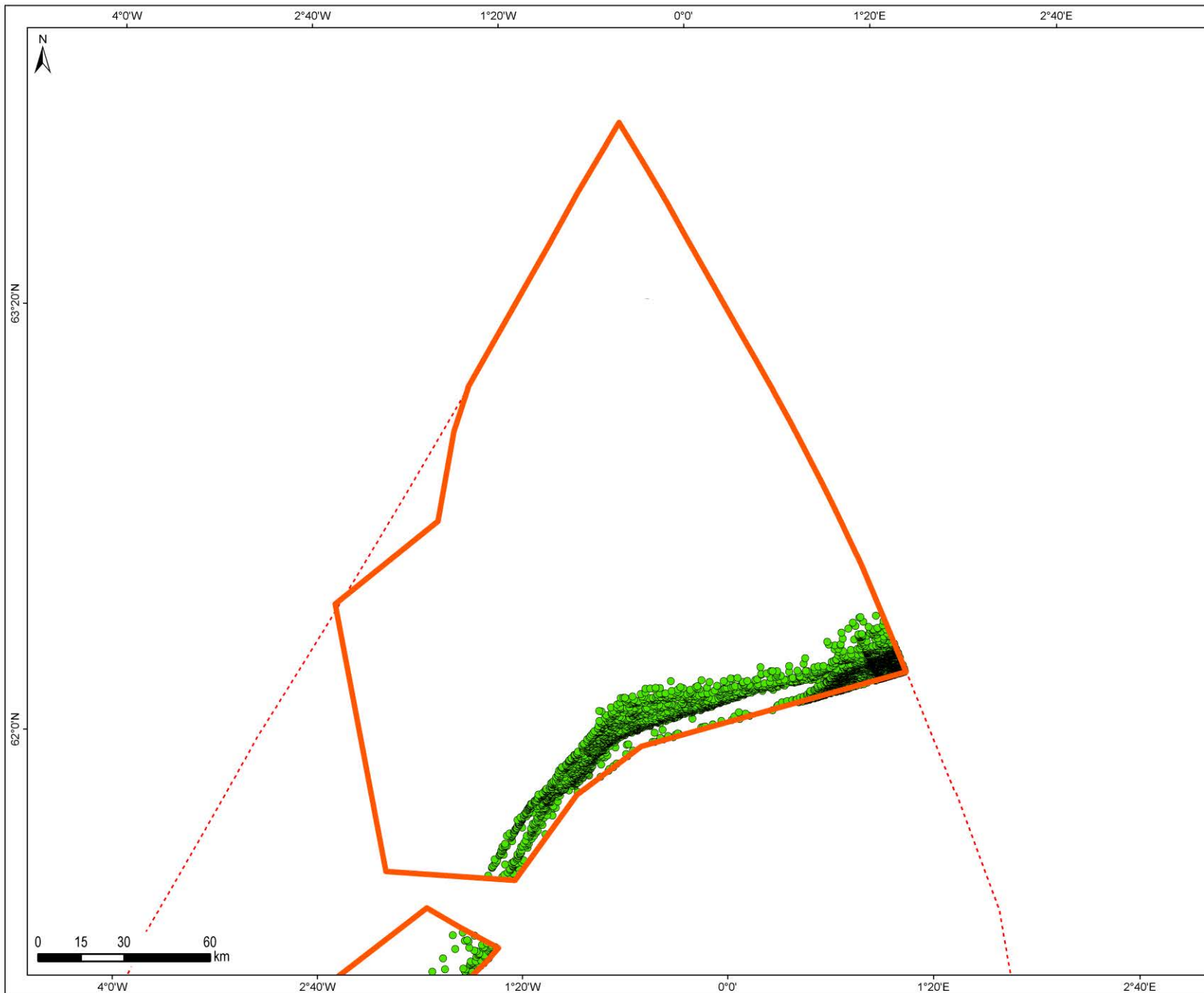
- Proposed Marine Protected Area
- UK Continental Shelf
- Telecommunication Cables**
- Subsea Telecomms Cables
- Active
- Oil & Gas**
- Hydrocarbon Fields
- Platforms
- Pipelines
- Significant Discoveries
- Carbon Capture & Storage**
- Potential Hydrocarbon Reservoirs
- Recreational Boating**
- RYA Cruising Routes
- Light

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:1,835,000	
QA		FMM	
4136MPA_HA_Faroe_Shetland.mxd			
Produced by ABPmer			



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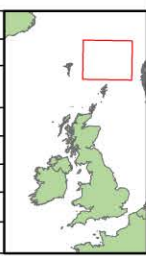
Human Activities which Occur within the Proposed MPA:
North-east Faroe-Shetland Channel



- Proposed Marine Protected Area
- UK Continental Shelf
- VMS Fishing Ping Data (2007 to 2011)
- All Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:1,835,000	
QA		FMM	
4136MPA_Fish_Faroe_Shettland.mxd			
Produced by ABPmer			



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 Data Source: Scottish Government, 2013
 NOT TO BE USED FOR NAVIGATION

**Fishing Activities which Occur within the Proposed MPA:
 North-east Faroe-Shetland Channel**

Norwegian Boundary Sediment Plain (NSP)

Site Area (km²): 161

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [NSP]					
Proposed protected features					
<i>Biodiversity Features</i> Ocean quahog aggregations (including offshore subtidal sands and gravels).					
<i>Geodiversity Features</i> None.					
<i>Site Description</i> The MPA proposal lies next to the Norwegian transboundary line in the northern North Sea.					
<i>Potential Alternative Designations</i> At the request of Marine Scotland, JNCC have proposed the Norwegian Boundary Sediment Plain possible MPA as a science-based alternative to the representation of ocean quahog aggregations in the Firth of Forth Banks Complex proposed MPA. If the Firth of Forth Banks Complex is designated for ocean quahog, Norwegian Boundary Sediment Plain is not required for designation as part of the MPA network.					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Ocean quahog aggregations (including offshore subtidal sands and gravels)	All scenarios: 160.79	Yes (Oil and Gas EIA surveys, 1979 - 1993; BGS PSA data, 1977 – 1982)	Partial – Offshore subtidal sand and gravel habitats present considered suitable habitat for ocean quahog	Low	Conserve (uncertain)
Geodiversity Features					
N/A					
Key: * Estimated area based on best available data References: Area of Features: GeMS Confidence in biodiversity feature presence and extent: JNCC (2012h) Confidence in biodiversity feature condition: JNCC (2013) pers. comm. Confidence in geodiversity feature presence and extent: Brooks et al. (2012) Confidence in geodiversity feature condition: Brooks et al. (2012)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [NSP]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries*	0.000	0.000	0.011
Oil and Gas	0.018	0.018	1.151
Total Quantified Economic Costs	0.018	0.018	1.162
Non-Quantified Economic Costs			
Commercial Fisheries	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts.
Oil and Gas	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.
<p>Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>			

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Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [NSP]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	0.005	0.005
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.002	0.002	0.002
Total Quantified Public Sector Costs	0.002	0.007	0.007
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [NSP]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 0 jobs Upper: 0 jobs	North East	Peterhead	Impacts concentrated in urban areas	Can not be identified for confidentiality reasons.	Lower: N/A Upper: <15m (minimal)	No Impact.	No Impact.	Unlikely to be employed in fisheries.
If any oil and gas developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).										
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive)			[NSP]
Benefit	Description		
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits	
Non-use value of natural environment	Nil - Low	Nil - Moderate	
Other Benefits			
None identified.			
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).			

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [NSP]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Ocean quahog aggregations (including offshore subtidal sands and gravels)	-	-	-	-	-	-	L/U	-	-	L/U	-	-	-	-	-	-	-
Geodiversity Features																	
N/A																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed designated feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed designated feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity)	[NSP]
<p>According to VMS-based estimates and ICES rectangle landings statistics, pelagic trawls and some otter trawls (over-15m) and nephrops trawls and other gears (under-15m vessels) operate within the NSP proposed MPA. The value of landings from the NSP area was £13,500 (over-15m vessels) and £2,200 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels were into Peterhead (100%). For the over-15m fleet, there was sparse activity by various trawlers in the southern part of the proposed MPA.</p> <p>Non-UK VMS ping data indicate that 15 non-UK vessels were active in the NSP area in 2012: 12 from Denmark; 2 from Sweden and 1 from Norway. The Swedish vessels fish with pelagic gear (pelagic trawls and purse seines) and, therefore, are unlikely to be affected by the management scenarios. Six Danish vessels fish with bottom trawl and, therefore, may be impacted by the management measures assessed under the intermediate and upper scenarios. No information on gear types used by the Norwegian vessel was available.</p> <p>Provisional ScotMap data do not indicate any under-15m vessel activity in the NSP proposed MPA.</p> <p>Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and based on JNCC recommendations.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>	

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No additional management. 	<ul style="list-style-type: none"> ▪ Closure to beam trawls and dredges (gears likely to impact on ocean quahog) across the ocean quahog feature extent (full extent of MPA). 	<ul style="list-style-type: none"> ▪ Closure to whitefish trawls, nephrops trawls, other trawls, beam trawls and dredges (the gears could possibly affect ocean quahog) across the ocean quahog feature extent (full extent of proposed MPA).
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
		values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ None. ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ None. 	values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (<0.001); ▪ Nephrops trawls (<0.001). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.001); ▪ Other affected gears (<0.001).
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (6 vessels), possibly Norway (1 vessel)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (6 vessels), possibly Norway (1 vessel)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	0.000	0.037
Average annual costs	0.000	0.000	0.002
Present value of total costs (2014–2033)	0.000	0.000	0.028
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.000	0.000	0.015
Average annual change to GVA	0.000	0.000	0.001
Present value of total change in GVA (2014–2033)	0.000	0.000	0.011
Direct and Indirect reduction in Employment	0.0 jobs	0.0 jobs	0.0 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4b. Oil and Gas				[NSP]
<p>There are four known hydrocarbon fields present within the boundary of the NSP proposed MPA. Four licensed blocks are present within the MPA proposal boundary, and two licence awards were granted during the 26th UK oil and gas licensing round; blocks 16/24c and 22/4c. A total of 56 wells are present within the NSP proposed MPA, and 8 pipeline sections.</p> <p>All oil and gas infrastructure within the NSP proposed MPA overlaps with feature extent for ocean quahog aggregations under all scenarios.</p> <p>Blocks awarded during the 26th round partially overlap the MPA proposal. There have been no significant discoveries within the NSP proposed MPA boundary.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks). 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks); ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; and ▪ Treat cuttings that use oil-based muds on site. 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks); ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; and ▪ Skip and ship drill cuttings. 	
Description of one-off costs	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (2 wells (2016)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (2 wells (2018)); and ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (2 wells (2018)). 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (2 wells (2016)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (2 wells (2018)); and ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (2 wells (2018)). 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (2 wells (2016)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (2 wells (2018)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (2 wells (2018)); and ▪ Skip and ship drill cuttings - £650k per well (2 wells (2018)). 	
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to 	

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
		investment; and ▪ Future decommissioning costs assessed at national level.	investment; and ▪ Future decommissioning costs assessed at national level.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.020	0.020	1.320
Average annual costs	0.001	0.001	0.066
Present value of total costs (2014–2033)	0.018	0.018	1.151
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA				[NSP]
Activity	Lower Estimate	Intermediate Estimate	Upper Estimate	
None identified.				

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA [NSP]	
Activity	Description
None identified.	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [NSP]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.00m Intermediate: £0.00m Upper: <£0.01m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: £0.00m Upper: <£0.01m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: x (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 0.0 jobs Upper: 0.0 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (6 vessels), possibly Norway (1 vessel))	Not Quantified		Employment – loss of foreign jobs from reduced landings.	

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	Displacement Effects	Not Quantified	<p>Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences:</p> <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited; ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		x
Oil and Gas	Additional operational costs associated with licence and permit applications for new exploration development and decommissioning	<p>Quantified Cost Impact (2014–2033): £0.018 – 1.151m</p> <p>Decommissioning assessed at national level</p>	Future employment opportunities – reduced future employment opportunities if increased costs affect the economic viability of projects and lead to some projects not proceeding.		0
	Additional mitigation measures for new developments or decommissioning activities to support achievement of site conservation objectives	Not Quantified	<p>Future employment opportunities – reduced future employment opportunities if costs significant and render development projects unviable.</p> <p>This impact is uncertain and is only likely to arise under the upper scenario. JNCC's current advice is that the intermediate scenario represents their best view on management requirements.</p>		xxx (under the upper scenario only)

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	Costs associated with delays during the licensing and permitting process Loss of investor confidence (developments do not proceed)	Not Quantified	Employment – reduced future employment opportunities if delays deter investments. This impact is uncertain and is only likely to arise under the upper scenario. JNCC’s current advice is that the intermediate scenario represents their best view on management requirements.		xxx (under the upper scenario only)
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [NSP]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries Reduction in landed value, GVA and employment	x North-East	x Largest employment impacts in Peterhead (100%)	x Coastal Urban	0	0	xx Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0 0-0.02 job losses	0
Fish Processors Reduction in local landings at landing ports	0	0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [NSP]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: <15m (minimal)	Cannot be identified for confidentiality reasons.	0	0	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	0	0
Fish Processors Reduction in local landings at landing ports		Shellfish: xxx Demersal: xx Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

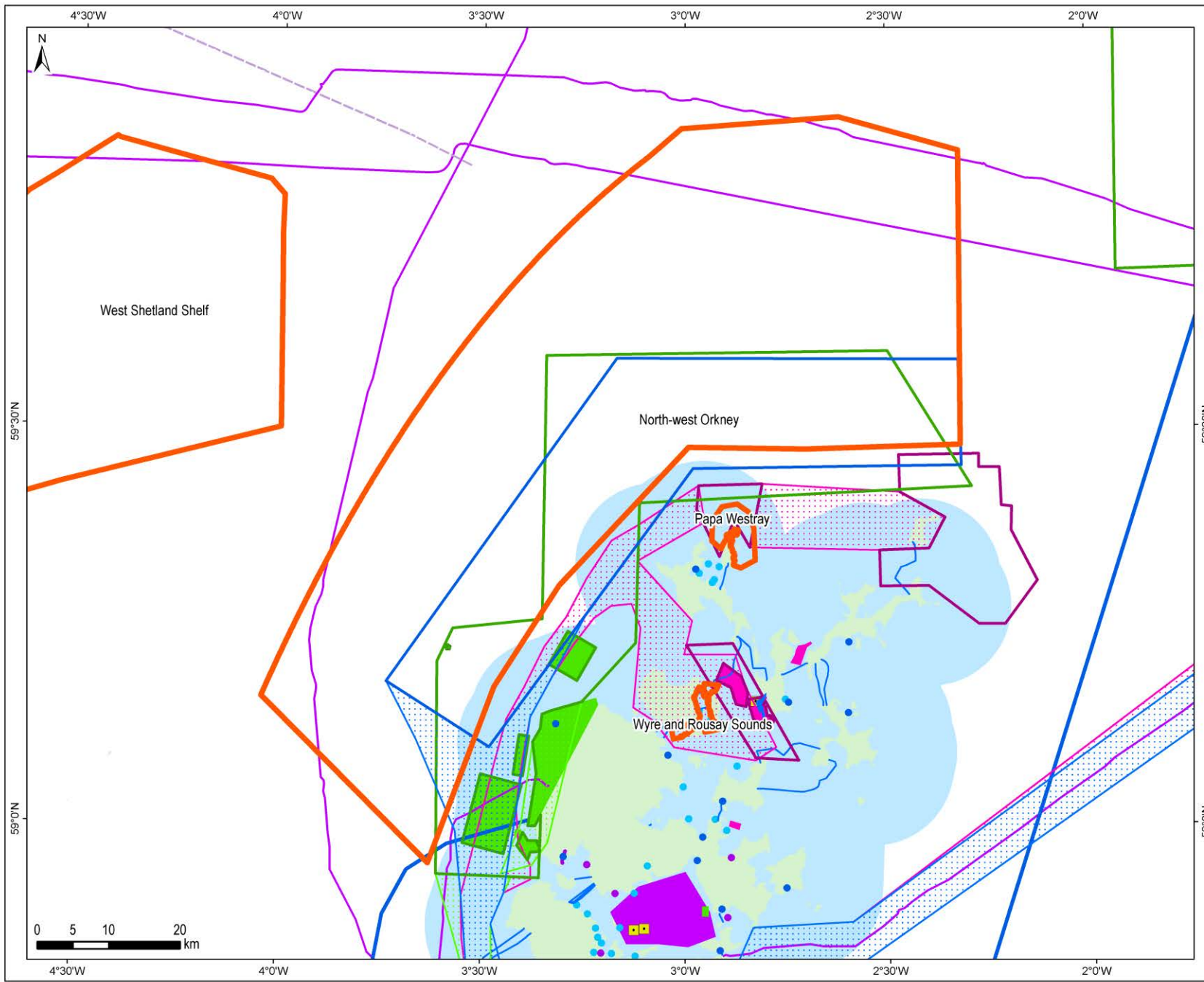
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [NSP]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Ocean quahog aggregations (including offshore subtidal sands and gravels)	Provides representation for an area of the species in the only OSPAR Region it is recorded within in offshore waters adjacent to Scotland – OSPAR Region II. Norwegian boundary sediment plain is not a relatively data-rich area for the species.	Provides one of at least three recommended examples to be protected in Scotland’s seas.	Not currently understood for ocean quahog.	Provides representation at the south-eastern extent of its range in OSPAR Region II in Scotland’s seas.	Ocean quahog is listed as Threatened and/or Declining by the OSPAR Commission in OSPAR Region II so the MPA is expected to help increase resilience for the feature.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ²⁷ [NSP]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Minimal - Low	Minimal	Nil	Nil - Minimal, no benefits likely from management measures.	Minimal	Minimal	Moderate	
Fish for non-human consumption		Minimal						
Gas and climate regulation	Nil - Low	Nil - Low	Nil, or at best a very low level of protection of parts of ecosystem providing these services.			Low	Nil - Low	High
Natural hazard protection	Nil - Low	Nil - Low				Low	Nil - Low	High
Regulation of pollution	Nil - Low	Nil - Low				Low	Nil - Low	High
Non-use value of natural environment	Low - Moderate	Low - Moderate	Nil	Low	Low - Moderate	Low - Moderate	Nil - Moderate	Low
Recreation	Minimal	Minimal	Nil	Minimal	Minimal	Minimal	Minimal	Moderate
Research and Education	Minimal - Low	Minimal	Nil	Low	Low	Low	Low	Low
Total value of changes in ecosystem services			Management measures unlikely to provide any significant benefits.			Minimal	Minimal	Moderate

²⁷ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



- Proposed Marine Protected Area
- Oil & Gas**
- Platforms
- Ports & Harbours**
- Port Locations
- Anchorage Areas
- Power Interconnectors**
- Existing Power Interconnectors
- Future Proposed Interconnectors
- Energy Generation**
- Draft Plan Option Areas - Wind
- Indicative Cable Routes - Wind
- Draft Plan Option Areas - Wave
- Indicative Cable Routes - Wave
- Wave Lease Areas
- Draft Plan Option Areas - Tidal
- Indicative Cable Routes - Tidal
- Tidal Lease Areas
- Telecommunication Cables**
- Subsea Telecomms Cables**
- Active
- Out of Service
- Watersports**
- Scenic Boat Dive Sites
- Sea Angling (6 nm from coast)

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:725,000	
QA		FMM	
4136MPA_HA_Orkney1.mxd			



Produced by ABPmer
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Human Activities which Occur within the Proposed MPA: North-west Orkney

North-west Orkney (NWO)

Site Area (km²): 4,388

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [NWO]					
Proposed protected features					
<p><i>Biodiversity Features</i> Sandeels.</p> <p><i>Geodiversity Features</i> Marine Geomorphology of the Scottish Deep Ocean Seabed – sand bank, sand wave field, sediment wave fields.</p> <p><i>Site Description</i> The North-west Orkney MPA proposal is an offshore site located to the north and west of the Orkney Islands. The MPA proposal boundary has been designated to focus on high densities of sandeels, their larvae and suitable sediment for sandeel colonisation.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Sandeels	All scenarios: 4384.84	Yes (Marine Scotland Science surveys, from 1970s to present day)	Partial – Adult sandeel and larvae present across the possible MPA and beyond.	Low	Conserve (uncertain)
Geodiversity Features					
Marine Geomorphology of the Scottish Deep Ocean Seabed – sand bank, sand wave field, sediment wave fields	Sand bank: 8.50 Sand wave field: 36.26 Sediment wave fields: 360.51	Yes	Yes	Low	Conserve (uncertain)
<p>Key: * Estimated area based on best available data</p> <p>References: Area of Features: GeMS Confidence in biodiversity feature presence and extent: JNCC (2012g) Confidence in biodiversity feature condition: JNCC (2013) pers. comm. Confidence in geodiversity feature presence and extent: Brooks et al. (2012) Confidence in geodiversity feature condition: Brooks et al. (2012)</p>					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [NWO]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Energy Generation	0.026	0.062	0.062
Oil and Gas	0.071	0.071	0.071
Total Quantified Economic Costs	0.096	0.132	0.132
Non-Quantified Economic Costs			
Energy Generation	<ul style="list-style-type: none"> Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> Costs of project delays during consenting; risk of deterrent to investment.
Oil and Gas	<ul style="list-style-type: none"> Costs of project delays during consenting; risk of deterrent to investment; and Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> Costs of project delays during consenting; risk of deterrent to investment; and Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> Costs of project delays during consenting; risk of deterrent to investment; and Future decommissioning costs assessed at national level.

Note: For detailed information on economic cost impacts on activities, see Table 4.

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [NWO]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	None	None
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.010	0.013	0.013
Total Quantified Public Sector Costs	0.010	0.013	0.013
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [NWO]									
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis						
			Location			Fishing Groups Predominantly Affected		Social Groups Affected	
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities
None identified (Commercial Fisheries).									
If any energy generation developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).									
If any oil and gas developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).									
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.									

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [NWO]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Recreation	Moderate. Sea angling and diving take place on this site.	Low - Moderate
Non-use value of natural environment	Nil - Low	Nil - Moderate
Other Benefits		
None identified.		
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [NWO]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Sandeels	-	-	-	-	-	-	L/I/U	L/I/U	-	L/I/U	-	L/I/U	L/I/U	-	L/I/U	-	L/I/U
Geodiversity Features																	
Marine Geomorphology of the Scottish Deep Ocean Seabed – sand bank, sand wave field, sediment wave fields	Considered to have a low sensitivity to the pressures associated with activities they are currently exposed and likely to be exposed to in the future; thus, not considered in the context of management.																
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed protected feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed protected feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Energy Generation				[NWO]
<p>There are no energy generation activities currently operating within the NWO proposed MPA boundary or corresponding buffer zones. Thus, economic costs and management measures associated with energy generation in this proposed MPA are described in light of known possible future developments.</p> <p>The Costa Head (SSE Renewables Developments (UK) Ltd and Alstom UK Holdings Ltd, 200MW), West Orkney South and West Orkney Middle South (both E.ON Climate & Renewables UK Ltd, 50MW each) wave energy developments are all at pre-application stage and located within 5km of the sandeels feature which occupies the whole of the proposed MPA. Therefore, additional licensing costs to assess potential impacts to sandeels within 5km (intermediate and upper scenarios) of the proposed activities may be incurred.</p> <p>Areas of Search (AoS) for possible offshore wind and wave energy developments are present within the NWO proposed MPA boundary, overlapping the sandeels feature under all scenarios. In addition, a potential export cable route for the wind energy AoS overlaps the MPA feature Sandeels within the NWO proposed MPA boundary under all scenarios.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to sandeels within 1km of proposed activities. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to sandeels within 5km of proposed activities. 	<ul style="list-style-type: none"> ▪ Additional licensing costs to assess potential impacts to sandeels within 5km of proposed activities. 	
Description of one-off costs	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k per licence application (up to 3 in total). Application(s) estimated for submission in 2024 (wind and wave energy AoS and wind energy AoS export cable route). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k per licence application (up to 6 in total). Application(s) estimated for submission in 2014 (Costa Head, West Orkney South and West Orkney Middle South) and 2024 (wind and wave energy AoS and wind energy AoS export cable route). 	<ul style="list-style-type: none"> ▪ Additional assessment costs for licence application - £12k per licence application (up to 6 in total). Application(s) estimated for submission in 2014 (Costa Head, West Orkney South and West Orkney Middle South) and 2024 (wind and wave energy AoS and wind energy AoS export cable route). 	
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment. 	
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)				
Total costs (2014–2033)	0.036	0.072	0.072	
Average annual costs	0.002	0.004	0.004	
Present value of total costs (2014–2033)	0.026	0.062	0.062	
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>				

Table 4b. Oil and Gas				[NWO]
<p>Thirteen licensed blocks are present within the NWO proposed MPA that overlap with sandeels under all scenarios. There are an additional eight licence awards given during the 26th UK oil and gas licensing round encompassed within the NWO proposed MPA boundary.</p> <p>All eight of the awarded blocks overlap with sandeels within the MPA proposal boundary, under all scenarios, although only three of the awards are wholly encompassed by the MPA proposal boundary. The remainder overlap the boundary.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks). 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks). 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks). 	
Description of one-off costs	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (8 wells (2016)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (8 wells (2018)); and ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (8 wells (2018)). 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (8 wells (2016)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (8 wells (2018)); and ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (8 wells (2018)). 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (8 wells (2016)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (8 wells (2018)); and ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (8 wells (2018)). 	
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)				
Total costs (2014–2033)	0.080	0.080	0.080	
Average annual costs	0.004	0.004	0.004	
Present value of total costs (2014–2033)	0.071	0.071	0.071	
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p>				

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA [NWO]				
Activity	Description	Lower Estimate	Intermediate Estimate	Upper Estimate
Water Sports – Sea Angling	Sea angling is carried out along most of the Scottish coastline within 6nm (SSACN). A small portion of the proposed NWO MPA is within 6nm of the UK coastline and also overlaps with the MPA biodiversity feature Sandeels (all feature extents). The density of sea angling in this overlapping area is likely to be very small. No management restrictions upon this activity are considered to be required.	Sea anglers could benefit from any on-site positive effects resulting from the MPA designation including an increase in the size and diversity of species which in turn is expected to increase the attraction of a site for anglers (Fletcher et al. 2012).	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.
Water Sports – Scuba Diving	There is one dive site located within the proposed MPA named 'North Shoal' which is described as 'a scenic boat dive' (http://www.finstrokes.com). The dive site overlaps the MPA biodiversity feature Sandeels within all feature extents. No management restrictions upon this activity are considered to be required.	The added protection offered by an MPA designation and management measures placed upon sector activities may improve the marine ecosystem positively impacting on fish, benthic species and other marine wildlife which potentially will benefit the quality of the diving experience.	The intermediate management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower estimate.	The upper management measures applied to sector activities will result in an increase of the beneficial impacts seen in the lower and intermediate estimates.

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA [NWO]	
Activity	Description
Commercial Fisheries	Whitefish trawls, pelagic trawls, pots, other trawls, nephrops trawls, whitefish seines and nets (over-15m vessels) and pots, pelagic trawls, whitefish trawls and other gears (under-15m vessels) operate in the NWO proposed MPA. The value of landings from the NWO area was £4.10 million (over-15m vessels) and £1.01 million (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Provisional ScotMap data indicate that the annual average earnings from the NWO proposed MPA was £232,000, entirely from pots (predominantly for brown crab). Landings from the over-15m vessels are into Scrabster (40% by value), Peterhead (23%) and Lerwick (12%). VMS ping data indicate that 30 non-UK vessels were active in the NWO area in 2012: 12 from Norway; 6 from Ireland; 5 from the Netherlands; 3 from Germany, 2 from France and 1 from the Denmark and the Faroe Islands. Of the EU vessels, these were predominantly pelagic trawlers. Newly-emerged sandeel larvae, the proposed protected biodiversity feature for the site, are not thought to be sensitive or vulnerable to pressures from fishing gears operating within the area and therefore no management measures for fisheries are proposed and no cost impacts are anticipated.
Recreational Boating	One medium use RYA cruising route (belonging to Clyde Cruising Club, Stromoway Sailing Club, Orkney Harbours and Orkney Sailing Clubs) and five light use RYA cruising route (belonging to: RYA Route / RYA Scotland Clyde Cruising Club, Stomness Marina; North of Scotland Yachting Association; Stromness Marina; Dalgety Bay Sailing Club; and RYA Route / RYA Scotland, Clyde Cruising Club) overlap with the 'sandeels' feature of the NWO proposed MPA under all scenarios (lower, intermediate and upper). The RYA cruising routes overlap with the sandeels feature for the following distances; Clyde Cruising Club, Stromoway Sailing Club, Orkney Harbours, Orkney Sailing Clubs overlaps for a distance of 11.8km; RYA Route / RYA Scotland, Clyde Cruising Club, Stomness Marina overlaps for a distance of 9.7km; North of Scotland Yachting Association overlaps for a distance of 50.5km; Stromness Marina overlaps for a distance of 37.3km; Dalgety Bay Sailing Club overlaps for 23.6km; and RYA Route / RYA Scotland, Clyde Cruising Club overlaps for a distance of 26.9km. It is unlikely there would be a significant interaction between the sandeel feature and recreational boating; therefore, no cost impacts are expected.
Power Interconnectors	One future power interconnector (Orkney 132kV Subsea Link) overlaps with the NWO proposed MPA for a distance of 1.3km in the far south-western point of the MPA. The future power interconnector overlaps with sandeels (all scenarios). However no cost impacts are foreseen as the site is located beyond the 12 nautical mile threshold (within which licences are required for cables).
Telecom Cables	Three operational telecom cables (Atlantic Crossing 1 Seg. A, Farice (2) (operational since 2004) and TAT 14(K)) overlap with sandeels (all scenarios) within the NWO proposed MPA boundary. However, no cost impacts are foreseen as the site is located beyond the 12 nautical mile threshold (within which licences are required for cables).

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Identification of Social Impacts from Designation of the Site as an MPA and their significance (over 2014 to 2033 inclusive) [NWO]					
Sector	Economic Impacts	Economic Costs and GVA (PV)	Consequent Social Impacts	Mitigation	Significance of Social impact
Energy Generation	Additional operational costs	Quantified Cost Impact (2014–2033): £0.026 – 0.062m	Future employment opportunities – if increased operational costs associated with management measures render projects unviable or restrict project size there will be a negative impact on economic activity and job creation in this sector.		xxx (under the upper scenario only) Potentially significant
	Costs associated with delays during the consenting process Loss of investor confidence (developments do not proceed)	Not Quantified	Future employment opportunities – if the delays deter investments there will be a negative impact on economic activity and future job creation in this sector. Environment – possible negative impact in relation to climate change and the ability of the Scottish Government to meet its 2020 renewables targets, decarbonisation targets and climate change targets. There would also be consequent financial implications of climate change impacts. This impact is uncertain and is only likely to arise under the upper scenario. JNCC's current advice is that the intermediate scenario represents their best view on management requirements.		xxx (under the upper scenario only)
Oil and Gas	Additional operational costs associated with licence and permit applications for new exploration development and decommissioning	Quantified Cost Impact (2014–2033): £0.071m Decommissioning assessed at national level	Future employment opportunities – reduced future employment opportunities if increased costs affect the economic viability of projects and lead to some projects not proceeding.		0
	Additional mitigation measures for new developments or decommissioning activities to support achievement of site conservation objectives	Not Quantified	Future employment opportunities – reduced future employment opportunities if costs significant and render development projects unviable. This impact is uncertain and is only likely to arise under the upper scenario. JNCC's current advice is that the intermediate scenario represents their best view on management requirements.		xxx (under the upper scenario only)

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	Costs associated with delays during the licensing and permitting process Loss of investor confidence (developments do not proceed)	Not Quantified	<p>Employment – reduced future employment opportunities if delays deter investments.</p> <p>This impact is uncertain and is only likely to arise under the upper scenario. JNCC’s current advice is that the intermediate scenario represents their best view on management requirements.</p>		xxx (under the upper scenario only)
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [NWO]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
None identified.								
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [NWO]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m	Gear Types/Sector	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long-term Sick
None identified.								
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

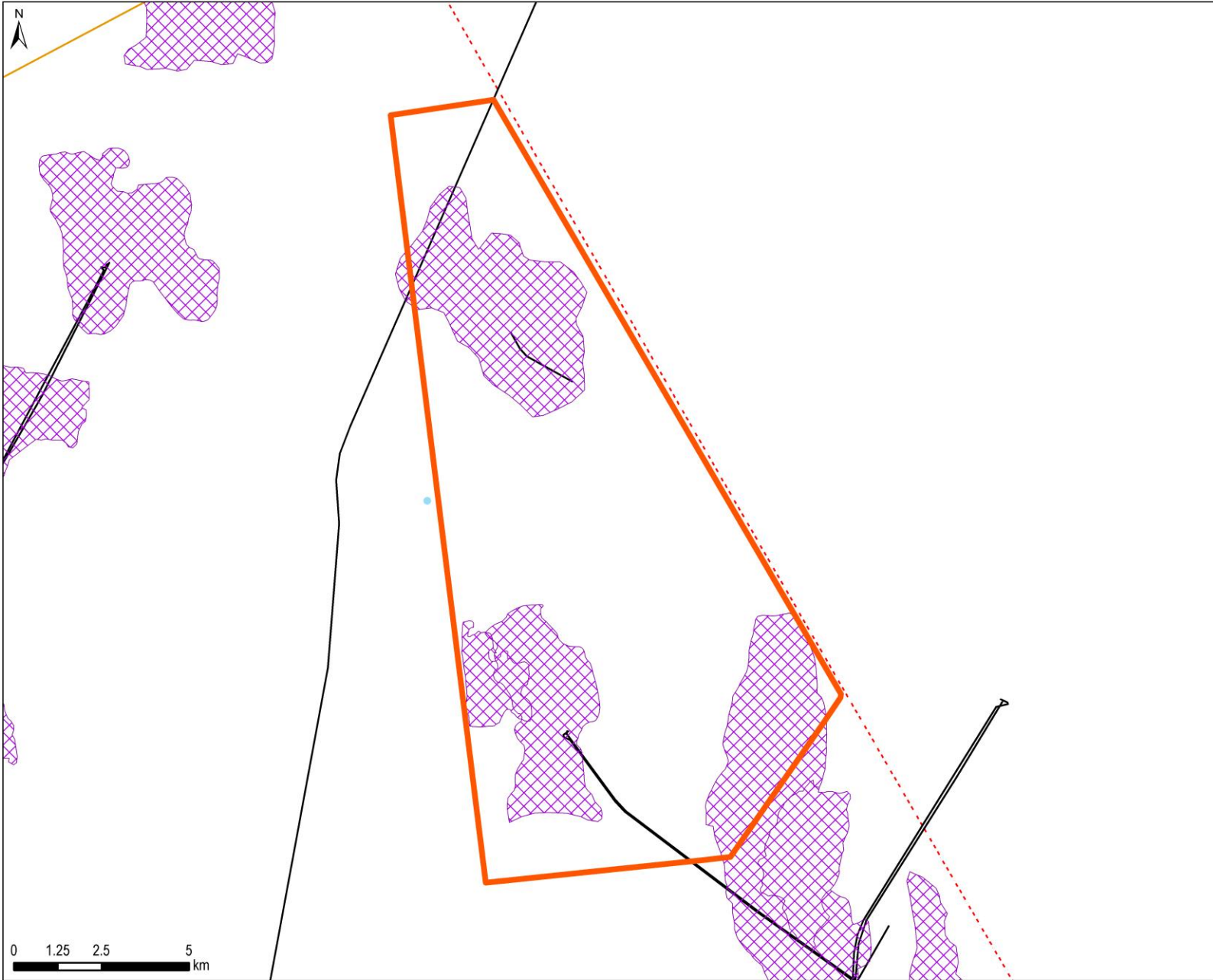
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [NWO]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Sandeels	Provides representation for an area considered to be of importance to the life history of sandeels as a source of recruits to other sandeel grounds.	Provides one of multiple examples to be protected in Scotland's seas, based on advice received from Marine Scotland Science.	Sandeel larvae from North-west Orkney may be an important source of recruits to areas south of the Moray Firth and Shetland.	Provides representation of an area importance to the life history of sandeels at the Northern extent of their range in OSPAR Region II in Scotland's seas.	Sandeels are considered, in places, to be in decline in Scotland's seas. MPA-based management can help prevent further decline.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

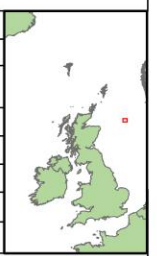
Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ²⁸ [NWO]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Minimal - Low	Minimal	Nil	Nil - Minimal, no benefits likely from management measures. However, sandeels here play an important role in repopulating fished grounds to the south around Moray Firth and Shetland.	Minimal	Minimal	Moderate	
Fish for non-human consumption		Minimal						
Gas and climate regulation	Nil - Low	Nil - Low	Nil, or at best a very low level of protection of parts of ecosystem providing these services			Low	Nil - Low	High
Natural hazard protection	Nil - Low	Nil - Low				Low	Nil - Low	High
Regulation of pollution	Nil - Low	Nil - Low				Low	Nil - Low	High
Non-use value of natural environment	Low - Moderate	Low - Moderate	Nil	Low	Low - Moderate	Low - Moderate	Nil - Moderate	Low
Recreation	Minimal	Minimal	Nil	Minimal	Minimal	Minimal	Minimal	Moderate
Research and Education	Minimal - Low	Minimal	Nil	Low	Low	Low	Low	Low
Total value of changes in ecosystem services			Management measures unlikely to provide any significant benefits.			Minimal	Minimal	Moderate

²⁸ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



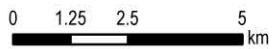
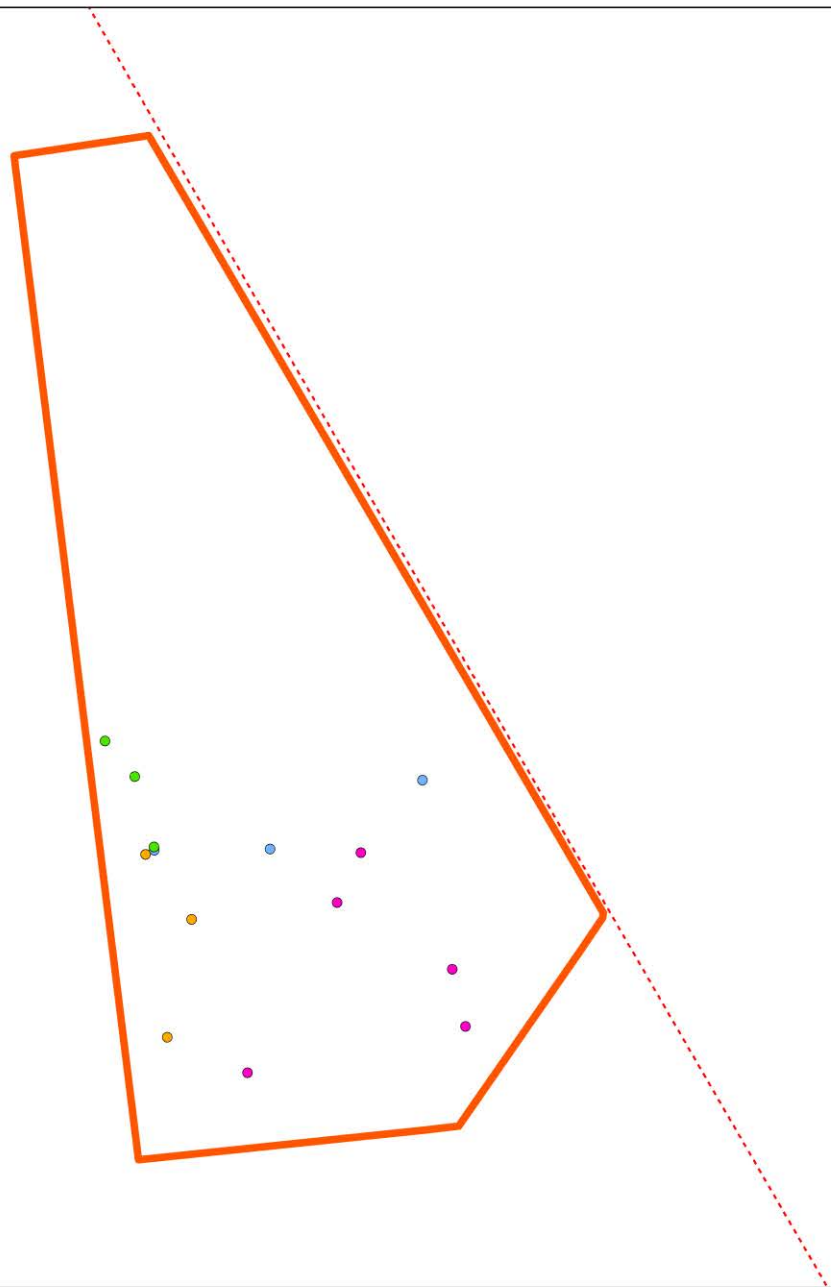
- Proposed Marine Protected Area
- UK Continental Shelf
- Oil & Gas**
- Hydrocarbon Fields
- Significant Discoveries
- Pipelines
- Recreational Boating**
- RYA Cruising Routes
- Light

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:155,000	
QA		FMM	
4136-MPA_HA_Norwegian.mxd			
Produced by ABPmer			



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 Sources: Marine Scotland, 2012; DECC, 2013; UK DEAL, 2013; RYA, 2008. NOT TO BE USED FOR NAVIGATION


**Human Activities which Occur
 within the Proposed MPA:
 Norwegian Boundary
 Sediment Plain**



-  Proposed Marine Protected Area
-  UK Continental Shelf
- VMS Fishing Ping Data (2007 to 2011)
-  Whitefish Trawls
-  Whitefish Seines
-  Nephrops Trawls
-  Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:155,000	
QA		FMM	
4136-MPA_Fish_Norwegian.mxd			
Produced by ABPmer			



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Data Source: Scottish Government, 2013
NOT TO BE USED FOR NAVIGATION

Fishing Activities which Occur within the Proposed MPA:
Norwegian Boundary Sediment Plain

Rosemary Bank Seamount (RBS)

Site Area (km²): 7,413

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [RBS]					
Proposed protected features					
<p><i>Biodiversity Features</i> Deep-sea sponge aggregations, seamount communities, seamounts</p> <p><i>Geodiversity Features</i> Quaternary of Scotland – iceberg ploughmark field; Submarine Mass Movement – slide scars; Marine Geomorphology of the Scottish Deep Ocean Seabed – scour moats, sediment drifts, sediment wave fields; Cenozoic Structures of the Atlantic Margin – Rosemary Bank Seamount</p> <p><i>Site Description</i> The Rosemary Bank Seamount MPA proposal is an offshore site located to the north-west of the Outer Hebrides. The MPA proposal boundary encompasses the geodiversity features representative of the Rosemary Bank Seamount and adjacent seafloor.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Deep sea sponge aggregations	Lower: 1941.17 Intermediate: 1941.17 Upper: 4697.77	Yes (Marine Scotland Science surveys, up to 2012)	Partial – relatively sparse feature data	Low	Conserve (uncertain)
Seamount communities	Lower: 1941.17 Intermediate: 1941.17 Upper: 4697.77	Yes (camera and video data, 2006; coral species records, 1987 & 1979; Marine Scotland Science, 2012)	Partial – relatively sparse feature data	Low	Conserve (uncertain)
Seamounts		Yes (BAS, 2003; UK SeaMap, 2010)	Yes	Low	Conserve (uncertain)

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Geodiversity Features					
Quaternary of Scotland – iceberg ploughmark field	257.96	Yes	Yes	Low	Conserve (uncertain)
Submarine Mass Movement – slide scars	76.34				
Marine Geomorphology of the Scottish Deep Ocean Seabed – scour moats, sediment drifts, sediment wave fields	Scour moats: 901.18 Sediment drifts: 821.26 Sediment wave fields: 1119.77				
Cenozoic Structures of the Atlantic Margin – Rosemary Bank Seamount	3820.92				
Key: * Estimated area based on best available data References: Area of Features: GeMS Confidence in biodiversity feature presence and extent: JNCC (2012i) Confidence in biodiversity feature condition: JNCC (2013) pers. comm. Confidence in geodiversity feature presence and extent: Brooks et al. (2012) Confidence in geodiversity feature condition: Brooks et al. (2012)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [RBS]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries*	0.070	1.415	2.596
Total Quantified Economic Costs	0.070	1.415	2.596
Non-Quantified Economic Costs			
Commercial Fisheries	<ul style="list-style-type: none"> ▪ Displacement impacts 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts
<p>Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [RBS]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	0.005	0.005	0.005
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	None	None	None
Total Quantified Public Sector Costs	0.005	0.005	0.005
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [RBS]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 job Intermediate: 2 jobs Upper: 4 jobs	West South West	Milford Haven Newlyn	Impacts concentrated in rural and urban coastal areas	Cannot be identified for confidentiality reasons.	Lower: <15m Upper: <15m (may be over-estimate)	No Impact.	No breakdown of fisherman employment by ethnic origin.	Unlikely to be employed in fisheries.
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [RBS]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use value of natural environment	Nil - Low	Nil - Moderate
Other Benefits		
None identified.		
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [RBS]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Deep sea sponge aggregations	-	-	-	-	-	-	L/U	-	-	L/U	-	-	-	-	-	-	-
Seamount communities	-	-	-	-	-	-	L/U	-	-	L/U	-	-	-	-	-	-	-
Seamounts	Not considered as thought to have a low sensitivity to pressures associated with human activity and also considered from a geodiversity context.																
Geodiversity Features																	
Quaternary of Scotland – iceberg ploughmark field	Not considered as thought to have a low sensitivity/not be exposed to pressures associated with human activity and also considered from a geodiversity context.																
Submarine Mass Movement – slide scars																	
Marine Geomorphology of the Scottish Deep Ocean Seabed – scour moats, sediment drifts, sediment wave fields																	
Cenozoic Structures of the Atlantic Margin – Rosemary Bank Seamount																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed protected feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed protected feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity)	[RBS]
<p>According to VMS-based estimates and ICES rectangle landings statistics, pots, pelagic trawls and nets (over-15m) and otter trawlers (whitefish, nephrops and other), netters, potters, pelagic trawlers and liners (under-15m vessels (indicated from ICES rectangle landings data)) operate within the RBS proposed MPA. The value of catches from the RBS area for over-15m vessels (VMS data) cannot be disclosed as there were fewer than 5 vessels. The value of catches for under-15m vessels was £298,000 (indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels are predominantly into Corunna, Spain (48% by value) and Ijmuiden, The Netherlands (39%), with small amounts into Lochinver (6%), Marin (4%) and Ullapool (2%). For the over-15m fleet, pots operate in particular around the edge of the seamount, while nets operate mainly over the top of the seamount, across the area of deep sea sponge aggregations and seamount communities.</p> <p>The deep sea sponge aggregations and seamount communities are in the central area of the proposed MPA, with differing feature extents under the different scenarios (lower: where deep sea sponge aggregations have been recorded; intermediate: across seamount down to 1000m depth; upper: across full extent of seamount). Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and based on JNCC recommendations. A lower scenario which excludes mobile bottom-contact gear use but does not exclude static gear use on deep sea sponge aggregations and seamount communities has also been included.</p> <p>VMS ping data indicate that three non-UK vessels were active in the RBS area in 2012: one from each of the Faroe Islands, Germany and Norway. The German vessel fishes with lines and therefore would be affected by management measures assessed under the intermediate and upper scenarios. No information on gear types used by the Norwegian or Faroese vessels was available.</p> <p>Information submitted by the French ministry indicated that 6 vessels fished in the proposed MPA area in 2008. They were all >40m and were predominantly demersal trawlers, targeting black scabbardfish and grenadiers, with catches worth €1.361 million (in 2008). The vessels originated from Boulogne-sur-Mer, Lorient and Saint-Malo ports, but had their home ports at Lochinver, Ullapool, Boulogne-sur-Mer and Saint Malo. 5% of their turnover was dependent on fishing in the proposed MPA area, and they accounted for 138 FTE jobs on board. Their fishing activity was mainly in the northern part of the proposed MPA area, and therefore may not be affected by management measures under the lower scenario.</p> <p>Provisional ScotMap data do not indicate any under-15m vessel activity in the RBS proposed MPA. The cost estimates for the under-15m sector may be overestimates, as the 'under-15m' length group in the ICES rectangle landings data may include cases where information on vessel length and/or administrative port is missing from landings returns.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>	

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Closure to mobile bottom contact gears (whitefish, nephrops and other trawls and seines, beam trawls, and dredges) across deep sea sponge aggregations and seamount communities. 	<ul style="list-style-type: none"> ▪ Closure to all bottom contact gear (static and mobile) (whitefish, nephrops and other trawls and seines, beam trawls, and dredges, nets, lines and pots) across a portion of the seamount area (down to 1000m). 	<ul style="list-style-type: none"> ▪ Closure to all bottom contact gear (static and mobile) (whitefish, nephrops and other trawls and seines, beam trawls, and dredges, nets, lines and pots) across the whole seamount area.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of recurring costs	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ None. ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> All affected gears (0.009). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (fewer than 5 vessels; value not presented). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> All affected gears (0.124). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (fewer than 5 vessels; value not presented). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> All affected gears (0.273).
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Germany (1 vessel), possibly Norway (1 vessel) and Faroe Islands (1 vessel)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Germany (1 vessel), possibly Norway (1 vessel) and Faroe Islands (1 vessel)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	*	*	*
Average annual costs	*	*	*
Present value of total costs (2014–2033)	*	*	*
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.096	1.924	3.529

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Average annual change to GVA	0.005	0.096	0.176
Present value of total change in GVA (2014–2033)	0.070	1.415	2.596
Direct and Indirect reduction in Employment	0.1 jobs	1.9 jobs	4.1 jobs
<p>* Value for non-VMS vessels only. VMS data represents less than 5 vessels and therefore cannot be disclosed. Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA				[RBS]
Activity	Lower Estimate	Intermediate Estimate	Upper Estimate	
None identified.				

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA		[RBS]
Activity	Description	
Oil and Gas	There is currently no oil and gas activity within the RBS proposed MPA boundary, although licence blocks were offered in the 27 th licensing round that overlap with features under the all scenarios, but not accepted. With no awarded licence blocks or significant discoveries within the RBS proposed MPA boundary, it is unlikely that any future activity will occur and, therefore, no cost assessments have been made.	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [RBS]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Cannot be disclosed for reasons of confidentiality. Annual Average Loss in GVA (direct and indirect)*: Lower: <£0.01m Intermediate: £0.10m Upper: £0.18m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: xx (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.1 jobs Intermediate: 1.9 jobs Upper: 4.1 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Germany (1 vessel), possibly Norway (1 vessel) and Faroe Islands (1 vessel))	Not quantified	Employment – loss of foreign jobs from reduced landings.		
	Displacement Effects	Not quantified	Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences:		xx

			<ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited; ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		
<p>Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [RBS]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries	xx	xx	xx	xxx	xxx	xx	xxx	xxx
Reduction in landed value, GVA and employment	(Milford Haven and Newlyn)	Largest employment impacts in: Milford Haven (81%), Newlyn (19%)	Coastal	Potentially significant negative effect if parent loses job/becomes unemployed.	Potentially significant negative effect if individuals lose job/become unemployed	Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0.1-4 job losses Potentially significant negative effect on	Potentially significant negative effect if member of household loses job/

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							individuals that lose job/become unemployed.	becomes unemployed.
Fish Processors Reduction in local landings at landing ports	x North-West	x Corunna Marin Lochinver Ullapool	x Coastal Rural	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [RBS]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long-term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: <15m Upper: <15m (may be over-estimate)	Can not be identified for confidentiality reasons.	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Fish Processors Reduction in local landings at landing ports		Shellfish: xxx Demersal: xx Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario								

Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [RBS]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Deep sea sponge aggregations	Provides representation for deep sea sponge aggregations in OSPAR Region V.	Provides one of at least three recommended examples to be protected in Scotland's seas.	Not currently understood for deep sea sponge aggregations.	Provides representation of an ecologically distinct type of deep sea sponge aggregation to those in the Faroe-Shetland Channel in OSPAR Region II and Hatton-Rockall Basin in OSPAR Region V. This type of deep sea sponge aggregation is only recorded in this location and not anywhere else in Scotland's seas.	Deep sea sponge aggregations are considered to be Threatened and/or Declining by the OSPAR Commission in OSPAR Region V so the MPA is expected to help increase resilience for the feature.
Seamount communities	Provides representation for Seamount communities in OSPAR Region V.	Provides one of at least three recommended examples to be protected in Scotland's seas.	Not currently understood for seamount communities.	There are three seamounts recorded in Scotland's seas and these only occur within OSPAR Region V. MPA recommendations, considered alongside the existing MPA network, will mean the inclusion of all three seamounts in Scotland's seas in the resultant MPA network.	Seamount communities are considered to be Threatened and/or Declining by the OSPAR Commission in OSPAR Region V so the MPA is expected to help increase resilience for the feature.
Seamounts	Provides representation for Seamounts in OSPAR Region V.	Provides one of at least two recommended examples to be protected in Scotland's seas.	The Rosemary Bank seamount is considered to be of wider functional significance to the health and diversity of Scotland's seas, e.g. enhanced biodiversity resulting from mixing caused by the interaction between the seamount and oceanic currents, increased productivity, and as feeding grounds for fish and marine mammals.	There are three seamounts recorded in Scotland's seas and these only occur within OSPAR Region V. MPA recommendations, considered alongside the existing MPA network, will mean the inclusion of all three seamounts in Scotland's seas in the resultant MPA network.	Seamounts are only distributed in OSPAR Region V in Scotland's seas.

JNCC (pers. comm.); SNH and JNCC. (2012). *Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.*
Available online from: <http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612>.



Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ²⁹ [RBS]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Stocks not at MSY	Low – possible small recovery of fish stocks in medium/long term	Low – possible recovery of fish stocks in medium/long term. Features provide low level of supporting services to support recovery	Moderate – value of landings	Low	Low	
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Nil - Low	Nil - Low	Nil, or at best a very low level of protection of parts of ecosystem providing these services			Low	Nil - Low	High
Natural hazard protection	Nil - Low	Nil - Low				Low	Nil - Low	High
Regulation of pollution	Nil - Low	Nil - Low				Low	Nil - Low	High
Non-use value of natural environment	Low - Moderate	Low - Moderate	Nil	Low	Low - Moderate	Low	Nil - Moderate	Low
Recreation	Minimal	Minimal	Nil	Nil	Nil	Minimal	Minimal	Moderate
Research and Education	Low - Moderate, features protected (esp. seamounts) of research interest	Minimal	Nil	Low	Low	Low	Low	Low
Total value of changes in ecosystem services			Fisheries likely to drive benefits from scenario ranging from low to moderate benefits.			Low - Moderate	Low	

²⁹ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



 Proposed Marine Protected Area

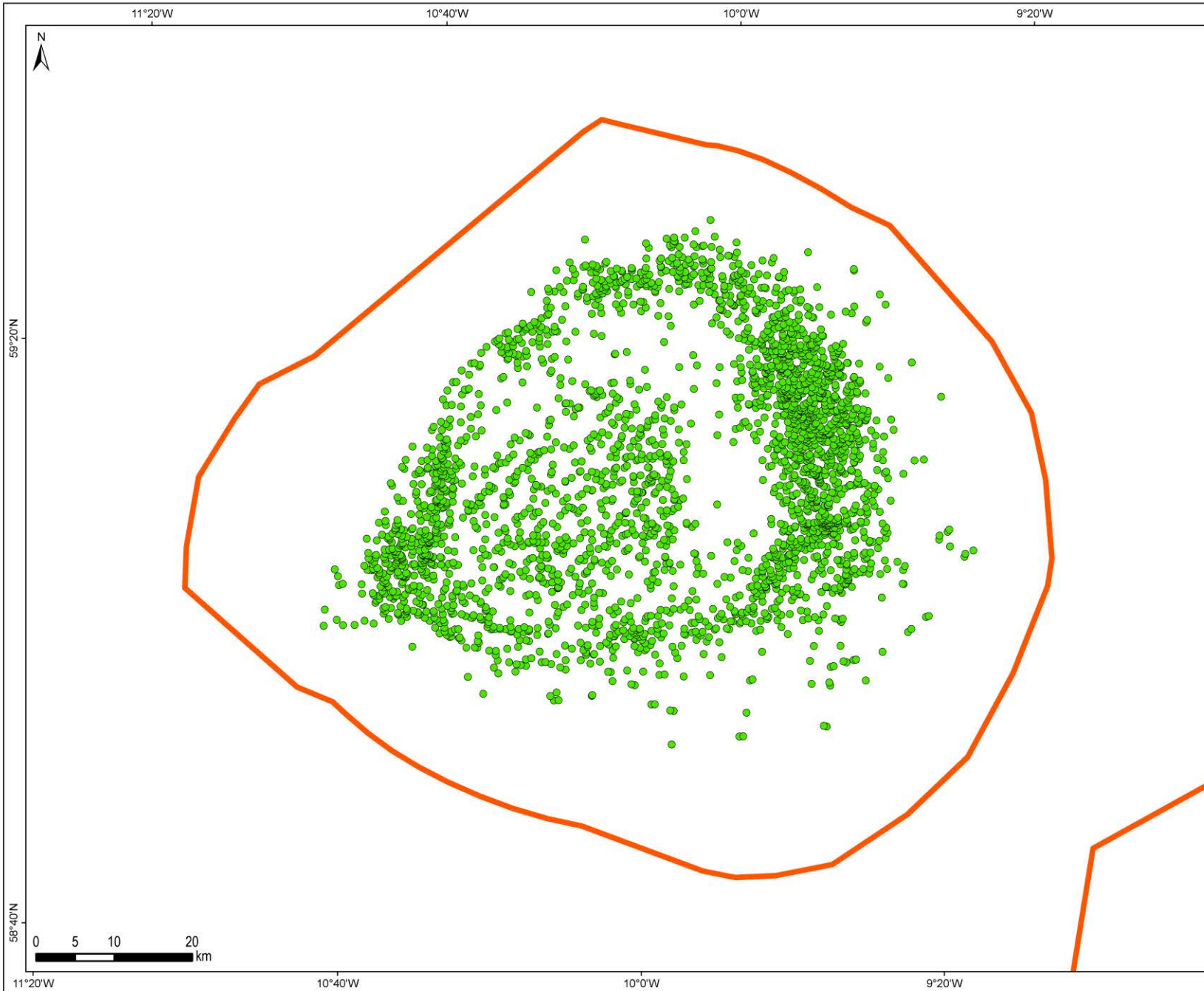
Telecommunication Cables
 Subsea Telecomms Cables
 Active
 Out of Service

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:674,000	
QA		FMM	
4136-MPA_HA_Rosemary_Bank.mxd			



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**Human Activities which Occur within the Proposed MPA:
 Rosemary Bank Seamount**



- Proposed Marine Protected Area
- VMS Fishing Ping Data (2007 to 2011)
- All Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:674,000	
QA		FMM	
4136-MPA_Fish_Rosemary_Bank.mxd			
Produced by ABPmer			



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Data Source: Scottish Government, 2013
NOT TO BE USED FOR NAVIGATION

**Fishing Activities which Occur within the Proposed MPA:
Rosemary Bank Seamount**

South-east Fladen (SEF)

Site Area (km²): 416

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [SEF]					
Proposed protected features					
<i>Biodiversity Features</i> Burrowed mud – seapens and burrowing megafauna.					
<i>Geodiversity Features</i> Seabed Fluid and Gas Seep – pockmarks.					
<i>Site Description</i> The South-east Fladen MPA proposal falls within the Fladen Grounds to the east of Scotland in the offshore waters of the northern North Sea. It encompasses areas of average and higher than average seapen densities by comparison to the wider Fladen Grounds based on available data.					
<i>Potential Alternative Designations</i> JNCC have identified South-east Fladen as a science-based alternative to the Central Fladen for representation of the seapens and burrowing megafauna burrowed mud habitat type. JNCC recommend that the southern part of the Central Fladen possible MPA – ‘Central Fladen Core’ – is still designated as it represents another type of burrowed mud (records of tall seapen).					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Burrowed mud	All scenarios: 415.81	Yes – (Marine Science Scotland surveys, 2008 – 2010; JNCC & Cefas survey data 2013; BGS data, 1980-1985)	Yes – (Marine Science Scotland surveys, 2008 – 2010; JNCC & Cefas survey data 2013; BGS data, 1980-1985)	Low	Conserve (uncertain)
Geodiversity Features					
Seabed Fluid and Gas Seep – pockmarks	730.03	Yes	Yes	Low	Conserve (uncertain)
Key: * Estimated area based on best available data References: Area of Features: GeMS Confidence in biodiversity feature presence and extent: JNCC (2012) Confidence in biodiversity feature condition: JNCC (2013) pers. comm. Confidence in geodiversity feature presence and extent: Brooks et al. (2012) Confidence in geodiversity feature condition: Brooks et al. (2012)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [SEF]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries*	0.000	1.915	3.830
Total Quantified Economic Costs	0.000	1.915	3.830
Non-Quantified Economic Costs			
Commercial Fisheries	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts.
Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [SEF]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	0.005	0.005
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	None	None	None
Total Quantified Public Sector Costs	0.000	0.005	0.005
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [SEF]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 4 jobs Upper: 8 jobs	North East North East	Fraserburgh Peterhead	Impacts concentrated in urban coastal areas	Whitefish trawls, Nephrops trawls, Other gears	Lower: N/A Upper: >15m	No Impact.	No breakdown of fisherman employment by ethnic origin.	Unlikely to be employed in fisheries.
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [SEF]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use value of natural environment	Low	Low - Moderate
Other Benefits		
None identified.		
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [SEF]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Burrowed mud	-	-	-	-	L/I/U	-	L/I/U	-	-	L/I/U	-	L/I/U	-	-	-	-	-
Geodiversity Features																	
Seabed Fluid and Gas Seep – pockmarks	It is assumed that management put in place from the Scanner Pockmark SAC will be sufficient to also conserve the geodiversity feature.																
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed protected feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed protected feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity)	[SEF]
<p>According to VMS-based estimates and ICES rectangle landings statistics, nephrops trawls, whitefish trawls and other trawls (over-15m) and nephrops trawls, whitefish trawls and other gears (under-15m vessels) operate within the SEF proposed MPA. The value of catches from the SEF area was £652,000 (over-15m vessels) and £24,500 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels are predominantly into Fraserburgh (72% by value) and Peterhead (26%). For the over-15m fleet, nephrops and whitefish trawlers operate in particular across the proposed MPA and area of burrowed mud.</p> <p>Non-UK VMS ping data indicate that 30 non-UK vessels were active in the SEF area in 2012: 16 from Denmark; 8 from Norway; 3 from the Netherlands; 2 from France and 1 from Sweden. The Swedish and Dutch vessels fish with pelagic gear (pelagic trawls) and therefore are considered unlikely to be affected by the management scenarios. Six Danish vessels and 1 French vessel fishes with bottom trawls or seines, and therefore may be affected by the management measures assessed under the intermediate and upper scenarios. No information on gear types used by the Norwegian vessels was available.</p> <p>Information submitted by Copeche indicated that French vessels operate in the SEF proposed MPA, but no information was provided on numbers of vessels or value of catches.</p> <p>Provisional ScotMap data do not indicate any under-15m vessel activity in the SEF proposed MPA. The cost estimates for the under-15m sector may be overestimates, as the 'under-15m' length group in the ICES rectangle landings data may include cases where information on vessel length and/or administrative port is missing from landings returns.</p> <p>Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and based on JNCC recommendations.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>	

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No additional management. 	<ul style="list-style-type: none"> ▪ Reduce mobile bottom contact gear (whitefish, nephrops and other trawls and seines, beam 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom contact gear (whitefish, nephrops and other trawls and seines, beam trawls,

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
		trawls, and dredges) pressure by 50% across burrowed mud.	and dredges) across the whole proposed MPA extent.
Description of one-off costs	▪ None.	▪ None.	▪ None.
Description of recurring costs	▪ None.	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.314); ▪ Other affected gears (0.012). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.011); ▪ Other affected gears (<0.001). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.628); ▪ Other affected gears (0.024). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.022); ▪ Other affected gears (<0.001).
Description of non-quantified costs	▪ None.	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using mobile bottom-contact gears in the proposed MPA (Denmark (6 vessels), France (1 vessel), and possibly Norway (8 vessels)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (6 vessels), France (1 vessel), and possibly Norway (8 vessels)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	6.749	13.498
Average annual costs	0.000	0.337	0.675
Present value of total costs (2014–2033)	0.000	4.964	9.928
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.000	2.603	5.207
Average annual change to GVA	0.000	0.130	0.260
Present value of total change in GVA (2014–2033)	0.000	1.915	3.830
Direct and Indirect reduction in Employment	0.0 jobs	3.8 jobs	7.7 jobs
<p>* Due to data confidentiality, the value of catches from the affected gear types has been summed together with other gear types that are not expected to be impacted by management measures. The cost impact is therefore an overestimate of the actual expected impact from the proposed management measures.</p> <p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period.</p> <p>Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20).</p> <p>Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.</p> <p>Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period.</p> <p>Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20).</p> <p>Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%.</p> <p>Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA				[SEF]
Activity	Lower Estimate	Intermediate Estimate	Upper Estimate	
None identified.				

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA [SEF]	
Activity	Description
Carbon Capture and Storage	There is currently no CCS activity which occurs within the boundaries of the SEF proposed MPA, nor within a 1km buffer zone. One potential hydrocarbon field (Britannia) overlaps with the southern area of the 'burrowed mud' feature of the SEF proposed MPA under all scenarios (lower, intermediate and upper). However, in the timescales of the project (2014-2033), it is considered that CCS will utilise existing oil and gas pipelines, where possible, between St Fergus and the Goldeneye hydrocarbon field and that possible new infrastructure (pipeline or shipping) will link the Firth of Forth to St Fergus and Teesside to an offshore hub at Goldeneye. None of these possible future CCS developments occur within the boundaries of the SEF proposed MPA, nor within a 1km buffer zone. Therefore, no cost impacts are expected.
Power Interconnectors	One future power interconnector (UK-Norway NorthConnect) overlaps with the SEF proposed MPA for a distance of 19.3km in the northern half of the MPA. The future power interconnector overlaps with burrowed mud (all scenarios). However, no cost impacts are foreseen as the site is located beyond the 12 nautical mile threshold (within which licences are required for cables).
Oil and Gas	The SEF proposed MPA boundary encompasses 10 known hydrocarbon fields. All 10 fields overlap with MPA features under all scenarios. Feature extents show that there are 82 wells and 6 pipeline sections within the MPA proposal that overlap with MPA features. There are ten licensed blocks within the MPA proposal boundary that overlap with burrowed mud under all scenarios, and in one of these blocks is a significant oil discovery. As no new licence awards have been granted during the 26 th and 27 th rounds, no additional management or assessment costs are anticipated.

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [SEF]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.00m Intermediate: £0.34m Upper: £0.68m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: £0.13m Upper: £0.26m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: xx (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 3.8 jobs Upper: 7.7 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Loss of value of catches from non-UK vessels using mobile bottom contact gears in the proposed MPA (Denmark (6 vessels), France (1 vessel), and possibly Norway (8 vessels))	Not Quantified	Employment – loss of foreign jobs from reduced landings.		

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	Displacement Effects	Not Quantified	<p>Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences:</p> <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited; ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		xx
<p>Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [SEF]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries Reduction in landed value, GVA and employment	xx North-East North-West (and Belfast)	xx Largest employment impacts in: Fraserburgh (67%), Peterhead (17%), Belfast (5%)	xx Coastal Urban and Rural	xxx Potentially significant negative effect if parent loses job/becomes unemployed.	xxx Potentially significant negative effect if individuals lose job/become unemployed.	xx Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	xxx 0-8 job losses Potentially significant negative effect on individuals that lose job/become unemployed.	xxx Potentially significant negative effect if member of household loses job/becomes unemployed.
Fish Processors Reduction in local landings at landing ports	x North-East	x Fraserburgh Peterhead	x Coastal Urban	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [SEF]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: >15m	Whitefish trawls Nephrops trawls Other gears	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Fish Processors Reduction in local landings at landing ports		Shellfish: xxx Demersal: xx Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

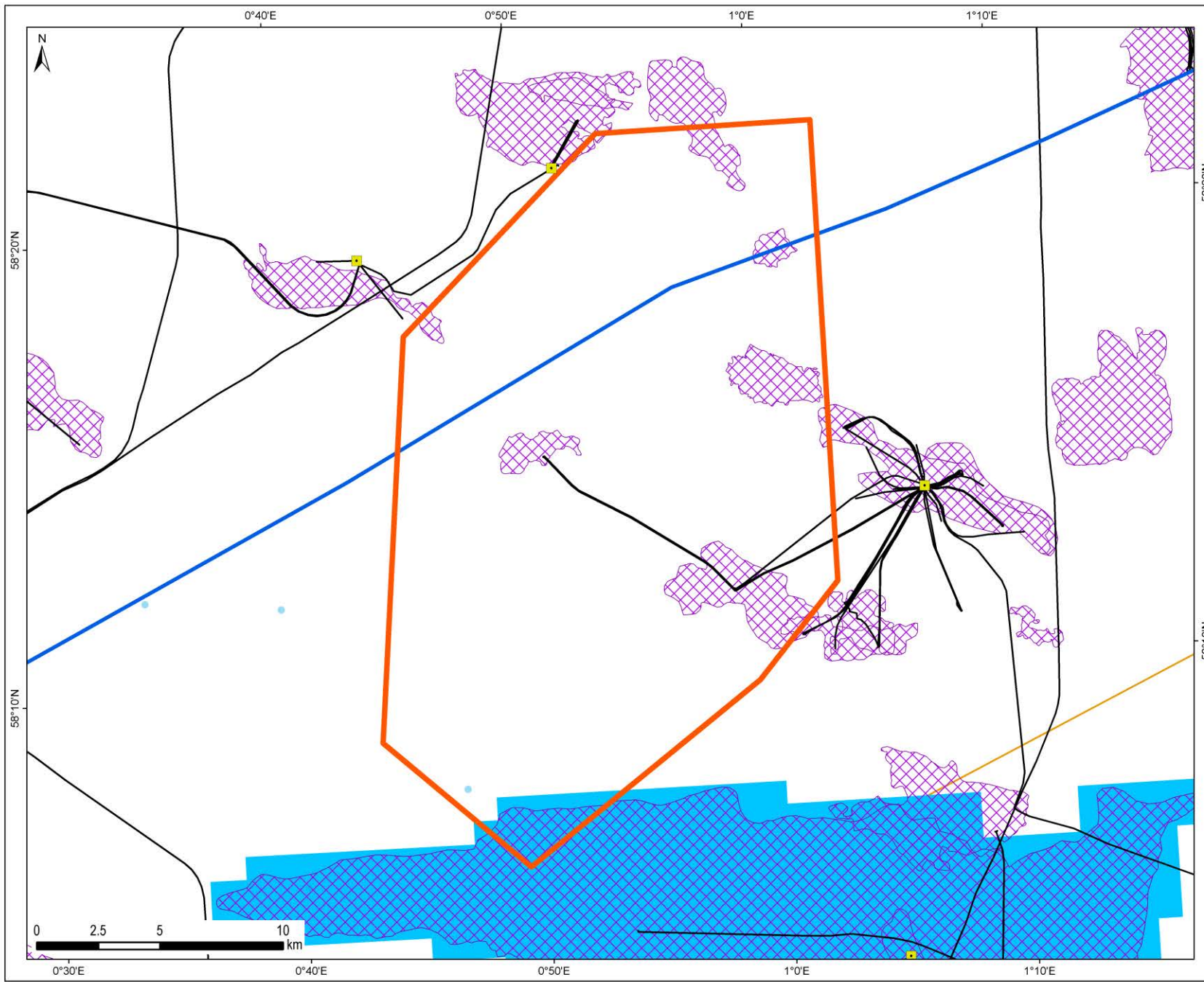
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [SEF]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Burrowed mud	Provides representation for one type of burrowed mud (seapens and burrowing megafauna in offshore waters of OSPAR Region II in Scotland's seas.	Provides one of at least three examples of this one type of burrowed mud to be protected in Scotland's seas.	Not well understood for burrowed mud.	Provides representation for one type of burrowed mud (seapens and burrowing megafauna) in offshore waters of OSPAR Region II in Scotland's seas.	Burrowed mud is considered to be Threatened and/or Declining by the OSPAR Commission in OSPAR Region II so the MPA is expected to help increase resilience for the feature.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ³⁰ [SEF]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Low - Moderate, Habitats make contribution to food webs.	Stocks not at MSY	Nil	Minimal - Low – potential increase in fish populations in medium/long term. Features provide low level of supporting services to support recovery.	Low - Moderate	Nil - Low	Low - Moderate	
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Nil - Low	Nil - Low	Nil, or at best a very low level of protection of parts of ecosystem providing these services			Low	Nil - Low	High
Natural hazard protection	Nil - Low	Nil - Low				Low	Nil - Low	High
Regulation of pollution	Nil - Low	Nil - Low				Low	Nil - Low	High
Non-use value of natural environment	Low – features do not provide large non use values.	Low - Moderate	Nil	Low	Low - Moderate	Low - Moderate	Nil - Moderate	Low
Recreation	Minimal	Minimal	Nil	Nil	Nil	Minimal	Minimal	Moderate
Research and Education	Minimal	Minimal	Nil	Minimal	Minimal	Low	Low	Low
Total value of changes in ecosystem services			Fisheries likely to drive low benefits from intermediate and upper scenarios			Low	Low	Low

³⁰ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



- Proposed Marine Protected Area
- Oil & Gas**
- Platforms
- Pipelines
- Hydrocarbon Fields
- Significant Discoveries
- Carbon Capture & Storage**
- Potential Hydrocarbon Reservoirs
- Power Interconnectors**
- Future Proposed Interconnectors
- Recreational Boating**
- RYA Cruising Routes
- Light

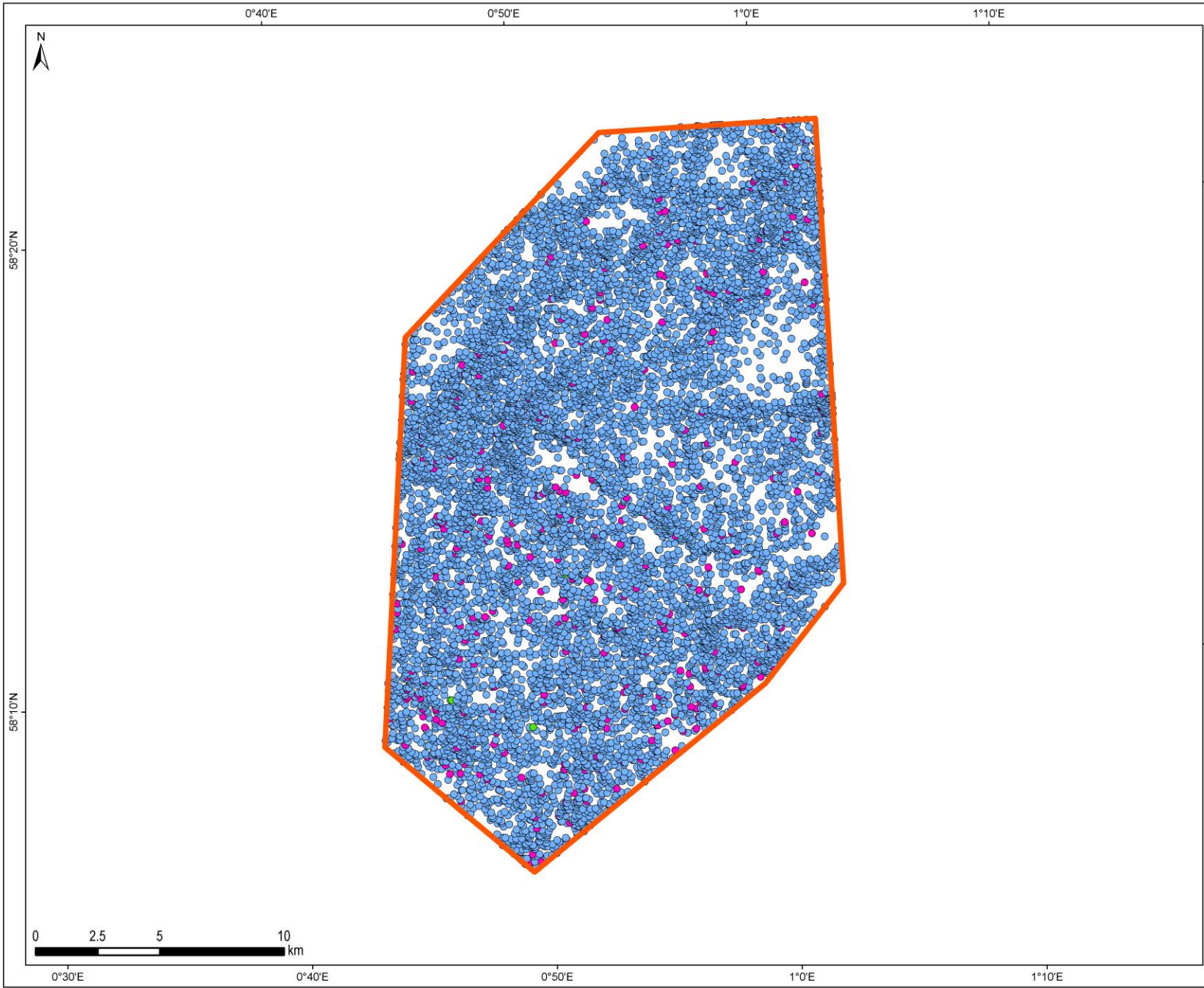
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Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:60,000,000	
QA		FMM	
4136MPA_HA_SE_Flادن.mxd			



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Human Activities which Occur within the Proposed MPA:
SE Fladen



- Proposed Marine Protected Area
- VMS Fishing Ping Data (2007 to 2011)
- Whitefish Trawls
- Nephrops Trawls
- Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:210,000	
QA		FMM	
4136MPA_Fish_SE_Flادن.mxd			
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 Data Source: Scottish Government, 2013
 NOT TO BE USED FOR NAVIGATION

**Fishing Activities which Occur
 within the Proposed MPA:
 SE Fladen**

South-west Sula Sgeir & Hebridean Slope (SSH)

Site Area (km²): 2,093

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [SSH]					
Proposed protected features					
<p><i>Biodiversity Features</i> Burrowed mud, offshore subtidal sands and gravels, offshore deep sea muds, continental slope.</p> <p><i>Geodiversity Features</i> Quaternary of Scotland – iceberg ploughmark fields, prograding wedges; Submarine Mass Movement – slide deposits.</p> <p><i>Site Description</i> The SSH MPA proposal is an offshore area located to the north west of the Outer Hebrides. The proposal extends from the continental shelf, down the Hebridean slope and into the Rockall Trough.</p> <p><i>Potential Alternative Designations</i> The MPA proposal is considered to offer an equivalent contribution to the MPA network as the Geikie Slide and Hebridean Slope possible MPA. Only one of these two designations would therefore be required to be designated.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Burrowed mud	Lower: 1563.68 Intermediate: 1563.68 Upper: 1723	Yes (Marine Scotland Science survey data, 2000 – 2009; SAMS analysis of SEA7, 1988 - 1998)	Partial	Low	Conserve (uncertain)
Offshore subtidal sands and gravels	Lower: 271.61 Intermediate: 271.61 Upper: 373.77	Yes (UK SeaMap, 2010; SAMS analysis of SEA7, 1988 – 1998; BGS PSA data, provided 2012)	Partial	Low	Conserve (uncertain)
Offshore deep sea muds	All scenarios: 22.04	Yes (UK SeaMap, 2010; SAMS analysis of SEA7, 1988 - 1998)	Partial	Low	Conserve (uncertain)
Continental slope		Yes (UK SeaMap, 2010)	Partial	Low	Conserve (uncertain)

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Geodiversity Features					
Quaternary of Scotland – iceberg ploughmark fields	4435.65	Yes	Yes	Low	Conserve (uncertain)
As above – prograding wedges	514.70	Yes	Yes	Low	Conserve (uncertain)
Submarine Mass Movement – slide deposits	1046.25	Yes	Yes	Low	Conserve (uncertain)
Key: * Estimated area based on best available data References: Area of Features: GeMS Confidence in biodiversity feature presence and extent: JNCC (2012k) Confidence in biodiversity feature condition: JNCC (2013) pers. comm. Confidence in geodiversity feature presence and extent: Brooks et al. (2012) Confidence in geodiversity feature condition: Brooks et al. (2012)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [SSH]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries*	0.000	5.282	6.495
Total Quantified Economic Costs	0.000	5.282	6.495
Non-Quantified Economic Costs			
Commercial Fisheries	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts.
Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.			

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [SSH]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	0.005	0.005
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	None	None	None
Total Quantified Public Sector Costs	0.000	0.005	0.005
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [SSH]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 9 jobs Upper: 11 jobs	North-East North North-West	Fraserburgh Kirkwall Lochinver	Impacts concentrated in island, rural and urban coastal areas	Whitefish trawls	Lower: N/A Upper: <15m (may be over-estimate)	No Impact.	No breakdown of fisherman employment by ethnic origin.	Unlikely to be employed in fisheries.
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [SSH]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use value of natural environment	Nil - Low	Nil - Moderate
Other Benefits		
None identified.		
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [SSH]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Burrowed mud	-	-	-	-	-	-	L/U	-	-	L/U	-	-	-	-	-	-	-
Offshore subtidal sands and gravels	-	-	-	-	-	-	L/U	-	-	-	-	-	-	-	-	-	-
Offshore deep sea muds	-	-	-	-	-	-	L/U	-	-	L/U	-	-	-	-	-	-	-
Continental slope	Not considered as not thought to be sensitive to pressures associated with human activity.																
Geodiversity Features																	
Quaternary of Scotland – iceberg ploughmark fields, prograding wedges	Considered to have a low sensitivity to the pressures associated with activities they are currently exposed and likely to be exposed to in the future; thus not considered in the context of management.																
Submarine Mass Movement – slide deposits																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed protected feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed protected feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity)			[SSH]
<p>According to VMS-based estimates and ICES rectangle landings statistics, pelagic trawls, whitefish trawls and lines (over-15m) and whitefish trawls, lines, pelagic trawls, and other gear (under-15m vessels) operate within the SSH proposed MPA. The value of catches from the SSH area was £1.68 million (over-15m vessels) and £1.01 million (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels are predominantly into Peterhead (28% by value), Lerwick (15%), Fraserburgh (12%), Ijmuiden, The Netherlands (11%) and Ellingsoy, Norway (9%). For the over-15m fleet, whitefish trawlers operate in particular in the east part of the proposed MPA in the area of subtidal sands and gravels.</p> <p>Combined, burrowed mud, offshore deep-sea muds and offshore subtidal sands and gravels cover the whole proposed MPA. Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and based on JNCC recommendations.</p> <p>VMS ping data indicate that 33 non-UK vessels were active in the SSH area in 2012: 13 from France; 9 from Spain; 7 from Norway; 3 from the Netherlands and 1 from Germany. The Dutch and German vessels fish with pelagic gear (pelagic trawls) and therefore are unlikely to be affected by the proposed management scenarios. Five French vessels and 4 Spanish vessels fish with bottom trawl and therefore would be impacted by the management measures assessed under the intermediate and upper scenarios. No information on gear types used by the Norwegian vessels was available.</p> <p>Information submitted by the French ministry indicated that 7 vessels in 2008, and 5 vessels in 2011, fished in the proposed MPA area. These were predominantly demersal trawlers and predominantly >40m vessels. Target species were black scabbardfish, hake, grenadiers, blue ling, anglerfish and saithe, with catches worth €0.829 million in 2008 and €0.467 million in 2011. The vessels originated from Lorient, Fécamp and Saint Malo ports, but had their home ports at Lochinver, Lorient and Ijmuiden (in 2011). 2% of their turnover was dependent on fishing in the proposed MPA area, and they accounted for 93 FTE jobs on board in 2011.</p> <p>Provisional ScotMap data do not indicate any under-15m vessel activity in the SSH proposed MPA. The cost estimates for the under-15m sector may be overestimates, as the 'under-15m' length group in the ICES rectangle landings data may include cases where information on vessel length and/or administrative port is missing from landings returns.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No additional management. 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gear (whitefish, nephrops and other trawls and 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
		seines, beam trawls and dredges) across the MPA, with the exception of depth corridors where all gears are permitted between 300-600m and 1200-1400m depth.	trawls and dredges) across full extent of MPA.
Description of one-off costs	▪ None.	▪ None.	▪ None.
Description of recurring costs	▪ None.	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.195). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (0.601); ▪ Other affected gears (0.001). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.319). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (0.682); ▪ Other affected gears (0.001).
Description of non-quantified costs	▪ None.	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (France (5 vessels), Spain (4 vessels), possibly Norway (7 vessels)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (France (5 vessels), Spain (4 vessels), possibly Norway (7 vessels)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	15.941	20.060
Average annual costs	0.000	0.797	1.003
Present value of total costs (2014–2033)	0.000	11.724	14.754
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.000	7.181	8.830
Average annual change to GVA	0.000	0.359	0.442
Present value of total change in GVA (2014–2033)	0.000	5.282	6.495
Direct and Indirect reduction in Employment	0.0 jobs	9.1 jobs	11.4 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA				[SSH]
Activity	Lower Estimate	Intermediate Estimate	Upper Estimate	
None identified.				

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA		[SSH]
Activity	Description	
Oil and Gas	There are two wells within the SSH proposed MPA boundary and in one a significant gas discovery has been made, although the discovery was made in 2000 and both wells now have an abandoned status. Although both wells overlap with proposed protected features, no licence blocks have been awarded within the SSH proposed MPA boundary and no future activity is expected.	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [SSH]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.00m Intermediate: £0.80m Upper: £1.00m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: £0.36m Upper: £0.44m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: xx (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 9.1 jobs Upper: 11.4 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (France (5 vessels), Spain (4 vessels), possibly Norway (7 vessels))	Not Quantified	Employment – loss of foreign jobs from reduced landings.		

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	Displacement Effects	Not Quantified	<p>Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences:</p> <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited; ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		xx
<p>Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.</p>					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [SSH]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries	xx	xx	xx	xxx	xxx	xx	xxx	xxx
Reduction in landed value, GVA and employment	North-East North North-West	Largest employment impacts in: Fraserburgh (51%), Kirkwall (15%), Lochinver (12%)	Coastal and Island Urban and Rural	Potentially significant negative effect if parent loses job/becomes unemployed.	Potentially significant negative effect if individuals lose job/become unemployed	Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0-11 job losses Potentially significant negative effect on individuals that lose job/become unemployed.	Potentially significant negative effect if member of household loses job/ becomes unemployed.
Fish Processors	xx	xx	xx	xx	xx	xx	0	xx
Reduction in local landings at landing ports	North-West North-East North	Kinlochbervie Ullapool Peterhead Scrabster Lochinver Fraserburgh	Coastal Urban and Rural					
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [SSH]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: <15m (may be over-estimate)	Whitefish trawls	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Fish Processors Reduction in local landings at landing ports		Shellfish: xx Demersal: xxx Pelagic: 0	xx	xx	0	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [SSH]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Burrowed mud	Provides representation for the seapens and burrowing megafauna type of burrowed mud in OSPAR Region V at the northern extent of its geographical range on the Hebridean slope.	Makes a contribution to one of at least two recommended areas of this type of burrowed mud in OSPAR Region V in Scotland's seas.	Not currently understood for burrowed mud.	Provides representation at the northern extent of its range on the continental slope and off the shelf in OSPAR Region V in Scotland's seas.	Burrowed mud is considered to be Threatened and/or Declining by the OSPAR Commission in OSPAR Region V so the MPA is expected to help increase resilience for the feature.
Offshore deep sea muds	Provides representation for Atlantic-influenced offshore deep sea mud habitats on the slope in OSPAR Region V.	Represents one of at least two examples of slope Atlantic-influenced offshore deep sea mud habitats recommended for protection in OSPAR Region V.	Not currently understood for offshore deep sea muds.	Provides representation of Atlantic influenced offshore deep sea muds at the northern extent of their range in OSPAR Region V.	Offshore deep sea muds are fairly widely recorded across offshore waters in Scotland's seas.
Offshore subtidal sands and gravels	Provides representation for Atlantic-influenced offshore subtidal sand and gravel habitats predominantly on the slope in OSPAR Region V, but also to a small extent on the shelf in OSPAR Region III.	It represents one of at least two recommended examples of Atlantic influenced slope and shelf offshore, subtidal sand and gravel habitats to be protected in OSPAR Regions V and III respectively.	Not currently understood for offshore subtidal sands and gravels.	Provides representation at the northern extent of its range on the continental slope and on the shelf in OSPAR Regions V and III respectively in Scotland's seas.	Offshore subtidal sands and gravels are fairly widely recorded across offshore waters in Scotland's seas.
Continental slope	The possible MPA provides representation for one of two recommended areas of the Scottish continental slope to be included within the MPA network.	The Hebridean slope is considered ecologically and hydrographically distinct to the Faroe-Shetland Channel slope and so the recommendation is for at least one example of each area of the slope to be included.	Not currently understood for the continental slope.	The Hebridean slope is considered ecologically and hydrographically distinct to the Faroe-Shetland Channel slope. This possible MPA represents one example of the Hebridean slope.	The continental slope occurs between Scotland's shelf and off-shelf environment.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ³¹ [SSH]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Stocks not at MSY	Nil	Low - Moderate, promotes stocks in medium /long term. Features provide moderate level of supporting services to support recovery	High – fishing grounds are of high value	Nil - Moderate	Moderate	
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Nil - Low	Nil - Low	Nil, or at best a very low level of protection of parts of ecosystem providing these services			Low	Nil - Low	High
Natural hazard protection	Nil - Low	Nil - Low				Low	Nil - Low	High
Regulation of pollution	Nil - Low	Nil - Low				Low	Nil - Low	High
Non-use value of natural environment	Low - Moderate	Low - Moderate	Nil	Low	Low - Moderate	Low - Moderate	Nil - Moderate	Low
Recreation	Minimal	Minimal	Nil	Nil	Nil	Minimal	Minimal	Moderate
Research and Education	Minimal - Low	Minimal	Nil	Low	Low	Low	Low	Low
Total value of changes in ecosystem services			Fisheries likely to drive benefits from scenarios ranging from low to moderate benefits.			Low - Moderate	Low	

³¹ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



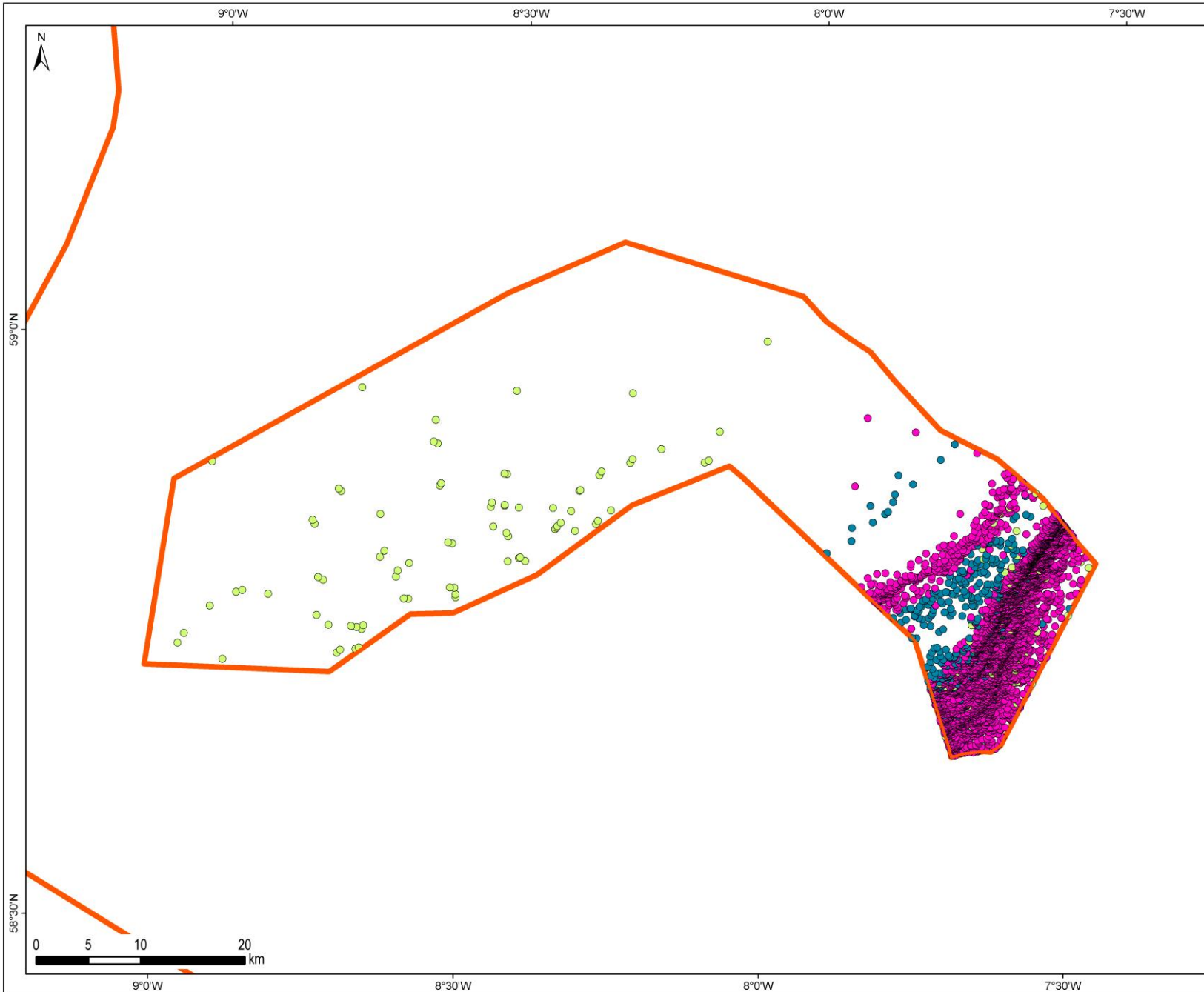
- Proposed Marine Protected Area
- Energy Generation**
- Draft Plan Option Areas - Wave
- Oil & Gas**
- Significant Discoveries

Date	By	Size	Version
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Human Activities which Occur within the Proposed MPA:
South-west Sula Sgeir and Hebridean Slope



- Proposed Marine Protected Area
- Whitefish Trawls
- Pelagic Trawls
- Lines
- Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:505,000	
QA		FMM	
4136-MPA_Fish_SW_Sula_Sgeir.mxd			
Produced by ABPmer			



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**Fishing Activities which Occur within the Proposed MPA:
 South-west Sula Sgeir and Hebridean Slope**

Turbot Bank (TBB)

Site Area (km²): 233

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [TBB]					
Proposed protected features					
<p><i>Biodiversity Features</i> Offshore subtidal sands and gravels, shelf banks and mounds, sandeels.</p> <p><i>Geodiversity Features</i> None.</p> <p><i>Site Description</i> The Turbot Bank MPA proposal lies in offshore waters to the east of Aberdeen. The MPA proposal encompasses the Turbot Bank shelf bank and mound large-scale feature, as well as relatively high densities of settled adult sandeels and appropriate sandeel habitat.</p> <p><i>Potential Alternative Designations</i> At the request of Marine Scotland, JNCC have proposed science-based alternatives to the ocean quahog aggregations proposed protected feature (Norwegian Boundary Sediment Plain) and the shelf banks and mounds and offshore subtidal sands and gravels proposed protected features (Turbot Bank) of the Firth of Forth Banks Complex MPA proposal. However, it should be noted that regardless of the decision around these options, Turbot Bank is still recommended for the protection of sandeels in its own right. Cost impacts associated with human activities take into account the various alternative options (see Table 4), including the designation of all features and the designation of sandeels only.</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Offshore subtidal sands and gravels	All scenarios: 233.35	Yes (Cefas & JNCC, 2012, UK SeaMap, 2010; BGS data, 1973 – 1980)	Partial – Extent largely based on seabed habitat predictive mapping data	Low	Conserve (uncertain)
Shelf banks and mounds		Yes (Cefas & JNCC, 2012, UK Admiralty data)	Yes – Multibeam data helps support information from admiralty chart data of the extent of Turbot Bank.	Low	Conserve (uncertain)

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Sandeels	All scenarios: 233.35	Yes (Marine Scotland Science survey data, 2008 – 2010; sediment suitability data)	Yes (Marine Scotland Science survey data, 2008 – 2010; sediment suitability data)	Low	Conserve (uncertain)
Geodiversity Features					
N/A					
<p>Key: * Estimated area based on best available data References: Area of Features: GeMS Confidence in biodiversity feature presence and extent: JNCC (2012) Confidence in biodiversity feature condition: JNCC (2013) pers. comm. Confidence in geodiversity feature presence and extent: Brooks et al. (2012) Confidence in geodiversity feature condition: Brooks et al. (2012)</p>					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [TBB]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries* **	0.000	0.000 – 0.392	0.000 – 0.556
Oil and Gas**	0.008	0.008	0.008 – 0.537
Total Quantified Economic Costs	0.008	0.008 – 0.400	0.008 – 1.093
Non-Quantified Economic Costs			
Commercial Fisheries	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts.
Oil and Gas	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.
<p>Note: For detailed information on economic cost impacts on activities, see Table 4. * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs. ** Range of quantified total costs (present value) due to alternative options for the designation of MPA features. The lower estimate relates to designation of sandeels only.</p>			

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Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [TBB]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	0.005	0.005
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.001	0.001	0.001
Total Quantified Public Sector Costs	0.001	0.006	0.006
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [TBB]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 1 job Upper: 2 jobs	North East West North East North	Fraserburgh Oban Peterhead Lerwick	Impacts concentrated in island and urban coastal areas	Whitefish trawls Nephrops trawls Whitefish Seines Dredges	Lower: N/A Upper: >15m	No Impact.	No breakdown of fisherman employment by ethnic origin.	Unlikely to be employed in fisheries.
If any oil and gas developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).										
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [TBB]		
Benefit	Relevance	Description
Ecosystem Services Benefits (Moderate and High Benefits)		
Non-use value of natural environment	Nil - Low	Nil - Moderate
Other Benefits		
None identified.		
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [TBB]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Offshore subtidal sands and gravels	-	-	-	-	-	-	L/U	-	-	L/U	-	-	-	-	-	-	-
Sandeels	-	-	-	-	-	-	L/U	-	-	L/U	-	-	-	-	-	-	-
Shelf banks and mounds	Not considered sensitive to pressures associated with marine activities and, therefore, is not considered further.																
Geodiversity Features																	
N/A																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed protected feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed protected feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity) [TBB]			
<p>According to VMS-based estimates and ICES rectangle landings statistics, whitefish trawls, dredges and pelagic trawls (over-15m) and pelagic trawls, pots, whitefish trawls, lines and dredges (under-15m vessels) operate within the TBB proposed MPA. The value of catches from the TBB area was £139,000 (over-15m vessels) and £9,100 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels were predominantly into Peterhead (87% by value) and Fraserburgh (7%). For the over-15m fleet, there was sparse activity by dredgers and whitefish trawlers across the whole proposed MPA over areas of subtidal sands and gravels and sandeels.</p> <p>Non-UK VMS ping data indicate that 10 non-UK vessels were active in the TBB area in 2012: 8 from Denmark; 1 from France and 1 from the Netherlands. The majority fish with pelagic, static or unknown gear types and, therefore, would be unlikely to be affected by proposed management scenarios. Two Danish vessels fish with bottom trawl and, therefore, may be affected by the proposed management measures assessed under the intermediate and upper scenarios.</p> <p>Provisional ScotMap data do not indicate any under-15m vessel activity in the TBB proposed MPA.</p> <p>Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and based on JNCC recommendations. Historically, the Turbot Bank possible MPA area was subject to industrial demersal trawling for sandeels. However, following the east coast of Scotland sandeel closure in 2000, the industrial sandeel fishery in Scottish waters has decreased dramatically. Although the westernmost edge of the TBB proposed MPA is the only section that overlaps with the closure area, it is likely that recent effort within the site does not reflect historic fishing patterns in the area. As such, no management measures have been associated with the designation of this feature.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No additional management. 	<ul style="list-style-type: none"> ▪ Reduce mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) pressures by 50% across the MPA area. 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across full extent of MPA.
Description of one-off costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (0.054); ▪ Whitefish seines (<0.001); ▪ Dredges (0.014); ▪ Other affected gears (<0.001). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (<0.001). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (0.108); ▪ Whitefish seines (<0.001); ▪ Dredges (0.028); ▪ Other affected gears (<0.001). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ All affected gears (0.001).
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (2 vessels)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (2 vessels)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	1.376	2.752
Average annual costs	0.000	0.069	0.138
Present value of total costs (2014–2033)	0.000	0.000 – 1.012*	0.000 – 2.024*
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.000	0.534	0.756
Average annual change to GVA	0.000	0.027	0.038
Present value of total change in GVA (2014–2033)	0.000	0.000 – 0.392*	0.000 – 0.556*
Direct and Indirect reduction in Employment	0.0 jobs	0.8 jobs	1.6 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers. * Range of quantified total costs (present value) due to alternative options for the designation of MPA features (see Table 1). The lower estimate relates to designation of sandeels only (i.e. no management measures required).</p>			

Table 4b. Oil and Gas **[TBB]**

The TBB proposed MPA boundary encompasses one licence block (20/16) that was awarded under the 27th UK oil and gas licensing round and overlaps with MPA features proposed for designation. The awarded licence block overlaps with feature extents for offshore subtidal sands and gravels and sandeels under all scenarios.

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks). 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks); ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; and ▪ Treat cuttings that use oil-based muds on site. 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks); ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; ▪ Micro-siting of infrastructure in areas of more representative habitat types for offshore subtidal sands and gravels using data held by JNCC and collected by operators; and ▪ Skip and ship drill cuttings.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (1 well (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (1 well (2020)); and ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (1 well (2020)). 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (1 well (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (1 well (2020)); and ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (1 well (2020)). 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (1 well (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (1 well (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (1 well (2020)); and ▪ Skip and ship drill cuttings - £650k per well (1 well (2020)).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.010	0.010	0.660
Average annual costs	0.001	0.001	0.033
Present value of total costs (2014–2033)	0.008	0.008	0.008 – 0.537*
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. * Range of quantified total costs (present value) due to alternative options for the designation of MPA features (see Table 1). The lower estimate relates to designation of sandeels only (i.e. assessment costs only, no management measures required).</p>			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA				[TBB]
Activity	Lower Estimate	Intermediate Estimate	Upper Estimate	
None identified.				

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA [TBB]	
Activity	Description
None identified.	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [TBB]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.00m Intermediate: £0.07m Upper: £0.14m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: £0.03m Upper: £0.04m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: xx (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 0.8 jobs Upper: 1.6 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (2 vessels))	Not Quantified	Employment – loss of foreign jobs from reduced landings.		

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	Displacement Effects	Not Quantified	<p>Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences:</p> <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited; ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		xx
Oil and Gas	Additional operational costs associated with licence and permit applications for new exploration development and decommissioning	<p>Quantified Cost Impact (2014–2033): £0.008 – 0.537m</p> <p>Decommissioning assessed at national level</p>	Future employment opportunities – reduced future employment opportunities if increased costs affect the economic viability of projects and lead to some projects not proceeding.		0
	Additional mitigation measures for new developments or decommissioning activities to support achievement of site conservation objectives	Not Quantified	<p>Future employment opportunities – reduced future employment opportunities if costs significant and render development projects unviable.</p> <p>This impact is uncertain and is only likely to arise under the upper scenario. JNCC's current advice is that the intermediate scenario represents their best view on management requirements.</p>		xxx (under the upper scenario only)

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	Costs associated with delays during the licensing and permitting process Loss of investor confidence (developments do not proceed)	Not Quantified	Employment – reduced future employment opportunities if delays deter investments. This impact is uncertain and is only likely to arise under the upper scenario. JNCC’s current advice is that the intermediate scenario represents their best view on management requirements.		xxx (under the upper scenario only)
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [TBB]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries	xx	xx	xx	xxx	xxx	xx	xxx	xxx
Reduction in landed value, GVA and employment	North-East West North	Largest employment impacts in: Peterhead (58%), Oban (18%), Fraserburgh (7%), Lerwick (7%)	Coastal and Island Urban	Potentially significant negative effect if parent loses job/becomes unemployed.	Potentially significant negative effect if individuals lose job/become unemployed.	Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0-1.6 job losses Potentially significant negative effect on individuals that lose job/become unemployed.	Potentially significant negative effect if member of household loses job/becomes unemployed.
Fish Processors	x	x	x	0	0	0	0	0
Reduction in local landings at landing ports	North-East	Peterhead Fraserburgh	Coastal Urban					
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [TBB]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: >15m	Whitefish trawls Whitefish Seines Dredges Other gear	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Fish Processors Reduction in local landings at landing ports		Shellfish: xx Demersal: xxx Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

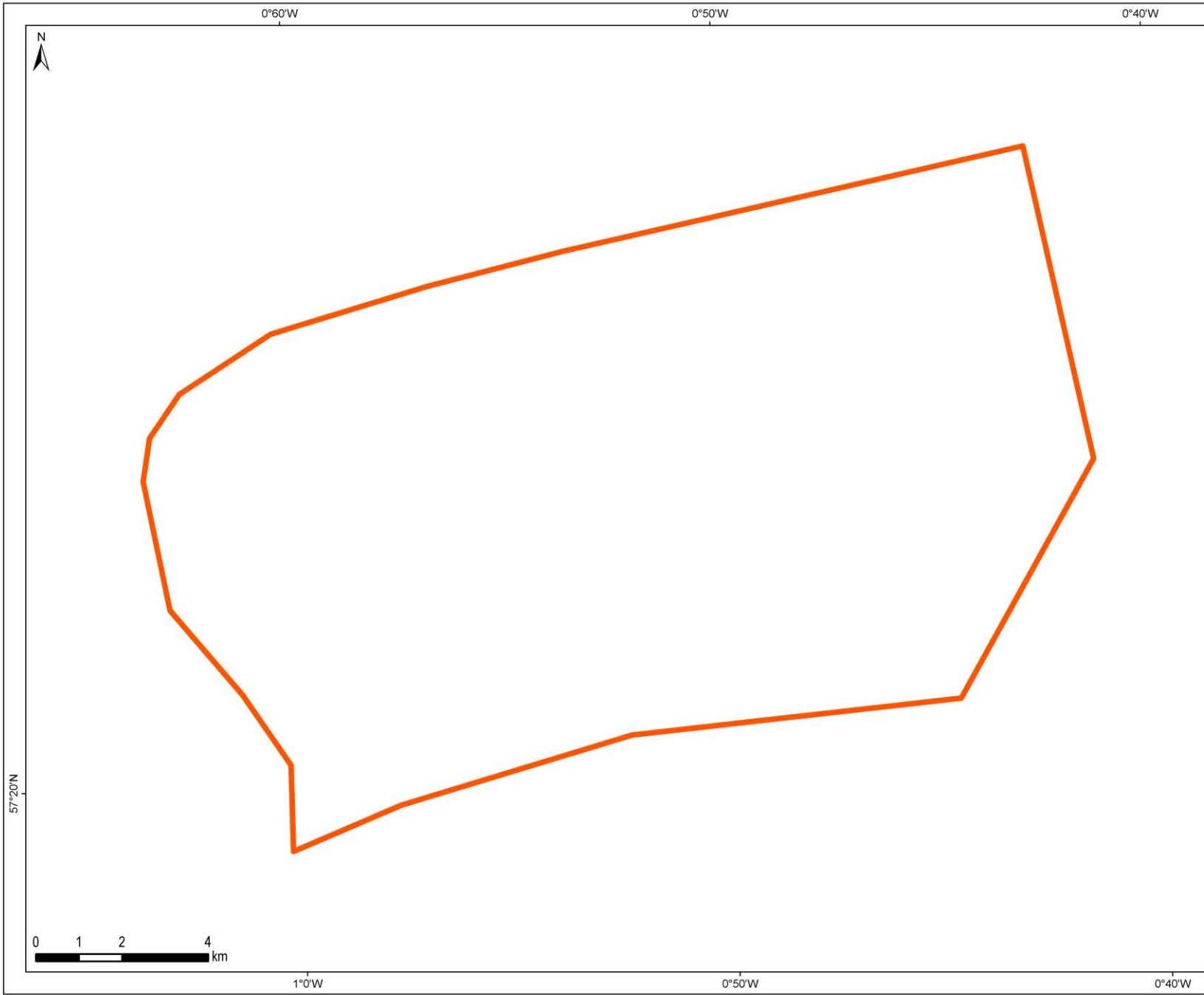
Potential Contribution of the Site to an Ecologically-Coherent Network


Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [TBB]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Offshore subtidal sands and gravels (option if FOF banks complex not designated)	Provides representation for a range of different types of offshore subtidal sand and gravel habitats on the continental shelf in OSPAR Region II. Turbot Bank is a relatively data-rich area for the habitat, but is not considered as data-rich as Firth of Forth Banks complex and so is being taken forward as a science-based alternative for representation of the feature in the Firth of Forth Banks Complex.	Provides one of at least two recommended examples to be protected on the continental shelf in OSPAR Region II in Scotland's seas.	Not currently understood for offshore subtidal sands and gravels.	Provides representation at the south-western extent of its range on the continental shelf in OSPAR Region II in Scotland's seas.	Offshore subtidal sands and gravels are widely recorded across offshore waters in Scotland's seas.
Shelf banks and mounds	Provides representation for shelf bank and mound features that may be of wider functional significance to the health and diversity of Scotland's seas, although evidence is relatively weak compared to other shelf bank and mound areas (e.g. Firth of Forth Banks Complex and Shiant East Bank). Therefore, the possible MPA is being considered as a science-based alternative to inclusion of the feature in the Firth of Forth Banks Complex possible MPA.	Provides representation for one of at least two recommended areas to be included in the MPA network for shelf banks and mounds considered to be of wider functional significance in Scotland's seas.	The Turbot Bank shelf bank and mound feature includes sediments of the appropriate type to harbour sandeels. These sandeels may be an important source of recruits to areas east and south of the Turbot Bank.	Provides representation at the south-western extent of its range in OSPAR Region II in Scotland's seas.	Shelf banks and mounds are fairly widely recorded across Scotland's seas.
Sandeels	Provides representation for an area considered to be of importance to the life history of sandeels as a source of recruits to other sandeel grounds.	Provides one of multiple examples to be protected in Scotland's seas, based on advice received from Marine Scotland Science.	Sandeels from Turbot Bank may be an important source of recruits to areas east and south of the possible MPA.	Provides representation of an area importance to the life history of sandeels at the southern extent of their range in OSPAR Region II in Scotland's seas.	Sandeels are considered, in places, to be in decline in Scotland's seas. MPA-based management can help prevent further decline.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ³² [TBB]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Habitats make contribution to food webs, particularly via sandeels.	Stocks not at MSY	Nil	Low – possible recovery of fish stocks in medium/long term. Features provide low level of supporting services to support recovery, although sandeels are important for repopulating fished grounds.	Low – low level of landings	Low	Moderate	
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Nil - Low	Nil - Low	Nil, or at best a very low level of protection of parts of ecosystem providing these services.			Low	Nil - Low	High
Natural hazard protection	Nil - Low	Nil - Low				Low	Nil - Low	High
Regulation of pollution	Nil - Low	Nil - Low				Low	Nil - Low	High
Non-use value of natural environment	Low - Moderate	Low - Moderate	Nil	Low	Low - Moderate	Low - Moderate	Nil - Moderate	Low
Recreation	Minimal	Minimal	Nil	Nil	Nil	Minimal	Minimal	Moderate
Research and Education	Minimal - Low	Minimal	Nil	Low	Low	Low	Low	Low
Total value of changes in ecosystem services			Fisheries likely to drive benefits from scenarios ranging from low to moderate benefits.				Nil - Low	Low

³² This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



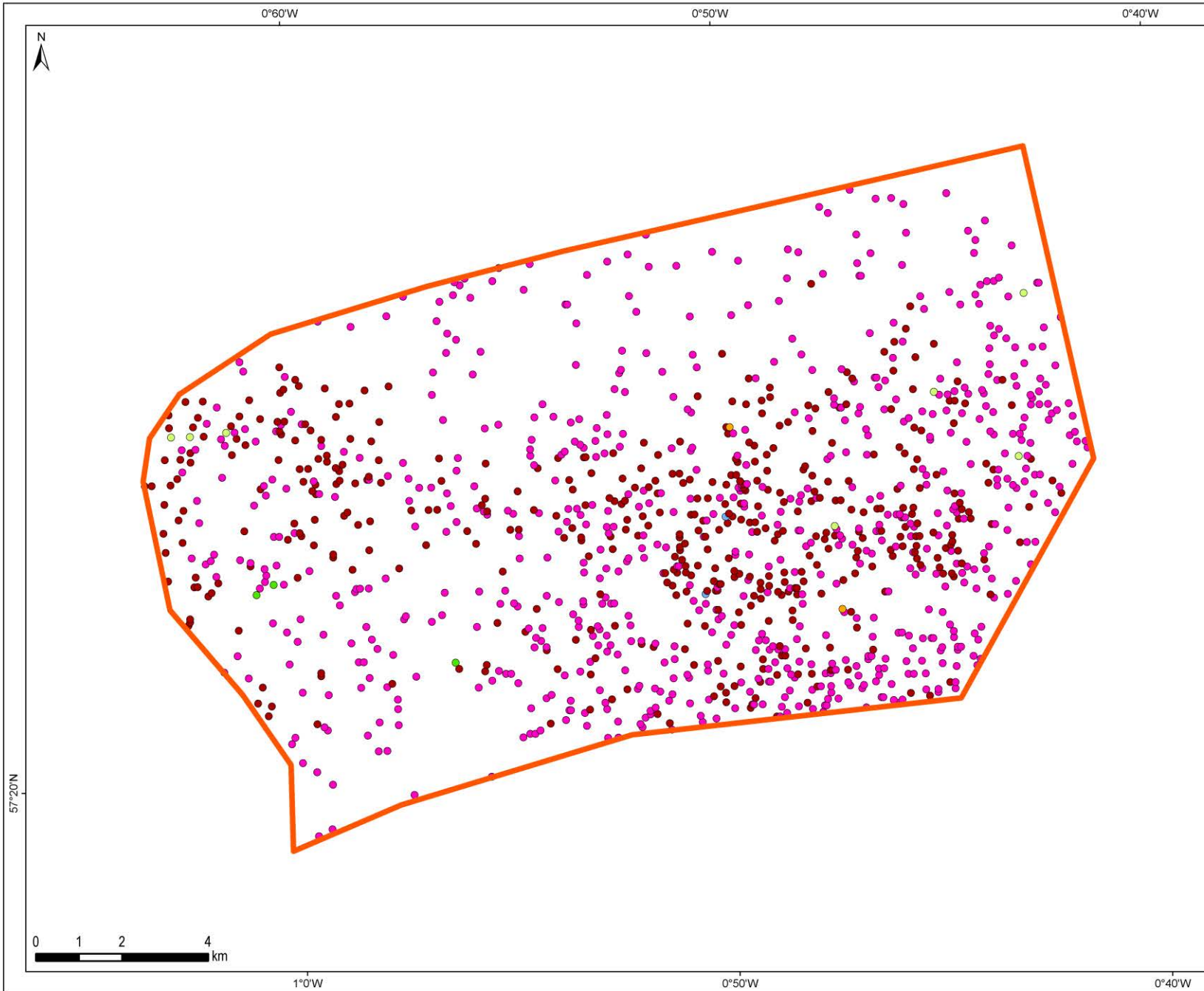
 Proposed Marine Protected Area

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:122,000	
QA		FMM	
4136-MPA_HA_Turbot_Bank.mxd			
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57°20'N

Human Activities which Occur within the Proposed MPA:
Turbot Bank



Proposed Marine Protected Area

VMS Fishing Ping Data (2007 to 2011)

- Whitefish Trawls
- Whitefish Seines
- Nephrops Trawls
- Pelagic Trawls
- Dredges
- Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:122,000	
QA		FMM	
4136-MPA_Fish_Turbot_Bank.mxd			
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57°20'N

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Fishing Activities which Occur within the Proposed MPA:
Turbot Bank

West Shetland Shelf(WSS)

Site Area (km²): 4,047

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [WSS]					
Proposed protected features					
<i>Biodiversity Features</i> Offshore subtidal sands and gravels.					
<i>Geodiversity Features</i> None.					
<i>Site Description</i> The West Shetland Shelf MPA proposal is located to the west of the southern Shetland Islands and northern Orkney in offshore waters. The proposal broadly encompasses the offshore Windsock Fisheries Area.					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Offshore subtidal sands and gravels	All Scenarios: 4045.30	Yes (JNCC/Marine Scotland Science, 2011; BGS data, 1984 – 1988)	Yes (JNCC/Marine Scotland Science, 2011; BGS data, 1984 – 1988)	Low	Conserve (uncertain)
Geodiversity Features					
N/A					
Key: * Estimated area based on best available data References: Area of Feature: GeMS Confidence in biodiversity feature presence and extent: JNCC (2012m) Confidence in biodiversity feature condition: JNCC (2013) pers. comm. Confidence in geodiversity feature presence and extent: Brooks et al. (2012) Confidence in geodiversity feature condition: Brooks et al. (2012)					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [WSS]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Oil and Gas	0.025	0.025	2.172
Total Quantified Economic Costs	0.025	0.025	2.172
Non-Quantified Economic Costs			
Oil and Gas	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.

Note: For detailed information on economic cost impacts on activities, see Table 4.

Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [WSS]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	None	None
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.002	0.002	0.002
Total Quantified Public Sector Costs	0.002	0.002	0.002
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [WSS]									
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis						
			Location			Fishing Groups Predominantly Affected		Social Groups Affected	
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities
No social impacts are expected.									
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.									

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [WSS]		
Benefit	Description	
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits
Non-use of natural environment	Low - Moderate	Low - Moderate
Other Benefits		
None identified.		
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).		

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [WSS]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Offshore subtidal sands and gravels	-	-	-	-	-	-	L/I/U	-	-	L/I/U	-	-	L/I/U	-	L/I/U	-	-
Geodiversity Features																	
N/A																	
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed protected feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed protected feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Oil and Gas [WSS]			
<p>There are three abandoned wells within the WSS proposed MPA boundary and three licensed blocks awarded under the 27th UK oil and gas round. All wells and awarded licence blocks overlap with feature extents for offshore subtidal sands and gravels under all scenarios.</p> <p>The three 27th round licence awards only partially overlap the WSS proposed MPA, and are not wholly within the MPA boundary.</p>			
Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks). 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks); ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; and ▪ Treat cuttings that use oil-based muds on site. 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 only (as no significant discoveries present within awarded blocks); ▪ Micro-siting of infrastructure in areas of more representative habitat types for offshore deep sea muds and offshore subtidal sands and gravels using data held by JNCC and collected by operators; ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; and ▪ Skip and ship drill cuttings.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (3 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (3 wells (2020)); and ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (3 wells (2020)). 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (3 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (3 wells (2020)); and ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (3 wells (2020)). 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (3 wells (2018)); ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (3 wells (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (3 wells (2020));

**The Scottish Marine Protected Area Project –
Developing the Evidence Base for Impact Assessments
and the Sustainability Appraisal**

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
			<ul style="list-style-type: none"> ▪ Micro-siting survey costs - £230k per well (3 wells (2020)); and ▪ Skip and ship drill cuttings - £650k per well (3 wells (2020)).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.030	0.030	2.670
Average annual costs	0.002	0.002	0.134
Present value of total costs (2014–2033)	0.025	0.025	2.172
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA				[WSS]
Activity	Lower Estimate	Intermediate Estimate	Upper Estimate	
None identified.				

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA		[WSS]
Activity	Description	
Commercial Fisheries	<p>The WSS proposed MPA area is located within the 'Windsock' closure, implemented in 2001 as part of the cod recovery plan. The legislation prohibits the use of any demersal trawl, seine or similar towed net, any gill net, trammel net, tangle net or similar static net or any fishing gear incorporating hooks. Any management measures for the proposed protected features would apply to mobile demersal gear, which are already prohibited under the Windsock closure. Since there should therefore be no fishing within the WSS area from potentially-affected gears, no additional cost impacts are expected from designation of the proposed MPA.</p> <p>VMS ping data indicate that 20 non-UK vessels were active in the WSS area in 2012: 6 from Ireland; 5 from the Netherlands; 4 from France, 2 from Germany, 2 from Norway and 1 from the Faroe Islands. The majority fish with pelagic gear (pelagic trawls and purse seines) and therefore would not be affected by the proposed MPA. One Danish vessel fishes with bottom trawl and therefore would be impacted by the management measures assessed under the intermediate and upper scenarios, but this is perhaps an anomaly in the data as it should not be fishing in the area due to the Windsock closure. No information on gear types used by the Norwegian or Faroese vessels was available. Information submitted by Copeche indicated that French vessels operate in the WSS proposed MPA, but no information was provided on numbers of vessels or value of catches. Provisional ScotMap data do not indicate any under-15m vessel activity in the WSS proposed MPA.</p>	
Recreational Boating	<p>One light use RYA cruising route (from Stromoway Sailing Club) overlaps with the 'offshore subtidal sands and gravels' feature of the WSS proposed MPA. Under all scenarios (lower, intermediate and upper) the cruising route intersects the western extent of the feature for a distance of 19.5km under the lower and intermediate scenarios and a distance of 21.0km under the high scenario. However, it is unlikely there would be a significant interaction between the offshore subtidal sands and gravels feature and recreational boating; therefore, no cost impacts are expected.</p>	
Telecom Cables	<p>One telecom cable (Atlantic Crossing) overlaps with offshore subtidal sands and gravels (all scenarios). However, no cost impacts are foreseen as the site is located beyond the 12 nautical mile threshold (within which licences are required for cables).</p>	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [WSS]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Oil and Gas	Additional operational costs associated with licence and permit applications for new exploration development and decommissioning	Quantified Cost Impact (2014–2033): £0.025 – 2.172m Decommissioning assessed at national level	Future employment opportunities –reduced future employment opportunities if increased costs affect the economic viability of projects and lead to some projects not proceeding.		0
	Additional mitigation measures for new developments or decommissioning activities to support achievement of site conservation objectives	Not Quantified	Future employment opportunities – reduced future employment opportunities if costs significant and render development projects unviable. This impact is uncertain and is only likely to arise under the upper scenario. JNCC's current advice is that the intermediate scenario represents their best view on management requirements.		xxx (under the upper scenario only)
	Costs associated with delays during the licensing and permitting process Loss of investor confidence (developments do not proceed)	Not Quantified	Employment – reduced future employment opportunities if delays deter investments. This impact is uncertain and is only likely to arise under the upper scenario. JNCC's current advice is that the intermediate scenario represents their best view on management requirements.		xxx (under the upper scenario only)
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender								[WSS]
Sector	Location			Age			Gender	
	Region	Ports	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
None identified.								
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups								[WSS]
Sector	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m	Gear Types/Sector	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long-term Sick
None identified.								
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected.								

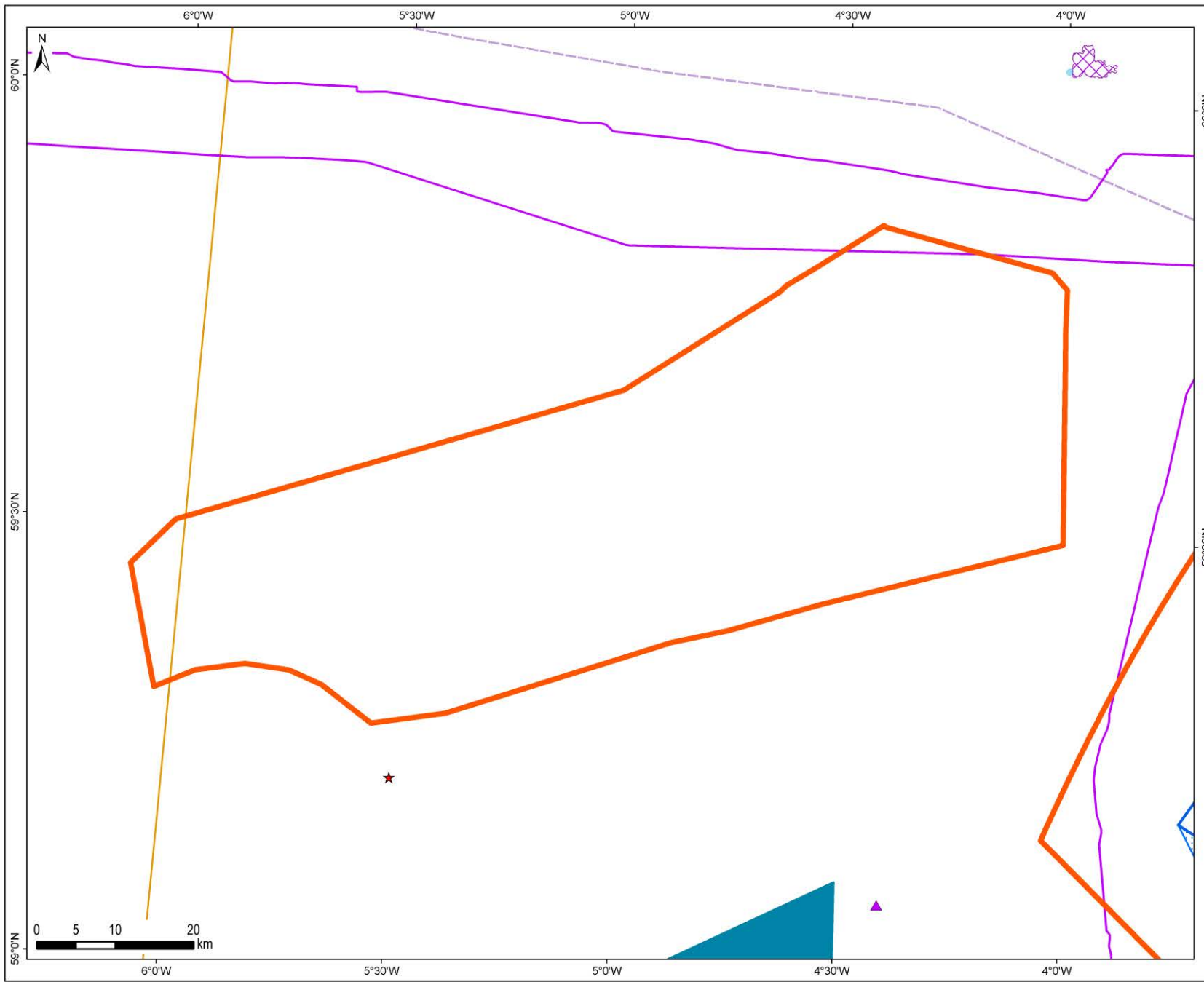
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [WSS]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Offshore subtidal sands and gravels	Provides representation for a range of different types of offshore subtidal sand and gravel habitats on the continental shelf in OSPAR Regions II and III. West Shetland Shelf is a relatively data-rich area for the habitat.	Provides one of at least two recommended examples to be protected on the continental shelf in OSPAR Regions II and III in Scotland's seas	Not currently understood for offshore subtidal sands and gravels.	Provides representation at the North-western extent of its range on the continental shelf in OSPAR Region II in Scotland's seas, and the North-eastern extent of its range on the continental shelf in OSPAR Region III.	Offshore subtidal sands and gravels are widely recorded across offshore waters in Scotland's seas.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ³³ [WSS]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Stocks not at MSY	Nil	Low – possible recovery of fish stocks in medium/long term. Features provide low level of supporting services to support recovery.	Moderate - High fish populations, but windsock fishing closure	Nil - Low	Moderate	
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Nil - Low	Nil - Low	Nil, or at best a very low level of protection of parts of ecosystem providing these services			Low	Nil - Low	High
Natural hazard protection	Nil - Low	Nil - Low				Low	Nil - Low	High
Regulation of pollution	Nil - Low	Nil - Low				Low	Nil - Low	High
Non-use value of natural environment	Low - Moderate	Low - Moderate	Nil	Low	Low - Moderate	Low - Moderate	Low - Moderate	Low
Recreation	Low	Low	Nil	Nil	Nil	Minimal	Minimal	Moderate
Research and Education	Minimal	Minimal	Nil	Low	Low	Low	Low	Low
Total value of changes in ecosystem services			Fisheries likely to drive benefits from scenario ranging from low to moderate benefits.			Low - Moderate	Low	

³³ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



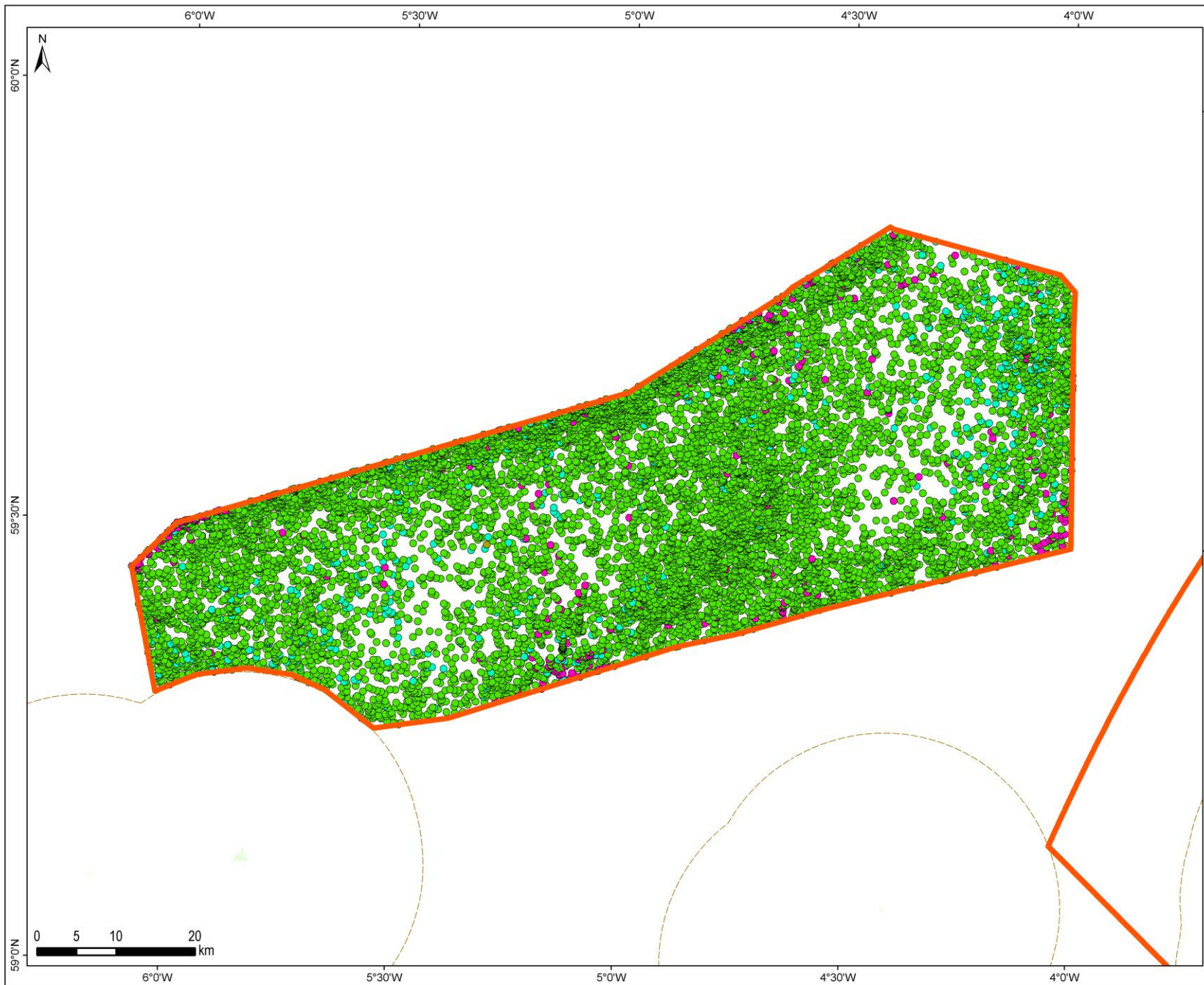
- Proposed Marine Protected Area
- Military Practice Areas**
- Other Exercise Areas
- Oil & Gas**
- Hydrocarbon Fields
- Significant Discoveries
- Recreational Boating**
- RYA Cruising Routes
- Light
- Energy Generation**
- Draft Plan Option Areas - Wind
- Indicative Cable Routes - Wind
- Telecommunication Cables**
- Subsea Telecomms Cables
- Active
- Out of Service
- Watersports**
- ★ Submarine Dive Sites
- ▲ Wreck Dive Sites

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
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4136-MPA_HA_West_Sheland.mxd			
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Human Activities which Occur within the Proposed MPA:
West Shetland



- Proposed Marine Protected Area
- Scottish 12 Nautical Mile Limit
- VMS Fishing Ping Data (2007 to 2011)
 - Whitefish Trawls
 - Pelagic Trawls
 - Other Trawls
 - Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:660,000	
QA		FMM	
4136-MPA_Fish_West_Sheland.mxd			
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Fishing Activities which Occur within the Proposed MPA:
West Shetland

Western Fladen (WFL)

Site Area (km²): 723

Site Summary

Table 1. Summary of Proposed Protected Features, Data Confidence and Conservation Objectives [WFL]					
Proposed protected features					
<p><i>Biodiversity Features</i> Burrowed mud – seapens and burrowing megafauna.</p> <p><i>Geodiversity Features</i> Quaternary of Scotland – sub-glacial tunnel valleys.</p> <p><i>Site Description</i> The Western Fladen MPA proposal falls within the Fladen Grounds to the east of Scotland in the offshore waters of the northern North Sea. It encompasses areas of average and higher than average seapen densities by comparison to the wider Fladen Grounds based on available data.</p> <p><i>Potential Alternative Designations</i> JNCC have identified Western Fladen as a science-based alternative to the Central Fladen for representation of the seapens and burrowing megafauna burrowed mud habitat type. JNCC recommend that the southern part of the Central Fladen MPA proposal – ‘Central Fladen Core’ – is still designated as it represents another type of burrowed mud (records of tall seapen).</p>					
Summary of confidence in presence, extent and condition of proposed protected features and conservation objectives					
Proposed Protected Feature	Estimated Area of Feature (by scenario) (km ²)	Confidence in Feature Presence	Confidence in Feature Extent	Confidence in Feature Condition	Conservation Objective and Risk
Biodiversity Features					
Burrowed mud	All scenarios: 723.18	Yes (Marine Scotland Science survey data, 2008 – 2010; JNCC & Cefas survey data 2013; BGS data, 1980-1985)	Yes (Marine Scotland Science survey data, 2008 – 2010; JNCC & Cefas survey data 2013; BGS data, 1980-1985)	Low	Conserve (uncertain)
Geodiversity Features					
Quaternary of Scotland – sub-glacial tunnel valleys	1.59	Yes (UK Admiralty charts; Olex database)	Yes (UK Admiralty charts; Olex database)	Low	Conserve (uncertain)
<p>Key: * Estimated area based on best available data</p> <p>References: Area of Features: GeMS Confidence in biodiversity feature presence and extent: JNCC (2012n) Confidence in biodiversity feature condition: JNCC (2013) pers. comm. Confidence in geodiversity feature presence and extent: Brooks et al. (2012) Confidence in geodiversity feature condition: Brooks et al. (2012)</p>					

Summary of Costs and Benefits

Table 2a. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an MPA (present value of total costs over 2014 to 2033 inclusive) [WFL]			
Human Activity	Cost Impact on Activity		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Economic Costs (Discounted)			
Commercial Fisheries*	0.000	2.428	4.856
Oil and Gas	0.065	3.907	7.769
Total Quantified Economic Costs	0.065	6.335	12.625
Non-Quantified Economic Costs			
Commercial Fisheries	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels; and ▪ Displacement impacts.
Oil and Gas	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of mitigation measures; ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level.

Note: For detailed information on economic cost impacts on activities, see Table 4.
 * These estimates (present value of total change in GVA) assume zero displacement of fishing activity and hence are likely to overestimate the costs.

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Table 2b. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [WFL]			
Description	Public Sector Costs		
	Lower Estimate (£Million)	Intermediate Estimate (£Million)	Upper Estimate (£Million)
Quantified Public Sector Costs (Discounted)			
Preparation of Marine Management Schemes	None	None	None
Preparation of Statutory Instruments	None	0.005	0.005
Development of voluntary measures	National assessment	National assessment	National assessment
Site monitoring	National assessment	National assessment	National assessment
Compliance and enforcement	National assessment	National assessment	National assessment
Promotion of public understanding	National assessment	National assessment	National assessment
Regulatory and advisory costs associated with licensing decisions	0.006	0.006	0.006
Total Quantified Public Sector Costs	0.006	0.011	0.011
Non-Quantified Public Sector Costs			
None identified.			

Table 2c. Summary of Social Impacts and Distribution of Quantified Impacts arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive) [WFL]										
Key Areas of Social Impact	Description	Scale of Expected Impact across Scenarios, Average (mean no. of jobs affected)	Distributional Analysis							
			Location			Fishing Groups Predominantly Affected		Social Groups Affected		
			Region	Port	Rural/Urban/Island	Gear Types Most Affected	Vessels most affected	Crofters	Ethnic minorities	With disability or long term sick
Employment with consequent impacts on: Health, Crime, Environment, and Culture and Heritage	Commercial fisheries – Loss of jobs (direct and indirect)	Lower: 0 jobs Intermediate: 5 jobs Upper: 10 jobs	North East North East North East Non-UK East	Fraserburgh Peterhead Buckie Belfast Scarborough	Impacts concentrated in rural and urban coastal areas	Whitefish trawls Nephrops trawls Whitefish seines	Lower: N/A Upper: >15m	No Impact.	No breakdown of fisherman employment by ethnic origin.	Unlikely to be employed in fisheries.
If any oil and gas developments do not proceed as a result of designation (due to additional costs, project delays, loss of investor confidence), there may be significant social impacts due to job losses (non-quantified).										
Note: For detailed information on socio-economic impacts by sector, see Table 7a. For more detailed information on distributional impacts of quantified costs by sector see Tables 7b and 7c.										

Table 2d. Site-Specific Benefits arising from the Designation and Management of the Site as an MPA (over 2014 to 2033 inclusive)			[WFL]
Benefit	Description		
Ecosystem Services Benefits (Moderate and High Benefits)	Relevance	Scale of Benefits	
Non-use value of natural environment	Low	Low - Moderate	
Other Benefits			
None identified.			
Note: For detailed information on ecosystem services benefits, see Tables 9 and 10. For detailed information on other benefits, see Table 5 (activities that would benefit) and Table 8 (contribution to ecologically-coherent network).			

Summary of Overlaps and Interactions between Proposed Designated Features and Human Activities

Table 3. Overlaps and Potential Interactions between Features and Activities under different Scenarios, indicating need for Assessment of Cost Impacts on Human Activities from Designation of the Site as an MPA [WFL]																	
	Aggregates	Aquaculture (Finfish)	Aquaculture (Shellfish)	Aviation	Carbon Capture & Storage	Coastal Protection	Commercial Fisheries	Energy Generation	Military Activities	Oil & Gas	Ports & Harbours	Power Interconnectors	Recreational Boating	Shipping	Telecom Cables	Tourism	Water Sports
Biodiversity Features																	
Burrowed mud	-	-	-	-	L/I/U	-	L/I/U	-	-	L/I/U	-	-	-	-	-	-	-
Geodiversity Features																	
Quaternary of Scotland – sub-glacial tunnel valleys	Considered to have a low sensitivity to the pressures associated with activities they are currently exposed and likely to be exposed to in the future; thus, not considered in the context of management.																
Note: L = Lower Scenario; I = Intermediate Scenario; U = Upper Scenario. Normal font indicates that there is an overlap between the activity and proposed protected feature under that scenario, bold indicates that the overlap results in a potential interaction between the activity and proposed protected feature that has resulted in cost impacts under that scenario. For detail of management measures assessed under each scenario for each activity, and results of the cost estimates, see Table 4.																	

Human Activity Summaries

Human activities that would be impacted by designation of the site as an MPA

Table 4a. Commercial Fisheries (assuming zero displacement of fishing activity)				[WFL]
<p>According to landing statistics, nephrops trawls, pelagic trawls, whitefish trawls and seines (over-15m vessels) and nephrops trawls, pelagic trawl and other seines (under-15m vessels) operate within the WFL proposed MPA. The value of catches from the WFL area was £896,000 (over-15m vessels) and £49,700 (under-15m vessels, indicated from ICES rectangle landings data) (annual average for 2007–2011, 2012 prices). Landings from the over-15m vessels were predominantly into Fraserburgh (78% by value), Peterhead (16%) and Ijmuiden, The Netherlands (4%). For the over-15m fleet, nephrops trawlers in particular are active across the whole proposed MPA and the area of burrowed mud.</p> <p>VMS ping data indicate that 16 non-UK vessels were active in the WFL area in 2012: 6 from the Netherlands; 4 from Norway; 2 from Sweden; 2 from Germany, 1 from Denmark and 1 from the Faroe Islands. The majority fish with pelagic gear (pelagic trawls and purse seines) and therefore are unlikely to be affected by the proposed management scenarios. One Danish vessel fishes with bottom trawl and therefore may be affected by the proposed management measures assessed under the intermediate and upper scenarios. No information on gear types used by the Norwegian vessels was available.</p> <p>Information submitted by Copeche indicated that French vessels operate in the WFL proposed MPA, but no information was provided on numbers of vessels or value of catches.</p> <p>Provisional ScotMap data do not indicate any under-15m vessel activity in the WFL proposed MPA. The cost estimates for the under-15m sector may be overestimates, as the 'under-15m' length group in the ICES rectangle landings data may include cases where information on vessel length and/or administrative port is missing from landings returns.</p> <p>Burrowed mud (seapens and burrowing megafauna) covers the whole proposed MPA. Management measures for the scenarios have been developed based on the sensitivity and vulnerability of the features to the pressures caused by different gear types and based on JNCC recommendations.</p> <p>Unlike most other sectors, the potential cost of designation on commercial fisheries is a loss or displacement of current (and future) output, caused by restrictions on fishing activities. Any decrease in output will, all else being equal, reduce the Gross Value Added (GVA) generated by the sector and have knock-on effects on the GVA generated by those industries that supply commercial fishing vessels. The costs estimates for this sector have therefore been estimated in terms of GVA.</p> <p>GVA estimates have been generated by applying fleet segment-specific 'GVA/total income' ratios to the value of landings affected. The GVA ratios have been calculated using data on total income and GVA from the Sea Fish Industry Authority Multi-year Fleet Economic Performance Dataset (published March 2013). Further details on the GVA ratios and the methodology for estimating GVA and employment impacts applied are presented in Appendix C7.</p> <p>It is important to note that all costs presented below assume that all affected landings are lost, that is, there is no displacement of fishing activity to alternative fishing grounds. In reality, some displacement is likely to occur and hence the cost, GVA and employment impacts presented in this table are likely to overestimate the costs.</p>				
Economic Costs on the Activity of Designation of the Site as an MPA				
	Lower Estimate	Intermediate Estimate	Upper Estimate	
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ No cost impacts expected. 	<ul style="list-style-type: none"> ▪ Reduce mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) pressures by 50% across the MPA area. 	<ul style="list-style-type: none"> ▪ Closure to mobile bottom-contact gear (whitefish, nephrops and other trawls and seines, beam trawls and dredges) across full extent of MPA. 	

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Description of one-off costs	▪ None.	▪ None.	▪ None.
Description of recurring costs	▪ None.	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (0.005); ▪ Whitefish seines (0.001); ▪ Nephrops trawls (0.399). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.020); ▪ Other affected gears (<0.001). 	<ul style="list-style-type: none"> ▪ Loss of >15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Whitefish trawls (0.011); ▪ Whitefish seines (0.002); ▪ Nephrops trawls (0.798). ▪ Loss of <15m fishing income (annual values, £ million, 2012 prices): <ul style="list-style-type: none"> ▪ Nephrops trawls (0.040); ▪ Other affected gears (0.001).
Description of non-quantified costs	▪ None.	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (1 vessel), possible Norway (4 vessels)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs. 	<ul style="list-style-type: none"> ▪ Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (1 vessel), possible Norway (4 vessels)); and ▪ Displacement effects, including conflict with other fishing vessels, environmental impacts in targeting new areas, longer steaming times and increased fuel costs, changes in costs and earnings, gear development and adaptation costs, and additional quota costs.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.000	8.518	17.037
Average annual costs	0.000	0.426	0.852
Present value of total costs (2014–2033)	0.000	6.265	12.531
Economic Impacts (£Million)			
Total change in GVA (2014–2033)	0.000	3.301	6.602
Average annual change to GVA	0.000	0.165	0.330
Present value of total change in GVA (2014–2033)	0.000	2.428	4.856
Direct and Indirect reduction in Employment	0.0 jobs	4.9 jobs	9.7 jobs
<p>Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%. Total change in GVA (2014–2033) = The change in direct GVA in the sector for the site summed over the 20 year period. Average annual change to GVA = Total change in direct GVA in the sector for the site divided by the total number of years under analysis (i.e. 20). Present value of total change in GVA (2014–2033) = Total change in direct GVA in the sector for the site discounted to current value, using a discount rate of 3.5%. Direct and Indirect reduction in Employment = The average (mean) reduction in direct employment in the sector plus the indirect reduction in employment on the sector's suppliers.</p>			

Table 4b. Oil and Gas	[WFL]
<p>There are three known hydrocarbon fields and six currently licensed blocks within the WFL proposed MPA boundary that overlap with the burrowed mud</p> <p>Feature extents show that 19 oil and gas pipelines overlap with burrowed mud within the MPA proposal boundary under all scenarios, and a further 3 within the 1km buffer zone. Some sections of these pipelines (Ivanhoe/Rob, Roy) are currently going through decommissioning as part of a wider decommissioning programme, expected to be completed by the end of 2016. No platforms overlap with any of the MPA features proposed for designation, although one (14/09a CAP/PPP) is within 1km of burrowed mud under all scenarios.</p> <p>67 wells overlap with burrowed mud (all scenarios) within the MPA proposal boundary, and a further 59 are within 1km.</p> <p>Under the 26th and 27th UK licensing rounds, a further five licence awards were granted; 4 in the 26th round and 1 in the 27th round. All of these licence blocks overlap with burrowed mud feature extents within the MPA proposal boundary under all scenarios. All of the licence awards partially overlap the MPA proposal boundary.</p> <p>There are significant oil discoveries within two of the 26th round awards in the WFL proposed MPA boundary.</p>	

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
Assumptions for cost impacts	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 if no significant discoveries present within award or Assessment and Development Phases 1 – 6 if significant discoveries present (only Phases 2 – 6 anticipated for 26th round awards). 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 if no significant discoveries present within award or Assessment and Development Phases 1 – 6 if significant discoveries present (only Phases 2 – 6 anticipated for 26th round awards); ▪ Micro-siting in areas of reduced seapen density using data held by JNCC and collected by operators; ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; and ▪ Treat cuttings that use oil-based muds on site. 	<ul style="list-style-type: none"> ▪ Additional costs to assess potential impacts to MPA features for 26th and 27th licensing awards that overlap with MPA features – Assessment Phases 1 – 3 if no significant discoveries present within award or Assessment and Development Phases 1 – 6 if significant discoveries present (only Phases 2 – 6 anticipated for 26th round awards); ▪ Micro-siting in areas of reduced seapen density using data held by JNCC and collected by operators; ▪ Minimising alterations to seabed habitat; any deposited material should meet local habitat type; and ▪ Skip and ship drill cuttings.
Description of one-off costs	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (2 wells (2014), 2 wells, (2016) and 1 well (2018)); 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (2 wells (2014), 2 wells, (2016) and 1 well (2018)); 	<ul style="list-style-type: none"> ▪ Assessment Phase 1: surveys and evaluation costs; consultancy fees and additional operator staff input - £2k per well (2 wells (2014), 2 wells, (2016) and 1 well (2018));

Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
	<ul style="list-style-type: none"> ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (2 wells (2016), 2 wells, (2018) and 1 well (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (2 wells (2016), 2 wells, (2018) and 1 well (2020)); ▪ Development Phase 4: development; consultancy fees and additional operator staff input - £4k per well (2 wells (2022)); ▪ Operation and Production Phase 5: annual permits, consultancy fees, additional operator staff input - £20k per well (2 wells (2022)); and ▪ Maintenance Phase 6: consultancy fees; additional operator staff input – £2k per well (2 wells (2022)). 	<ul style="list-style-type: none"> ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (2 wells (2016), 2 wells, (2018) and 1 well (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (2 wells (2016), 2 wells, (2018) and 1 well (2020)); ▪ Development Phase 4: development; consultancy fees and additional operator staff input - £4k per well (2 wells (2022)); ▪ Operation and Production Phase 5: annual permits, consultancy fees, additional operator staff input - £20k per well (2 wells (2022)); ▪ Maintenance Phase 6: consultancy fees; additional operator staff input – £2k per well (2 wells (2022)); ▪ Micro-siting survey costs - £230k per well (2 wells (2016), 2 wells (2018), 1 well (2020) and 2 wells (2022)); ▪ Re-routing of new pipelines for Phases 4 – 6 - £2m per additional km of pipeline (10% of distance); and ▪ Survey costs for additional pipeline length - £580k per well. 	<ul style="list-style-type: none"> ▪ Assessment Phase 2: drilling and exploration; consultancy fees and additional operator staff input - £4k per well (2 wells (2016), 2 wells, (2018) and 1 well (2020)); ▪ Assessment Phase 3: drilling and appraisal; consultancy fees and additional operator staff input - £4k per well (2 wells (2016), 2 wells, (2018) and 1 well (2020)); ▪ Development Phase 4: development; consultancy fees and additional operator staff input - £4k per well (2 wells (2022)); ▪ Operation and Production Phase 5: annual permits, consultancy fees, additional operator staff input - £20k per well (2 wells (2022)); ▪ Maintenance Phase 6: consultancy fees; additional operator staff input – £2k per well (2 wells (2022)); ▪ Micro-siting survey costs - £230k per well (2 wells (2016), 2 wells (2018), 1 well (2020) and 2 wells (2022)); ▪ Re-routing of new pipelines for Phases 4 – 6 - £2m per additional km of pipeline (10% of distance); ▪ Survey costs for additional pipeline length - £580k per well; and ▪ Skip and ship drill cuttings - £650k per well (2 wells (2016), 2 wells (2018), 1 well (2020) and 2 wells (2022)).
Description of recurring costs	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ None.
Description of non-quantified costs	<ul style="list-style-type: none"> ▪ Costs of project delays during consenting; risk of deterrent to investment; and ▪ Future decommissioning costs assessed at national level. 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice; ▪ Costs of project delays during consenting; risk of deterrent to investment; and 	<ul style="list-style-type: none"> ▪ Costs of some mitigation measures should be covered by industry best practice ▪ Costs of project delays during consenting; risk of deterrent to investment; and

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Economic Costs on the Activity of Designation of the Site as an MPA			
	Lower Estimate	Intermediate Estimate	Upper Estimate
		▪ Future decommissioning costs assessed at national level.	▪ Future decommissioning costs assessed at national level.
Quantified Costs on the Activity of Designation of the Site as an MPA (£Million)			
Total costs (2014–2033)	0.076	4.946	9.496
Average annual costs	0.004	0.247	0.475
Present value of total costs (2014–2033)	0.065	3.907	7.769
Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period. Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20). Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.			

Human activities that would benefit from designation of the site as an MPA

Table 5. Human Activities that would Benefit from Designation of the Site as an MPA				[WFL]
Activity	Lower Estimate	Intermediate Estimate	Upper Estimate	
None identified.				

Human activities that are present but which would be unaffected by designation of the site as an MPA

Table 6. Human Activities that are Present but which would be Unaffected by Designation of the Site as an MPA		[WFL]
Activity	Description	
Carbon Capture and Storage	<p>There is currently no CCS activity which occurs within the boundaries of the WFL proposed MPA, nor within a 1km buffer zone. One potential hydrocarbon field (Claymore) overlaps with the south-eastern component of the 'burrowed mud' feature of the WFL proposed MPA under all scenarios (lower, intermediate and upper). However, in the timescales of the project (2014-2033) it is considered that CCS will utilise existing oil and gas pipelines, where possible, between St Fergus and the Goldeneye hydrocarbon field and that possible new infrastructure (pipeline or shipping) will link the Firth of Forth to St Fergus and Teesside to an offshore hub at Goldeneye. None of these possible future CCS developments occur within the boundaries of the WFL proposed MPA, nor within a 1km buffer zone. Therefore, no cost impacts are expected.</p>	

Social and Distributional Analysis of Impacts from Designation of the Site as an MPA

Table 7a. Social Impacts Associated with Quantified and Non-Quantified Economic Costs [WFL]					
Sector	Potential Economic Impacts	Economic Costs and GVA (PV)	Area of Social Impact Affected	Mitigation	Significance of Social impact
Commercial Fisheries	Loss of traditional fishing grounds with consequent loss in landings, value of landings and hence GVA	Annual Average Loss in Value of Landings*: Lower: £0.00m Intermediate: £0.43m Upper: £0.85m Annual Average Loss in GVA (direct and indirect)*: Lower: £0.00m Intermediate: £0.17m Upper: £0.33m	Culture and heritage – impact on traditions from loss of fishing grounds.		Health: xx (for individuals affected who do not find alternative employment)
	If the loss in GVA significant enough, risk of job losses (direct and indirect)	Job Losses*: Lower: 0.0 jobs Intermediate: 4.9 jobs Upper: 9.7 jobs	A reduction in employment can generate a wide range of social impacts which, in turn, can generate a range of short and long term costs for wider society and the public purse: <ul style="list-style-type: none"> ▪ Health (increase in illness, mental stress, loss of self esteem and risk of depression); ▪ Increase in crime; and ▪ Reduction in future employment prospects/future earnings. 	Support to retrain those affected and for the promotion of new small businesses in fisheries dependent areas.	
	Loss of value of catches from non-UK vessels using bottom contact gears in the proposed MPA (Denmark (1 vessel), possible Norway (4 vessels))	Not quantified		Employment – loss of foreign jobs from reduced landings.	

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	Displacement Effects	Not quantified	<p>Quantified impact on jobs assume worst case scenario (i.e. no redistribution of effort). In reality displacement effects likely to occur with socio-economic consequences:</p> <ul style="list-style-type: none"> ▪ Employment – reduced employment due to changes in costs and earnings profile of vessels (e.g. increased fuel costs, gear development and adaption costs, additional quota costs); ▪ Conflict/Loss of social cohesion – diminishing fishing grounds may increase conflict with other vessels/gear types, increase social tensions within fishing communities and lead to a loss of social cohesion among fleets. Could also lead to increased operating costs as a result of lost or damaged gear. Equally, gear conflict could reduce where gears are restricted/prohibited; ▪ Health – increased risks to the safety of fishers and vessels and increased stress due to moving to lesser known areas; ▪ Environmental – increased impact in targeting new areas, longer streaming times and increased fuel consumption; and ▪ Culture and heritage – change in traditional fishing patterns/ activities. 		xx
Oil and Gas	Additional operational costs associated with licence and permit applications for new exploration development and decommissioning	<p>Quantified Cost Impact: £0.065 – 7.769m</p> <p>Decommissioning assessed at national level</p>	Future employment opportunities – reduced future employment opportunities if increased costs affect the economic viability of projects and lead to some projects not proceeding.		0
	Additional mitigation measures for new developments or decommissioning activities to support achievement of site conservation objectives	Not Quantified	<p>Future employment opportunities – reduced future employment opportunities if costs significant and render development projects unviable.</p> <p>This impact is uncertain and is only likely to arise under the upper scenario. JNCC's current advice is that the intermediate scenario represents their best view on management requirements.</p>		xxx (under the upper scenario only)

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	Costs associated with delays during the licensing and permitting process Loss of investor confidence (developments do not proceed)	Not Quantified	Employment – reduced future employment opportunities if delays deter investments. This impact is uncertain and is only likely to arise under the upper scenario. JNCC’s current advice is that the intermediate scenario represents their best view on management requirements.		xxx (under the upper scenario only)
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * These estimates assume zero displacement of fishing activity and hence are likely to overestimate the costs.					

Table 7b. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Location, Age and Gender [WFL]								
Sector/Impact	Location			Age			Gender	
	Region	Ports*	Rural, Urban, Coastal or Island	Children	Working Age	Pensionable Age	Male	Female
Commercial Fisheries	Xx	xx	xx	xxx	xxx	xx	xxx	xxx
Reduction in landed value, GVA and employment	North-East West North-West	Largest employment impacts in: Fraserburgh (73%), Peterhead (9%), Buckie (9%), Belfast (2%), Scarborough (2%)	Coastal Urban and Rural	Potentially significant negative effect if parent loses job/becomes unemployed.	Potentially significant negative effect if individuals lose job/become unemployed	Potential negative effect if retirees own affected vessels or live in households affected by unemployment.	0-10 job losses Potentially significant negative effect on individuals that lose job/become unemployed.	Potentially significant negative effect if member of household loses job/becomes unemployed.
Fish Processors	x	x	x	0	0	0	0	0
Reduction in local landings at landing ports	North-East	Fraserburgh Peterhead Macduff	Coastal Urban and Rural					
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on value of landings by home port affected under intermediate scenario.								

Table 7c. Distribution of Quantified Economic Costs for Commercial Fisheries and Fish Processors (assuming zero displacement of fishing activity) – Fishing Groups, Income Groups and Social Groups [WFL]								
Sector/Impact	Fishing Groups		Income Groups			Social Groups		
	Vessel Category <15m >15m*	Gear Types/Sector*	10% Most Deprived	Middle 80%	10% Most Affluent	Crofters	Ethnic minorities	With Disability or Long- term Sick
Commercial Fisheries Reduction in landed value, GVA and employment	Lower: N/A Upper: >15m	Whitefish trawls Nephrops trawls Whitefish seines	xx	xx	x Information only available on average incomes not the distribution of income. Therefore, not clear whether this group will be affected.	0	No breakdown of fisherman employment by ethnic origin.	0 No employment data but unlikely to be employed in fisheries.
Fish Processors Reduction in local landings at landing ports		Shellfish: xxx Demersal: xx Pelagic: 0	0	0	0	0	0	0
Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. * Based on costs to gear types/sectors and vessel categories affected under the intermediate scenario.								

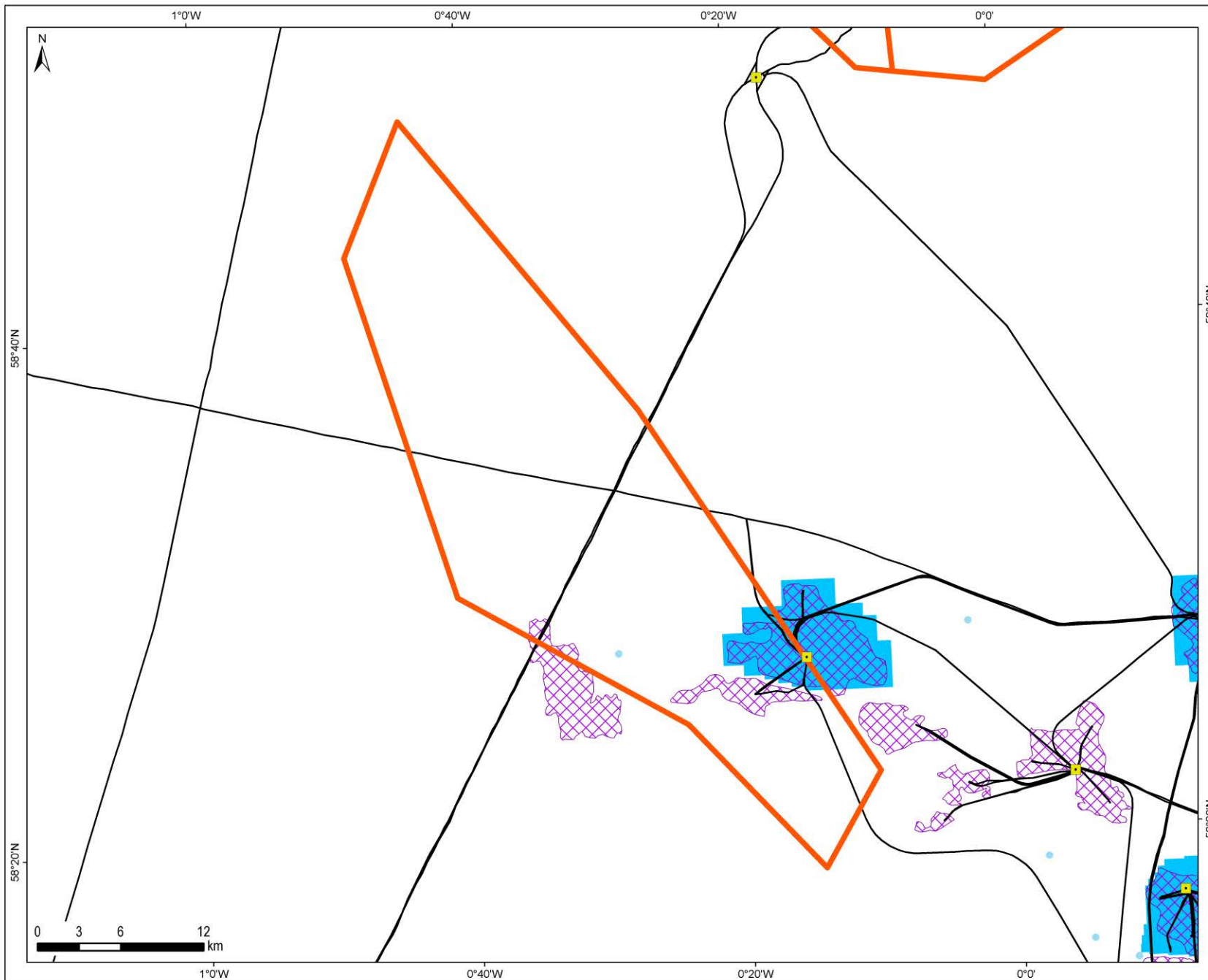
Potential Contribution of the Site to an Ecologically-Coherent Network

Table 8. Overview of Features Proposed for Designation and how these contribute to an Ecologically Coherent Network of MPAs [WFL]					
Feature Name	Representation	Replication	Linkages	Geographic Range and Variation	Resilience
Burrowed mud	Provides representation for one type of burrowed mud (seapens and burrowing megafauna in offshore waters of OSPAR Region II in Scotland's seas.	Provides one of at least three examples of this one type of burrowed mud to be protected in Scotland's seas.	Not well understood for burrowed mud.	Provides representation for one type of burrowed mud (seapens and burrowing megafauna) in offshore waters of OSPAR Region II in Scotland's seas.	Burrowed mud is considered to be Threatened and/or Declining by the OSPAR Commission, in OSPAR Region II so the MPA is expected to help increase resilience for the feature.
<p>JNCC (pers. comm.); SNH and JNCC. (2012). <i>Assessment of the potential adequacy of the Scottish MPA network for MPA search features: summary of the application of the stage 5 selection guidelines.</i> Available online from: http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/270612.</p>					

Anticipated Benefits to Ecosystem Services

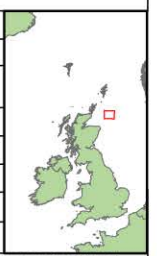
Table 9. Summary of Ecosystem Services Benefits arising from Designation of the Site as an MPA ³⁴ [WFL]								
Services	Relevance to Site	Baseline Level	Estimated Impacts of Designation			Value Weighting	Scale of Benefits	Confidence
			Lower	Intermediate	Upper			
Fish for human consumption	Moderate. Habitats make contribution to food webs.	Stocks not at MSY	Nil	Minimal/Low – potential increase of fish stocks in medium/long term. Features provide low level of supporting services to support recovery.	Moderate	Nil - Low	Moderate	
Fish for non-human consumption		Stocks reduced from potential maximum						
Gas and climate regulation	Nil - Low	Nil - Low	Nil, or at best a very low level of protection of parts of ecosystem providing these services			Low	Nil – Low	High
Natural hazard protection	Nil - Low	Nil - Low				Low	Nil - Low	High
Regulation of pollution	Nil - Low	Nil - Low				Low	Nil - Low	High
Non-use value of natural environment	Low – features do not provide large non use values.	Low - Moderate	Nil	Low	Low - Moderate	Low - Moderate	Nil - Moderate	Low
Recreation	Low	Low	Nil	Nil	Nil	Nil	Minimal	Moderate
Research and Education	Minimal	Minimal	Nil	Minimal	Minimal	Nil - Minimal	Low	Low
Total value of changes in ecosystem services			Fisheries likely to drive low benefits from intermediate and upper scenarios			Low - Moderate	Low	

³⁴ This table is based on information on which features are likely to benefit from management measures, from Table 3, and information on the ecosystem services provided by individual features in Appendix D.



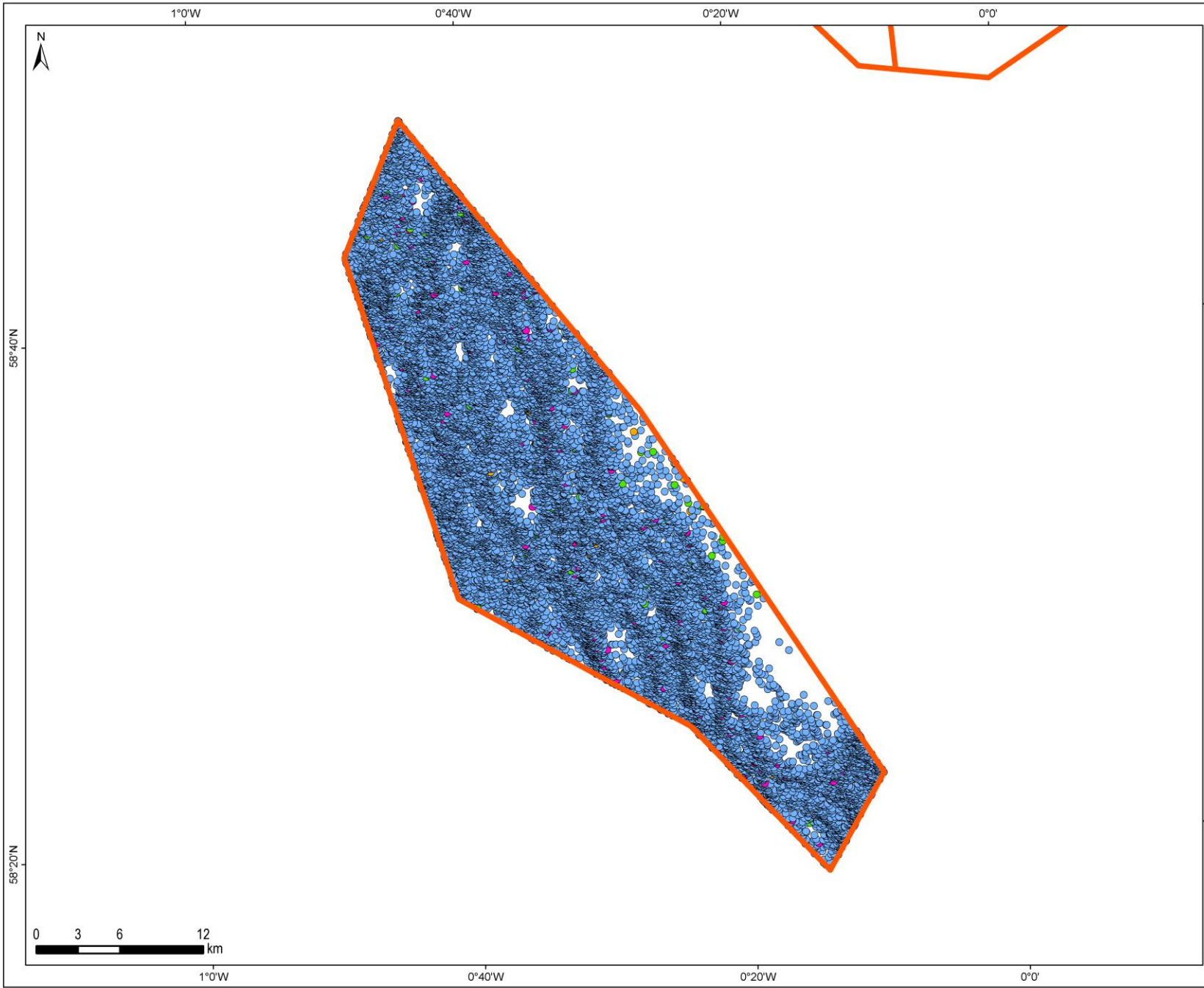
- Proposed Marine Protected Area
- Oil & Gas**
- Hydrocarbon Fields
- Pipelines
- Platforms
- Significant Discoveries
- Carbon Capture & Storage**
- Potential Hydrocarbon Reservoirs

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:375,000	
QA		FMM	
4136-MPA_HA_Western_Fladen.mxd			
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**Human Activities which Occur within the Proposed MPA:
Western Fladen**



- Proposed Marine Protected Area
- Whitefish Trawls
- Whitefish Seines
- Nephrops Trawls
- Other Gears

NOTE: Fishing activities data is based on the VMS 'fishing ping' data recorded by the over-15m fleet only.

Date	By	Size	Version
Jul 13	TAP	A4	1
Coordinate System		WGS 1984 UTM Zone 30N	
Projection		Transverse Mercator	
Scale		1:375,000	
QA		FMM	
4136-MPA_Fish_Western_Fladen.mxd			
Produced by ABPmer			



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 Data Source: Scottish Government, 2013
 NOT TO BE USED FOR NAVIGATION

**Fishing Activities which Occur within the Proposed MPA:
 Western Fladen**



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The Scottish Government
St Andrew's House
Edinburgh
EH1 3DG

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