The Scottish Government
Riaghaltas na h-Alba

Planning Scotland's Seas

2013 Possible Nature Conservation Marine Protected Areas Consultation Overview
Strategic Environmental Assessment
Environmental Report
August 2013

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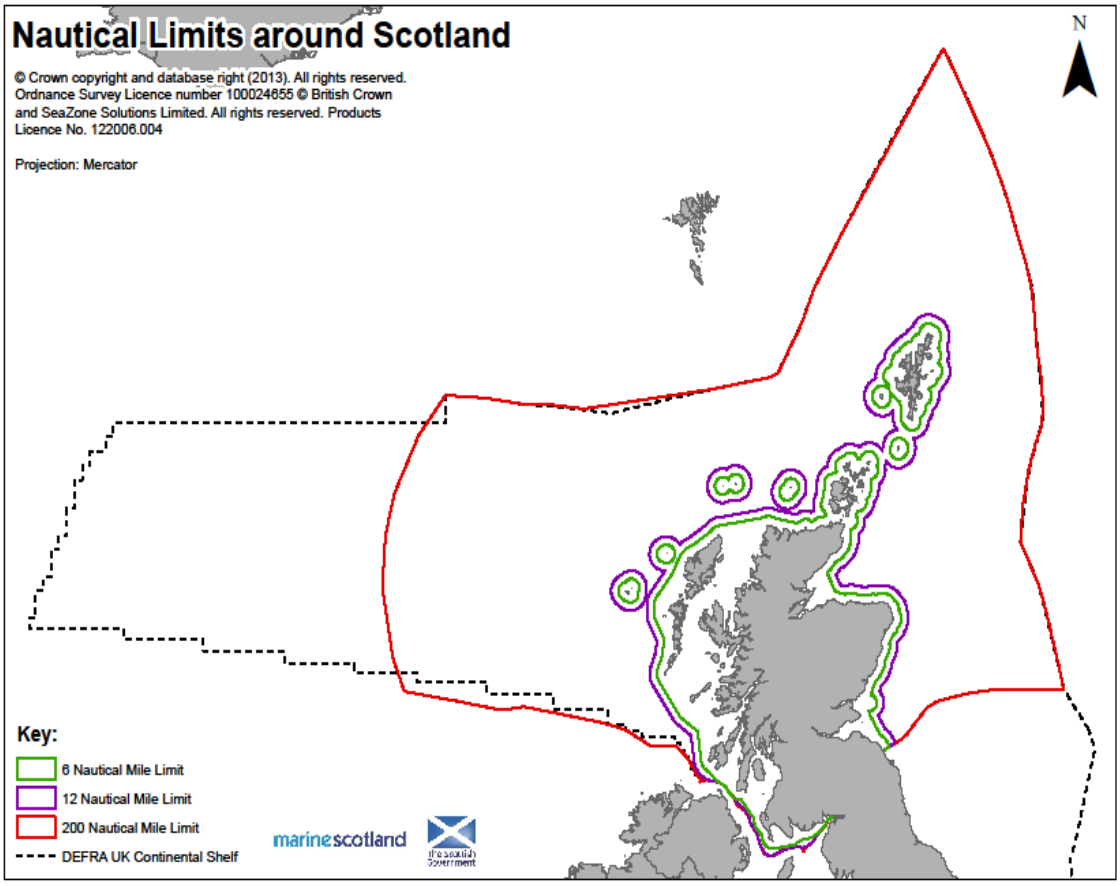
Non-Technical Summary

Introduction

1. The Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 call for the designation of Nature Conservation Marine Protected Areas (MPAs) in Scottish waters, to protect marine biodiversity and geodiversity and to contribute to a UK and international network of MPAs. Work to satisfy these requirements has been underway since 2010. The Scottish Government received advice from the Joint Nature Conservation Committee (JNCC) and Scottish Natural Heritage (SNH) on 33 MPA proposals and four search locations in December 2012. SNH and JNCC have advised that between 29 and 33 of these locations should be included in the network.

2. The Scottish Government is proposing that these original 33 MPA proposals now be considered for designation as possible Marine Protected Areas (pMPAs), to supplement existing protected areas for marine species and habitats, and to create a wider network of Marine Protected Areas[1]. The pMPAs are located in both Scottish territorial waters (0-12 nautical miles) and offshore waters (12-200 nautical miles) (Figure 1).

Figure 1. Nautical Limits around Scotland



[1] http://www.scotland.gov.uk/Publications/2013/07/2072

What is Strategic Environmental Assessment?

3. This report summarises the findings from a strategic environmental assessment (SEA) of the possible Marine Protected Areas (pMPAs). SEA of the pMPAs is required by the Environmental Assessment (Scotland) Act 2005. Given that the possible MPAs are located in both Scottish territorial and offshore waters, it was decided that (on a voluntary basis) the SEA should also meet the requirements of The Environmental Assessment of Plans and Programmes Regulations 2004.

4. SEA identifies the likely significant environmental impacts of plans and policies, and alternatives to them. Taking place at an early stage in the plan or policy preparation process, it ensures that decision-making is informed by relevant environmental information. SEA provides opportunities for the public to consider this information and use it to inform their views on the draft plan or policy.

5. A socio-economic assessment has also been undertaken, which comprises:

   - for each of the pMPAs, a Business and Regulatory Impact Assessment (BRIA); and
   - for the network as a whole, the results of the socio-economic assessment have been combined with the SEA to provide a Sustainability Appraisal, which is provided in a separate Sustainability Appraisal Report.

What are the possible Marine Protected Areas?

6. As well as the powers to designate MPAs, the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 require that a network of MPAs in UK seas is created to protect biodiversity and geodiversity. The network will contribute to agreements with international partners to create an ecologically coherent network of well-managed MPAs in the north-east Atlantic. The key overall objective of the MPA network is to safeguard the most important natural and cultural heritage features in Scottish waters, based on the principle of sustainable use[2].

7. Marine Scotland is working in partnership with Scottish Natural Heritage (SNH), the Joint Nature Conservation Committee (JNCC), the Scottish Environment Protection Agency (SEPA) and Historic Scotland (HS). SNH and JNCC have provided joint scientific advice[3] (as statutory nature conservation bodies) on existing protected areas and other area-based measures that contribute to the network, and have identified possible Nature Conservation MPAs that could form part of a network to protect biodiversity and geodiversity. A significant part of the work underlying this advice has been based around ensuring that network and feature coverage satisfies the OSPAR principles of developing an ecologically coherent network.

[2] Marine Scotland. 2012. Report to the Scottish Parliament on Progress to Identify a Scottish Network of Marine Protected Areas, page 10.

[3] Scottish Natural Heritage and the Joint Nature Conservation Committee (2012) *Advice to the Scottish Government on the selection of Nature Conservation Marine Protected Areas (MPAs) for the development of the Scottish MPA network*. Scottish Natural Heritage Commissioned Report No. 547.

8. Thirty-three possible Nature Conservation MPAs have been identified, and a further four MPA search locations remain to be fully assessed (Table 1 and Figure 2). The evolving MPA network in Scotland's seas builds on the existing network of protected areas, which includes Special Areas of Conservation (SACs); Special Protection Areas (SPAs); Sites of Special Scientific Interest (SSSIs), and fisheries management areas. More information on these other designations and sites is provided in the SNH/JNCC advice[3].

9. The focus of the possible MPAs, reflected in their conservation objectives (Table 1), is to either:

- protect a range of biodiversity or geodiversity features in their current state for the future, or
- to allow them to recover to the state they should be to remain healthy and productive.

10. The pMPAs will be managed to achieve their conservation objectives, using the principle of sustainable use. This means that only activities that present a risk of hindering the achievement of the conservation objectives will have specific management measures implemented.

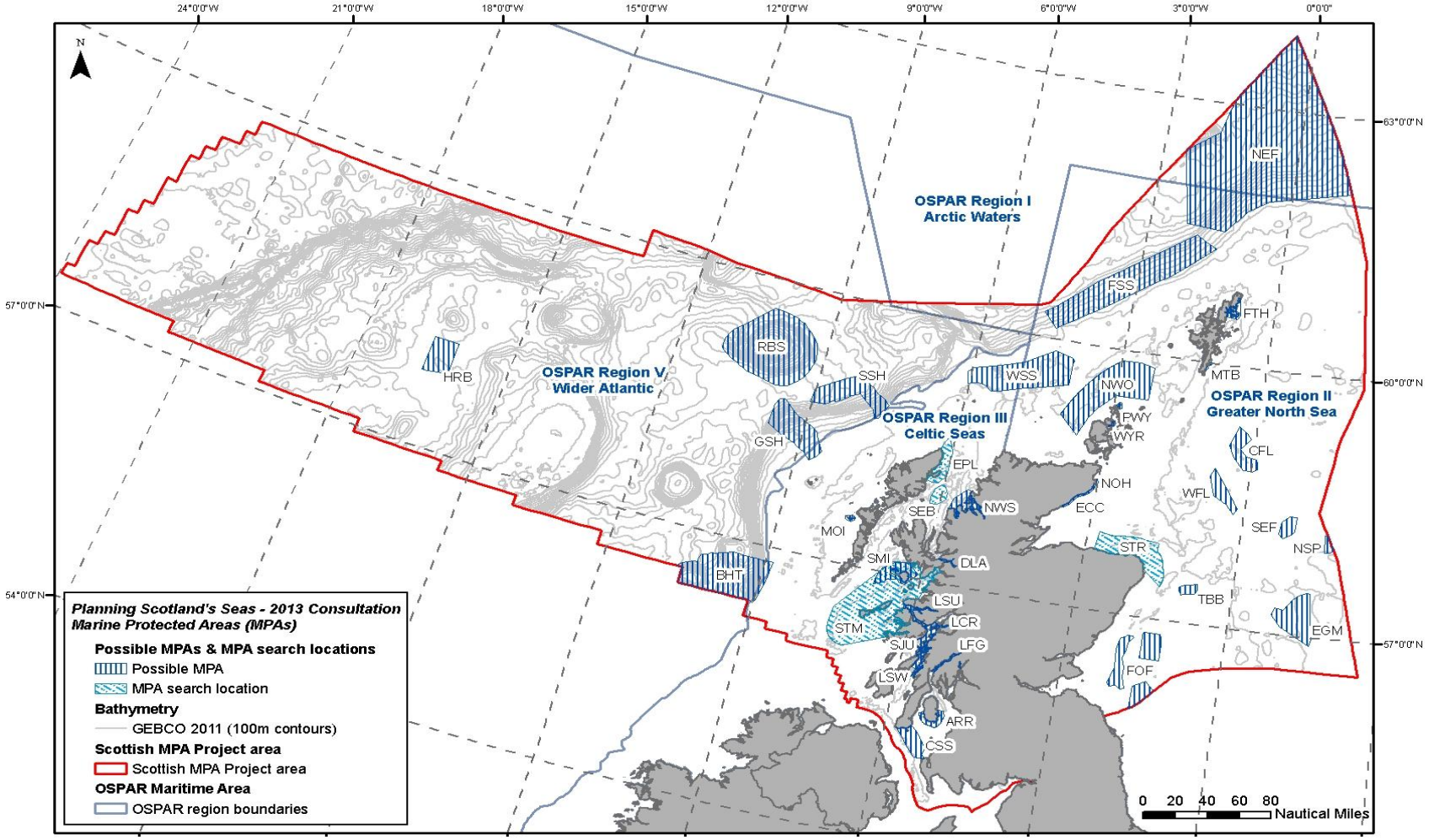
11. Management options papers have been produced for each of the pMPAs. These papers use a risk-based approach to identify management options, based on the protected features, the conservation objectives, and the activities which could affect their condition. Management options are a key element of the consultation, which provides opportunities for stakeholders to present their views, including their practical environmental knowledge and activity data.

Historic MPAs

12. Scotland's first Historic Marine Protected Area (HMPA) was designated on 18 March 2013, to protect an historic wreck close to the harbour of Drumbeg, Sutherland (Figure 5). On the same day, Historic Scotland also launched a consultation to make the Drumbeg designation permanent, and to designate a further six HMPAs. These comprise historic wreck sites currently designated under section 1 of the Protection of Wrecks Act 1973.

13. In 2013-14, Historic Scotland is progressing consideration of an HMPA for Scapa Flow's outstanding underwater heritage. This will involve review and transition to HMPA status for the seven intact wrecks of the German High Seas Fleet scuttled in Scapa Flow in 1919, currently scheduled monuments, and consideration of any other underwater sites relating to Scapa Flow's wartime naval heritage for inclusion in an HMPA proposal for consultation in 2014 (Figure 5). A small number of other high priority sites may be considered for designation as HMPAs before 2015.

Figure 2. Possible Nature Conservation MPAs and search locations in Scotland's seas



Map projected in Europe Albers Equal Area Conic (Modified Standard Parallels - Standard Parallel 1 = 50.2; Standard Parallel 2 = 58.5). The exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (©Crown Copyright). Coastline ©Crown copyright and database right [2013]. All rights reserved. Ordnance Survey Licence number 100017908. Bathymetry ©GEBCO. NOT TO BE USED FOR NAVIGATION. MPA network ©SNH, JNCC and Marine Scotland. 03.07.13. All rights reserved.

Table 1. Protected Features – Biodiversity and Geodiversity – for each pMPA

Name	Code	Protected features	Conservation objective
Territorial waters			
Clyde Sea Sill	CSS	*Biodiversity protected features* - Black guillemot; circalittoral sand and coarse sediment communities; fronts *Geodiversity protected features* - Marine Geomorphology of the Scottish Shelf Seabed - sand banks, sand ribbon fields, sand wave fields	*conserve*
East Caithness Cliffs	ECC	*Biodiversity protected features* - Black guillemot	*conserve*
Fetlar to Haroldswick	FTH	*Biodiversity protected features* - Black guillemot; circalittoral sand and coarse sediment communities; horse mussel beds; kelp and seaweed communities on sublittoral sediments; maerl beds; shallow tide-swept coarse sands with burrowing bivalves *Geodiversity protected features* - Marine Geomorphology of the Scottish Shelf Seabed	*conserve*
Loch Creran	LCR	*Biodiversity protected features* - Flame shell beds *Geodiversity protected features* - Quaternary of Scotland	*conserve*
Lochs Duich, Long and Alsh	DLA	*Biodiversity protected features* - Burrowed mud, flame shell beds	*conserve*
Loch Sunart	LSU	*Biodiversity protected features* - Flame shell beds; northern feather star aggregations on mixed substrata; serpulid aggregations	*conserve*
Loch Sunart to the Sound of Jura	SJU	*Biodiversity protected features* - Common skate *Geodiversity protected features* - Quaternary of Scotland	*conserve*
Loch Sween	LSW	*Biodiversity protected features* - Burrowed mud; maerl beds; native oysters; sublittoral mud and mixed sediment communities	*conserve*
Monach Isles	MOI	*Biodiversity protected features* - Black guillemot *Geodiversity protected features* - Marine Geomorphology of the Scottish Shelf Seabed; Quaternary of Scotland - landscape of areal glacial scour	*conserve*
Mousa to Boddam	MTB	*Biodiversity protected features* - Sandeels *Geodiversity protected features* - Marine Geomorphology of the Scottish Shelf Seabed	*conserve*

Name	Code	Protected features	Conservation objective
North-west sea lochs and Summer Isles	NWS	*Biodiversity protected features* - Burrowed mud; circalittoral muddy sand communities; flame shell beds; kelp and seaweed communities on sublittoral sediments; maerl beds; maerl or coarse shell gravel with burrowing sea cucumbers; northern feather star aggregations on mixed substrata *Geodiversity protected features* - Marine Geomorphology of the Scottish Shelf Seabed - banks of unknown substrate; Quaternary of Scotland - glaciated channels/troughs, megascale glacial lineations, moraines; Seabed Fluid and Gas Seep - pockmarks; Submarine Mass Movement - slide scars	*recover flame shell beds and maerl beds* *conserve other features*
Noss Head	NOH	*Biodiversity protected features* - Horse mussel beds	*conserve*
Papa Westray	PWY	*Biodiversity protected features* - Black guillemot *Geodiversity protected features* - Marine Geomorphology of the Scottish Shelf Seabed - sand wave field	*conserve*
Small Isles	SMI	*Biodiversity protected features* - Black guillemot; burrowed mud, circalittoral sand and mud communities; fan mussel aggregations; horse mussel beds; northern feather star aggregations on mixed substrata; northern sea fan and sponge communities; shelf deeps; white cluster anemones *Geodiversity protected features* - Quaternary of Scotland - glaciated channels/troughs, glacial lineations, meltwater channels, moraines, rock basins, streamlined bedforms	*conserve*
South Arran	ARR	*Biodiversity protected features* - Burrowed mud; herring spawning grounds; kelp and seaweed communities on sublittoral sediments; maerl beds; maerl or coarse shell gravel with burrowing sea cucumbers; ocean quahog; seagrass beds; shallow tide-swept coarse sands with burrowing bivalves	*recover maerl beds* *conserve other features*
Upper Loch Fyne and Loch Goil	LFG	*Biodiversity protected features* - Burrowed mud; flame shell beds; horse mussel beds; ocean quahog; sublittoral mud and mixed sediment communities	*recover flame shell beds* *conserve other features*
Wyre and Rousay Sounds	WYR	*Biodiversity protected features* - Kelp and seaweed communities on sublittoral sediment; maerl beds *Geodiversity protected features* - Marine Geomorphology of the Scottish Shelf Seabed	*conserve*

Name	Code	Protected features	Conservation objective
Offshore waters			
Central Fladen	CFL	*Biodiversity protected features* - Burrowed mud *Geodiversity protected features* - Quaternary of Scotland - sub-glacial tunnel valley	*conserve*
East of Gannet and Montrose Fields	EGM	*Biodiversity protected features* - Ocean quahog aggregations (including sands and gravels as their supporting habitat); offshore deep sea muds	*conserve*
Faroe-Shetland sponge belt	FSS	*Biodiversity protected features* - Continental slope; deep-sea sponge aggregations; ocean quahog aggregations; offshore subtidal sands and gravels *Geodiversity protected features* - Marine Geomorphology of the Scottish Deep Ocean Seabed - sand wave field, sediment wave field; Quaternary of Scotland - continental slope channels; iceberg ploughmark fields, prograding wedges; Submarine Mass Movement - slide deposits	*conserve*
Firth of Forth Banks Complex	FOF	*Biodiversity protected features* - Ocean quahog aggregations; offshore subtidal sands and gravels; shelf banks and mounds *Geodiversity protected features* - Quaternary of Scotland - moraines	*conserve*
Geikie Slide and Hebridean slope	GSH	*Biodiversity protected features* - Burrowed mud; continental slope; offshore deep-sea muds, offshore subtidal sands and gravels *Geodiversity protected features* - Submarine Mass Movement - slide deposits, slide scars	*conserve*
Hatton-Rockall Basin	HRB	*Biodiversity protected features* – Deep-sea sponge aggregations; offshore deep-sea muds *Geodiversity protected features* - Marine Geomorphology of the Scottish Deep Ocean Seabed - sediment drifts; Polygonal fault systems	*conserve*
North-east Faroe Shetland Channel	NEF	*Biodiversity protected features* - Continental slope; deep-sea sponge aggregations; offshore deep-sea muds; offshore subtidal sands and gravels *Geodiversity protected features* - Cenozoic Structures of the Atlantic Margin - mud diapirs; Marine Geomorphology of the Scottish Deep Ocean Seabed - contourite sand/silt; Quaternary of Scotland - prograding wedge; Submarine Mass Movement - slide deposits	*conserve*
North-west Orkney	NWO	*Biodiversity protected features* – Sandeels *Geodiversity protected features* - Marine Geomorphology of the Scottish Shelf Seabed - sand bank, sand wave field, sediment wave fields	*conserve*

Name	Code	Protected features	Conservation objective
Norwegian boundary sediment plain	NSP	*Biodiversity protected features* - Ocean quahog aggregations (including sands and gravels as their supporting habitat), offshore subtidal sands and gravels	*conserve*
Rosemary Bank Seamount	RBS	*Biodiversity protected features* – Deep-sea sponge aggregations; seamount features; seamount communities *Geodiversity protected features* - Cenozoic Structures of the Atlantic Margin - Rosemary Bank Seamount; Marine Geomorphology of the Scottish Deep Ocean Seabed - scour moats, sediment drifts, sediment wave fields; Quaternary of Scotland - iceberg ploughmark field; Submarine Mass Movement - slide scars	*conserve*
South-east Fladen	SEF	*Biodiversity protected features* - Burrowed mud *Geodiversity protected features* - Seabed Fluid and Gas Seep - pockmarks	*conserve*
South-west Sula Sgeir and Hebridean slope	SSH	*Biodiversity protected features* - Burrowed mud; continental slope; offshore deep-sea muds; offshore subtidal sands and gravels *Geodiversity protected features* - Quaternary of Scotland - iceberg ploughmark fields, prograding wedges; Submarine Mass Movement - slide deposits	*conserve*
The Barra Fan and Hebrides Terrace Seamount	BHT	*Biodiversity protected features* - Burrowed mud; continental slope; offshore deep-sea muds; offshore subtidal sands and gravels; orange roughy; seamount; seamount communities *Geodiversity protected features* - Cenozoic Structures of the Atlantic Margin - continental slope, Hebrides Terrace Seamount; Marine Geomorphology of the Scottish Deep Ocean Seabed - scour moat; Quaternary of Scotland - iceberg ploughmark field, prograding wedges; Submarine Mass Movement - continental slope turbidite canyons, slide deposits	*conserve*
Turbot Bank	TBB	*Biodiversity protected features* – Sandeels, offshore subtidal sands and gravels, shelf banks and mounds	*conserve*
West Shetland Shelf	WSS	*Biodiversity protected features* - Offshore subtidal sands and gravels	*conserve*
Western Fladen	WFL	*Biodiversity protected features* - Burrowed mud *Geodiversity protected features* - Quaternary of Scotland - sub-glacial tunnel valleys	*conserve*

How was the Strategic Environmental Assessment undertaken?

14. This is a strategic-level appraisal of the possible MPAs, which broadly assesses their expected effects. A series of key questions ('strategic environmental assessment objectives') is used to structure the assessment. Information about the existing marine environment has been used to inform the appraisal and define these appraisal objectives. The appraisal identifies the individual and collective effects of the draft plan's policies and objectives on: marine biodiversity, flora and fauna (including the ecological and/or environmental status of water bodies); marine geodiversity; and climatic factors. Social and economic effects, including those on other users of the marine environment, have been assessed by the socio-economic assessment.

15. The SEA identifies positive and negative effects, including 'cumulative' effects. The assessment has been systematic, and the findings are recorded in a series of tables. The significant impacts are described in detail in the Environmental Report.

Which reasonable alternatives have been assessed?

Alternative proposals

16. The MPA identification and selection process has used a science-led approach. Science has been the primary consideration in the selection of sites. Socio-economic evidence will be considered when the ecological coherence of the network has been met. Ministers also have a power to take account of socio-economic impacts that may arise from a MPA designation.

17. The different steps have considered alternatives and made key decisions all the way through the process. Some of these key decisions have included:

- amendments to pMPA boundaries
- changes to the "drivers" for identifying pMPAs
- removal of features from some pMPA proposals
- addition of features to some pMPA proposals
- moving features from one pMPA to another
- progressing requests for additional survey information and/or research to underpin pMPAs

18. Further details are provided in SNH/JNCC's advice to the Scottish Government. Stakeholder engagement has been a key part of this MPA process.

19. For certain features there are different options for representing them in the network. The consultation overview document and the Environmental Report contain details of science-based alternatives to represent offshore subtidal sands and gravels, ocean quahog and shelf banks and mounds in OSPAR Region II. There are also ecologically equivalent options for burrowed mud in OSPAR Region II.

20. Four areas that have yet to be assessed fully remain as MPA search locations (Figure 2). This is to enable further work to be completed on one or more of the relevant MPA search features before SNH provides its formal advice to Scottish Ministers in 2014. The remaining work relates primarily to mobile species features including minke whale, Risso's dolphin and basking shark. The Southern Trench MPA search location also encompasses the burrowed mud feature.

Alternative Approaches

21. It has been suggested that identification of a coherent ecological network should be delayed, at least until the assessment of the four search locations is complete. The challenge of taking forward the network in the light of existing gaps in the scientific evidence is acknowledged. However, it should be noted that an iterative approach (including refinement of the pMPAs) is a cornerstone of this work, and that the six-year review cycle will facilitate the continued collection of environmental data and activity information. It will also facilitate amendment of pMPA boundaries in response to pressures and changes resulting from both natural variability and human activities. In addition, such a delay would result in significant uncertainty for the marine economic sector. Scottish Ministers are of the view that this work should be progressed, noting that it has taken a precautionary stance.

22. The conservation objectives for the possible MPAs focus on the protection of biodiversity or geodiversity features, or their recovery. An alternative approach would be to restore and/or enhance features. This possibility was reviewed in the early stages of the process. It was felt that there is insufficient clear evidence to support an objective to “restore”. For example, changes to features are not always the result of anthropogenic pressures: natural processes, which are inherently variable (e.g. in the weather) play a significant role in this. In addition, a “restore” objective would require information about the historic condition of a feature, and this evidence is rarely available. It was therefore decided to utilise the “conserve” and “recover” objectives, as appropriate and on a site-by-site basis, for each of the features.

What is the current state of the environment?

23. Scotland’s seas are among the most biologically diverse and productive in the world, supporting an estimated 6,500 species of marine animals and plants.

24. Scotland’s marine biodiversity is protected by a range of European, UK and Scottish-level designations. Key habitat types include estuaries; lagoons; large shallow inlets and bays; mudflats and sandflats not covered by seawater at low tide; reefs; sandbanks which are slightly covered by seawater all the time; submarine structures made by leaking gases; and submerged or partially submerged sea caves. Key animal species include cetaceans (whales, dolphins and porpoises), seals, seabirds, fish (including sharks, skates and rays) and turtles.

25. Scotland's seas are mostly classed as being of good or high status under the Water Framework Directive (out to three nautical miles). Some of the pressures on coastal waters and estuaries include low oxygen levels, elevated growth of algae, human effects on the morphological characteristics of water bodies (e.g. construction of sea defences) or the condition of benthic invertebrate populations.

26. Climate change is predicted to lead to an increase in water temperature and acidity, a rise in sea levels, changes in wave heights and changes to coastlines. Climate change is already having an impact on weather patterns. Changes in temperature, levels and timing of rainfall, and more extreme weather events are all expected, affecting other aspects of the environment.

27. Scottish waters are quite different between the east and west coasts. The east coast presents mostly uniform depths and shallow inclines interspersed with localised trenches, while the seabed off Scotland's west coast shelves steeply away from the coast, and deep waters occur relatively close to the land.

28. In general, the marine sediments around Scotland are sandy or gravelly and originate from deposits during the Quaternary glaciation. Muddy sediments are located principally near-shore or, if further offshore, in depressions on the sea floor where currents may be relatively weak.

29. Marine geodiversity in Scottish waters is representative of the geological processes that have influenced the evolution and present day morphology of the Scottish seabed. Eight categories of geodiversity interests have been identified in Scottish waters:

- Quaternary of Scotland;
- Submarine Mass Movement;
- Marine Geomorphology of the Scottish Deep Ocean Seabed;
- Seabed Fluid and Gas Seep;
- Cenozoic Structures of the Atlantic Margin;
- Marine Geomorphology of the Scottish Shelf Seabed;
- Coastal Geomorphology of Scotland; and
- Biogenic Structures of the Scottish Seabed

Pressures

30. There are many pressures on Scotland's seas. An example of some of the pressures on marine biodiversity is provided in Box 1.

Box 1. Pressures on marine biodiversity

Commercial fishing:
- removal of target fish species may affect the sustainability of fish stocks
- discards of fish are a waste of the resource, and also encourage scavenger species
- bycatch inadvertently catches both non-target fish and other species, generally leading to the death of individuals and subsequent decline in populations
- the seabed and its benthic habitat may be damaged by mobile fishing gear, with the consequent loss of marine plants and animals
- removal of target species may also decrease the availability of prey species, leading to declines in populations e.g. of birds

Non-native invasive species may outcompete native species, thereby displacing them from the marine environment.

Marine litter can result in the injury and/or death of marine animals.

Climate change, through increasing sea temperatures, acidification, changes to rainfall patterns, etc:
- may result in populations of marine animals and plants moving further north
- may give rise to population decline
- may result in new competitors arriving in Scottish waters, including non-native invasive species

What are the likely significant environmental effects of the possible MPAs?

31. This SEA has undertaken a high-level assessment of the pMPAs. A summary is provided in the following paragraphs.

Marine Biodiversity, Flora and Fauna

32. The pMPAs will have benefits for biodiversity, flora and fauna. This is their key purpose, with a focus on specific features (identified in Table 1), and the benefit of designation will primarily accrue to these features.

33. The key pressures associated with marine activities include:

- surface abrasion and damage. For example, in demersal fishing, mobile/active gear (trawls, dredges, etc) makes contact with and moves along the surface of the seabed and can result in surface abrasion and/or damage. Surface abrasion can also be caused by anchorages/moorings (recreational and commercial), although the effects tend to be more localised.
- siltation rate changes, e.g. associated with marine disposal of dredged material and with aquaculture
- contact with the seabed, e.g. fishing using static gear. Often the issue here is the intensity of the activity. The use of static gear at moderate intensity is not an issue for most features. The issue comes with high intensity and concentration of static gear, e.g. creels/pots.
- risk of injury and/or death to mobile species. For example, the use of set nets (e.g. fyke, gill, trammel or tangle) may entangle black guillemot. Of

highest risk to black guillemot would be set nets around kelp forests which are widely used for feeding. Offshore renewable energy devices also pose a risk of collision to mobile species.
- organic enrichment, e.g. pressures associated with aquaculture

34. In general, species that use benthic habitat for spawning (e.g. herring), growth and/or refuge will also benefit from the reduction and/or removal of these pressures. There are also likely to be benefits to biodiversity through increased nutrient cycling, as a result of the actions of burrowing animals.

35. Displacement of marine activities, as a result of pMPA designation, is a key concern of stakeholders. Displacement could result from the introduction of measures to manage pMPAs, and these management measures may have consequences for the environment:

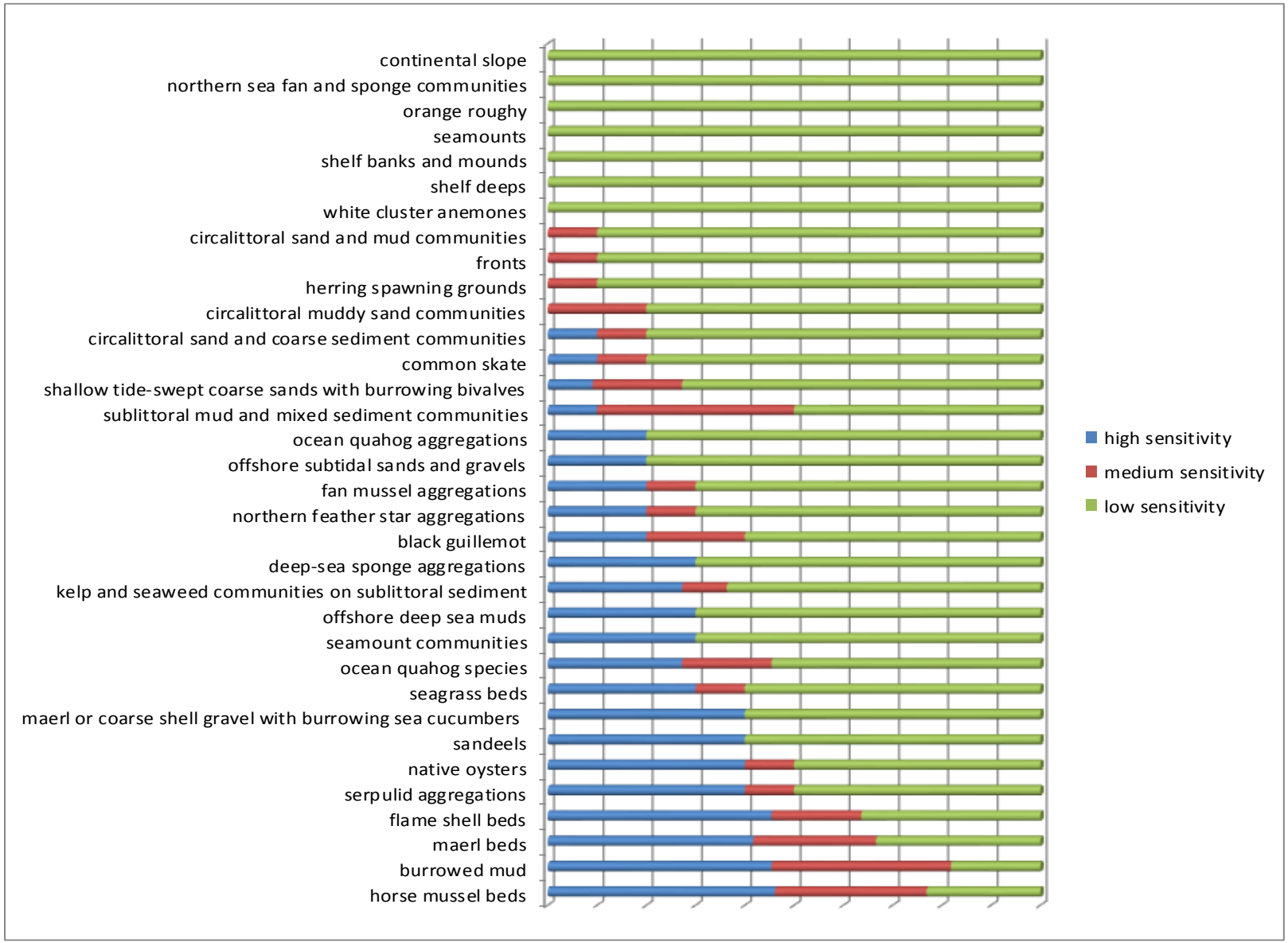
- Where no management measures are recommended, this would result in continuation of the status quo. Small-scale, local effects may occur but these are unlikely to be significant. (If they were significant, management measures would have been recommended.)
- Where the recommendation is to reduce/limit pressures, this may result in amendments to current practices.
- Where the recommendation is to remove/avoid pressures, this may result in the activity being discontinued or displacement of the activity to another location. This could result in new pressures in this location or an intensification of already-existing pressures.

36. The following marine activities have been reviewed for the SEA, in terms of the sensitivities of MPA features to these activities and the potential for management measures:

- marine disposal
- commercial fishing (mobile gear; static gear; diver-operated gear)
- infrastructure (renewables; oil and gas; cables)
- aquaculture (finfish; shellfish)
- moorings/ anchorages

37. Very few of the biodiversity features are not sensitive to at least one of the marine activities identified in paragraph 36, and management measures have been proposed for all the features potentially affected. (Few, if any, measures have been recommended for the management of geodiversity features.) Figure 3 shows the results. Features which are highly sensitive to marine activities are shown as primarily blue, e.g. serpulid aggregations, seamount communities. Those with low sensitivity are shown as primarily green, e.g. white cluster anemones. Most features, however, are more sensitive to certain activities than others. Black guillemot, for example, are highly sensitive to a limited number of activities (in this case, the risk of entanglement in static fishing nets). Flame shell beds, maerl beds, native oysters have a high sensitivity to some activities, medium sensitivity to others, and low sensitivity to the remainder.

Figure 3. Sensitivity of pMPA features to marine activities (identified in paragraph 37)



38. The activities which appear to have the greatest potential to result in displacement comprise:

- commercial fishing using bottom-contact mobile gear, particularly hydraulic gear;
- commercial fishing using diver-operated hydraulic gear; and
- some use of static gear.

39. Some uncertainties remain, particularly with features where the recommendation has been to reduce and/or limit the pressure. Much of this uncertainty focuses around the type of measure to be employed, be it spatial and/or temporal restriction, or changes to gear types or target species.

40. Review of the potential for displacement has demonstrated the following:

- Designation of some pMPA features does not appear to require management measures, and these would therefore not result in displacement.
- Many of the management measures can be zoned, so displacement is unlikely to occur in pMPAs where this can be progressed.
- For infrastructure (renewables, oil and gas, cables), MPA features will need to be considered in the course of project siting and design. For the purposes of this SEA, it has been assumed that such measures will be able to successfully mitigate adverse effects on these features, and that displacement will not occur.

The results of the review are summarised in Table 2, taking these factors into account.

41. For those activities where displacement will occur, it is not possible at this stage to identify alternative locations. This will be the subject of discussion with stakeholders in the course of the consultation. We are therefore unable to assess the potential environmental effects of new and/or intensified activity, other than to note the following:

- moving activities to new areas that are currently unused or have low levels of use would likely result in effects on the seabed, e.g. abrasion, surface damage, etc. The significance of these effects would depend on the nature of the seabed affected and the sensitivity of the habitat.
- moving activities to areas that are already in use may intensify existing environmental effects, including pressures on benthic habitats, pressures on fish stocks, risk of injury through collision, etc. Again, the significance of these effects would depend on the area in question, the type of activity and the current level of activity.

Table 2. Potential for Displacement red = uncertain; blue = more likely

					infrastructure					
MPA features	marine disposal	mobile gear	static gear	diver	renew-ables	oil and gas	cables	shellfish farms	finfish farms	anchors mooring
continental slope										
northern sea fan and sponge communities										
orange roughy										
seamounts										
shelf banks and mounds										
shelf deeps										
white cluster anemones										
circalittoral sand and mud communities										
fronts										
herring spawning grounds										
circalittoral muddy sand communities										
circalittoral sand and coarse sediment communities										
common skate										
shallow tide-swept coarse sands with burrowing bivalves										
sublittoral mud and mixed sediment communities										
ocean quahog aggregations										
offshore subtidal sands and gravels										
fan mussel aggregations										
northern feather star aggregations on mixed substrata										
black guillemot										
deep-sea sponge aggregations										
kelp and seaweed communities on sublittoral sediment										
offshore deep sea muds										
seamount communities										
ocean quahog (species)										
seagrass beds										
maerl or coarse shell gravel with burrowing sea cucumbers										
sandeels										
native oysters										
serpulid aggregations										
flame shell beds										
maerl beds										
burrowed mud										
horse mussel beds										

Marine Geodiversity

42. As with biodiversity, the pMPAs will have benefits for geodiversity features. This is their key purpose, with a focus on specific features (identified in Table 1), and the benefit of designation will primarily accrue to these features.

43. Designation and protection of these geodiversity features may result in benefits to geodiversity features in other areas of the sea, through changes to existing marine activities and/or management practices.

Climatic Factors

44. Displacement of commercial fishing could result in longer journeys, with increased fuel consumption and therefore increased greenhouse gas emissions. However, at this stage, it is not possible to estimate the increase in journey length. As noted in paragraph 41, we do not know where displaced mobile and/or static gear. for example, would be likely to go. In consequence, other than to say there may be an increase in fuel consumption, it is not possible to provide estimates of such increased emissions, nor to ascertain how significant this may be in the overall context of the Scottish fleet.

45. It should be noted that the seas also offer us indirect benefits, such as nutrient cycling or reducing the effects of climate change. These are benefits that we currently gain no direct economic output from, but which provide services that would be very costly to manage ourselves if they disappeared. Habitats such as kelp forests and seagrass beds are not only important habitats for juvenile fish, but are also recognised by the United Nations Environment Programme as important carbon sinks. Carbon sinks store carbon dioxide, helping to regulate climate and contribute to mitigating change.

What are the likely combined effects of the possible MPAs with other plans, when viewed together?

46. The assessment of cumulative effects has looked at the combined effects of the possible MPAs (i.e., all the pMPAs working together) and in combination with other plans, programmes and/or strategies.

47. Taken together, the pMPAs are likely to result in benefits to biodiversity, in terms of protection provided to the MPA features. However, there is also potential for adverse effects on biodiversity from displacement of commercial fishing activities. At this stage, for those activities where displacement is likely to occur, it is not possible to identify alternative locations.

48. In consequence, it is not possible at this stage to ascertain whether there may be cumulative effects resulting from the effects of displacement of commercial fishing activities and the effects of other proposals for activity in the marine environment, including the Draft Sectoral Marine Plans for Offshore Renewable Energy in Scottish Waters (part of the Planning Scotland's Seas consultation).

49. The possible MPAs will work together with the existing protection measures to provide protection to the biodiversity and geodiversity features in Scottish territorial and offshore waters. Taken together, this will be of benefit to those features. In addition, the possible MPAs will contribute to meeting the objectives of the Marine Strategy Framework Directive, in terms of the achievement of good environmental status and in contributing to the objectives of good environmental status, such as the protection of seafloor systems (Qualitative Descriptor 6 of Annex I of the directive).

What happens next?

50. Following consultation, the possible MPAs will be revised in response to comments made on the consultation overview, the Environmental Report, the Sustainability Appraisal Report and the Business and Regulatory Impact Assessments (BRIAs). Once the MPAs have been "adopted", i.e. through designation orders under section 67 of the Marine (Scotland) Act 2010, a Post-Adoption Statement will be prepared.

51. The Post-Adoption Statement will explain how issues raised in the SEA, and associated views in response to the consultation, have been addressed.

How do I respond to the consultation?

52. Views on the possible MPAs and the findings of the SEA are now invited.

53. Copies of the consultation document (2013 Possible Nature Conservation Marine Protected Areas Consultation Overview), the Environmental Report, the Sustainability Appraisal Report and the BRIAs are available for viewing during office hours at the Scottish Government library at Saughton House, Edinburgh (K Spur, Saughton House, Broomhouse Drive, Edinburgh, EH11 3XD).

54. Please send your comments to the MPA Network Consultation, by 13 November 2013, at the following address:

By email to: Marine_Environment_Mailbox@scotland.gsi.gov.uk or

By post, to:

MPA Network Consultation
Scottish Government
Marine Planning and Policy Division
Area 1-A South
Victoria Quay
Edinburgh EH6 6QQ

55. If you have any inquiries please send them to Marine_Environment_Mailbox@scotland.gsi.gov.uk or telephone Sebastian Howell on 0131 244 5301, Micahel McLeod on 0131 244 5562 or Paul Cook on 0131 244 0381.

1.0 Introduction

1.1 The Scottish Government is committed to a clean, healthy, safe, productive and biologically diverse marine and coastal environment that meets the long term needs of its people and natural assets. In order to meet this commitment, Scotland's seas must be managed in a sustainable manner that balances the competing demands on marine resources and space. The biological and geological diversity within Scottish waters must be protected to ensure that the future marine ecosystem is capable of providing the economic and social benefits that it yields today.

1.2 The Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 call for the designation of Nature Conservation Marine Protected Areas (MPAs) in Scottish waters, to protect marine biodiversity and geodiversity and to contribute to a UK and international network of MPAs. This will contribute towards achieving Good Environmental Status (GES) under the Marine Strategy Framework Directive (MSFD) and deliver Scotland's contribution to the ecologically coherent network of MPAs under the OSPAR convention on the protection of the marine environment in the North East Atlantic.

1.3 Work to satisfy these requirements has been underway since 2010. The Scottish Government received advice from the Joint Nature Conservation Committee (JNCC) and Scottish Natural Heritage (SNH) on 33 MPA proposals and four search locations in December 2012. SNH and JNCC have advised that between 29 and 33 of these locations should be included in the network.

1.4 The Scottish Government is proposing that these original 33 MPA proposals now be considered, through public consultation, as possible Marine Protected Areas (pMPAs) for designation to supplement existing protected areas for marine species and habitats, and to create a wider network of Marine Protected Areas[4]. The pMPAs are located in both Scottish territorial waters (0-12 nautical miles) and offshore waters (12-200 nautical miles) (Figure 1).

Strategic Environmental Assessment

1.5 The Environmental Assessment (Scotland) Act 2005 requires that certain public plans, programmes and strategies (PPS) be assessed for their potential effects on the environment. Strategic Environmental Assessment (SEA) is the process used to fulfil this requirement, and includes consultation with the public and organisations with responsibility for the environment. The work to deliver possible nature conservation MPAs falls under Section 5(4) of the Act.

1.6 Marine Scotland undertook screening in April 2013 and determined, as the Responsible Authority, that the possible MPAs have the potential to give rise to significant environmental effects, and that a SEA would therefore be undertaken in accordance with the requirements of the Environmental Assessment (Scotland) Act 2005. Given that the possible MPAs are located

[4] http://www.scotland.gov.uk/Publications/2013/07/2072

in both Scottish territorial and offshore waters, it was decided that (on a voluntary basis) the SEA should also meet the requirements of The Environmental Assessment of Plans and Programmes Regulations 2004.

1.7 A scoping exercise for the SEA was subsequently undertaken, in accordance with the requirements of Section 15 of the Act. A combined Screening and Scoping Report was issued in April 2013, setting out the proposed approach to the SEA, including the proposed scope and level of detail. Comments were invited from the Scottish Consultation Authorities[5], the UK Consultation Bodies[6] and the members of the MPA Project Advisory Group. The PAG consisted of a representative from each interest area to form an advisory group at both a national and regional level to ensure the approach, methodology and scope of the socio-economic and environmental assessments were suitable and accurate.

1.8 The purpose of this Environmental Report is to document the findings of the SEA, undertaken by the Scottish Government's Environmental Assessment Team. A socio-economic assessment has also been undertaken, of both the network and individual pMPAs. The results of the SEA and the network level socio-economic assessment are together summarised in a separate Sustainability Appraisal Report.

1.9 The views of the public, the Consultation Authorities and the Consultation Bodies on the possible MPAs and the findings of this Environmental Report are now being sought.

1.10 The remainder of this Environmental Report is structured as follows:

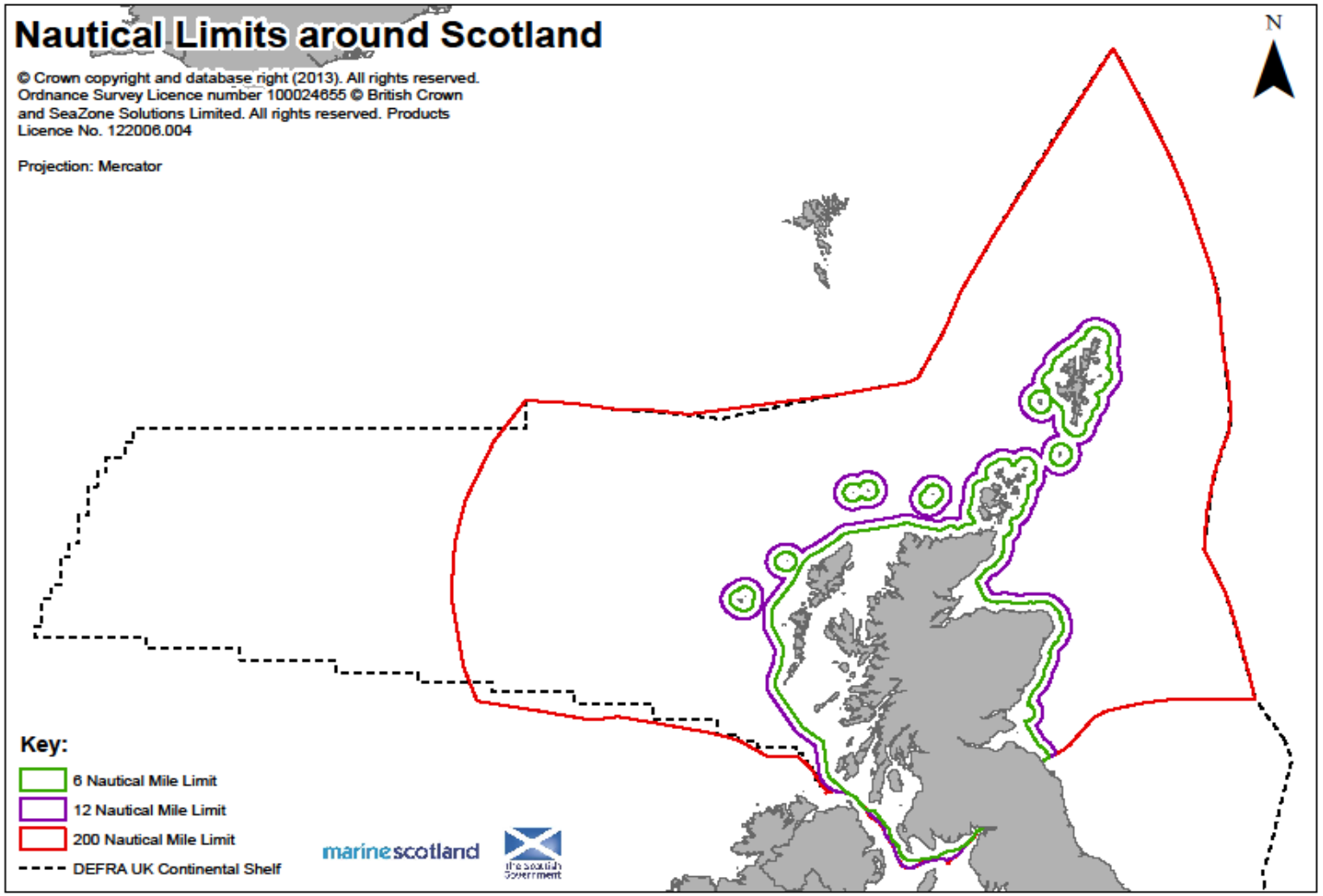
- Section 2 provides information on the possible MPAs.
- Section 3 discusses the approach to the SEA and the methods used.
- Section 4 provides information about the approach taken to identifying reasonable alternatives.
- Section 5 describes the relevant components of the environment.
- Section 6 sets out the results of the assessment.
- Section 7 considers the next steps.

The Non-Technical Summary precedes Section 1.

[5] Scottish Environment Protection Agency (SEPA), Scottish Natural Heritage (SNH) and Historic Scotland.

[6] Environment Agency, Natural England, English Heritage, Natural Resources Wales, Cadw, and the Department of the Environment for Northern Ireland

Figure 1. Nautical Limits around Scotland



2.0 2013 Possible Nature Conservation Marine Protected Areas Consultation Overview

Introduction

2.1 As noted in the introduction, the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 both contain powers to designate Marine Protected Areas (MPAs). These contribute to a range of measures to manage and protect Scotland's seas for current and future generations. The legislation also requires that a network of MPAs in UK seas is created to protect biodiversity and geodiversity. The network will contribute to agreements with international partners to create an ecologically coherent network of well-managed MPAs in the north-east Atlantic. The key overall objective of the MPA network is to safeguard the most important natural and cultural heritage features in Scottish waters, based on the principle of sustainable use[7].

The Possible MPAs

2.2 Marine Scotland is working in partnership with Scottish Natural Heritage (SNH), the Joint Nature Conservation Committee (JNCC), the Scottish Environment Protection Agency (SEPA) and Historic Scotland (HS). SNH and JNCC have provided joint scientific advice (as statutory nature conservation bodies) on existing protected areas and other area-based measures that contribute to the network and have identified possible Nature Conservation MPAs that could form part of a network to protect biodiversity and geodiversity[8]. A significant part of the work underlying this advice has been based around ensuring that network and feature coverage satisfies the OSPAR principles of developing an ecologically coherent network.

2.3 Thirty-three possible Nature Conservation MPAs have been identified, and a further four MPA search locations remain to be fully assessed (Table 1 and Figure 2). The evolving MPA network in Scotland's seas builds on the existing network of protected areas (Figure 3), which includes Special Areas of Conservation (SACs); Special Protection Areas (SPAs); Sites of Special Scientific Interest (SSSIs), and fisheries management areas. More information on these other designations and sites is provided in the SNH/JNCC advice[8].

2.4 Details of the protected features for each pMPA are provided in Table 2. Key facts about the proposals are summarised in Table 3.

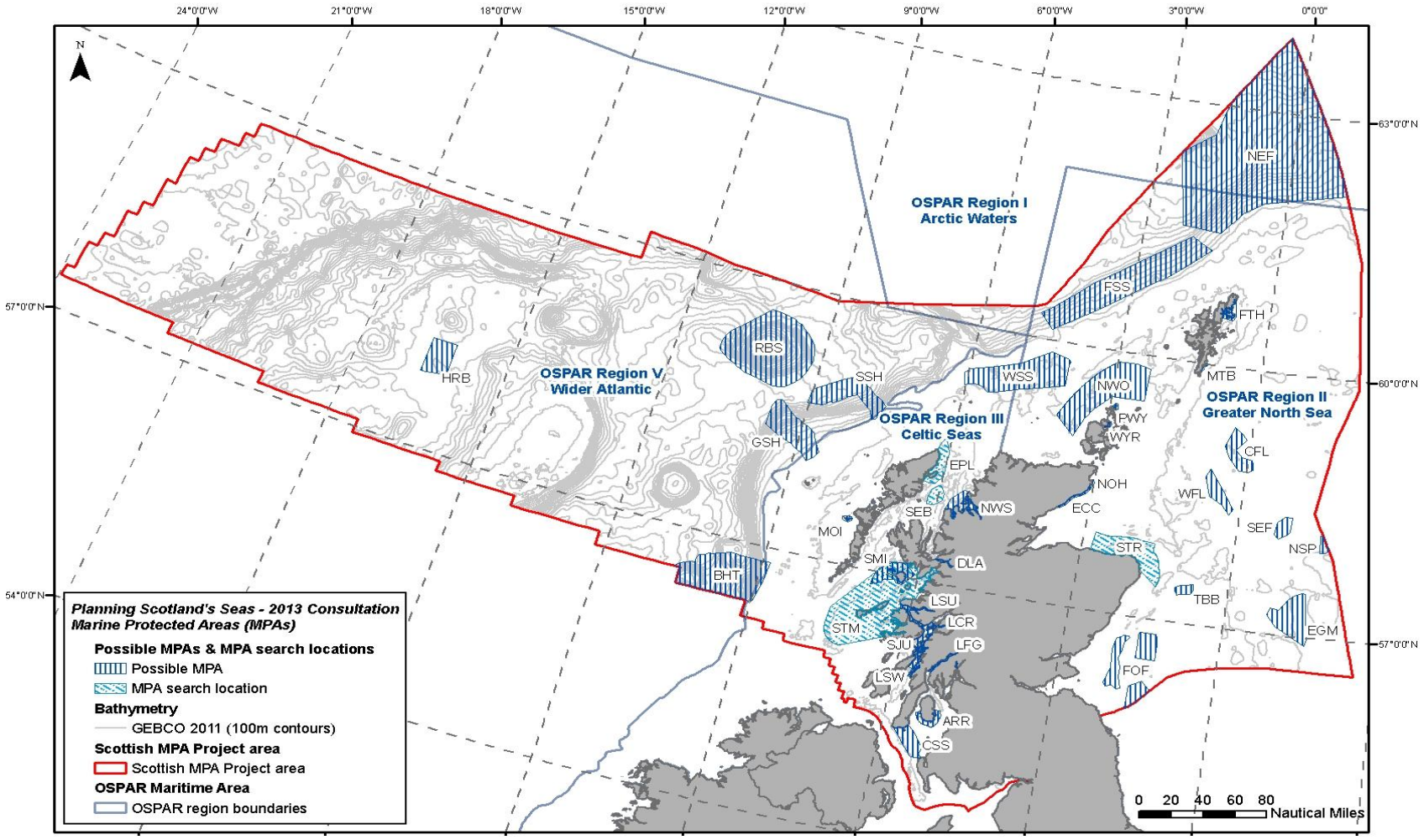
[7] Marine Scotland. 2012. Report to the Scottish Parliament on Progress to Identify a Scottish Network of Marine Protected Areas, page 10.

[8] Scottish Natural Heritage and the Joint Nature Conservation Committee. 2012. *Advice to the Scottish Government on the selection of Nature Conservation Marine Protected Areas (MPAs) for the development of the Scottish MPA network*. Scottish Natural Heritage Commissioned Report No. 547.

Table 1. Possible Nature Conservation MPAs and MPA search locations (*) in Scottish waters (by sea area)

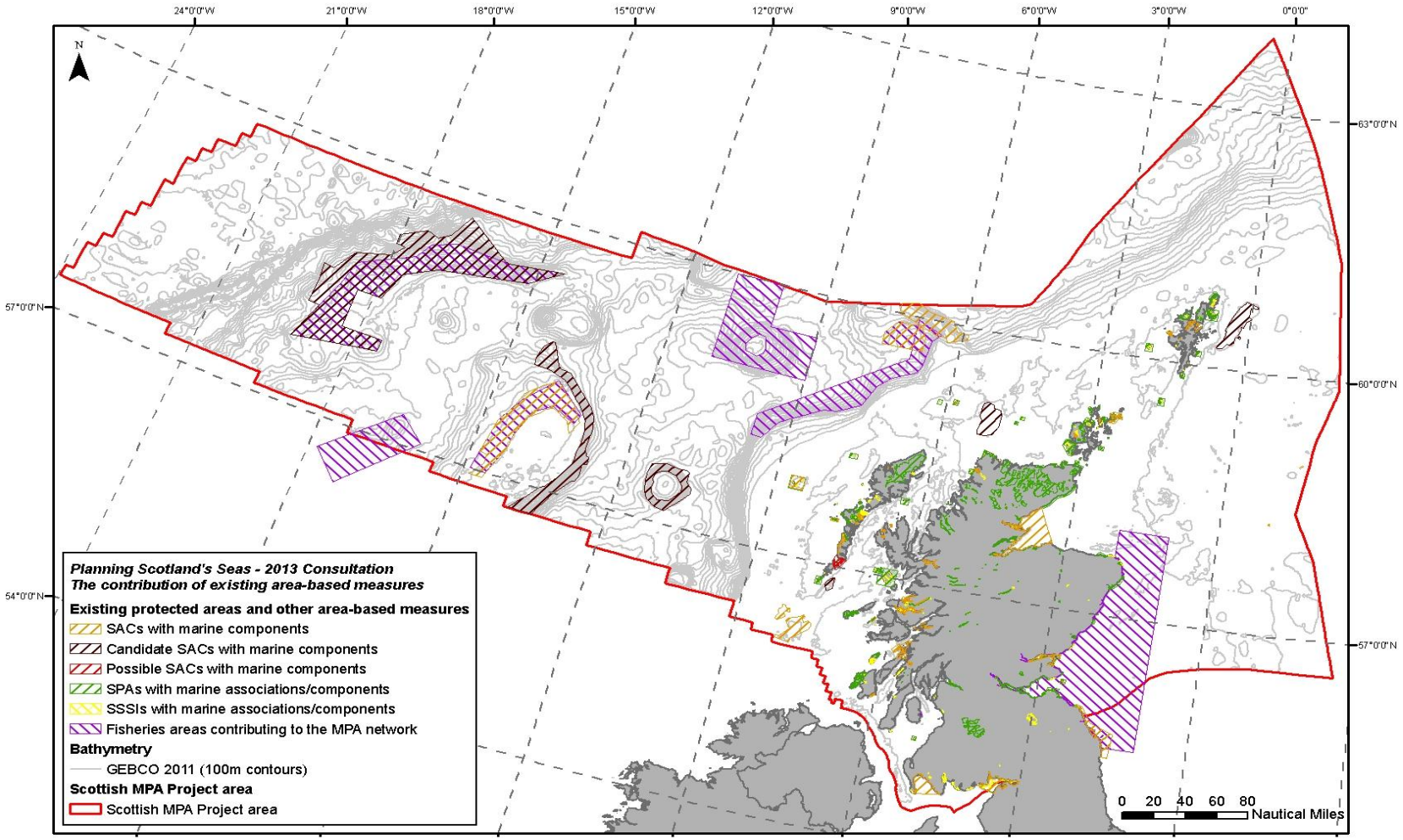
OSPAR Region(s)	Possible MPA/MPA search location	Code	Territorial / Offshore
I	Faroe-Shetland sponge belt	FSS	Offshore
I & II	North-east Faroe Shetland Channel	NEF	Offshore
II	Central Fladen	CFL	Offshore
	East Caithness Cliffs	ECC	Territorial
	East of Gannet and Montrose Fields	EGM	Offshore
	Fetlar to Haroldswick	FTH	Territorial
	Firth of Forth Banks Complex	FOF	Offshore
	Mousa to Boddam	MTB	Territorial
	North-west Orkney	NWO	Both
	Norwegian boundary sediment plain	NSP	Offshore
	Noss Head	NOH	Territorial
	Papa Westray	PWY	Territorial
	South-east Fladen	SEF	Offshore
	Southern Trench*	STR	Territorial
	Turbot Bank	TBB	Offshore
	Western Fladen	WFL	Offshore
	Wyre and Rousay Sounds	WYR	Territorial
II & III	West Shetland Shelf	WSS	Offshore
III	Clyde Sea Sill	CSS	Territorial
	Eye Peninsula to Butt of Lewis*	EPL	Territorial
	Loch Creran	LCR	Territorial
	Lochs Duich, Long and Alsh	DLA	Territorial
	Loch Sunart	LSU	Territorial
	Loch Sunart to the Sound of Jura	SJU	Territorial
	Loch Sween	LSW	Territorial
	Monach Isles	MOI	Territorial
	North-west sea lochs and Summer Isles	NWS	Territorial
	Shiant East Bank*	SEB	Territorial
	Skye to Mull*	STM	Territorial
	Small Isles	SMI	Territorial
	South Arran	ARR	Territorial
	Upper Loch Fyne and Loch Goil	LFG	Territorial
III & V	Geike Slide and Hebridean Slope	GSH	Offshore
	South-west Sula Sgeir and Hebridean Slope	SSH	Offshore
	The Barra Fan and Hebrides Terrace Seamount	BHT	Offshore
V	Hatton-Rockall Basin	HRB	Offshore
	Rosemary Bank Seamount	RBS	Offshore

Figure 2. Possible Nature Conservation MPAs and search locations in Scotland's seas



Map projected in Europe Albers Equal Area Conic (Modified Standard Parallels - Standard Parallel 1 = 50.2; Standard Parallel 2 = 58.5). The exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (©Crown Copyright). Coastline ©Crown copyright and database right [2013]. All rights reserved. Ordnance Survey Licence number 100017908. Bathymetry ©GEBCO. NOT TO BE USED FOR NAVIGATION. MPA network ©SNH, JNCC and Marine Scotland. 03.07.13. All rights reserved.

Figure 3. The contribution of existing protected areas and other area-based measures to the MPA network



Map projected in Europe Albers Equal Area Conic (Modified Standard Parallels - Standard Parallel 1 = 50.2; Standard Parallel 2 = 58.5). The exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (©Crown Copyright). Coastline ©Crown copyright and database right [2013]. All rights reserved. Ordnance Survey Licence number 100017908. Bathymetry ©GEBCO. NOT TO BE USED FOR NAVIGATION. MPA network ©SNH, JNCC and Marine Scotland. 03.07.13. All rights reserved.

Table 2. Protected Features – Biodiversity and Geodiversity – for each pMPA

Name	Code	Protected features	Conservation objective
Territorial waters			
Clyde Sea Sill	CSS	*Biodiversity protected features* - Black guillemot; circalittoral sand and coarse sediment communities; fronts *Geodiversity protected features* - Marine Geomorphology of the Scottish Shelf Seabed - sand banks, sand ribbon fields, sand wave fields	*conserve*
East Caithness Cliffs	ECC	*Biodiversity protected features* - Black guillemot	*conserve*
Fetlar to Haroldswick	FTH	*Biodiversity protected features* - Black guillemot; circalittoral sand and coarse sediment communities; horse mussel beds; kelp and seaweed communities on sublittoral sediments; maerl beds; shallow tide-swept coarse sands with burrowing bivalves *Geodiversity protected features* - Marine Geomorphology of the Scottish Shelf Seabed	*conserve*
Loch Creran	LCR	*Biodiversity protected features* - Flame shell beds *Geodiversity protected features* - Quaternary of Scotland	*conserve*
Lochs Duich, Long and Alsh	DLA	*Biodiversity protected features* - Burrowed mud, flame shell beds	*conserve*
Loch Sunart	LSU	*Biodiversity protected features* - Flame shell beds; northern feather star aggregations on mixed substrata; serpulid aggregations	*conserve*
Loch Sunart to the Sound of Jura	SJU	*Biodiversity protected features* - Common skate *Geodiversity protected features* - Quaternary of Scotland	*conserve*
Loch Sween	LSW	*Biodiversity protected features* - Burrowed mud; maerl beds; native oysters; sublittoral mud and mixed sediment communities	*conserve*
Monach Isles	MOI	*Biodiversity protected features* - Black guillemot *Geodiversity protected features* - Marine Geomorphology of the Scottish Shelf Seabed; Quaternary of Scotland - landscape of areal glacial scour	*conserve*
Mousa to Boddam	MTB	*Biodiversity protected features* - Sandeels *Geodiversity protected features* - Marine Geomorphology of the Scottish Shelf Seabed	*conserve*

Name	**Code**	**Protected features**	**Conservation objective**
North-west sea lochs and Summer Isles	NWS	*Biodiversity protected features* - Burrowed mud; circalittoral muddy sand communities; flame shell beds; kelp and seaweed communities on sublittoral sediments; maerl beds; maerl or coarse shell gravel with burrowing sea cucumbers; northern feather star aggregations on mixed substrata *Geodiversity protected features* - Marine Geomorphology of the Scottish Shelf Seabed - banks of unknown substrate; Quaternary of Scotland - glaciated channels/troughs, megascale glacial lineations, moraines; Seabed Fluid and Gas Seep - pockmarks; Submarine Mass Movement - slide scars	*recover flame shell beds and maerl beds* *conserve other features*
Noss Head	NOH	*Biodiversity protected features* - Horse mussel beds	*conserve*
Papa Westray	PWY	*Biodiversity protected features* - Black guillemot *Geodiversity protected features* - Marine Geomorphology of the Scottish Shelf Seabed - sand wave field	*conserve*
Small Isles	SMI	*Biodiversity protected features* - Black guillemot; burrowed mud, circalittoral sand and mud communities; fan mussel aggregations; horse mussel beds; northern feather star aggregations on mixed substrata; northern sea fan and sponge communities; shelf deeps; white cluster anemones *Geodiversity protected features* - Quaternary of Scotland - glaciated channels/troughs, glacial lineations, meltwater channels, moraines, rock basins, streamlined bedforms	*conserve*
South Arran	ARR	*Biodiversity protected features* - Burrowed mud; herring spawning grounds; kelp and seaweed communities on sublittoral sediments; maerl beds; maerl or coarse shell gravel with burrowing sea cucumbers; ocean quahog; seagrass beds; shallow tide-swept coarse sands with burrowing bivalves	*recover maerl beds* *conserve other features*
Upper Loch Fyne and Loch Goil	LFG	*Biodiversity protected features* - Burrowed mud; flame shell beds; horse mussel beds; ocean quahog; sublittoral mud and mixed sediment communities	*recover flame shell beds* *conserve other features*
Wyre and Rousay Sounds	WYR	*Biodiversity protected features* - Kelp and seaweed communities on sublittoral sediment; maerl beds *Geodiversity protected features* - Marine Geomorphology of the Scottish Shelf Seabed	*conserve*

Name	Code	Protected features	Conservation objective
Offshore waters			
Central Fladen	CFL	*Biodiversity protected features* - Burrowed mud *Geodiversity protected features* - Quaternary of Scotland - sub-glacial tunnel valley	*conserve*
East of Gannet and Montrose Fields	EGM	*Biodiversity protected features* - Ocean quahog aggregations (including sands and gravels as their supporting habitat); offshore deep sea muds	*conserve*
Faroe-Shetland sponge belt	FSS	*Biodiversity protected features* - Continental slope; deep-sea sponge aggregations; ocean quahog aggregations; offshore subtidal sands and gravels *Geodiversity protected features* - Marine Geomorphology of the Scottish Deep Ocean Seabed - sand wave field, sediment wave field; Quaternary of Scotland - continental slope channels; iceberg ploughmark fields, prograding wedges; Submarine Mass Movement - slide deposits	*conserve*
Firth of Forth Banks Complex	FOF	*Biodiversity protected features* - Ocean quahog aggregations; offshore subtidal sands and gravels; shelf banks and mounds *Geodiversity protected features* - Quaternary of Scotland - moraines	*conserve*
Geikie Slide and Hebridean slope	GSH	*Biodiversity protected features* - Burrowed mud; continental slope; offshore deep-sea muds, offshore subtidal sands and gravels *Geodiversity protected features* - Submarine Mass Movement - slide deposits, slide scars	*conserve*
Hatton-Rockall Basin	HRB	*Biodiversity protected features* – Deep-sea sponge aggregations; offshore deep-sea muds *Geodiversity protected features* - Marine Geomorphology of the Scottish Deep Ocean Seabed - sediment drifts; Polygonal fault systems	*conserve*
North-east Faroe Shetland Channel	NEF	*Biodiversity protected features* - Continental slope; deep-sea sponge aggregations; offshore deep-sea muds; offshore subtidal sands and gravels *Geodiversity protected features* - Cenozoic Structures of the Atlantic Margin - mud diapirs; Marine Geomorphology of the Scottish Deep Ocean Seabed - contourite sand/silt; Quaternary of Scotland - prograding wedge; Submarine Mass Movement - slide deposits	*conserve*
North-west Orkney	NWO	*Biodiversity protected features* – Sandeels *Geodiversity protected features* - Marine Geomorphology of the Scottish Shelf Seabed - sand bank, sand wave field, sediment wave fields	*conserve*

Name	Code	Protected features	Conservation objective
Norwegian boundary sediment plain	NSP	*Biodiversity protected features* - Ocean quahog aggregations (including sands and gravels as their supporting habitat), offshore subtidal sands and gravels	*conserve*
Rosemary Bank Seamount	RBS	*Biodiversity protected features* – Deep-sea sponge aggregations; seamount features; seamount communities *Geodiversity protected features* - Cenozoic Structures of the Atlantic Margin - Rosemary Bank Seamount; Marine Geomorphology of the Scottish Deep Ocean Seabed - scour moats, sediment drifts, sediment wave fields; Quaternary of Scotland - iceberg ploughmark field; Submarine Mass Movement - slide scars	*conserve*
South-east Fladen	SEF	*Biodiversity protected features* - Burrowed mud *Geodiversity protected features* - Seabed Fluid and Gas Seep - pockmarks	*conserve*
South-west Sula Sgeir and Hebridean slope	SSH	*Biodiversity protected features* - Burrowed mud; continental slope; offshore deep-sea muds; offshore subtidal sands and gravels *Geodiversity protected features* - Quaternary of Scotland - iceberg ploughmark fields, prograding wedges; Submarine Mass Movement - slide deposits	*conserve*
The Barra Fan and Hebrides Terrace Seamount	BHT	*Biodiversity protected features* - Burrowed mud; continental slope; offshore deep-sea muds; offshore subtidal sands and gravels; orange roughy; seamount; seamount communities *Geodiversity protected features* - Cenozoic Structures of the Atlantic Margin - continental slope, Hebrides Terrace Seamount; Marine Geomorphology of the Scottish Deep Ocean Seabed - scour moat; Quaternary of Scotland - iceberg ploughmark field, prograding wedges; Submarine Mass Movement - continental slope turbidite canyons, slide deposits	*conserve*
Turbot Bank	TBB	*Biodiversity protected features* – Sandeels, offshore subtidal sands and gravels, shelf banks and mounds	*conserve*
West Shetland Shelf	WSS	*Biodiversity protected features* - Offshore subtidal sands and gravels	*conserve*
Western Fladen	WFL	*Biodiversity protected features* - Burrowed mud *Geodiversity protected features* - Quaternary of Scotland - sub-glacial tunnel valleys	*conserve*

2.5 The Scottish MPA Selection Guidelines[9] set out a five-stage process for the selection of Nature Conservation MPAs in Scotland's seas:

- Stage 1: Identification of search locations based on presence of key features
- Stage 2: Prioritisation of search locations based on the qualities of their features
- Stage 3: Assessment of the size an MPA needs to be, to be effective
- Stage 4: Assessment of the ability to manage features effectively
- Stage 5: Prioritising potential areas according to their contribution to the network

More detail about the process is provided in Section 4. A full description is set out in Marine Scotland's Report to the Scottish Parliament (2012)[7].

2.6 The focus of the possible MPAs is to either:

- protect a range of biodiversity or geodiversity features in their current state for the future, or
- to allow them to recover to the state they should be to remain healthy and productive.

This is reflected in the conservation objective identified for each pMPA (Table 2).

2.7 The MPAs will be managed to achieve their conservation objectives, using the principle of sustainable use. This means that only activities that present a risk of hindering the achievement of the conservation objectives will have specific management measures implemented.

2.8 Management options papers have been produced for each of the pMPAs. These papers use a risk-based approach to identify management options, based on the protected features, the conservation objectives, and the activities which could affect their condition. Management options are a key element of the consultation, which provides opportunities for stakeholders to present their views, including their practical environmental knowledge and activity data.

Policy Context

2.9 The Environmental Assessment (Scotland) Act 2005 requires that the Environmental Report include an outline of the relationships between the possible MPAs and other relevant plans, programmes and strategies. The policy context for the development of the possible MPAs is illustrated in Figure 4.

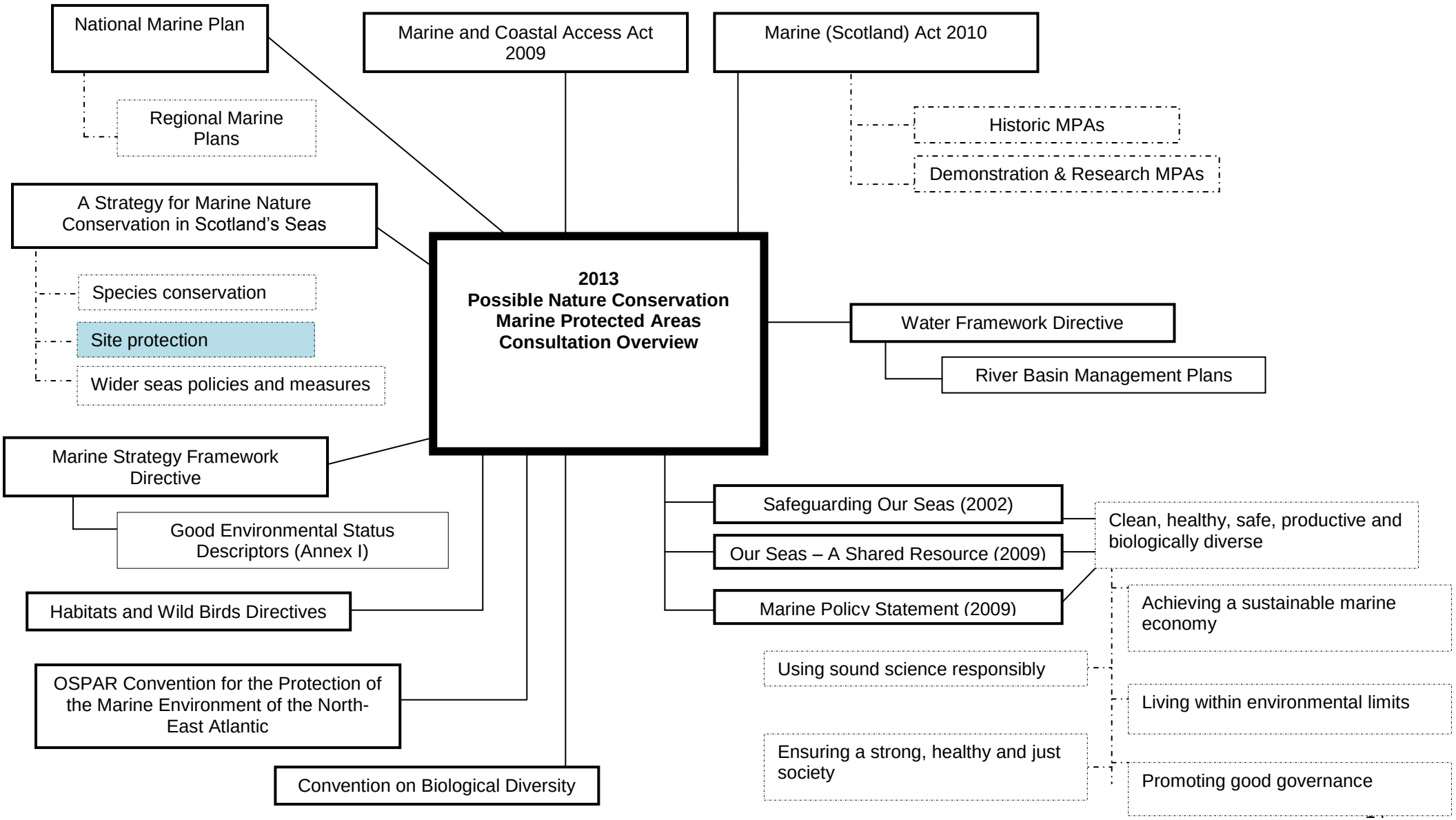
2.10 MPAs are a key element of Scottish Ministers' three-pillar approach to marine nature conservation (site protection, species protection and wider seas policies and measures).

[9] available at http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/mpaguidelines

Table 3. Key Facts About the Possible MPAs

Responsible Authority	Marine Scotland
Title of PPS	2013 Possible Nature Conservation Marine Protected Areas Consultation Overview
Purpose of PPS	To identify possible nature conservation MPAs that will contribute to an ecologically coherent network of MPAs
What prompted the PPS	Marine (Scotland) Act 2010 and Marine and Coastal Access Act 2009
Subject	Marine biodiversity and geodiversity
Period covered by PPS	2014 onwards
Frequency of updates	The achievement of conservation objectives is required to be reviewed and reported on every six years
Area covered by PPS	Scottish territorial waters (0-12 nautical miles) and Scottish offshore waters (12-200 nautical miles)
Summary of nature/ content of PPS	The consultation document identifies possible nature conservation MPAs in Scotland's seas
Are there any proposed PPS objectives?	Yes. The key overall objective of the nature conservation MPA network is to safeguard the most important natural heritage features in Scottish waters, based on the principle of sustainable use. In addition each feature has its own conservation objective(s).
Copy of objectives attached	Conservation objectives are provided in Table 2.
Date	August 2013
Contact	Amanda Chisholm, Environmental Assessment Team 2J South Victoria Quay Edinburgh EH6 6QQ tel. 0131 244 7806 email: amanda.chisholm@scotland.gsi.gov.uk Sebastian Howell, Marine Scotland 1A South Victoria Quay Edinburgh EH6 6QQ tel: 0131 244 5301 email: sebastian.howell@scotland.gsi.gov.uk

Figure 4. Policy Context for the possible MPAs

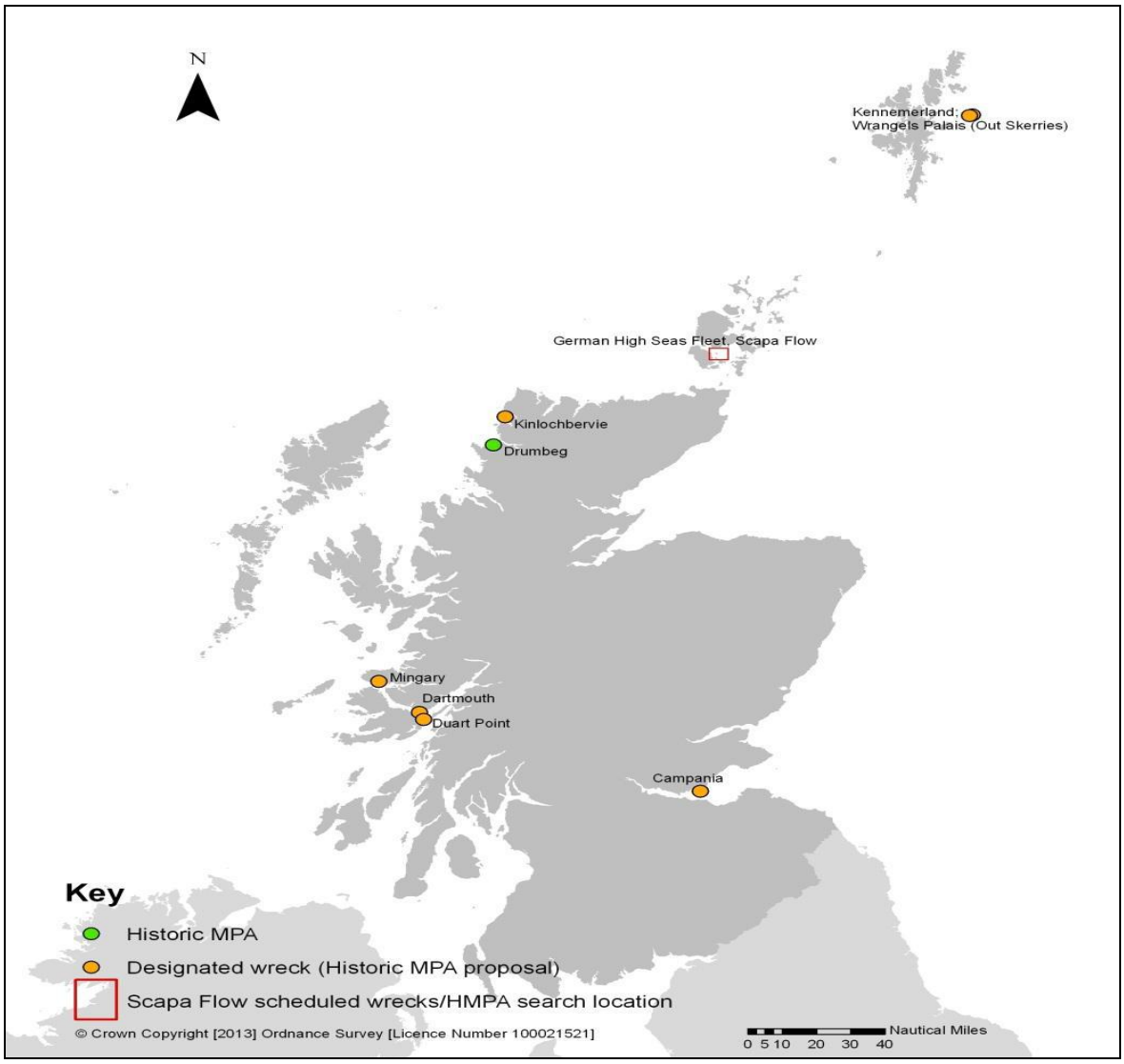


Historic MPAs

2.11 Scotland's first Historic Marine Protected Area (HMPA) was designated on 18 March 2013, to protect an historic wreck close to the harbour of Drumbeg, Sutherland (Figure 5). On the same day, Historic Scotland also launched a consultation to make the Drumbeg designation permanent, and to designate a further six HMPAs. These comprise historic wreck sites currently designated under section 1 of the Protection of Wrecks Act 1973.

2.12 In 2013-14, Historic Scotland is progressing consideration of an HMPA for Scapa Flow's outstanding underwater heritage. This involves review and transition to HMPA status for the seven intact wrecks of the German High Seas Fleet scuttled in Scapa Flow in 1919, currently scheduled monuments, and consideration of any other underwater sites relating to Scapa Flow's wartime naval heritage for inclusion in an HMPA proposal for consultation in 2014 (Figure 5). A small number of other high priority sites may be considered for designation as HMPAs before 2015.

Figure 5. Historic MPAs (current and possible)



3. APPROACH TO THE ASSESSMENT

3.1 Scope of the Possible MPAs to be Assessed

3.1.1 The purpose of the SEA is to assess the potential effects of the possible MPAs on the environment. The SEA has not assessed the scientific or conservation effectiveness of the possible MPAs. For example, the SEA has not evaluated whether or not the pMPAs, alongside the existing measures, will achieve their conservation objectives. This has been undertaken by SNH and JNCC, as part of the MPA identification and selection process.

3.1.2 The SEA has assessed each of the possible MPA locations, as well as the potential for the cumulative effects of the nature conservation MPA network. This has not included the areas of search, as these remain the subject of further study. Assessment of any possible MPAs in these areas will be progressed, as required, once further information is available.

3.1.3 The possible MPAs include draft management options for each feature. These have been assessed, at a strategic level, for their potential to displace activities, and the effects that this may have in terms of activities in new areas or intensification of already-existing activities.

3.1.4 Historic MPA proposals have been treated as part of the environmental baseline, and included in the cumulative assessment.

3.1.5 As noted in paragraph 1.8, a socio-economic assessment has also been undertaken. The assessment investigates the potential cumulative economic benefits and costs, and associated potential social impacts, of designating each pMPA. It also considers the potential economic benefits and costs, and associated potential social impacts, of designating the suite of pMPAs as a whole. The assessment has informed the Business and Regulatory Impact Assessments (BRIAs) prepared for each pMPA, and the Sustainability Appraisal for the suite of pMPAs as a whole.

3.2 Scope of the Environmental Topics Assessed

3.2.1 An initial review of the possible MPAs against the environmental topics set out in Schedule 3 of the Environmental Assessment (Scotland) Act 2005 suggested that potential effects would be focused on biodiversity, water, and climatic factors. The scoping report proposed that the SEA should focus on these factors, but sought advice as to whether cultural heritage and landscape/seascape should be included.

3.2.2 Several scoping responses suggested that the scope of the assessment should be wider than that proposed in the scoping report, and should include:

- geodiversity
- landscape/seascape
- cultural heritage
- different aspects of climatic factors to those proposed
- population and human health

These are discussed in the following paragraphs.

Geodiversity

3.2.3 This topic was not included in the scoping report, but this was an oversight. Geodiversity issues have been included in the SEA.

Landscape/seascape

3.2.4 There were mixed views as to whether landscape/seascape should be scoped into the SEA. For example, some respondents considered that the possible MPAs have the opportunity to help to manage development activities which in turn have an implication for landscape/ seascape, and that landscape/ seascape should therefore be scoped in.

3.2.5 Other respondents also considered, although for different reasons, that landscape/seascape should be scoped in, and cited the contribution of landscape/seascape to the Scottish economy. (We have assumed that this relates to the importance of landscape/seascape to tourism.)

3.2.6 One of the activities with implications for landscape/seascape is the deployment of offshore wind farms. Scenarios for the management of the possible MPAs have been developed as part of the socio-economic assessment. The "upper management scenario" for offshore renewable energy includes mitigation measures such as graded scour protection, re-routeing of cables, and relocation of development within areas identified as potentially suitable for offshore wind[10]. Relocation would be the key measure which could have the benefit (which we consider to be indirect) described in paragraph 3.2.4, i.e. resulting in offshore wind turbines being located elsewhere. However, given that the focus is on relocation, rather than removal, it is possible that such displacement could affect landscape/seascape outwith proposed MPA areas. On balance, having taken advice from SNH, we do not consider that such potential impacts are certain or significant enough for this topic to be scoped into the assessment.

3.2.7 It should also be noted that the possible MPA management options papers present options for the management of activities which may interact with features of the MPAs. They should not be viewed as a means to manage activities for the conservation of features other than those for which the pMPA is intended. In addition, the potential landscape/seascape effects of offshore renewable energy will be managed at plan-level by the forthcoming National Marine Plan and the sectoral marine plans, and at project-level by the marine licensing process.

Cultural heritage

3.2.8 In their scoping response, Historic Scotland noted that Marine Scotland's report to the Scottish Parliament [7] identified 1220 records of wrecks and

[10] Blue Seas, Green Energy (2011) identifies areas potentially suitable for offshore wind (http://www.scotland.gov.uk/Topics/marine/marineenergy/wind). The *Draft Sectoral Marine Plans for Offshore Renewable Energy in Scottish Waters*, which include offshore wind, are now available for comment as part of the Planning Scotland's Seas consultation http://www.scotland.gov.uk/Publications/2013/07/8702

documented losses of ships within the boundaries of possible nature conservation MPAs. There is therefore potential for some secondary benefit to the historic environment from the nature conservation pMPAs, but the extent of this would depend on their conservation objectives and the extent to which these would also be beneficial for historic environment features. It was therefore agreed that the effects of the nature conservation pMPAs are likely to be positive, but not significant, for the historic environment and that the historic environment could be scoped out of the SEA.

3.2.9 However, there were mixed views as to whether cultural heritage should be scoped into the SEA. Some respondents considered that the possible MPAs could help to support cultural heritage by ensuring the protection and, where appropriate, enhancement of marine species and habitats which in themselves have cultural existence value. One respondent cited SNH's "Big 5" campaign[11] as an example of species with such value.

3.2.10 Others felt that the SEA should assess the potential effects of the possible MPAs on traditional activities considered to comprise a key part of Scotland's cultural heritage. The focus of this view was on fishing as a traditional activity.

3.2.11 In addition to the tangible features of the historic environment (such as listed lighthouses and protected wreck sites), marine cultural heritage includes the important relationships of many communities to the seas around them, as reflected in traditional uses of the waters and their products, as well as events such as traditional boat regattas. Intangible cultural heritage (ICH) is protected by the UNESCO Convention on the Safeguarding of Intangible Cultural Heritage 2003 (not yet ratified by the UK). It was preceded by the UNESCO Universal Declaration on Cultural Diversity (adopted in November 2001), Article 1 of which states that preservation of cultural diversity "is embodied in the uniqueness and plurality of the identities and the groups of societies making up humankind". The consultation document (on page 11) acknowledges the importance of what are known as non-use benefits and notes that these are more to do with cultural values: protecting places simply to know that they are there to be enjoyed enriches us all, and to lose them would be a loss to future generations that will not be able to experience them.

3.2.12 The subjective nature of intangible cultural heritage, and the lack of baseline evidence, makes assessment difficult, and it would be difficult to reach a meaningful conclusion without significant background work including, for example, survey of fishing communities around Scotland. In consequence, cultural heritage has been scoped out of the SEA. However, the socio-economic assessment has noted where traditional fishing activity may be lost, as a potential social effect.

Climatic factors

3.2.13 The scoping report noted that displacement of fishing activity, where it may occur, could result in longer journey times/lengths. This could result, for

[11] Year of Natural Scotland 2013 - Scotland's Big 5 celebrations - http://www.snh.gov.uk/enjoying-the-outdoors/year-of-natural-scotland-2013/scotlands-big-5-celebrations/

example, from fishing vessels making longer trips to different fishing grounds as an alternative to those previously used. The scoping report therefore included climatic factors in the scope of the SEA, given the potential for increased greenhouse gas emissions from fishing vessels. It was suggested that the scope should be widened to include potential increases in emissions from vessels from other sectors, and this suggestion has been accepted.

3.2.14 It was also suggested that the SEA should include the effects on climatic factors of the potential displacement of marine renewables from proposed MPAs. In particular, one respondent requested that the effects on the ability of the offshore wind, wave and tidal resource to mitigate climate change, and the potential effect on climate change targets, be assessed. There are difficulties in progressing such an assessment. At this stage, the sectoral plan options do not identify generation targets for each of the draft plan option areas. In addition, the management proposals for renewables tend to focus on relocation, e.g. through micro-siting, rather than removal. In consequence, we consider that it is too early to undertake this work and it has not been scoped into the SEA. The socio-economic assessment has identified, at a very high level, where the pMPAs may have a possible 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.

Population and Human Health

3.2.15 It was proposed that the safety implications of proposed management measures, in terms of the safety of operatives and other users of the sea, should be included in the SEA. We considered whether health and safety issues should be included as part of "human health"; this topic was scoped out of the SEA at scoping stage, as population and human health issues would be considered by the socio-economic assessment. EU Commission advice on the treatment of "human health" in SEA notes that it should be considered in the context of the other SEA topics, e.g. air and water quality, soil, etc. The guidance suggests that environmentally-related health issues, such as exposure to air pollutants, could be the subject of assessment. In consequence, health and safety has not been included in the SEA. However, the socio-economic assessment has noted where the proposed management measures may result in changes to marine activities which could have health and safety implications.

Environmental Scope

3.2.16 The resulting scope of the environmental topics to be used in the SEA, considered in light of the consultation responses, is provided in Table 4.

3.3 Environmental Protection Objectives

3.3.1 The Environmental Assessment (Scotland) Act 2005 requires that the SEA should identify the environmental protection objectives (established at international, European, UK or Scottish level) relevant to the strategies. Environmental legislation and policy has been reviewed and a summary as well as details of the environmental protection objectives are provided in

Appendix 1. The principles underlying these have been incorporated into the SEA objectives (Table 5).

Table 4. Scoping In / Out of SEA Topics

SEA Topic	In/out	Reasons for inclusion / exclusion
Biodiversity, flora and fauna	In	Possible MPAs could have positive effects on biodiversity. Displaced activities could have adverse effects on biodiversity, e.g. fishing in previously unfished areas, or increasing fishing intensity in existing fisheries.
Population Human health	Out Out	Social and economic effects, including health and safety, have been considered by the socio-economic assessment.
Soil: seabed	Out	Potential management of the effects of human activity on seabed strata and/or bottom sediments could benefit the ecological/environmental status of water bodies. These issues are covered in "biodiversity".
Soil: marine geodiversity	In	Potential management of the effects of human activity in the marine environment could benefit marine geodiversity.
Water	Out	Potential management of the effects of human activity could benefit the ecological/environmental status of water bodies. Such effects are considered under "biodiversity". Effects on water quality are not anticipated and have been scoped out.
Air	Out	It is unlikely that the possible MPAs and their potential management measures would affect air quality. Air quality has therefore been scoped out.
Climatic factors	In	The displacement of vessel activity, should this occur, could result in longer journey times/lengths and consequent increases in GHG emissions. The socio-economic assessment has considered ecosystem services to manage climate change, provided by certain components of the proposals.
Material assets	Out	The effects of the possible MPAs on other users of the marine environment, both adverse and beneficial, have been assessed by the socio-economic assessment.
Cultural heritage	Out	The potential effects of the possible MPAs on tangible and intangible cultural heritage have been scoped out of the SEA (see discussion in paragraphs 3.2.8-12). This has been agreed by Historic Scotland. However, the socio-economic assessment has noted where traditional fishing activity may be lost, as a potential social effect.
Landscape/ Seascape	Out	The potential effects of the possible MPAs on landscape/seascape, both negative and positive, have not been considered to be significant and, in consequence, landscape/seascape has been scoped out of the assessment. This has been agreed by SNH.

3.4 Assessment Methods

3.4.1 The SEA has considered the environmental effects of the possible MPAs as follows:

- Direct effects, e.g. benefits for biodiversity through changes to human activities progressed in certain locations
- Indirect effects, e.g. the effects of displacement of fishing on previously unfished areas or the intensification of effort in existing fisheries

3.4.2 The SEA has been undertaken as a high-level, qualitative assessment, using the SEA objectives set out in Table 5.

3.4.3 One respondent suggested that the SEA objective for climatic factors be widened to include "to contribute to climate change adaptation by considering the use of flexible MPA boundaries to respond to climate-induced changes". However, such flexibility is an integral part of MPA designation and management. The boundaries can and may change in future to take account of climate change and evidence of changing distributions of features, amongst other things. However, this is for the medium to long-term: at this stage of the process, it is too early to indicate where such flexibility may be required.

Assessment framework

3.4.4 The assessment of the pMPAs against the SEA objectives is set out in assessment tables in Appendix 3.

Table 5. SEA Objectives

SEA Topics	SEA Objective
Biodiversity, flora and fauna	• to safeguard (and, where appropriate, enhance) marine and coastal ecosystems, including species and habitats, and their interactions • to maintain or work towards good ecological/environmental status of water bodies • to maintain and protect the character and integrity of the seabed
Water	• see biodiversity
Soil: marine geodiversity	• to safeguard (and, where appropriate, enhance) geodiversity features
Soil: seabed	• seabed integrity: see biodiversity
Climatic factors	• to reduce GHG emissions from vessels

4.0 Reasonable Alternatives

4.1 Figure 6 sets out the process for identifying and selecting possible MPAs. The purpose of this section is to set out the way in which reasonable alternatives have been identified and assessed in the course of this process.

4.2 The process has used a science-led approach. Science has been the primary consideration in the selection of sites. Socio-economic evidence will be considered when the ecological coherence of the network has been met. Ministers also have a power to take account of socio-economic impacts that may arise from a MPA designation.

4.3 The list of MPA search features is based on priority marine features(PMFs), identified on the basis of features identified and protected by the following conservation measures: the OSPAR Convention, Biodiversity Action Plans, the Scottish Biodiversity Strategy and the EC Habitats and Birds Directives. The MPA search features mostly comprise those PMFs for which MPAs are considered an appropriate conservation measure. Fish have been added to the list of MPA search features, as it was considered that these species were not adequately represented.[12]

4.4 The OSPAR criteria have been a key component of the process:

- Representation – To support the sustainable use, protection and conservation of marine biological diversity and ecosystems, areas which best represent the range of species, habitats and ecological processes (for which MPAs are a suitable measure) should be considered for inclusion.
- Replication – Replication of features in separate MPAs in each biogeographic area is desirable where it is possible in order to contribute to resilience and the aims of the network.
- Size of site – The appropriate size of a site should be determined by the purpose of the site and be sufficiently large to maintain the integrity of the feature for which it is selected.
- Adequacy – the MPA network should be of adequate size to deliver its ecological objectives.
- Connectivity – the MPA network should take into account the linkages between marine ecosystems and the dependence of species and habitats on processes that occur outside the MPA concerned.
- Management – MPAs should be managed to ensure the protection of the features for which they were selected and to support the functioning of an ecologically coherent network.

[12] Atlantic salmon (*Salmo salar*) have not been included on the list of MPA search features. Atlantic salmon are protected through Special Area of Conservation designation, which protects their freshwater interests. Little is known about the migration routes of Atlantic salmon in the marine environment, and this lack of data is such that inclusion in MPA features could not be supported by the appropriate level of evidence.

4.5 Key decisions have been undertaken all the way through the process described in Figure 6. These include:

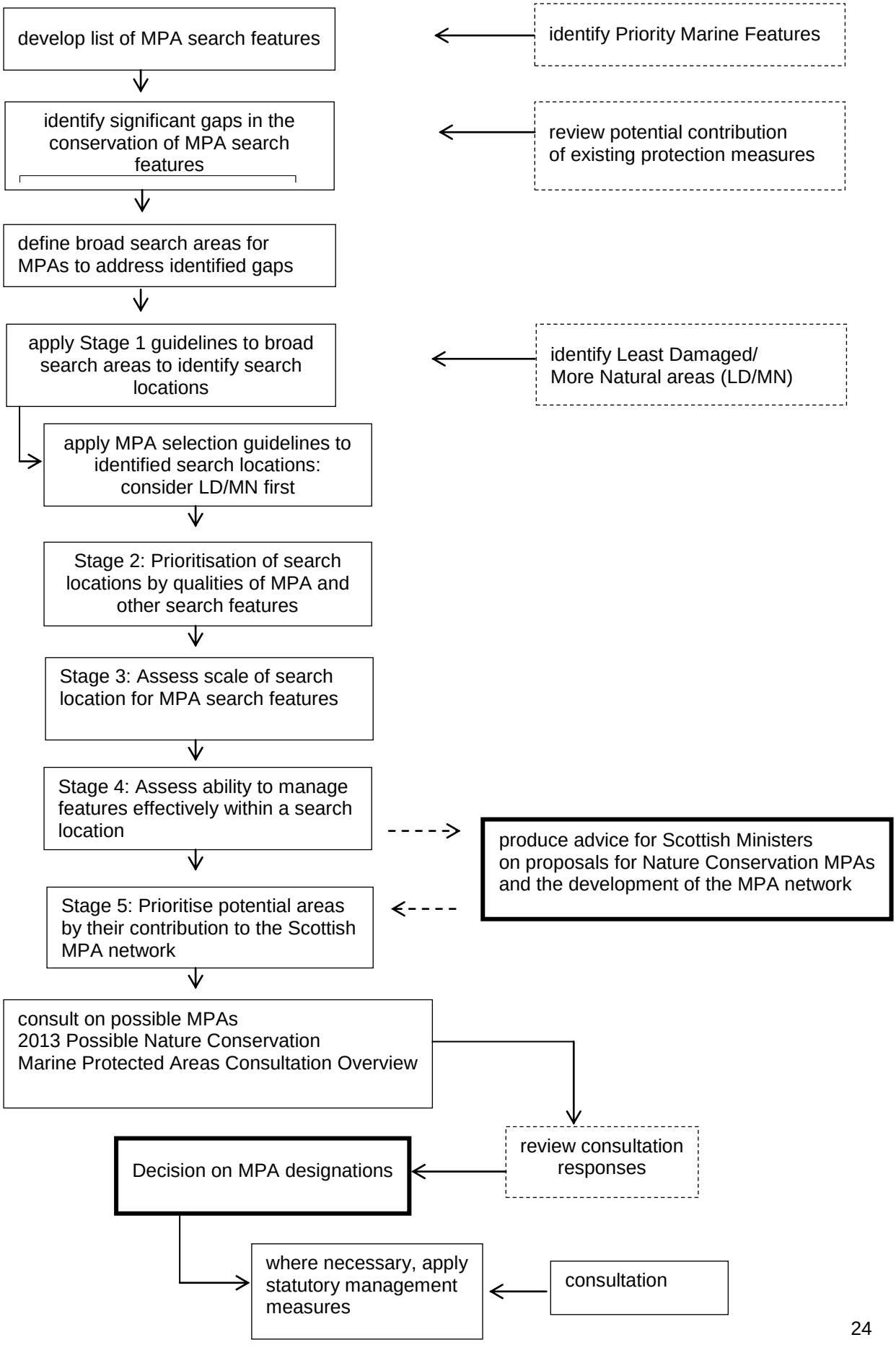
- amendments to boundaries, e.g. drawing boundaries more tightly around features of interest; amending boundaries to reflect distribution of search features or black guillemot foraging activity, for example; amalgamating smaller areas to better represent areas to support features, e.g. common skate.
- changes to "drivers", e.g. the use of mud burrowing amphipod *Maera loveni* as a driver in identifying boundaries to the Norwegian boundary sediment plan pMPA was dropped, given the short longevity of the feature and the likelihood that it is under-recorded.
- requests for additional information to underpin pMPAs have resulted in additional survey and review work, which has informed the process (e.g. work on fronts in support of the Clyde Sea Sill pMPA)
- removal of features from some pMPA proposals, e.g. burrowed mud, common skate from Loch Sunart pMPA; burrowed mud from Shiant East Bank; and sand eels from Fetlar to Haroldswick.
- the addition of features to some pMPAs, e.g. common skate to Loch Sunart to Sound of Jura pMPA; and geodiversity features to Small Isles pMPA.
- moving features from one pMPA to another, e.g. basking shark and minke whale from Small Isles and development of a new search location – Skye to Mull - for these.

4.6 Further details are provided in SNH/JNCC's advice to the Scottish Government. Stakeholder engagement has been a key part of this aspect of the MPA process.

4.7 The SNH/JNCC advice also contains details of alternative sites considered. For example, alternatives have been identified to some pMPAs to deal with the potential overlap with economic activities, e.g. Firth of Forth Banks Complex (FOF) to deal with overlap between pMPA and offshore renewables; Central Fladen (CFL) to deal with overlap between pMPA and Nephrops fishing grounds (see paragraphs 4.14-16 and 4.17-20 respectively).

4.8 There are also alternatives based around scientific alternatives and pMPAs which are considered to ecologically equivalent. These are described in paragraphs 4.21-22.

Figure 6. MPA identification and selection process



Alternative Approaches

Timing

4.9 It has been suggested that identification of a coherent ecological network should be delayed, at least until the assessment of the four search locations is complete. The challenge of taking forward the network in the light of existing gaps in the scientific evidence is acknowledged. However, it should be noted that an iterative approach (including refinement of the pMPAs) is a cornerstone of this work, and that the six-year review cycle will facilitate the continued collection of environmental data and activity information. It will also facilitate amendment of pMPA boundaries in response to pressures and changes resulting from both natural variability and human activities. In addition, such a delay would result in significant uncertainty for the marine economic sector. Scottish Ministers are of the view that this work should be progressed, noting that it has taken a precautionary stance.

Conservation Objectives

4.10 The focus of the possible MPAs is to either:

- protect a range of biodiversity or geodiversity features in their current state for the future, or
- to allow them to recover to the state they should be to remain healthy and productive.

4.11 An alternative to this approach would be to restore and/or enhance features. This possibility was reviewed in the early stages of the process. It was felt that there is insufficient clear evidence to support an objective to “restore”. For example, changes to features are not always the result of anthropogenic pressures: natural processes, which are inherently variable (e.g. in the weather) play a significant role in this. In addition, a “restore” objective would require information about the historic condition of a feature, and this evidence is rarely available. It was therefore decided to utilise the “conserve” and “recover” objectives, as appropriate and on a site-by-site basis, for each of the features.

Alternative Proposals

4.12 The alternative proposals include:

- the choices available for representation of certain features
- search locations
- third-party MPA proposals

Choices available for representation of certain features

4.13 For certain features there are options and alternatives to represent them in the network. The consultation seeks views on the following choices.

Science-based alternative: Offshore subtidal sands and gravels, ocean quahog and shelf banks and mounds in OSPAR Region II

4.14 JNCC identified science-based alternatives to the features being considered for protection within the Firth of Forth Banks Complex pMPA. Two pMPAs were identified to provide alternative representation of the features within Firth of Forth Banks Complex. JNCC identified Turbot Bank as a pMPA alternative for the representation of the offshore subtidal sands and gravels feature and shelf banks and mounds within OSPAR Region II in Scotland's seas. Norwegian Boundary Sediment Plain is considered to adequately represent an alternative for the representation of ocean quahog within OSPAR Region II in Scotland's seas. The alternative proposal (Turbot Bank and Norwegian Boundary Sediment Plain pMPAs) does meet the Guidelines for consideration as Nature Conservation MPAs as together these possible MPAs provide an adequate alternative for the representation of the features. However, the lesser evidence-base for the two alternatives, and the lack of diversity indicated on the basis of available evidence, has led to JNCC's conclusion that that alternative is of lower biodiversity and geodiversity conservation value than the Firth of Forth Banks Complex pMPA.

4.15 Therefore the following are the choices as to the representation of offshore subtidal sands and gravels, ocean quahog and shelf banks and mounds in OSPAR Region II:

1. Firth of Forth Banks Complex;
2. Turbot Bank and Norwegian Boundary Sedimentary Plain; or
3. Firth of Forth Banks Complex, Turbot Bank and Norwegian Boundary Sedimentary Plain.

4.16 Irrespective of decisions on alternative representation of offshore subtidal sands and gravels, ocean quahog, and shelf banks and mounds in OSPAR Region II, Turbot Bank remains a possible MPA recommended for the protection of sandeels.

Ecologically equivalent options: Burrowed mud in OSPAR Region II

4.17 JNCC identified science-based alternatives to the Central Fladen proposal for the representation of the burrowed mud search feature in the Fladen Grounds in OSPAR Region II. The Central Fladen proposal represents two component features of the burrowed mud habitat: seapens and burrowing megafauna, and the tall seapen (*Funiculina quadrangularis*). Western Fladen and South-East Fladen options have been identified as science-based alternative proposals for the representation of the seapens and burrowing megafauna component only.

4.18 All three pMPAs for the seapens and burrowing megafauna component of burrowed mud habitat have been assessed and are considered to be of equivalent ecological value. The tall seapen component of the burrowed mud feature within the Central Fladen pMPA is the known location that adequately represents that component within the Fladen Grounds.

4.19 JNCC concluded that representation of the burrowed mud search feature in offshore waters in OSPAR Region II could be achieved by either taking forward the Central Fladen proposal in its entirety, or taking forward just the part of Central Fladen containing the tall seapens together with one of the two alternative locations for the seapens and burrowing megafauna component.

4.20 Therefore the following are the choices as to the representation of the burrowed mud feature in the Fladens:

1. Central Fladen pMPA only;
2. The tall sea-pen component of Central Fladen, plus Western Fladen; or
3. The tall sea-pen component of Central Fladen, plus South-East Fladen.

Ecologically equivalent options: offshore subtidal sands and gravels, offshore deep-sea muds, burrowed mud in OSPAR Regions III and V

4.21 In offshore waters JNCC identified pMPAs with the potential to make an equivalent contribution to the network for representation of features. Atlantic-influenced slope offshore subtidal sands and gravels, offshore deep sea mud, burrowed mud, and an area of the Hebridean continental slope at the northern extent of the range of these features in OSPAR Regions III and V could be represented by either the South-West Sula Sgeir and Hebridean slope or the Geikie slide and Hebridean slope.

4.22 Therefore the following are the choices as to the representation of the offshore subtidal sands and gravels, offshore deep sea mud, and burrowed mud in OSPAR Regions III and V:

1. South-West Sula Sgeir and Hebridean slope; or
2. Geikie slide and Hebridean slope

Search Locations

4.23 Four areas that have yet to be assessed fully against the Scottish MPA Selection Guidelines remain as MPA search locations (Figure 2):

- Southern Trench;
- Eye Peninsula to Butt of Lewis;
- Shiant East Bank; and
- Skye to Mull.

4.24 This is to enable further work to be completed on one or more of the relevant MPA search features before SNH provides its formal advice to Scottish Ministers in 2014. The remaining work relates primarily to mobile species features including minke whale, Risso's dolphin and basking shark. The Southern Trench MPA search location also encompasses the burrowed mud feature.

4.25 Shiant East Bank has been identified for the shelf banks and mound feature and finer resolution seabed habitats. Survey work was carried out within the MPA search location in November 2011; however, further information is required before the detailed assessment against the Scottish MPA Selection

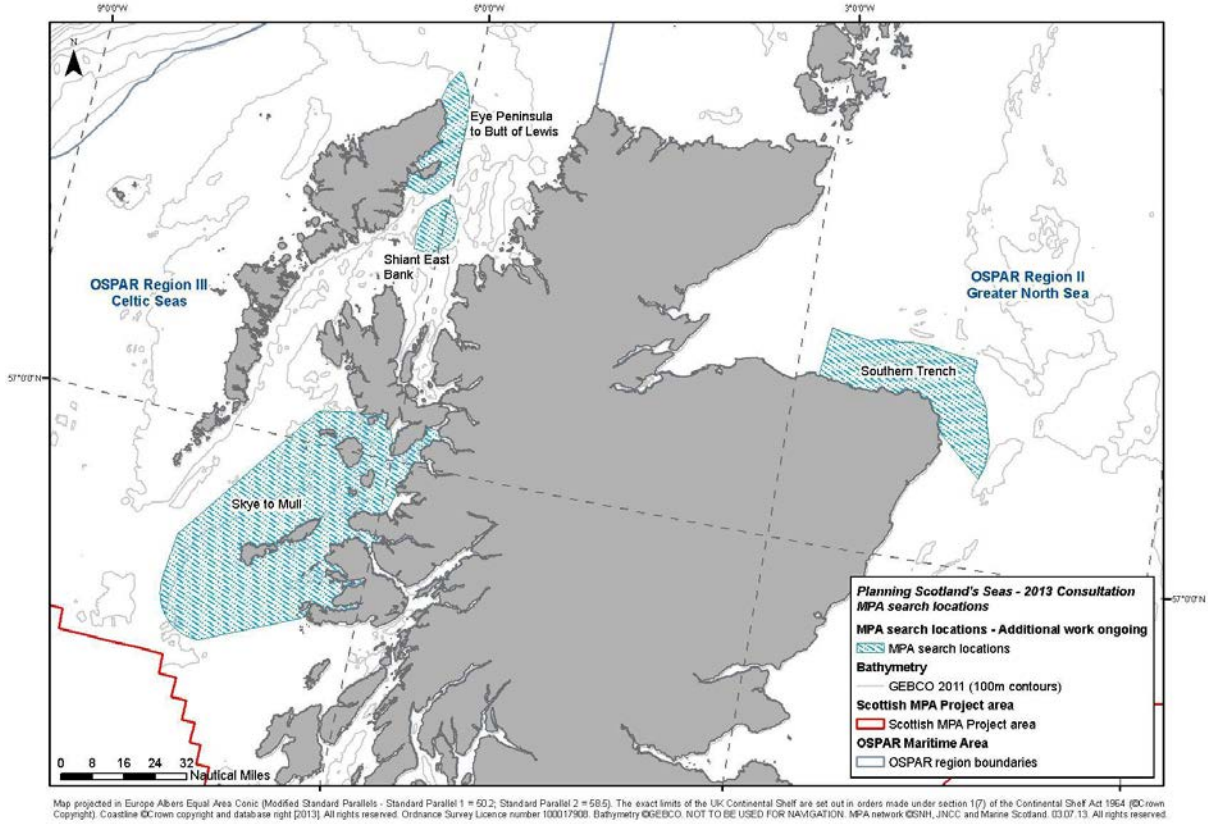
Guidelines can be completed. This will include information on the habitats and species associated with the shelf bank and mound and also on the functional role that it plays within the North Minch. SNH will provide its formal advice on the Shiant East Bank MPA search location in 2014.

Work on cetaceans and basking sharks

4.26 In July 2012 SNH and the University of Exeter launched a basking shark tagging project, focused on the Skye to Mull MPA search location. The aim of the project is to understand more about the fine-scale use of the search location by these animals. Alongside this, habitat modelling is underway for basking sharks and the three cetacean MPA search features, minke whale, Risso's dolphin and white-beaked dolphin.

4.27 The aim of the habitat modelling is to help understand more about the importance of the Eye Peninsula to Butt of Lewis, Skye to Mull and Southern Trench MPA search locations. The focus in identifying these search locations was on areas considered to be essential to key life stages (e.g. as nursery or feeding areas), based on the use of effort-corrected sightings data complemented by information on species behaviour/use of these areas. The habitat modelling will combine the sightings/tagging data with relevant environmental data to improve our understanding of what is driving the use of these areas by the different species. Following completion of this work, SNH will consider the results and provide advice to Scottish Ministers on whether these areas should be taken forward as nature conservation pMPAs.

Figure 7. MPA search locations



Third-Party Nature Conservation MPA Proposals

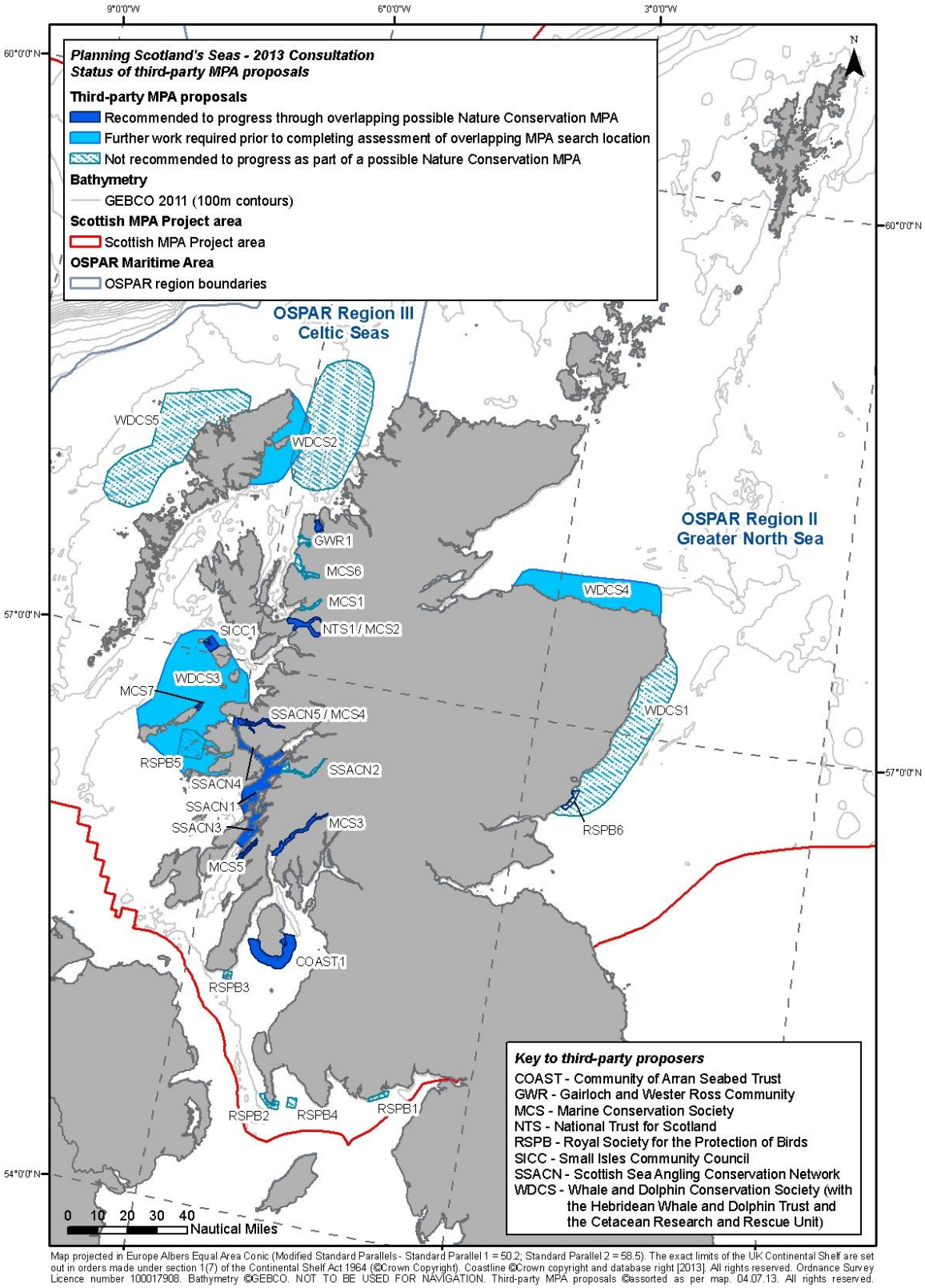
4.28 Twenty-seven proposals for third-party Nature Conservation MPAs were received (Figure 8; a detailed list is provided in Appendix 2). Many of these overlapped with search locations that had already been identified. Others were taken forward, as part of the overall process, and assessed using the Scottish MPA Selection Guidelines.

4.29 Twelve proposals met all the relevant guidelines, and have contributed to the development of eight possible nature conservation MPAs. Twelve proposals were not recommended for further consideration, as these could not meet the test of importance or were not considered to make a significant contribution to the network for the features for which they were proposed. The remaining three have had their assessment delayed / deferred to enable completion of further work by SNH in 2013.

Assessment of reasonable alternatives

4.30 Alternatives were identified during the MPA identification and selection process, both in terms of the approach utilised and in terms of alternative pMPAs. Alternatives were refined and decisions on the appropriate way forward were made throughout the process. In consequence, the 33 pMPAs identified in Table 2 are considered to be the reasonable alternatives that will achieve an ecologically coherent network. The SEA has therefore focused on assessing the pMPAs as they currently stand, as these are considered to be the reasonable alternatives. SEA of the search locations will be undertaken, as required, once further evaluation is complete.

Figure 8. Third-party MPA proposals



5.0 Environmental Baseline

5.0.1 This section of the Environmental Report describes the character of the environment which may be affected by the possible MPAs. The focus of this baseline information is therefore on biodiversity, geodiversity, the ecological/environmental status of water bodies, and climatic factors.

5.0.2 Scotland's location at the edge of the continental shelf means that it is subject to both subpolar and subtropical influences. The North Atlantic current brings warm water from the Gulf of Mexico to the west coast of Scotland. These warm waters mix with cooler polar waters that are rich in nutrients.

5.0.3 Scotland's coastline is over 18,000 km long, and very varied in nature. There are over 900 islands, including the major archipelagos of Shetland, Orkney and the Outer Hebrides.[13]

5.1 Biodiversity, flora and fauna

5.1.1 Scotland's marine environment supports a diverse complex of different habitats, which in their turn support a wide range of marine plants and animals. This diversity owes much to the factors described in paragraphs 5.0.2 and 5.0.3. Current estimates suggest there are around 6,500 species of animals and plants (excluding microbial flora and seabirds) in Scotland's seas (Scotland's Marine Atlas, 2011).

Key Marine Habitats

5.1.2 The seabed is a critical component of marine ecosystems. Six broad habitat types occur in Scottish waters (Figure 9): intertidal rock, intertidal sediment, subtidal rock, shallow subtidal sediments, shelf subtidal sediments and deep-sea habitats. Figure 10 illustrates the locations of these habitats relative to the shoreline. Overall, mud, sand and coarse sediment are found in the North Sea, to the west of the Hebrides and in the north of Scotland. The seabed in the far west and north of Scotland is characterised by mud and fine clay, with coarser sediments in shallower water and on banks and seamounts[14]. Details of these habitats are provided in the following paragraphs[15].

5.1.3 Intertidal rock comprises approximately 48% of the Scottish coastline. Large stretches of the west coast and Northern Isles are predominantly rocky, as are the Solway Firth and the Firth of Forth, whereas on the east coast intertidal rock is much more patchy and interspersed by large stretches of sandy and muddy coastline. This habitat, which includes bedrock, boulders and cobbles, is affected by a number of physical factors (e.g. wave exposure, salinity, temperature and tides).

[13] Information in this overview is taken from Scotland's Marine Atlas and SNH/JNCC (2012) Advice to the Scottish Government on the selection of Nature Conservation Marine Protected Areas (MPAs) for the development
of the Scottish MPA network. SNH Commissioned Report No 547.
[14] Charting Progress 2
[15] Information in this section is taken from: Scottish Government (2011) Scotland's Marine Atlas, Information for the national marine plan.

5.1.4 The various animals and plants found on rocky shores are adapted to survive the stresses imposed by regular immersion and emersion in sea water and the associated fluctuations in temperature and salinity caused by exposure to the sun and rain at low tide. The upper regions of many rocky shores are relatively species-poor, particularly on exposed coasts, but areas nearer to the bottom of the shore can be very species-rich. Rocky shores are popular resting and foraging places for many animals (e.g. harbour and grey seals, otter and various wading birds).

5.1.5 Intertidal sediments comprise around 50% of the Scottish coastline and include mobile shingle and gravel, sand and mud or combinations of these (including sandflats and mudflats), and saltmarsh in the upper shores. Intertidal sediments predominate on the west coast and in estuaries such as the Solway, Dornoch and Cromarty Firths and the Firths of Forth and Tay.

5.1.6 Intertidal habitats support communities that are tolerant of exposure to air and variable temperatures and salinities, particularly the mudflats and sandflats found in estuaries. The more mobile sediments, e.g. relatively coarse-grained sand, support fewer species of animals, whereas less mobile sediments (such as muddy sands) are more species-rich, supporting communities of amphipods, polychaetes and bivalve molluscs. Mudflats, which are found in the most sheltered areas, are finer (silt and clay) and have a high organic content. Intertidal sediments support such features as seagrass beds, blue mussel beds, and native oysters. Mudflats in particular provide habitat for many juvenile fish and for wintering waders and wildfowl.

5.1.7 Subtidal rock is extensive on the west coast and around Shetland, but is only present in isolated pockets on the east coast. Subtidal rock habitats consist of bedrock, boulders and cobbles occurring below low water mark and the communities found in these areas are affected by the availability of light. Shallow areas are typically dominated by seaweeds; communities in deeper areas comprise exclusively marine animals. Subtidal rock supports such features as Northern sea fan and sponge communities; white cluster anemone; pink sea fingers; European spiny lobster; tide-swept algal communities; and biogenic reefs.

5.1.8 Inshore subtidal and shelf sediments cover an extensive area of the seabed, all around the Scottish coast. Inshore subtidal sediments include shingle, gravel, sand and mud extending to the depth at which there is no effect from waves, typically around 50-70m. The shelf sediments extend to around 200m depth.

5.1.9 Inshore subtidal and shelf sediments support such features as burrowing sea anemone; northern feather star; fan mussel; heart cockle; ocean qhahog; burrowed mud; maerl beds; maerl or coarse shell gravel with burrowing sea cucumbers; inshore deep mud with burrowing heart urchins; shallow tide-swept coarse sands with burrowing bivalves; seagrass beds; and low or variable salinity habitats.

5.1.10 Deep sea habitats are those occurring beyond the continental shelf break at depths typically greater than around 200m. Knowledge of these habitats is limited but is increasing. They are found almost entirely to the north and west of Scotland, and comprise cold water coral reefs, coral carbonate mounds, submarine canyons, sea mounts and deep sea sediments.[16] They support such features as seamount communities; carbonate mound communities; coral gardens; deep sea sponge aggregations; offshore deep sea muds; and cold-water coral reefs.

Mobile Species

5.1.11 Scotland's marine environment also supports a wide range of mobile species. These include:

- seals (grey and common or harbour)
- cetaceans. Twenty-three species have been recorded in Scottish waters over the last 25 years. Of these, 11 are regularly sighted.
- birds, both breeding seabirds and overwintering waterbirds
- marine turtles
- sharks and rays, including basking shark and common skate
- commercial fish and shellfish

Protected Habitats and Species

5.1.12 The importance of Scotland's marine ecosystems is reflected in the range of designations which protect them at the international, UK and Scottish levels. The range of habitats protected includes estuaries; lagoons; large shallow inlets and bays, mudflats and sandflats; reefs; sandbanks; submarine structures; and sea caves. A wide range of species is protected, including breeding seabirds, overwintering waterbirds, fish and seals, amongst others.

5.1.13 In 2013, there were:

- 85 Special Protection Areas (SPAs) with marine associations, affording protection to bird species dependent on the marine environment. Thirty-one of the existing seabird breeding colony SPAs have been extended into the marine environment to include the adjacent waters.
- 40 marine Special Areas of Conservation (SAC), and seven candidate SACs.
- 188 Sites of Special Scientific Interest (SSSI) with marine associations / components, of which 61 overlap with the intertidal environment. The remainder have been designated for bird interests associated with the marine environment. An example of the habitats and species protected at the national level (through SSSI designation) is provided in Table 6.

[16] Scottish Government (2011) Scotland's Marine Atlas, Information for the national marine plan, Scottish Government pp 100-103

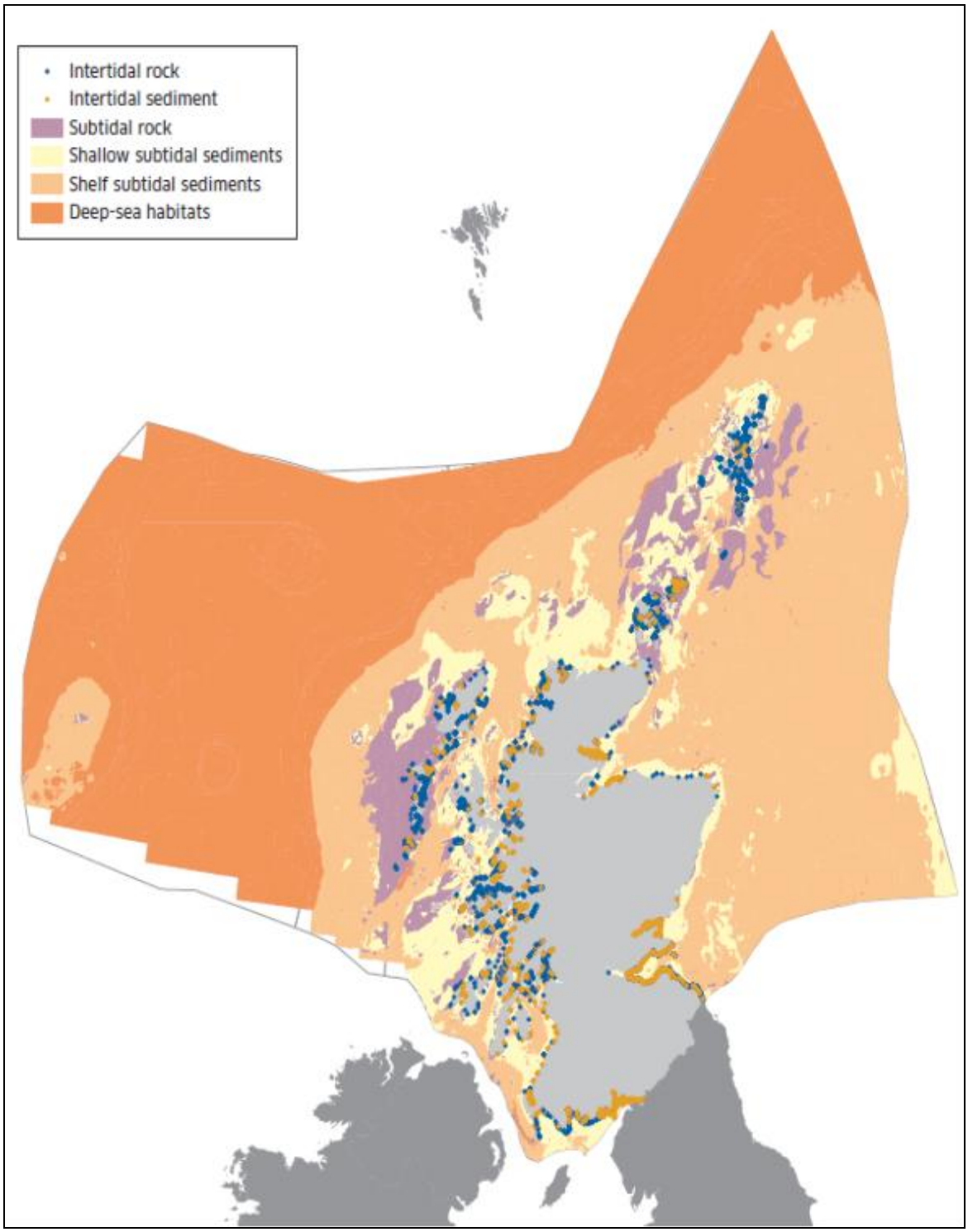


Figure 9. Modelled distribution of broad habitats in Scotland's marine environment[17]

[17] Scotland's Marine Atlas. p. 71

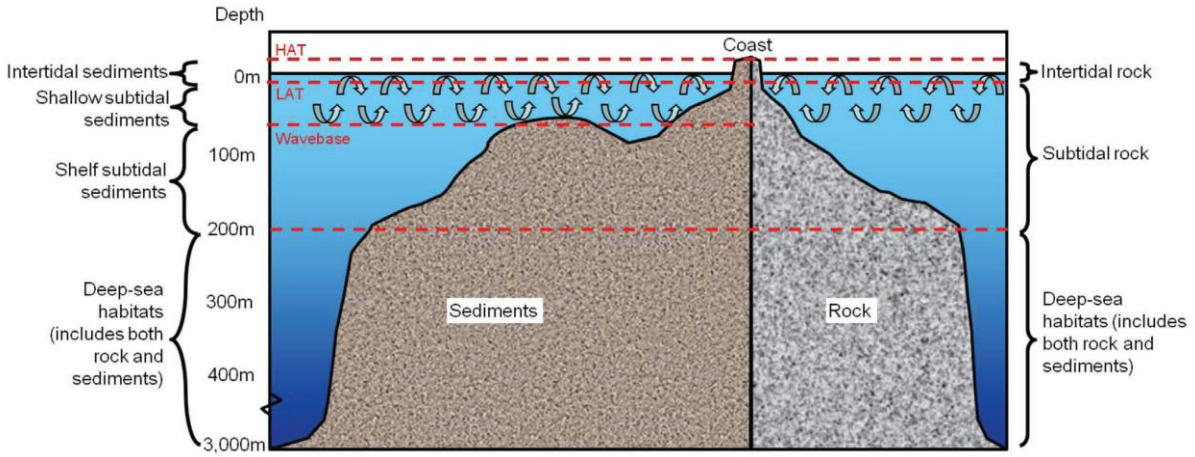


Figure 10. A generic cross-section of the seabed from the coast to deep waters offshore[18]

5.1.14 The evolving MPA network in Scotland's seas builds on the existing network of protected areas (Figure 11), which includes Special Areas of Conservation (SACs); Special Protection Areas (SPAs); Sites of Special Scientific Interest (SSSIs), and fisheries management areas. More information on these other designations and sites is provided in Marine Scotland's report to the Scottish Parliament[7].

Table 6. Marine notified habitats and species features of SSSIs

Habitats	***Species***
Eel grass bed	Brackish water cockle (*Cerastoderma lamarki*)
Mudflats	Egg wrack (*Ascophyllum nodosum* ecad *mackaii*)
Rocky shore	Common seal (*Phoca vitulina*)
Saline lagoon	Grey seal (*Halichoerus grypus*)
Sandflats	Stonewort (*Lamprothamnium papulosum*)
Sea caves	Vascular plant assemblage [covers eel grass communities in some sites]
Tidal rapids	

Priority Marine Features

5.1.15 SNH and JNCC have developed a list of Priority Marine Features (PMFs), to provide a new focus for marine conservation activities across the three pillar approach set out in the Marine Nature Conservation Strategy. Some of these PMFs are UK Biodiversity Action Plan species and habitats. UK BAP priority species are those that are identified as being threatened and requiring conservation. There are 74 UK BAP priority marine species listed as priorities in Scotland. These include sea-fan anemone, fan mussel, native oyster and fireworks anemone. These species can be vulnerable to fishing activities. For example, the fireworks anemone is highly sensitive to mechanical

[18] from Charting Progress 2 Feeder Report

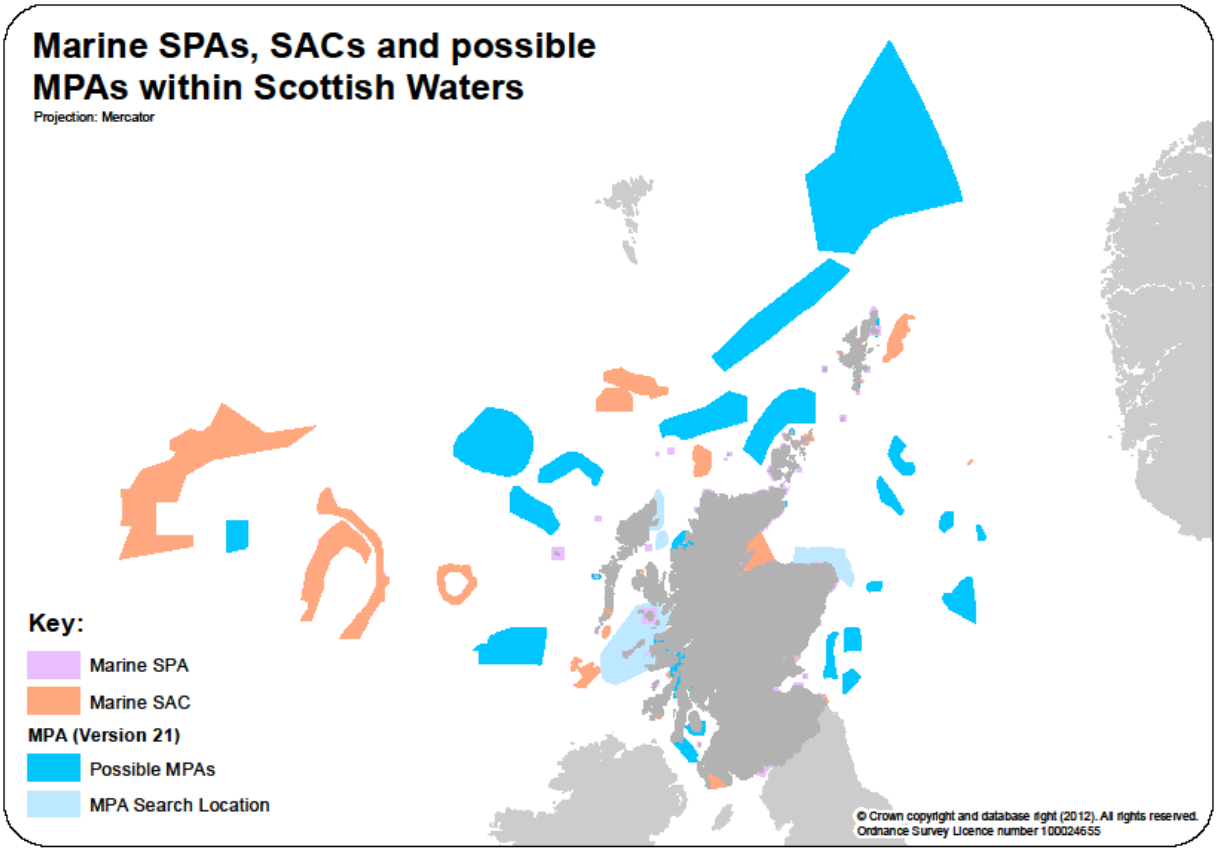
damage from mobile fishing gear, particularly trawling for Nephrops and, to a lesser degree, damage from creels.

5.1.16 SNH and JNCC have made recommendations to Scottish Ministers on PMFs, which comprises a list of PMFs for inshore and offshore waters[19]. This includes such marine species as cod, herring, mackerel and ling. The Marine Atlas identifies key PMFs and the pressures affecting them[20].

Trends and Pressures

5.1.17 The Marine Atlas reviewed the condition of the five major habitat types described in paragraphs 5.1.2-10. There were few or no concerns about subtidal rock. Intertidal rock and sediments show evidence of deterioration, with one concern being the introduction of such non-native invasive species as wire weed. The most significant level of concern was regarding the condition of shallow and shelf subtidal sediments, mainly as a result of fishing practices such as demersal fishing (trawling) and scallop dredging. There were also some concerns about the effects of trawling on deep sea habitat.

Figure 11. Marine SPAs, SACs and possible MPAs within Scottish Waters



[19] See http://www.snh.gov.uk/protecting-scotlands-nature/safeguarding-biodiversity/priority-marine-features/priority-marine-features/

[20] The Scottish Government. 2011. Scotland's Marine Atlas: Information for the National Marine Plan.

5.1.18 An assessment of the condition of the following species was also made: plankton, cetaceans, grey seals, harbour seals, seabirds, demersal fish, sharks/rays and water birds. Of these, the most concern was expressed about sharks/rays and harbour seals. Populations of sharks/rays are declining and, as these animals are slow growing, late to reach maturity, and typically have low fecundity, populations take some time to recover from such pressures as overfishing. Harbour seal numbers have declined (by over 50%) since 2001 in Shetland, Orkney and the east coast of Scotland, although numbers have remained relatively stable on the west coast and the Inner Hebrides.

5.1.19 Seabird populations are increasing in some areas (Solway Firth and the Clyde, for example) and decreasing in others. In East and West Shetland and along the North Scotland coast, this decrease is most probably related to a shortage of prey species resulting from changes in oceanographic conditions. Like seabirds, waterbirds (wildfowl and waders) are also both increasing and decreasing, depending on the species. The reasons for declines remain to be fully explained but may be due to redistribution of wintering birds across north-west Europe due to climate change effects.

5.1.20 Entanglement of baleen whales in static fishing gear has been observed in Scottish waters, for example, minke whales entangled in creel lines and other ropes. At the time of reporting (2010), such incidents were not considered to be a conservation threat in Scotland[21].

5.1.21 The Marine Atlas also noted that populations of many commercial fish species are declining, and that this is of particular concern in the Solway Firth, North Channel, Clyde, Minches and Malin Sea, North Scotland coast and West Shetland. Several commercial fish stocks were being fished above the levels consistent with achieving maximum sustainable yield in 2011, including northeast Atlantic mackerel, herring (west of Scotland), cod (North Sea and west of Scotland stocks), blue whiting, saithe and monkfish. Other stocks are fished at sustainable levels, including herring (North Sea), haddock (North Sea, west of Scotland, and Rockall) and Nephrops.

5.1.22 Table 7 sets out the pressures on Priority Marine Features associated with commercial fishing activities. Box 1 sets out current and future pressures on marine biodiversity, flora and fauna.

[21] Northidge, S., A Cargill, A Coram, L Mandleberg, S Calderan and B Reid. June 2010. Enganglement of minke whales in Scottish waters: an investigation into occurrence, causes and mitigation. Final Report to Scottish Government CR/2007/49.

Table 7. Key Priority Marine Features and Pressures (source: Marine Atlas)

PMF	Pressure
Seagrass	Suction dredging and bait digging
Blue mussel beds	Demersal fishing and bait digging
Native Oyster	Over fishing
Northern sea fan and sponge communities	Bottom fishing gear
European spiny lobster	Vulnerable to overfishing
Horse mussel beds	Damage from mobile fishing gear
Flame shell beds	Sensitive to damage from mobile fishing gear/dredging.
Serpulid aggregations	Vulnerable to demersal fishing
Burrowing sea anemone	Main pressures are from dredging and demersal fishing
Northern Feather Star	Main pressures are from dredging and demersal fishing
Fan mussel	Particularly sensitive to damage from scallop dredging and other fishing gear.
Heart cockle	Threatened by dredging and demersal fishing activities
Ocean quahog	Risk from mechanical damage particularly caused by bottom fishing gear.
Burrowed mud	Vulnerable to trawling for nephrops, bottom trawling and creeling.
Maerl beds	Extremely sensitive to physical disturbance/ smothering as a result of scallop dredging and bottom trawling.
Maerl of coarse shell gravel with borrowing sea cucumbers	Especially sensitive to physical disturbance from scallop dredging.
Inshore deep mud with burrowing heart urchins	Particularly vulnerable to damage from benthic trawling for nephrops.
Shallow tide-swept coarse sands with burrowing bivalves	Likely to be targeted for scallop dredging and surf clam fisheries. Sensitive to over fishing and physical disturbance.

Box 1. Pressures on marine biodiversity, fauna and flora

Commercial fishing:

- removal of target fish species may affect the sustainability of fish stocks, particularly where catches are above the level consistent with achieving maximum sustainable yield
- discards of fish are a waste of the resource, and also encourage scavenger species
- bycatch inadvertently catches both non-target fish and other species, generally leading to the death of individuals and subsequent decline in populations
- the seabed and its benthic habitat may be damaged by mobile fishing gear, with the consequent loss of marine plants and animals
- removal of target species may also decrease the availability of prey species, leading to declines in populations e.g. of birds

Non-native invasive species may outcompete native species, thereby displacing them from the marine environment.

Marine litter can result in the injury and/or death of marine animals, through entanglement, ingestion of litter (including plastic microparticles in particular) or both

Dredging:

- can result in loss of and/or damage to the seabed and the habitats that it supports
- may give rise to suspended sediments, resulting in decreased water quality and/or smothering of the seabed if these sediments settle out in a different area
- may disturb marine animals, including through increased noise levels

Marine transport:

- risks collision of vessels with marine animals, resulting in their injury and/or death, with subsequent population declines
- may result in increased coastal erosion, through the action of vessel wakes

Aquaculture:

- may give rise to elevated nutrient levels in and on the seabed, from fish faeces and excess animal feed, which can result in changes to community composition and/or smothering of the seabed
- can damage the seabed and its habitat, through anchoring of infrastructure
- may affect wild salmon, through transmission of sea lice

Marine wildlife watching may result in increased disturbance to populations of marine animals such as whales and dolphins.

Recreation:

- may result in loss of and/or damage to the seabed and its habitat, through anchoring
- may give rise to increased levels of marine litter
- may disturb marine animals, through human and/or vessel presence

Offshore renewables, in future:

- may result in loss of and/or damage to the seabed and its habitat, through anchoring of infrastructure
- give rise to collision risk, e.g. with birds, mammals, etc
- result in changes to sediment transport, through changes in energy levels in the water

Climate change, through increasing sea temperatures, acidification, changes to rainfall patterns, etc:

- may result in populations of marine animals and plants moving further north
- may give rise to population decline
- may result in new competitors arriving in Scottish waters, including non-native invasive species

5.2 Ecological/Environmental Status of Water Bodies

5.2.1 Scottish waters are quite different between the east and west coasts. The east coast presents mostly uniform depths and shallow inclines interspersed with localised trenches, while the seabed off Scotland's west coast shelves steeply away from the coast, and deep waters occur relatively close to the land.

5.2.2 There are various mechanisms in place for monitoring and managing the quality of Scottish waters. Each takes a different focus and approach:

- The Water Framework Directive establishes a framework for the protection of inland surface waters (rivers and lakes), transitional waters (estuaries), coastal waters and groundwater, with the aim of ensuring that all aquatic ecosystems meet 'good status' by 2015. [22,23]
- River Basin Management Plans [24] have been prepared for the Scotland and Solway-Tweed River Basin Districts to address the requirements of the Water Framework Directive in relation to the management of Scotland's river systems. Both plans also provide an overview of the state of the water environment for their districts.
- Scotland's coastal waters are monitored by SEPA to measure performance and compliance with targets for coastal water quality status under the Water Framework Directive.

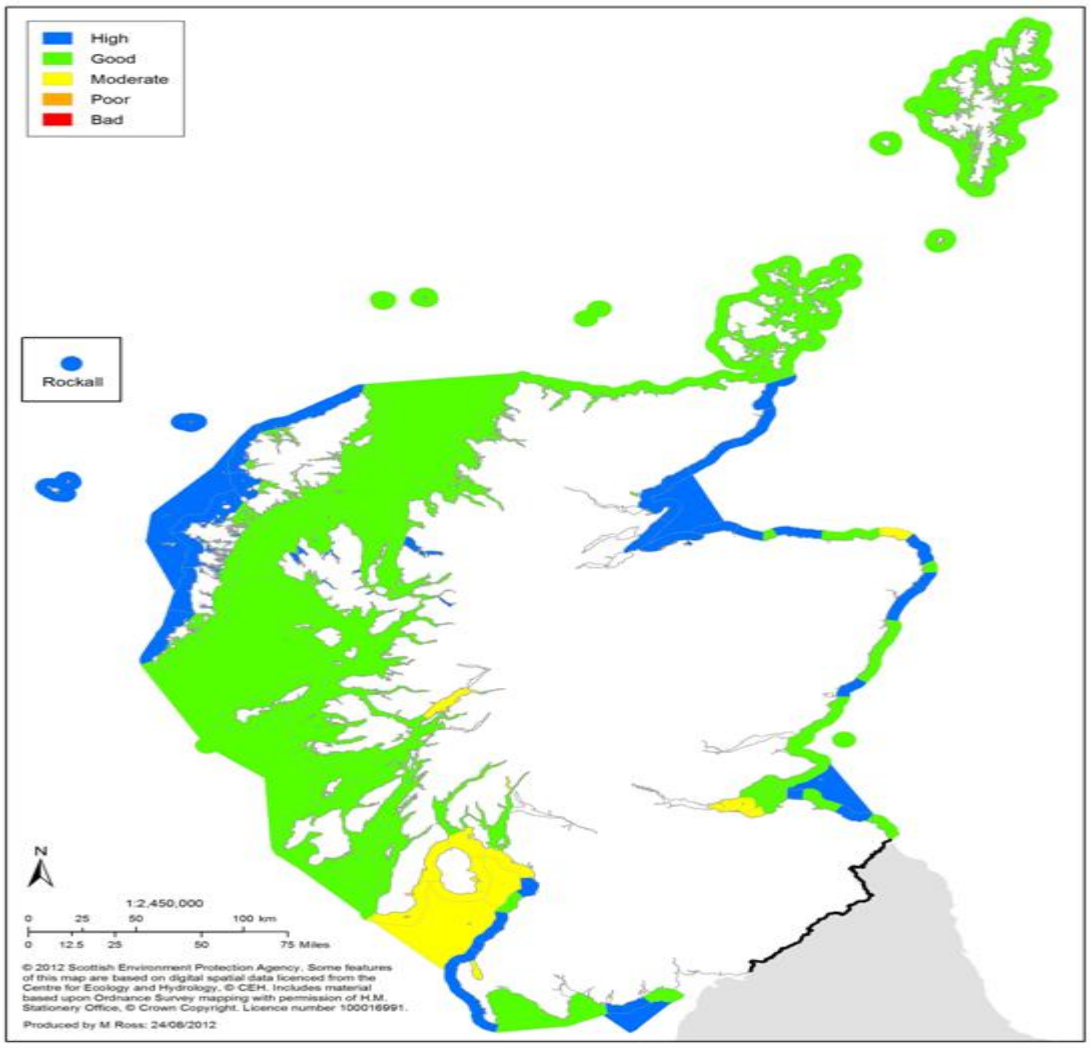
5.2.3 Scotland's seas are mostly classed as being of good or better ecological status under the Water Framework Directive (out to 3 nautical miles). There are some poorer quality waters in certain areas, such as the Firth of Forth and the Firth of Clyde. The key risks to the quality of the water environment are from contamination as a result of marine activities, such as the use of anti-fouling paint, pollution from oil and/or chemical spills, and pollution of coastal waters from activities on land, in particular from agricultural activities.

5.2.4 In 2011, the ecological status[25] of 61% of Scotland's surface water bodies was good or better (Figure 12)[26]. The following were in good or better condition:

- 96% of coastal waters;
- 86% of estuaries;
- 54% of rivers; and
- 63% of lochs.

[22] JNCC (2011) Council Directive 2000/60/EC establishing a framework for Community action in the field of water policy (Water Framework Directive),Available at: http://jncc.defra.gov.uk/page-1375
[23] European Commission (2011) EU Water Legislation and the Water Management Directive, [online] Available at: http://ec.europa.eu/environment/water/participation/notes_en.htm
[24] SEPA River Basement Management Plans, Available at: http://www.sepa.org.uk/water/river_basin_planning.aspx
[25] For all surface waters, classification describes the ecological quality of water bodies (this includes both ecological and chemical status). Ecological status is discussed further in "The river basin management plan for the Scotland river basin district 2009–2015", available at http://www.sepa.org.uk/water/river_basin_planning.aspx
[26] SEPA (2012) 2011 aquatic classification results and comparison to previous years. Available at: http://www.sepa.org.uk/water/monitoring_and_classification/classification.aspx

Figure 12. Coastal and Transitional Waters Classification 2011 (Source: Scotland's Environment website)[27]



[27] http://www.environment.scotland.gov.uk/our_environment/water/coastal_waters/description.aspx

5.3 Climatic Factors

5.3.1 In the marine context, climate change has been predicted to lead to an increase in water temperatures, rise in sea levels, changes in wave heights and changes to coastlines. Since 1961, average temperatures in all parts of Scotland have risen for every season [28] and over the last three decades, sea-surface temperatures around the UK coast have also risen by approximately 0.7ºC. [29] At the same time, the seas are becoming more acidic, particularly those to the north and west of Scotland, as increasing amounts of atmospheric carbon dioxide are absorbed at the sea surface. This change in acidity is already causing concern for marine ecosystems.[30]

5.3.2 Sea levels around the UK rose by about 1 mm/yr in the 20th century (corrected for land movement), although it is estimated that recent increases have been higher than this. [31] Under projections from the UKCIP09 model[32], further rises of between 12 and 76 cm are projected by 2095 [33], with the added potential for further adverse impacts on coastal areas and transitional waters. It should be noted that lower probability scenarios suggest this rise could be even greater.

5.3.3 Changes to sea levels, increased wave height and storm surges could have serious repercussions for the marine and coastal environments, and the many industries operating in them. As noted previously, climate change is already affecting the marine environment, and increasing the vulnerability of some habitats and species to future pressures.

5.3.4. For example, changes in the climate could result in a shift in distribution and changes in the abundance of fisheries through a loss of certain habitats and species, changes in species, changes in species migration and impact on breeding cycles and food supplies. Climate change may also favour some species leading to, for example, increased diversity of seabed marine life due to the warming of the air and seawater temperatures.[34] Risks from pests, diseases and invasive species may increase. There may also be a decline in ocean primary production and effects on increased ocean acidity.[35]

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[28] Sniffer (2006) A Handbook of Climate Trends Across Scotland, [online] Available at: www.sniffer.org.uk

[29] UKCIP (2011) Recent Climate Trends [online] Available at: http://www.ukcip.org.uk/essentials/climate-trends/

[30] Scottish Government (2012) Climate Change and Ocean Acidification [online] Available at: http://www.scotland.gov.uk/Topics/marine/science/atlas/climatechange

[31] UKCIP (2011) Recent Climate Trends [online] Available at: http://www.ukcip.org.uk/essentials/climate-trends/

[32] Marine Climate Change Impacts Partnership (2010) Coastal erosion and Coastal Geomorphology, [online] Available at: http://www.mccip.org.uk/annual-report-card/2007-2008/marine-environment/coastal-erosion.aspx

[33] Marine Scotland (2011) Scotland's Marine Atlas: Information for The National Marine Plan [online] Available at: http://www.scotland.gov.uk/Publications/2011/03/16182005/9

[34] SNH and The Marine Biological Association (undated) Impacts of climate change on seabed wildlife in Scotland[online] Available at: www.marlin.ac.uk/PDF/Climate_change_brochure.pdf

[35] SEAFISH (2009) Fishing vessel fuel emissions, research and development fact sheet, April 2009 [online] Available at: http://www.seafish.org/fishermen/fishing/fishing-gear/fuel-efficiency

Vessel emissions

5.3.5 Carbon dioxide (CO_2) is the primary greenhouse gas emitted through human activities. The main human activity that emits CO_2 is the combustion of fossil fuels (coal, natural gas and oil). Marine diesel (also known as gas oil or red diesel) is used by the majority of fishing vessels and is also the main fuel used by ferries.

5.3.6 In 2011, greenhouse gas[36] emissions from transport in Scotland amounted to 13 MtCO2e, approximately one-quarter of total Scottish emissions. The majority (9.3 $MtCO_2e$) were from road transport.[37] Emissions from Scottish ferries have been estimated as between 0.22[38]-0.23[39] Mt CO_2e.

5.3.7 Overall, transport emissions (including international aviation and shipping) have increased 0.1% since 1990. In 2011, emissions from domestic transport were 0.2% lower than 1990, at 10.47 $MtCO_2e$, while emissions from international aviation and shipping in 2011 were 2.49 $MtCO_2e$, up slightly from 2.45 $MtCO_2e$ in 1990 (aviation emissions rose significantly while shipping emissions fell).

5.3.8 Greenhouse gas emissions from vessel engines show a correlation with vessel speed. Greenhouse gas emissions from the fishing fleet, for example, are influenced by a number of factors including the abundance of fish (stocks), the steaming distance to fishing grounds and the technology used, including vessel and engine size, gear type etc.[40] For example, recent figures show that Nephrops trawlers of an average length of 15m and under 250 kW (engine size) operating in the west of Scotland consumed, on average, 390 litres of fuel per day at sea.[41] In contrast, vessels under 10m consumed 134 litres per day at sea.[42]

[36] Carbon dioxide, methane, nitrous oxide, hydroflurocarbons, perflurocarbons and sulphur hexafluoride

[37] Scottish Government (2013) Low Carbon Scotland: Meeting our Emissions Reduction Targets 2013-2027 - The Second Report on Proposals and Policies. Available from http://www.scotland.gov.uk/Publications/2013/06/6387/9

[38] CMAL (2009) Scottish Government Ferry Review: Vessels Report

[39] AEA Energy & Environment (2008) Transport Carbon Emissions in the Highlands and Islands. Final Report to Highlands and Islands Enterprise.

[40] SEAFISH (2009) Fishing vessel fuel emissions, research and development fact sheet, April 2009 [online] Available at: http://www.seafish.org/fishermen/fishing/fishing-gear/fuel-efficiency

[41] SEAFISH (2012) 2010 Economic Survey of the UK Fishing Fleet [online] Available at: http://www.seafish.org/publications-search?search=&category=Economics%20and%20Business&date_month=&date_year=&published_beforeafter

[42] SEAFISH (2012) 2010 Economic Survey of the UK Fishing Fleet [online] Available at: http://www.seafish.org/publications-search?search=&category=Economics%20and%20Business&date_month=&date_year=&published_beforeafter

5.4 Geodiversity

5.4.1 In the coastal zone, the coastline varies between deep and narrow sheltered sea lochs on the west coast, shallow bays and estuaries, and long stretches of exposed coastline. Major Scottish estuaries are the Solway Firth, the Clyde Sea, the Moray Firth, the Firth of Tay and the Firth of Forth. The North Sea coastline is predominantly rocky, with intertidal sediments in the bays and inlets and some extensive stretches of sandy beach. The west coast of Scotland is also typically rocky, with many bays, channels and sea lochs. The coastline of the Western Isles, the north of Scotland and the Northern Isles is also rocky. Along these stretches of coast there are areas characterised by quick transition between rocky shore, sand, gravel and silt. The machair landscapes and coastlines of the western Hebrides, which are created from ancient shell sand deposits, are an ecotype that is largely unique to Scotland.

5.4.2 The offshore environment in Scottish waters ranges from shelf sea areas to deep ocean regions with depths greater than 2,000 m. The continental shelf includes the Malin and Hebrides Shelf Seas, Orkney and Shetland Shelf Seas, and the North Sea. The shelf seas are marked by notable features such as banks (e.g. Stanton Banks, Viking Bank) and deep channels (Figure 13).

5.4.3 The western margin of the continental shelf is marked by a sharp change in depth of seabed at about 200 m. The continental slope is a transition area between two systems- the deeper oceanic waters and the shelf sea waters. The deep oceans have a complex bathymetry that is broken up by steep ridges (e.g. Wyville Thomson Ridge), seamounts (e.g. Anton Dohrn) and banks (e.g. Rockall Bank).

5.4.4 Details of the geological nature of the seabed, and the habitats this provides, are set out in paragraphs 5.1.2-10 and Figure 9.

5.4.5 Brooks et al (2012) describe marine geodiversity interests[43] in Scottish waters as being representative of the geological processes that have influenced the evolution and present day morphology of the Scottish seabed. Some of these have been formed by processes unique to the marine environment. Brooks et al (2012) identify the following categories of geodiversity interests:

- Quaternary of Scotland;
- Submarine Mass Movement;
- Marine Geomorphology of the Scottish Deep Ocean Seabed;
- Seabed Fluid and Gas Seep;
- Cenozoic Structures of the Atlantic Margin;
- Marine Geomorphology of the Scottish Shelf Seabed;
- Coastal Geomorphology of Scotland; and
- Biogenic Structures of the Scottish Seabed

[43] Geodiversity is the variety of rocks, minerals, fossils, landforms, sediments and soils, together with the natural processes which form and alter them (Brooks et al, 2012).

5.4.6 Protection of Scotland's geodiversity interests, in the main, is currently focused on terrestrial geodiversity. Current protection comprises[44]:

- Geoparks, a UNESCO designation. There are currently two UNESCO Geoparks in Scotland: North West Highlands Geopark, and Shetland Geopark.
- National Parks. Geodiversity is one of the special qualities of Scotland's National Parks, and both National Parks contain internationally important geodiversity.
- National Nature Reserves. Many contain significant geological and geomorphological interest.
- Sites of Special Scientific Interest. These are the primary statutory mechanism for geodiversity protection in Scotland.
- Local Nature Conservation Sites. These include Local Geodiversity Sites, sometimes also called Regionally Important Geological and Geomorphological Sites.

5.4.7 SNH/JNCC have identified geodiversity features for inclusion in the possible nature conservation Marine Protected Areas (Table 2). These are the pMPAs which have been published for public consultation.

[44] http://www.snh.gov.uk/protecting-scotlands-nature/safeguarding-geodiversity/protecting/

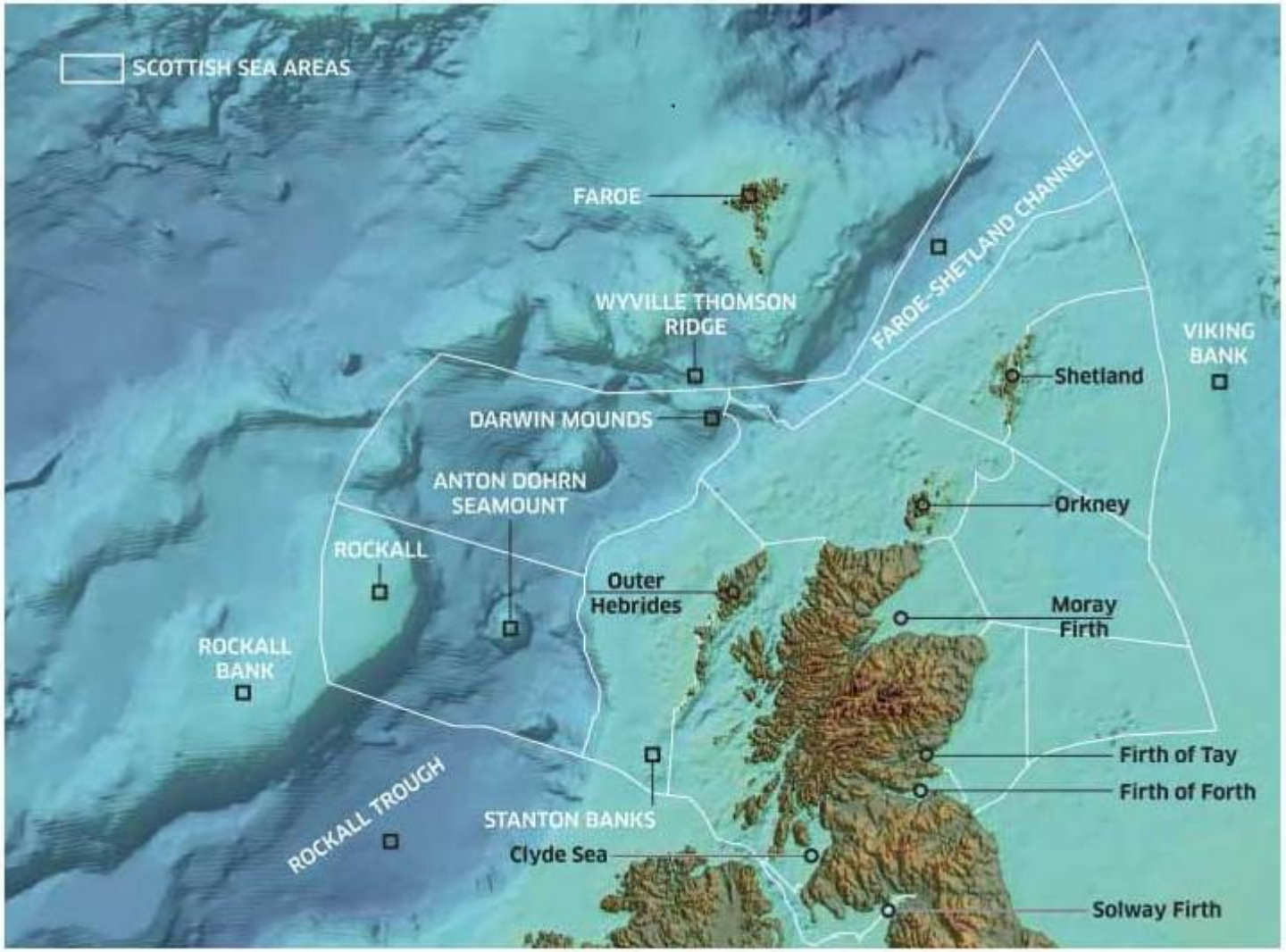


Figure 13. Coastal and offshore waters and features

6.0 Results of the SEA

6.0.1 The purpose of this section is to report the results of the SEA. An overview of the implications of the pMPAs for each of the environmental topics is provided here.

6.0.2 The assessment tables in Appendix 3 set out the environmental effects of each of the pMPAs. This includes the cumulative effect of having more than one feature in a pMPA.

6.1 Biodiversity, Flora and Fauna

6.1.1 The pMPAs will have benefits for biodiversity, flora and fauna. This is their key purpose, with a focus on specific features (identified in Table 2), and the benefit of designation will primarily accrue to these features.

6.1.2 However, many of the existing pressures on marine biodiversity currently result from activities that have the potential to result in abrasion of and/or damage to the seabed. Examples include the effects of anchoring, bottom-contact mobile gear, or infrastructure which has a large seabed footprint. Reduction and/or removal of these pressures is likely to have benefits for other species which depend on this habitat.

6.1.3 For example, some species use benthic habitat for spawning (Ellis et al, 2012). Herring spawn on gravel and similar habitats (e.g. coarse sand, maerl, shell) with a low proportion of fine sediment and where there is well-oxygenated water. Figure 14 shows the distribution of herring spawning grounds around the UK coast. It is likely that the benefits to the pMPA features will also result in benefits for species (such as herring) that use benthic habitat for spawning. As well as South Arran pMPA, such benefits may accrue around Orkney and off the east coast of Scotland.

6.1.4 In general, species that use benthic habitat for growth and/or refuge will also benefit from the reduction and/or removal of these pressures.

6.1.5 There are also likely to be benefits to biodiversity through increased nutrient cycling. For example, species like the burrowing sea cucumber stimulate nutrient cycling by digging burrows into the sea bed. The holes they dig bring nutrients down into the sediment that would otherwise not be reached, much like earthworms in a garden. This helps to release plankton larvae and nutrients into the water column, which support the entire ecosystem.

6.1.6 Displacement of marine activities, as a result of pMPA designation, is a key concern of stakeholders. This issue is discussed in the following paragraphs.

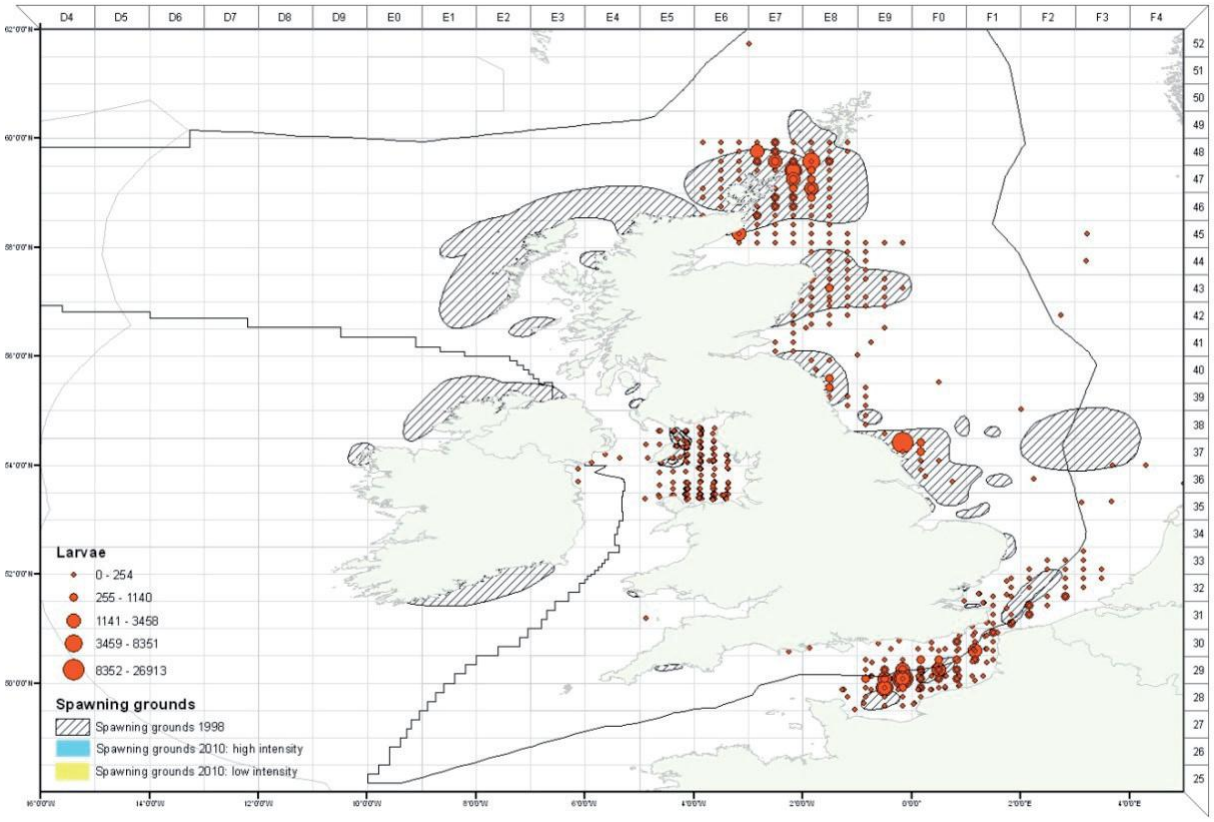
Management measures

6.1.7 Stage 4 of the MPA Selection Guidelines[45] requires that the search locations be assessed against the Stage 4 guideline ("There is a high probability that management measures, and the ability to implement them, will deliver the objectives of the MPA"). This stage includes identification of the likely management issues and approaches. Box 2 sets out the principles underlying the identification and implementation of management measures[46].

6.1.8 For each of the pMPAs, SNH/JNCC have considered whether any of the following management measures should be applied:

- no additional management required;
- management to reduce/limit pressures; or
- management to remove/avoid pressures.

Figure 14. Herring spawning grounds (Source: Ellis et al)



6.1.9 Many of the pMPAs have been designed to support more than one feature. Often the features do not occur across the whole pMPA, so there is potential for management (where this is considered to be needed) to be focused around the areas where features occur, or for zoning to be a key component of management measures.

[45] Marine Scotland, The Scottish Government, SNH and JNCC. no date. Marine Protected Areas in Scotland's Seas: Guidelines on the selection of MPAs and development of the MPA network.
[46] Marine Scotland 2012 Nature Conservation Marine Protected Areas Management Handbook

6.1.10 Recommendations for the appropriate level of management have been made by SNH/JNCC, on a site-by-site basis, for each of the pMPAs[47], based on current understanding of:

- the nature and sensitivity of features, and their extent within the pMPA;
- the pMPA's conservation objectives; and
- the type of activity undertaken in, near and/or adjacent to the pMPA (both now and in the future).

6.1.11 Management at a site level is being developed based on science and discussions with stakeholders. Participation is key to the successful delivery of a well-managed network. Stakeholders can provide higher-resolution local environmental knowledge and understanding of specific locations and the activities that take place, which will assist in providing greater certainty and fewer precautionary conclusions about management measures. These recommendations for potential management measures act as the basis for these discussions around pMPA management. These will continue during and after the consultation period.

6.1.12 The socio-economic assessment looks at the potential costs (both economic and social) that could result from the pMPAs. The estimates have focused on the costs associated with the loss of current (or future) economic activity, while acknowledging that displacement may occur instead. This information will also be used to inform discussion during the consultation period.

6.1.13 These cost estimates are based on the use of three scenarios for the management of the pMPAs: lower, intermediate and upper. For commercial fisheries, for example, the "lower scenario" may include reduction in pressure where fishing activity interacts with sensitive/high risk features of the pMPA. The "intermediate scenario" may include zoned management (e.g. restriction or limitation of fishing activity in part of the pMPA, which may allow fishing to continue elsewhere in the pMPA) and closure to certain gear types, in addition to the measures in the "lower scenario". The "upper scenario", as well as all these measures, may include total closure across the whole of the pMPA. Such closure may result in the loss or displacement of the fishery in that pMPA. There are uncertainties associated with the displacement of commercial fishing as management is still to be decided through discussion with stakeholders through this iterative process, which makes the assessment of such effects difficult.

Potential Effects of Management Measures

6.1.14 The management measures may have consequences for the environment:

- Where no management measures are recommended, this would result in continuation of the status quo. Small-scale, local effects may occur but

[47] Note: These are working drafts, produced to support initial discussions with stakeholders about management of activities in the pMPA. The development of site management is an on-going process which will continue after the conclusion of the formal consultation; this includes changes to reflect any relevant information that becomes available e.g. through stakeholder discussions.

these are unlikely to be significant. (If they were significant, management measures would have been recommended.)

- Where the recommendation is to reduce/limit pressures, this may result in amendments to current practices.
- Where the recommendation is to remove/avoid pressures, this may result in the activity being discontinued or displacement of the activity to another location. This could result in new pressures in this location or an intensification of already-existing pressures.

6.1.15 Recommendations to reduce/limit or remove/avoid pressures will also need to be taken into consideration in future project siting and design decisions. The effects of these are difficult to predict, given the lack of information about the type of future development and its possible location(s).

Box 2. Principles for management of pMPAs

General principles for Nature Conservation MPAs from the Scottish MPA Selection Guidelines (Marine Scotland 2011)[48]. The five principles listed below relate to management:

a. Management of MPAs should be integrated with wider marine management. By providing the framework within which all marine management will occur, marine planning will help ensure better integration between the needs of Nature Conservation MPAs and those of surrounding areas.

b. In most situations, existing sectoral measures (such as fishery management measures) or marine planning are expected to be sufficient. Additional powers such as Marine Conservation Orders will be available where necessary to support management of activities affecting MPAs.

c. The best available scientific information will be used to select and manage Nature Conservation MPAs. Lack of scientific certainty should not be used as a reason for postponing MPA selection or taking action where there is a threat of damage to areas in the network.

d. As our understanding improves, and/or the environment changes, there may be a need to select additional new Nature Conservation MPAs, alter boundaries, and/or remove designations particularly in the longer term in response to climate change.

e. Nature Conservation MPAs will be subject to a range of protection levels, depending on the conservation objectives, management requirements of the MPA protected features for which they are designated and socio-economic factors. There will be an assumption of multiple-use of a site. However activities which are not compatible with the conservation objectives of a Nature Conservation MPA will be restricted.

[48] http://tinyurl.com/c6tcaw8

6.1.16 The following marine activities have been reviewed for the SEA, in terms of the sensitivities of MPA features to these activities and the potential for management measures:

- marine disposal
- commercial fishing (mobile gear; static gear; diver-operated gear)
- infrastructure (renewables; oil and gas; cables)
- aquaculture (finfish; shellfish)
- moorings/ anchorages

6.1.17 The SEA has drawn on the work undertaken by SNH/JNCC and ABPmer/eftec to develop a strategic overview of the potential effects of the management measures. It has focused on the potential displacement of current and (known) proposed activities. (It has not included the effects of displacement of future unknown activities, given the high level of uncertainty associated with this.)

6.1.18 A review of the sensitivity of biodiversity features to the marine activities identified in paragraph 6.1.16 and the potential to result in displacement has been undertaken. (Few, if any, measures have been recommended for the management of geodiversity features.) Figure 15 shows the results. Features which are highly sensitive to marine activities are shown as primarily blue, e.g. serpulid aggregations, seamount communities. Those with low sensitivity are shown as primarily green, e.g. white cluster anemones. Most features, however, are more sensitive to certain activities than others. Black guillemot, for example, are highly sensitive to a limited number of activities (in this case, the risk of entanglement in static fishing nets). Flame shell beds, maerl beds, native oysters have a high sensitivity to some activities, medium sensitivity to others, and low sensitivity to the remainder.

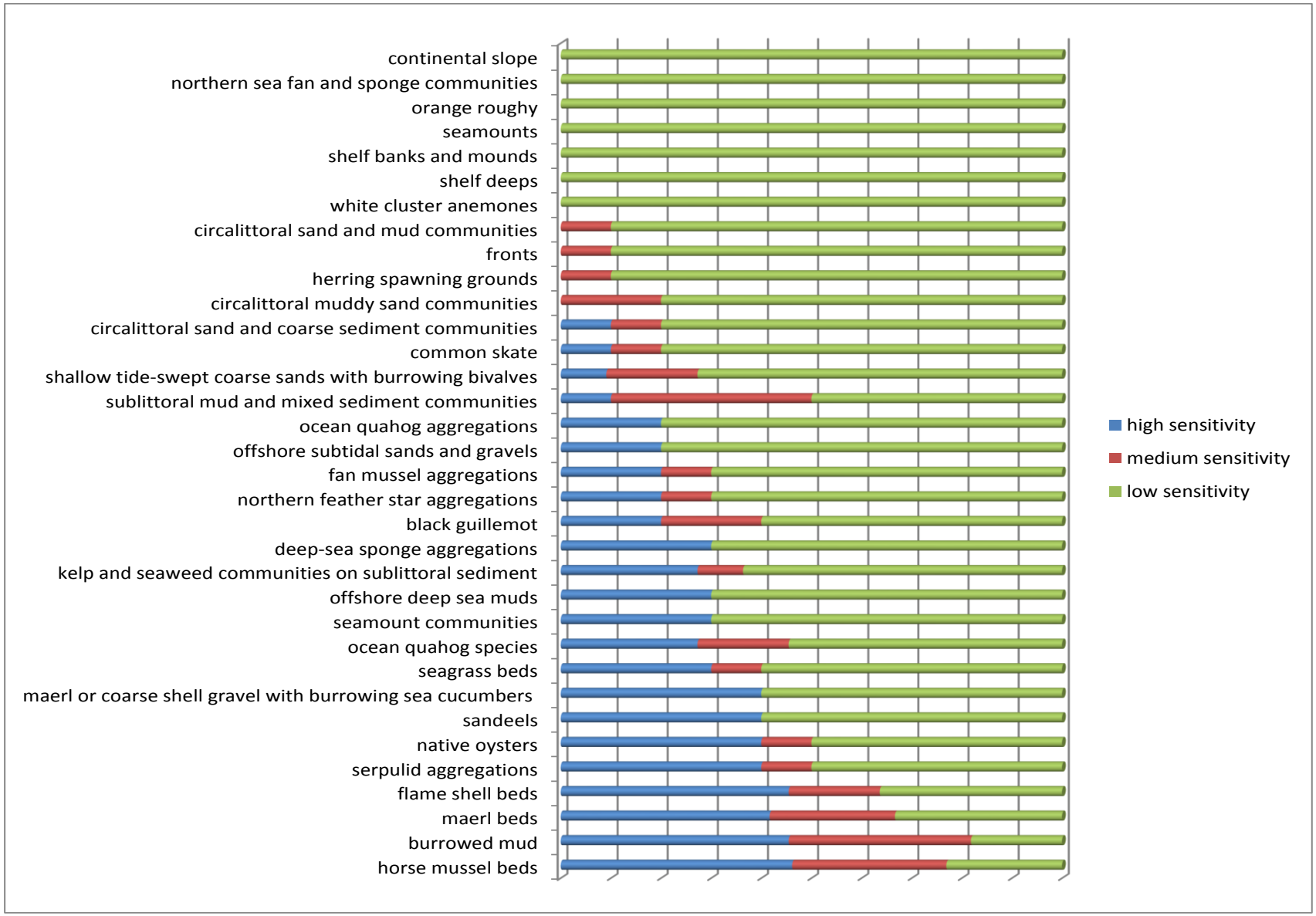
6.1.19 Those features which are shown as highly sensitive have the greatest potential to result in displacement.

Displacement of mobile gear

6.1.20 Very few of the protected features are not sensitive to the pressures from bottom contact mobile/ active gear. In consequence, it is recommended that such pressures on the features should be removed or managed. The features are as follows:

- six pMPAs with burrowed mud features (the remaining six are recommended to reduce/limit mobile gear)
- the four pMPAs supporting deep-sea sponge aggregations (Faroe-Shetland sponge belt; Hatton-Rockall Basin; North-east Faroe Shetland Channel; Rosemary Bank Seamount)
- fan mussel aggregations (Small Isles)
- the five pMPAs supporting flame shell beds (Loch Creran; Loch Sunart; Lochs Duich, Long and Alsh; North-west sea lochs and Summer Isles; Upper Loch Fyne and Loch Goil)
- the four pMPAs supporting horse mussel beds (Fetlar to Haroldswick; Noss Head; Small Isles; Upper Loch Fyne and Loch Goil)

Figure 15. Sensitivity of pMPA features to marine activities (identified in paragraph 6.1.16)



- kelp and seaweed communities on sublittoral sediment (Wyre and Rousay Sounds)
- the five pMPAs supporting maerl beds (Fetlar to Haroldswick; Loch Sween; North-west sea lochs and Summer Isles; South Arran; Wyre and Rousay Sounds)
- both pMPAs supporting maerl or coarse shell gravel with burrowing sea cucumbers (North-west sea lochs and Summer Isles; South Arran)
- the pMPAs supporting native oysters (Loch Sween)
- the four pMPAs supporting ocean quahog aggregations (East of Gannet and Montrose Fields; Faroe-Shetland sponge belt; Firth of Forth Banks Complex; Norwegian boundary sediment plain) and one supporting ocean quahog (Upper Loch Fyne and Loch Goil)
- the six pMPAs supporting offshore deep-sea muds (East of Gannet and Montrose Fields; Geikie Slide and Hebridean slope; Hatton-Rockall Basin; North-east Faroe Shetland Channel; South-west Sula Sgeir and Hebridean slope; The Barra Fan and Hebrides Terrace Seamount)
- seven of the eight pMPAs supporting offshore subtidal sands and gravels (Faroe-Shetland sponge belt; Firth of Forth Banks Complex; Geikie Slide and Hebridean slope; North-east Faroe Shetland Channel; South-west Sula Sgeir and Hebridean slope; The Barra Fan and Hebrides Terrace Seamount; Turbot Bank). No mobile gear fisheries currently take place within the West Shetland Shelf pMPA, which is currently closed to mobile gear under Common Fisheries Policy regulations for cod recovery.
- sand eels should be protected from demersal hydraulic gears in the Mousa to Boddam pMPA
- seagrass beds (South Arran)
- seamount features (Rosemary Bank Seamount; The Barra Fan and Hebrides Terrace Seamount)
- serpulid aggregations (Loch Sunart)

6.1.21 For commercial fisheries, therefore, the potential cost of designation is a loss or displacement of current (and future) output, caused by spatial or temporal restrictions on fishing activities. In reality, vessel owners are likely to try and adapt within the site (e.g. by changing gear type or target species) if that is possible, or operate in alternative fishing grounds, in an attempt to maintain profitability.

Displacement of static gear

6.1.22 At five of the six sites supporting black guillemot, SNH/JNCC have recommended that pressures from set nets be removed/avoided, as there is a risk that black guillemot will become entangled in such nets. On the whole, this relates to potential future deployment of such gear, as they are not currently used. There may therefore be displacement of static gear in the future, but this is uncertain.

6.1.23 The same applies to common skate: the exclusion of bottom-set nets and long-line fishing within the possible MPA is recommended. Again, there is little evidence of the use of such gear in Loch Sunart to the Sound of Jura

pMPA. There may therefore be displacement of static gear in the future, but is unlikely for current marine users.

6.1.24 Deep-sea sponge aggregations are highly sensitive to the pressures from static gear, and so the removal of such pressures is recommended for the four sites where these features occur (Faroe-Shetland sponge belt; Hatton-Rockall Basin; North-east Faroe Shetland Channel; Rosemary Bank Seamount). This pressure is predicted from set nets and long-line fishing (Faroe-Shetland sponge belt; North-east Faroe Shetland Channel; Rosemary Bank Seamount – which also supports creeling and potting), all of which currently takes place in the pMPA, so there is potential for displacement where these features are found within the pMPA.

6.1.25 In the Hatton-Rockall Basin pMPA, the limited evidence available suggests that there is currently negligible fishing here. Control measures already exist to limit fishing that would cause damage to this feature in this pMPA. The recommendation to remove/avoid pressure is therefore unlikely to result in any additional displacement to that which has already occurred.

6.1.26 Seamount features are also sensitive to static gear, and SNH/JNCC recommend that pressures from this activity should be removed from the two sites on which it occurs where these features are found within the pMPA. There is therefore potential for displacement from Rosemary Bank Seamount and The Barra Fan and Hebrides Terrace Seamount.

6.1.27 Of the six pMPAs where offshore deep-sea muds occur, only those in the Hatton-Rockall Basin pMPA have been identified as sensitive to static gear. However, zoned management may be possible in this pMPA, so displacement may not occur.

Displacement of diver-operated gear

6.1.28 One-third of all features are sensitive to diver-operated gear, in particular hydraulic gears, and the removal of these pressures is recommended for the following features:

- burrowed mud (Loch Sween; Lochs Duich, Long and Alsh)
- circalittoral sand and coarse sediment communities (Fetlar to Haroldswick)
- flame shell beds (Loch Creran; North-west sea lochs and Summer Isles)
- horse mussel beds (Fetlar to Haroldswick)
- kelp and seaweed communities on sublittoral sediment (Fetlar to Haroldswick; Wyre and Rousay Sounds)
- all five of the maerl bed pMPAs (Fetlar to Haroldswick; Loch Sween; North-west sea lochs and Summer Isles; South Arran; Wyre and Rousay Sounds)
- both pMPAs for maerl or coarse shell gravel with burrowing sea cucumbers (North-west sea lochs and Summer Isles; South Arran)
- sandeels (Mousa to Boddam)
- seagrass beds (South Arran)
- sublittoral mud and mixed sediment communities (Loch Sween)

6.1.29 The nature of these features means that, for many of them, management of diver-operated hydraulic gears can be zoned, e.g. flame shell beds, horse mussel beds, maerl beds. Displacement of the activity from the pMPAs as a whole is therefore unlikely, apart from perhaps Loch Sween, where the recommendation is to remove this pressure from the whole of the pMPA.

Displacement of marine disposal

6.1.30 SNH/JNCC have recommended that pressures associated with marine disposal be removed/avoided. The following features would be managed at four of the pMPAs:

- burrowed mud (North-west sea lochs and Summer Isles)
- fan mussel aggregations (Small Isles)
- horse mussel beds (Noss Head; Small Isles)

6.1.31 At three of the four sites, management could be zoned, as the features occur in specific areas of the pMPA. At the fourth site, the features occur across the whole site and so management measures will need to be applied across the whole site. Displacement at this site (Noss Head) may therefore occur.

Displacement of oil and gas

6.1.32 Removal of pressures associated with oil and gas activities is recommended for the following features:

- four out of twelve pMPAs with burrowed mud features recommend removal/avoidance of pressures associated with oil and gas (Central Fladen; South-east Fladen; The Barra Fan and Hebrides Terrace Seamount; Western Fladen)
- deep-sea sponge aggregations (Faroe-Shetland sponge belt)
- ocean quahog aggregations (East of Gannet and Montrose Fields; Faroe-Shetland sponge belt; Firth of Forth Banks Complex; Norwegian boundary sediment plain)
- three of six pMPAs with offshore deep-sea muds (East of Gannet and Montrose Fields, North-east Faroe Shetland Channel, The Barra Fan and Hebrides Terrace Seamount)

6.1.33 At all of these sites it is likely that management would take the form of:

- location of the activity to avoid impacts to the most sensitive features, for example, through micro-siting;
- minimising/avoiding introduction of materials that alter the seabed habitat type; and
- treatment of drill cuttings/ skip and ship.

6.1.34 Displacement from these pMPAs is therefore not anticipated, as the SEA has assumed that implementation of these mitigation measures would be successful.

Displacement of renewables/associated cables

6.1.35 There are eight pMPAs in territorial and two in offshore waters that have existing, planned or potential future offshore renewables development within the proposed site boundary or within 5km of the site boundary (Table 8).

6.1.36 The MPA features in Table 8 are sensitive to renewables development:

- black guillemots have medium sensitivity to death or injury by collision with underwater turbines (Clyde Sea Sill)
- fronts may be sensitive to changes in tidal currents/ removal of hydrodynamic energy (Clyde Sea Sill)
- sandeels are highly sensitive to physical change (to another seabed type), which may be associated with new infrastructure projects, as they have specific sediment requirements which affect their presence and density (Moussa to Boddam)
- horse mussel beds are highly sensitive to pressures (e.g. sub-surface abrasion or disturbance), which are associated with installation of cables (Noss Head).
- ocean quahog aggregations and offshore subtidal sands and gravels are both sensitive to physical disturbance

Table 8. Overlap of pMPAs with renewables development

Territorial Waters	**Infrastructure**	**Management Measure**
Clyde Sea Sill (Figure 16)	small overlap with tidal plan option TW2	remove/avoid (black guillemot); reduce/limit (fronts)
Loch Sunart to the Sound of Jura	future export power cables	no management measures
Moussa to Boddam	future export power cable	remove/avoid (sand eels)
North-west Sea Lochs & Summer Isles	future export power cable	no management measures
Noss Head	future cable infrastructure	remove/ avoid (horse mussel beds) Management would need to be applied across most, if not the entire, pMPA.
Papa Westray (Figure 17)	overlap with tidal plan option TN3; wave plan option WN2 future export power cable	no management measures
South Arran	future export power cable	no management measures
Wyre and Rousay Sounds (Figure 17)	overlap with tidal plan option future export power cable	no management measures
Offshore Sites		
Firth of Forth Banks Complex (Figure 18)	overlap with Firth of Forth Round 3 offshore wind lease area	it has been assumed that it will be possible to avoid features through micrositing, so that no displacement from the offshore energy areas will occur
North West Orkney (Figure 17)	offshore wind plan option OWN1 almost completely within pMPA; overlap with wave plan option WN2 and tidal plan option TN4	

Figure 16. West Area: overlap with pMPAs

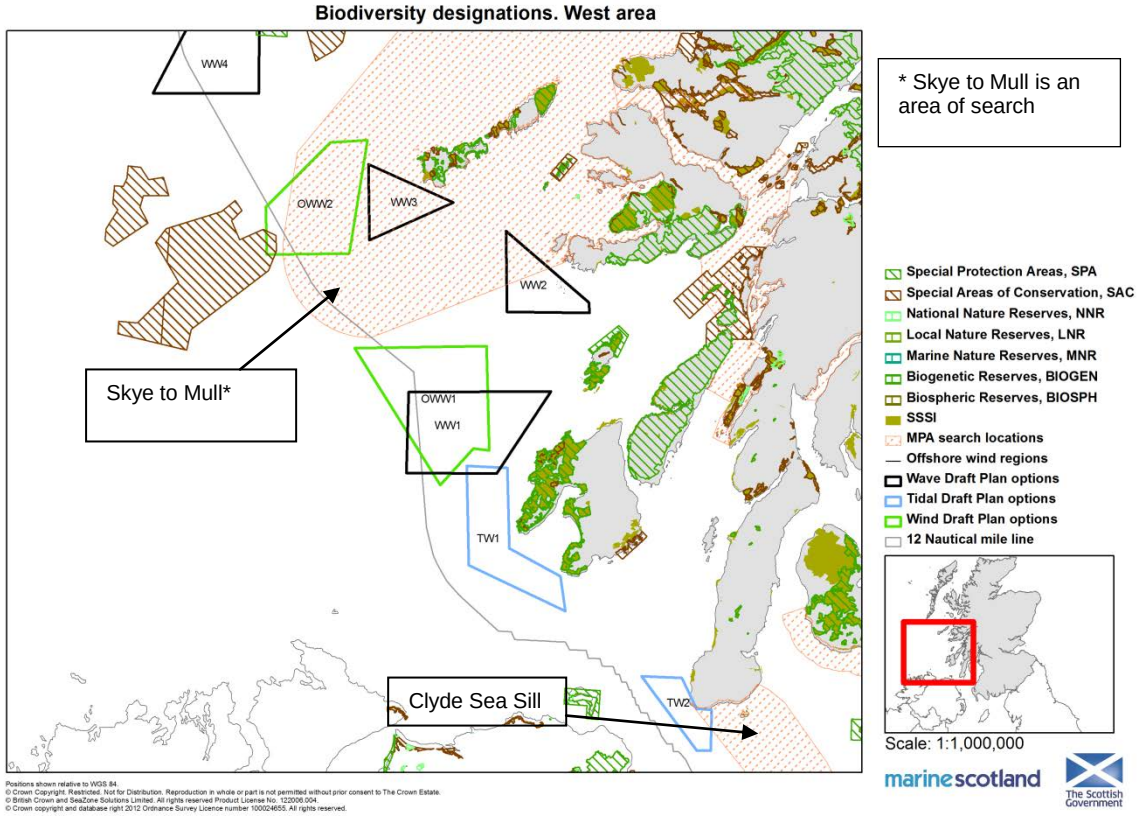


Figure 17. North Area: overlap with pMPAs

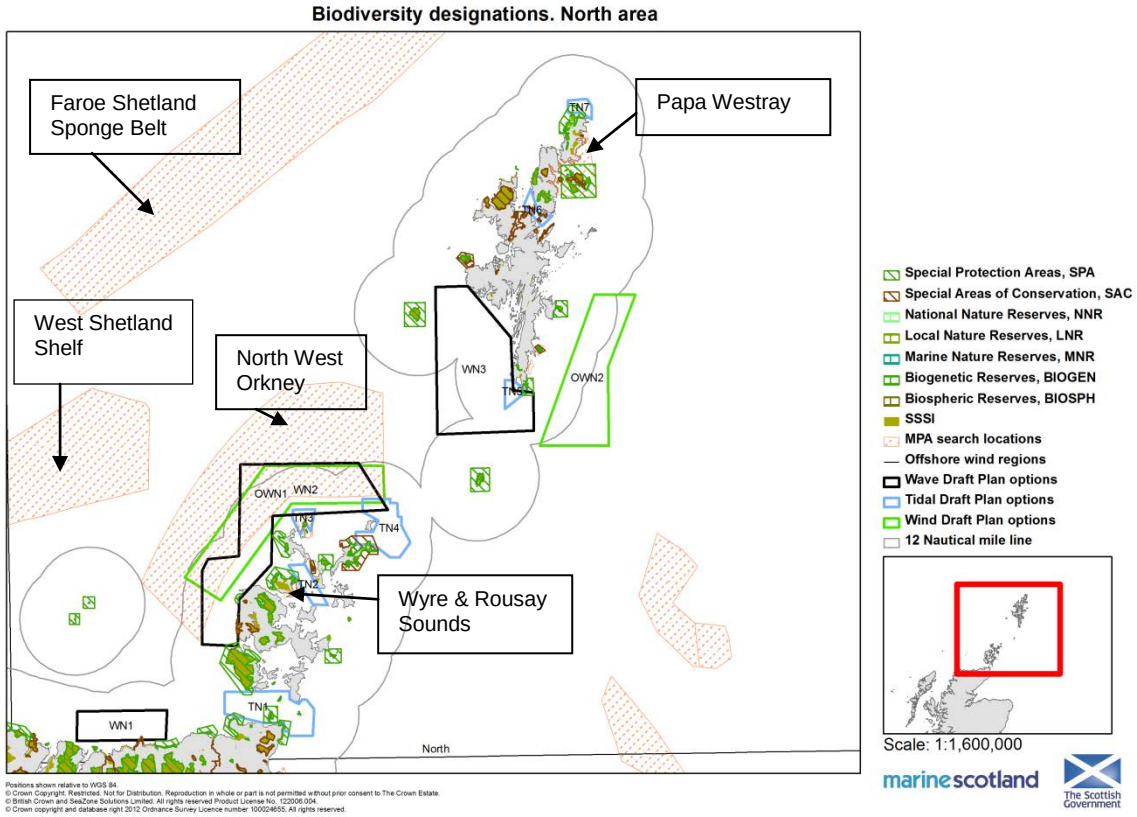
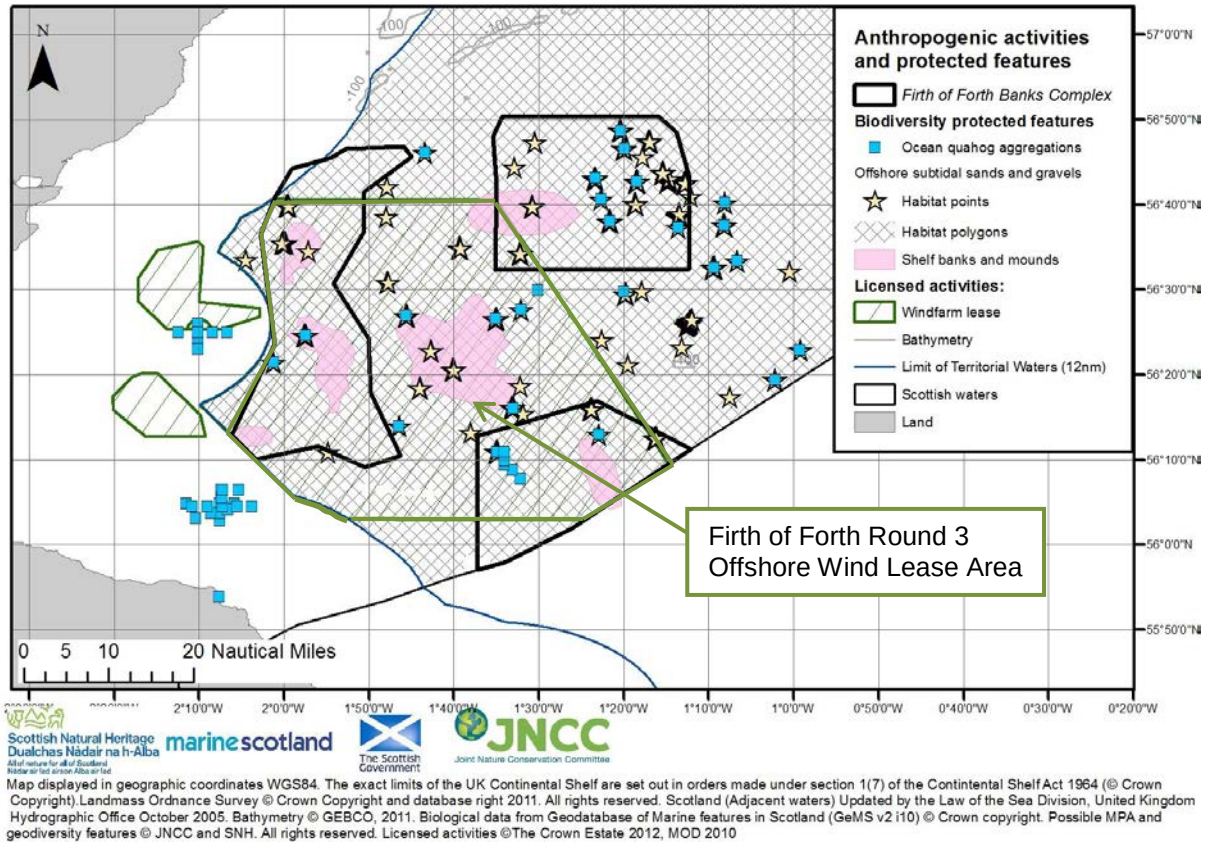


Figure 18. Firth of Forth Banks Complex overlap with Firth of Forth Round 3 area



6.1.37 At all of these sites it is likely that management would take the form of:

- location of the activity to avoid impacts to the most sensitive features, for example, through micro-siting;
- minimising/avoiding introduction of materials that alter the seabed habitat type; and
- use of graded scour protection, where necessary and/or appropriate.

6.1.38 For example, it has been assumed that project siting and design can be used to decrease the risk of death or injury to black guillemot, and to avoid and/or reduce disturbance to ocean quahog aggregations and offshore subtidal sands and gravels. The same would apply to the routing of cables across horse mussel beds and/or sandeel habitat, i.e. an alternative route could be found that would be acceptable to the developer.

6.1.39 Environmental assessment and on-going monitoring of a tidal test device in the Sound of Sanda (Clyde Sea Sill) indicate that the impacts on fronts are likely to be insignificant. However, any future proposals for new renewables development (including extension to existing development) would require careful consideration to ensure the conservation objectives are achieved.

6.1.40 At this stage, therefore, the SEA has assumed that displacement of renewables activities will not occur.

Displacement of moorings/anchorages

6.1.41 SNH/JNCC recommend that pressures from moorings/anchorages are removed from the following features:

- flame shell beds (Loch Sunart; North-west sea lochs and Summer Isles)
- maerl beds (one of the five pMPAs for this feature: Wyre and Rousay Sounds)
- native oysters (Loch Sween)
- seagrass beds in Whiting Bay (South Arran)
- serpulid aggregations (Loch Sunart)

6.1.42 In many of these pMPAs, the nature of the features would support zoning and relocation, rather than complete displacement. For example, in Loch Sunart the recommendation is to avoid the serpulid aggregations in Loch Teacius. Further work is required to determine whether there is an interaction with the serpulid aggregations and, if so, whether relocation of existing recreational anchorages would be required. For the moorings in Loch Sunart, further work is needed to ascertain the degree of overlap between moorings and MPA features. The recommendation is that management should be focused around the flame shell beds and serpulid aggregations, and thus does not need to be put in place across the whole pMPA.

Displacement of aquaculture: finfish and shellfish

6.1.43 Many features exhibit sensitivity to the pressures arising from finfish and shellfish aquaculture, and this has resulted in recommendations to remove/avoid these pressures. These measures are focused on the pressures associated with new finfish/shellfish farms and undeveloped consents, as well as the expansion or relocation of existing finfish/shellfish farms in areas where they would be likely to impact on sensitive features. There is no policy to review existing consents.

6.1.44 Sensitive features comprise:

- flame shell beds (all five pMPAs: Loch Creran; Loch Sunart; Lochs Duich, Long and Alsh; North-west sea lochs and Summer Isles; Upper Loch Fyne and Loch Goil)
- horse mussel beds (one of the four: Upper Loch Fyne and Loch Goil)
- maerl beds (shellfish: North-west sea lochs and Summer Isles) (finfish: Loch Sween; North-west sea lochs and Summer Isles; Wyre and Rousay Sounds)
- maerl or coarse shell gravel with burrowing sea cucumbers (North-west sea lochs and Summer Isles)
- native oysters (finfish only: Loch Sween)
- northern feather star aggregations on mixed substrata (two of three: Loch Sunart; North-west sea lochs and Summer Isles)
- ocean quahog (Upper Loch Fyne and Loch Goil)
- serpulid aggregations in Loch Sunart

- kelp and seaweed communities on sublittoral sediment (Wyre and Rousay Sounds) (finfish only)

6.1.45 Relocation of some aquaculture facilities has already occurred. It is likely that future aquaculture development in these pMPAs will need to avoid sensitive features and that this will be a factor in project siting and design. The nature of many of the pMPA features identified in paragraph 6.1.42 is such that they could be avoided in this way.

Displacement: Conclusion

6.1.46 The key pressures associated with marine activities include:

- surface abrasion and damage. For example, in demersal fishing, mobile/active gear (trawls, dredges, etc) makes contact with and moves along the surface of the seabed and can result in surface abrasion and/or damage. Surface abrasion can also be caused by anchorages/moorings (recreational and commercial), although the effects tend to be more localised.
- siltation rate changes, e.g. associated with marine disposal of dredged material and with aquaculture
- contact with the seabed, e.g. fishing using static gear. Often the issue here is the intensity of the activity. The use of static gear at moderate intensity is not an issue for most features. The issue comes with high intensity and concentration of static gear, e.g. creels/pots.
- risk of injury and/or death to mobile species. For example, the use of set nets (e.g. fyke, gill, trammel or tangle) may entangle black guillemot. Of highest risk to black guillemot would be set nets around kelp forests which are widely used for feeding. Offshore renewable energy devices also pose a risk of collision to mobile species.
- organic enrichment, e.g. pressures associated with aquaculture

6.1.47 Review of the potential for displacement has demonstrated the following:

- Designation of some pMPA features does not appear to require management measures, and these would therefore not result in displacement.
- Many of the management measures can be zoned, so displacement is unlikely to occur in pMPAs where this can be progressed.
- For infrastructure (renewables, oil and gas, cables), MPA features will need to be considered in the course of project siting and design. For the purposes of this SEA, it has been assumed that such measures will be able to successfully mitigate adverse effects on these features, and that displacement will not occur.

The results of the review are summarised in Table 9, taking these factors into account.

Table 9. Potential for displacement (red = uncertain; blue = more likely)

					infrastructure					
MPA features	marine disposal	mobile gear	static gear	diver	renew-ables	oil and gas	cables	shellfish farms	finfish farms	anchors mooring
continental slope										
northern sea fan and sponge communities										
orange roughy										
seamounts										
shelf banks and mounds										
shelf deeps										
white cluster anemones										
circalittoral sand and mud communities										
fronts										
herring spawning grounds										
circalittoral muddy sand communities										
circalittoral sand and coarse sediment communities										
common skate										
shallow tide-swept coarse sands with burrowing bivalves										
sublittoral mud and mixed sediment communities										
ocean quahog aggregations										
offshore subtidal sands and gravels										
fan mussel aggregations										
northern feather star aggregations on mixed substrata										
black guillemot										
deep-sea sponge aggregations										
kelp and seaweed communities on sublittoral sediment										
offshore deep sea muds										
seamount communities										
ocean quahog (species)										
seagrass beds										
maerl or coarse shell gravel with burrowing sea cucumbers										
sandeels										
native oysters										
serpulid aggregations										
flame shell beds										
maerl beds										
burrowed mud										
horse mussel beds										

6.1.48 The activities which appear to have the greatest potential to result in displacement comprise:

- commercial fishing using bottom-contact mobile gear, particularly hydraulic gear;
- commercial fishing using diver-operated hydraulic gear; and
- some use of static gear.

6.1.49 Some uncertainties remain, particularly with features where the recommendation has been to reduce and/or limit the pressure. Much of this uncertainty focuses around the type of measure to be employed, be it spatial and/or temporal restriction, or changes to gear types or target species.

6.1.50 For those activities where displacement will occur, it is not possible at this stage to identify alternative locations. This will be the subject of discussion with stakeholders in the course of the consultation. We are therefore unable to assess the potential environmental effects of new and/or intensified activity, other than to note the following:

- moving activities to new areas that are currently unused or have low levels of use would likely result in effects on the seabed, e.g. abrasion, surface damage, etc. The significance of these effects would depend on the nature of the seabed affected and the sensitivity of the habitat.
- moving activities to areas that are already in use may intensify existing environmental effects, including pressures on benthic habitats, pressures on fish stocks, risk of injury through collision, etc. Again, the significance of these effects would depend on the area in question, the type of activity and the current level of activity.

6.2 Marine Geodiversity

6.2.1 As with biodiversity, the pMPAs will have benefits for geodiversity features. This is their key purpose, with a focus on specific features (identified in Table 2), and the benefit of designation will primarily accrue to these features.

6.2.2 Designation and protection of these geodiversity features may result in benefits to geodiversity features in other areas of the sea, through changes to existing marine activities and/or management practices.

6.3 Climatic Factors

Increased greenhouse gas emissions

6.3.1 Displacement of commercial fishing could result in longer journeys, with increased fuel consumption and therefore increased greenhouse gas emissions. However, at this stage, it is not possible to estimate the increase in journey length. As noted in paragraph 6.1.50, we do not know where displaced mobile and/or static gear. for example, would be likely to go. In consequence, other than to say there may be an increase in fuel

consumption, it is not possible to provide estimates of such increased emissions, nor to ascertain how significant this may be in the overall context of the Scottish fleet.

6.3.2 It should be noted that the seas also offer us indirect benefits, such as nutrient cycling or reducing the effects of climate change. These are benefits that we currently gain no direct economic output from, but which provide services that would be very costly to manage ourselves if they disappeared. Habitats such as kelp forests and seagrass beds are not only important habitats for juvenile fish, but are also recognised by the United Nations Environment Programme as important carbon sinks. Carbon sinks store carbon dioxide, helping to regulate climate and contribute to mitigating change, much as peat bogs do on land.

6.4 Cumulative Effects

6.4.1 The Environmental Assessment (Scotland) Act 2005 requires that the cumulative environmental effects of the possible MPAs are identified and evaluated.

6.4.2 The cumulative effects of the pMPAs have been considered, in terms of:

- their combined effects (all the pMPAs working together); and
- in combination with other plans, programmes and/or strategies.

6.4.3 The assessment tables in Appendix 3 set out the environmental effects of each of the pMPAs. This includes the cumulative effect of having more than one feature in a pMPA.

6.4.4 Taken together, the pMPAs are likely to result in benefits to biodiversity, in terms of protection provided to the MPA features. However, there is also potential for adverse effects on biodiversity from displacement of commercial fishing activities. At this stage, for those activities where displacement is likely to occur, it is not possible to identify alternative locations. This will be the subject of discussion with stakeholders in the course of the consultation. We are therefore unable to assess the potential environmental effects of new and/or intensified activity, other than to note the following:

- moving activities to new areas that are currently unused or have low levels of use would likely result in effects on the seabed, e.g. abrasion, surface damage, etc. The significance of these effects would depend on the nature of the seabed affected and the sensitivity of the habitat.
- moving activities to areas that are already in use may intensify existing environmental effects, including pressures on benthic habitats, pressures on fish stocks, risk of injury through collision, etc. Again, the significance of these effects would depend on the area in question, the type of activity and the current level of activity.

6.4.5 In consequence, it is not possible at this stage to ascertain whether there may be cumulative effects, resulting from the effects of displacement of commercial fishing activities and the effects of other proposals for activity in

the marine environment, including the Draft Sectoral Marine Plans for Offshore Renewable Energy in Scottish Waters (part of the Planning Scotland's Seas consultation).

6.4.6 Figure 4 sets out the policy context within which the possible MPAs are being progressed, including the Marine Policy Statement and the (currently draft) National Marine Plan:

- The Marine Policy Statement sets out UK-level marine policy, and the policy framework in the draft National Marine Plan delivers these policies within the Scottish context.
- The National Marine Plan provides the overarching marine planning policy framework. This includes policy relating to activities where the marine planning and terrestrial systems overlap, for example those which occur on and around the coast or in coastal waters, such as aquaculture.

6.4.7 The focus of the possible MPAs, which is reflected in the conservation objectives, is to either:

- protect a range of biodiversity or geodiversity features in their current state for the future, or
- to allow them to recover to the state they should be to remain healthy and productive.

6.4.8 The possible MPAs will work together with the existing protection measures to provide protection to the biodiversity and geodiversity features in Scottish territorial and offshore waters. Taken together, this will be of benefit to those features.

6.4.9 In addition, the possible MPAs will contribute to meeting the objectives of the Marine Strategy Framework Directive, in terms of the achievement of good environmental status and in contributing to the objectives of good environmental status, such as the protection of seafloor systems (Qualitative Descriptor 6 of Annex I of the directive).

7.0 Next Steps

7.1 The consultation on the possible nature conservation MPAs and the accompanying Environmental Report, Sustainability Appraisal Report and BRIAs is now open, and will close on 13 November 2013. Views on this Environmental Report, and the possible nature conservation MPAs, are now invited.

7.2 Following the consultation period, the responses received will be analysed, and the findings from this analysis will be taken into account in the finalisation of the possible MPAs. Once the MPAs have been "adopted", i.e. through designation orders under section 67 of the Marine (Scotland) Act 2010, a Post-Adoption Statement will be prepared, reflecting on the findings of the assessment and the consultation, and outlining how the issues raised have been addressed.

7.3 Copies of the consultation document (2013 Possible Nature Conservation Marine Protected Areas Consultation Overview), the Environmental Report, the Sustainability Appraisal Report and the BRIAs are available for viewing during office hours at the Scottish Government library at Saughton House, Edinburgh (K Spur, Saughton House, Broomhouse Drive, Edinburgh, EH11 3XD).

7.4 Please send your comments, including a Respondent Information Form, to the Marine Scotland MPA team, by 13 November 2013.

By email to: Marine_Environment_Mailbox@scotland.gsi.gov.uk or

By post, to:

MPA Network Consultation
Scottish Government
Marine Planning and Policy Division
Area 1-A South
Victoria Quay
Edinburgh EH6 6QQ

7.5 If you have any inquiries please send them to Marine_Environment_Mailbox@scotland.gsi.gov.uk or telephone Sebastian Howell on 0131 244 5301, Michael McLeod on 0131 244 5562 or Paul Cook on 0131 244 0381.

8.0 References

Brooks, A.J. Kenyon, N.H. Leslie, A., Long, D. & Gordon, J.E. (2012). Characterising Scotland's marine environment to define search locations for new Marine Protected Areas. Part 2: The identification of key geodiversity areas in Scottish waters (2nd interim report). Scottish Natural Heritage Commissioned Report No.431.

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Marine Scotland. 2012. Report to the Scottish Parliament on Progress to Identify a Scottish Network of Marine Protected Areas.

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SEAFISH. March 2012. Responsible sourcing guide: Herring. Information sheet. Version 6. Available at: http://www.seafish.org/publications-search?__VIEWSTATE=%2FwEPDwUENTM4MQ9kFgJmD2QWAmYPZBYCZg9kFgJmD2QWAgIRD2QWAgIBD2QWAmYPZBYEAgIPDxYCHgRUZXh0ZWRkAgMPDxYCHwAFAzI0N2RkZAxTFu5GvETRcgVB%2F97cSTTGRZxD&search=herring&Submit=Search&published_beforeafter=after&date_month=1&date_year=2012

Appendix 1. Environmental Policy and Environmental Protection Objectives

A1. CONTEXT FOR THE SEA

Policy Framework

A.1 The Environmental Assessment (Scotland) Act 2005 requires responsible authorities to identify the broader policy context and the environmental protection objectives relevant to the plan, programme or strategy that is being assessed. The policy context for the development of the proposals is described in Section 2 of this report; the following paragraphs set out the broader policy environment, in terms of relationships between the proposals and other plans, programmes or strategies (PPS). Greater detail on the PPS policy context review and the environmental protection objectives is provided in this appendix.

Marine Policy

A.2 Marine policy includes international conventions, European Directives, and UK and Scottish strategy and law. The key policy messages relate to the need to balance competing interests and objectives within the marine environment within a strong protective framework. Protection of the marine environment includes managing marine transport, sustainable management of fish stocks, coastal protection and access within the context of sustainable economic growth.

Biodiversity, flora and fauna

A.3 The international context sets the framework for the conservation, protection and sustainable use of biodiversity, flora and fauna. In relation to the marine and coastal environment this includes planning for sustainable fisheries and mariculture, the protection of migratory species, including birds and fish stocks, protection of marine and coastal habitats, and management of non-native invasive species. Cetaceans and sharks are also highlighted as requiring specific protection from a range of marine activities including fishing and pollution.

A.4 There is strong emphasis on an ecosystems approach to managing and restoring marine and coastal environments. Protected sites as part of the Natura 2000 network also form a key component of the protection of fauna and flora. European and Scottish policy reflect the objectives of an eco-systems approach, action for priority species and habitats, with particular reference to the protection of seals and sustainable management of fish stocks. Building resilience to climate change is also a cross-cutting theme.

Climatic factors

A.5 The marine environment provides an important resource for achieving Scotland's renewable energy targets, which are required to achieve reductions in greenhouse gas emissions. The policy framework also provides for reducing emissions from shipping and explores the actions required to understand the necessary adaptation responses within the marine environment.

Plan, Programme or Strategy	Objectives
Marine Policy	
International	
UN Convention on the Law of the Sea 1982 (UNCLOS)[49]	Defines the rights and responsibilities of nations in their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of natural resources. It enshrines the notion that all problems of ocean space are closely interrelated and need to be addressed as a whole. Provides the framework for the establishment of territorial waters to 12 nautical miles.
European	
European Marine Strategy Framework Directive 2008 (MSFD)[50]	The MSFD is the most recent marine obligation on EU Member States. It extends the requirements of the Water Framework Directive (WFD) into seas beyond 1nm. The MSFD requires Member States to *"take necessary measures to achieve or maintain good environmental status in the marine environment by the year 2020 at the latest".* Coastal waters are also covered by the directive, and the Directive sets out the requirement for member states to develop a marine strategy.
European Integrated Maritime Policy 2007[51]	Aims to deliver a sustainable development approach for Europe's oceans and seas. Its scope includes: a marine transport strategy and new ports policy; research and data collection and management strategies, and work to mitigate climate change and reduce the impact of and adapt to the effects of climate change on coastal regions. In relation to fisheries it aims to take action in relation to eliminating discards and destructive fishing practices and promote the development of an environmentally safe aquaculture industry.
EU Common Fisheries Policy Reform[52] (the reformed CAP will enter into force in 2013)	The current reform of the Common Fisheries aims to improve fish stocks through sustainable fishing, support coastal communities, and improve governance and financing. The main points of the reform include: • fish stocks are to be brought to Maximum Sustainable Yield (MSY) by 2015; • the establishment of long term multi- annual plans, based on the best available scientific advice; • a commitment to greater regionalisation; • to phase out all discarding by 2016 with fishermen obliged to land all they catch; • the introduction of Transferable Fishing Concessions, an EU wide, and rights based management scheme.

[49] United Nations Convention on the Law of the Sea of 10 December 1982 http://www.un.org/Depts/los/convention_agreements/texts/unclos/UNCLOS-TOC.htm

[50] Directive 2008/56/EC Establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:164:0019:0040:EN:PDF

[51] An Integrated Maritime Policy for the European Union http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0575:FIN:EN:PDF

[52] Reform of the Common Fisheries Policy http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52011DC0417:EN:NOT

Plan, Programme or Strategy	Objectives
COUNCIL REGULATION (EC) No 850/98 (as amended) for the conservation of fishery resources through technical measures for the protection of juveniles of marine organisms[53]	This regulation is a set of measures aimed at ensuring the protection of fisheries resources by technical means, including fishing gear specifications, minimum fish landing sizes, catch composition rules, and establishing restricted fishing areas. There are also related transitional measures (see below) in Council Regulation (EC) No 1288/2009. *The Commission's 2008 proposal for updating the measures underwent a number of structural changes but was not agreed, therefore a roll over set of transitional measures is in place until the end of 2012. The Commission plans a new proposal for permanent measures to be developed in step with the reform of the Common Fisheries Policy which should take shape during 2012*.
United Kingdom	
Coast Protection Act 1949 (as amended by The Coast Protection (Notices) (Scotland) Regulations 1988[54] and The Coast Protection (Notices) (Scotland) Amendment Regulations 1996)[55]	Sets out the licensing and regulatory framework within which activities including navigation and flood defences are set. Aims to protect the coast from erosion and encroachment and to ensure safety in navigation. Excludes some tidal waters in Scotland. Local authorities which include coastline within their boundaries are designated as coastal protection authorities and given specific duties and powers to undertake coastal defence works where necessary.
Marine and Coastal Access Act 2009[56]	The key issues covered by the Act comprise: the creation of a Marine Management Organisation (MMO); planning in the marine area; licensing activities in the marine area; marine nature conservation; managing marine fisheries; reform of inland and migratory fisheries; modernisation and streamlining of enforcement powers; administrative penalties scheme for domestic fisheries offences; and access to coastal land.
Our seas – a shared resource – High level marine objectives for the UK[57]	Sets out high level objectives for the UK marine environment. This includes achieving a sustainable marine economy, ensuring a strong, healthy and just society, living within environmental limits, promoting good governance and using sound science responsibly. Renewable energy is strongly supported by the strategy.
Scotland	

[53] COUNCIL REGULATION (EC) No 850/98 (as amended) for the conservation of fishery resources through technical measures for the protection of juveniles of marine organisms http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1998R0850:20060117:EN:PDF
[54] The Coast Protection (Notices) (Scotland) Regulations 1988 http://www.legislation.gov.uk/uksi/1988/957/contents/made
[55] The Coast Protection (Notices) (Scotland) Amendment Regulations 1996 http://www.legislation.gov.uk/uksi/1996/141/contents/made
[56] Marine and Coastal Access Act 2009 http://www.legislation.gov.uk/ukpga/2009/23/pdfs/ukpga_20090023_en.pdf
[57] HM Government in association with Northern Ireland Executive, The Scottish Government and the Welsh Assembly Government (2009) http://www.scotland.gov.uk/Resource/Doc/1057/0080305.pdf

Plan, Programme or Strategy	Objectives
Marine (Scotland) Act 2010[58]	Provides a framework to manage activities with Scotland's marine environment in a sustainable way. Notes the importance of protecting seas whilst facilitating sustainable economic growth. Introduces a new statutory marine planning system, a simpler licensing system, improved marine nature and historic conservation with new powers to protect and manage areas of importance for marine wildlife, habitats and historic monuments; improved protection for seals and enforcement powers.
Biodiversity, Flora & Fauna	
International	
UN Convention on Biological Diversity (1992)[59]	The three main objectives of the CBD are: • the conservation of biodiversity; • the sustainable use of biodiversity; and • the sharing of benefits from the use of genetic resources (including by appropriate access to these resources). Article 6 requires that all parties to the Convention develop national biodiversity strategies, plans or programmes, and that they seek to integrate the provisions of these across other policy sectors. Article 7 requires the identification of key resources and their protection. Monitoring of potentially damaging processes and activities should also be undertaken. Two policy decisions came from the 1995 Conference of the Parties known as the Jakarta Mandate on marine and coastal biodiversity. Commitments include the development of a global system of marine and coastal protected areas, the establishment of and implementation of a global program of making fisheries and mariculture sustainable, blocking the pathways of invasions of alien species, increasing ecosystem resilience to climate change, and developing, encouraging, and enhancing implementation of wide-ranging integrated marine and coastal area management.[60]
Bonn Convention on the Conservation of Migratory Species of Wild Animals 1979[61]	Aims to conserve terrestrial, marine and avian species throughout their range through international co-operation.

[58] Marine (Scotland) Act 2010 [available online] http://www.legislation.gov.uk/asp/2010/5/pdfs/asp_20100005_en.pdf
[59] Convention on Biological Diversity [available online] http://www.cbd.int/convention/text/
[60] CBD and the Jakarta Mandate http://www.cbd.int/idb/2012/?ttle
[61] Introduction to the Convention on Migratory Species [available online] http://www.cms.int/about/intro.htm

Plan, Programme or Strategy	Objectives
Convention on Wetlands of International Importance 1971 (amended 1982/87)[62]	Otherwise known as the Ramsar Convention, this emphasises the special value of wetland, particularly as a key habitat for waterfowl, and this includes estuaries, tidal flats and near shore marine areas. The Convention resulted in designation of sites for management, sustainable use and conservation.
Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) (1992)[63] and Council Decision 2000/340/EC of 8 May 2000 concerning the approval, on behalf of the Community, of the new Annex V to the Convention for the Protection of the Marine Environment of the North-East Atlantic	The aim of the OSPAR Convention is to prevent and eliminate pollution and to protect the maritime area against the adverse effects of human activities. This Convention led to establishment of a cross-regional commission promoting an ecosystems approach to marine management, including establishment of a network of Marine Protected Areas. Its five work areas are biodiversity and ecosystems, eutrophication, hazardous substances, offshore industry, and radioactive substances). Climate change is also a key cross-cutting theme. Also includes a Biological Diversity and Ecosystems Strategy. The scope of the OSPAR Convention was limited to four main areas defined in four Annexes (on the prevention and elimination of pollution from land-based sources, by dumping or incineration, and from offshore sources, and on the assessment of the quality of the marine environment). A new Annex V was prepared, on the protection and conservation of the ecosystems and biological diversity of the maritime area. Under it, the Contracting Parties must adopt the necessary measures in order to protect and conserve the ecosystems and the biological diversity of the maritime area, and to restore, where practicable, maritime areas which have been adversely affected.
Agreement on the Conservation of African-Eurasian Migratory Waterbirds 1995 (AEWA)[64]	An independent international treaty developed under the auspices of the UNEP/Convention on Migratory Species. The AEWA covers 255 species of birds ecologically dependent on wetlands for at least part of their annual cycle, including species of divers, grebes, cormorants, herons, ducks, swans, geese, waders, gulls, and terns. An action plan[65] addresses issues including: species and habitat conservation, management of human activities, research, monitoring, education and implementation.
Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas 1992 (ASCOBANS)[66]	An agreement on the protection of small cetaceans, noting that the migratory nature of dolphins, porpoises and whales means that they can be vulnerable to a range of marine activities and issues including marine pollution and bycatch.
UN Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks 2001[67]	Sets out principles for the conservation and management of specified fish stocks and establishes that such management must be based on the precautionary approach and the best available scientific information. The Agreement elaborates on the fundamental principle, established in UNCLOS, that States should co-operate to ensure conservation and promote the objective of the optimum utilisation of fisheries resources both within and

[62] Convention on Wetlands of International Importance 1971 (amended 1982/87) http://www.ramsar.org/cda/en/ramsar-documents-texts/main/ramsar/1-31-38_4000_0__
[63] Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) http://www.ospar.org/html_documents/ospar/html/ospar_convention_e_updated_text_2007.pdf
[64] African-Eurasian Waterbird Agreement http://www.cms.int/species/aewa/aew_text.htm
[65] African-Eurasian Waterbird Agreement Action Plan http://www.cms.int/species/aewa/aew_ap.htm
[66] Convention on migratory species Agreement on the conservation of small cetaceans of the Baltic and North Seas http://www.cms.int/species/ascobans/asc_bkrd.htm
[67] UN Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks 2001 http://www.un.org/Depts/los/convention_agreements/convention_overview_fish_stocks.htm

Plan, Programme or Strategy	Objectives
	beyond the exclusive economic zone.
International Plan of Action for the Conservation and Management of Sharks 1999 and the UK Plan of Action for the Conservation and Management of Sharks[68]	The objective of the IPOA-SHARKS is to ensure the conservation and management of sharks and their long-term sustainable use. Threats to sharks include fishing pressures, habitat loss, pollution, disturbance from eco-tourism, climate change and the fields produced by sub-sea electric cables. The objectives for national Shark Plans should include assessment of threats, ensuring sustainable catch through directed and non directed fisheries, and improved data gathering and monitoring. There are 25 species of sharks in Scottish waters, of which a high proportion are already or nearly at risk.
European	
Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive)[69]	Established a commitment to designating networks of sites of ecological importance across Europe. These are known as Natura 2000 sites and include special protection areas (SPAs designated under the Birds Directive – see following paragraph) and special areas of conservation (SACs).
Council Directive 79/409/EEC on the conservation of wild birds (the Birds Directive)[70]	Protects all wild birds (together with their nests and eggs) and their associated habitats. Commitment to designation of SPAs (included in Natura 2000 sites - see preceding paragraph).
Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979)[71]	Aims to ensure conservation and protection of wild plant and animal species and their natural habitats and to promote co-operation between European states to protect biodiversity. Implemented in UK law by the Wildlife and Countryside Act (1981 and as amended).
The Pan-European Biological and Landscape Diversity Strategy (1995)[72]	The Strategy aims to reverse the decline of landscape and biological diversity, by promoting innovation and proactive policy making. It supports preceding measures for protecting natural heritage, and aims to supplement this by further promoting a number of action themes relating to different environmental resources. The long-term objectives of the strategy are: ▸ the establishment of a Pan-European Ecological Network to conserve ecosystems, habitats, species and landscapes that are of European importance; ▸ the sustainable management and use of Europe's biodiversity; ▸ integrating biodiversity conservation and sustainability into the activities of other sectors, such as agriculture, forestry, fisheries, industry, transport and tourism; ▸ improving information on and awareness of biodiversity and increasing public participation in conservation actions;

[68] Plan of Action for the Conservation and Management of Sharks in UK Waters (2004) http://jncc.defra.gov.uk/pdf/jncc360.pdf
[69] Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) http://europa.eu/legislation_summaries/environment/nature_and_biodiversity/l28076_en.htm
[70] Council Directive 79/409/EEC on the conservation of wild birds http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:020:0007:0025:EN:PDF
[71] The Convention on the Conservation of European Wildlife and Natural Habitats http://conventions.coe.int/Treaty/EN/Treaties/Html/104.htm
[72] Pan-European Biological and Landscape Diversity Strategy http://www.peblds.org/index.php?ido=20514351&lang=eng

Plan, Programme or Strategy	Objectives
	▸ improving our understanding of the state of Europe's biodiversity; ▸ assuring that adequate funds are made available to implement the strategy.
Our life insurance, our natural capital: an EU Biodiversity Strategy to 2020[73]	The strategy has six main targets and 20 actions to halt the loss of biodiversity and ecosystem services in the EU by 2020. The six targets cover: • Full implementation of EU nature legislation to protect biodiversity • Better protection for ecosystems, and more use of green infrastructure • More sustainable agriculture and forestry • Better management of fish stocks • Tighter controls on invasive alien species • A bigger EU contribution to averting global biodiversity loss
United Kingdom	
Wildlife and Countryside Act 1981[74]	Provides the framework for protection of species other than European Protected Species. Sets out protection objectives for specified birds and wild animals. The Act's various schedules detail the species that are protected under the Act, including dolphins, porpoises, and numerous birds such as geese and ducks. This was reviewed and updated in December 2008 and it was recommended that several further species of marine fish should be added to the lists attached to the Act, including shark, seahorse and ray species.
The Conservation (Natural Habitats, &c) Regulations 1994[75]	Transposes the requirements for protection of designated sites under the Habitats and Birds Directives, and the framework for protection of European Protected Species. Applies within 12nm. Several marine species are protected by various development consenting regimes covered by the Act. This includes marine turtles, all species of dolphins, porpoise and whale, seals and several types of marine fish (Atlantic salmon, barbel etc.)
UK Biodiversity Action Plan 1994 (UKBAP) (Since the creation of the UK BAP, devolution has led the four countries of the UK (England, Northern Ireland, Scotland and Wales) to produce their own country biodiversity groups and country biodiversity strategies. In 2007, however, a shared vision for UK biodiversity conservation was adopted by the devolved administrations and the UK governments, and is described in	In response to the 1992 Convention on Biological Diversity, this describes the UK's biological resources, commits a detailed plan for the protection of these resources. Sets out 1150 species and 65 habitats which are priorities for conservation action in the UK. The list was last updated in 2007 and includes 87 species in the marine group. Numerous habitats are also relevant to Scotland's marine environment, including several which are specific to coastal areas (salt marsh, sand dunes) or the marine environment (including machair, maerl beds, mud habitats in deep water, estuarine rocky habitats, blue mussel beds, carbonate mounds, tide swept channels, reefs, and intertidal mudflats).

[73] Our life insurance, our natural capital: an EU biodiversity strategy to 2020 http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/2020/1_EN_ACT_part1_v7%5b1%5d.pdf
[74] Wildlife and Countryside Act 1981 http://www.legislation.gov.uk/ukpga/1981/69
[75] The Conservation (Natural Habitats, &c) Regulations 1994 http://www.legislation.gov.uk/uksi/1994/2716/contents/made

Plan, Programme or Strategy	Objectives
'Conserving Biodiversity – the UK Approach')[76]	
Conserving Biodiversity – the UK Approach (2007)[77]	A framework document for biodiversity identifies six priorities for implementing biodiversity objectives within the integrating framework of an ecosystem approach: • protecting the best sites for wildlife; • targeting action on priority species and habitats; • embedding proper consideration of biodiversity and ecosystem services in all relevant sectors of policy and decision-making; • engaging people, and encouraging behaviour change; • developing and interpreting the evidence base; • ensuring that the UK plays a proactive role in influencing the development of Multilateral Environmental Agreements, and contributes fully to their domestic delivery.
Scotland	
Nature Conservation (Scotland) Act 2004[78]	Introduced a 'duty to further the conservation of biodiversity' for all public bodies, and sets out more specific provisions within this including for Sites of Special Scientific Interest. Also states a requirement for the preparation of a Scottish Biodiversity Strategy, to which all public bodies should pay regard. Applies to 12nm around Scotland and includes protection measures for marine species.
Scotland's Biodiversity – It's In Your Hands. A strategy for the conservation and enhancement of biodiversity in Scotland (2004) (Scotland's Biodiversity Strategy is currently being reviewed and was consulted on in summer 2012)	Sets out Scottish aims relating to biodiversity over 25 year period. Seeks to go beyond a previous emphasis on protecting individual sites to achieve conservation at a broader scale. Aims to halt loss and reverse decline of key species, to raise awareness of biodiversity value at a landscape or ecosystem scale, and to promote knowledge, understanding and involvement amongst people. The Strategy notes the importance and health of Scotland's ecosystems, and summarises key trends.
The Marine (Scotland) Act 2010 (the Act) repealed the Conservation of Seals Act 1970 on 31st January 2011[79].	On 31 January 2011, Part 6 of the Marine (Scotland) Act 2010 came into force. Part 6 seeks to balance seal conservation with sustainable fisheries and aquaculture and its introduction means: It is an offence to kill or injure a seal except under licence or for welfare reasons, outlawing unregulated seal shooting that was permitted under previous legislation A number of seal conservation areas around Scotland will begin to be introduced, designed to protect vulnerable, declining common seal populations A new seal licensing system, providing a well regulated and monitored context for seal management in Scotland has been introduced.
A Strategy for Marine Nature Conservation in Scotland's Seas	The strategy sets out aims and objectives for protecting and, where appropriate, enhancing valuable marine biodiversity in the marine area where Scottish Ministers have devolved responsibility (Scottish territorial waters

[76] Conserving Biodiversity the UK Approach (2007) http://jncc.defra.gov.uk/PDF/UKBAP_ConBio-UKApproach-2007.pdf
[77] Conserving Biodiversity – the UK Approach (2007) http://jncc.defra.gov.uk/PDF/UKBAP_ConBio-UKApproach-2007.pdf
[78] http://www.legislation.gov.uk/asp/2004/6/pdfs/asp_20040006_en.pdf
[79] Seal Conservation Areas [available online] http://www.scotland.gov.uk/Topics/marine/marine-environment/species/19887/20814/sealconareas

Plan, Programme or Strategy	Objectives
	and the Scottish offshore region). The strategy is designed to facilitate co-operation in pursuit of shared marine objectives in the UK and to meet national and international obligations. These include the achievement of Good Environmental Status under the Marine Strategy Framework Directive (MSFD).
Climatic Factors	
Scotland	
Climate Change (Scotland) Act 2009[80]	The Climate Change (Scotland) Act includes a greenhouse gas emissions reduction target of 80% by 2050 and an interim target of 42% by 2020. Proposals include setting of targets for 2050 and interim periods, requirement for annual reporting, and provisions for meeting targets through additional policies and legislation. The targets include emissions from the aviation and shipping sectors. .
Climate Change Delivery Plan: meeting Scotland's statutory climate change targets (2009)[81]	Sets out the measures required to meet Scotland's targets for climate change mitigation included in the Act (above). Includes commitments to the development of the renewable energy sector, including marine renewables. Also aims to reduce emissions from aviation and shipping. Further reductions could arise from the use of biofuels in shipping and improved energy efficiency measures, but interventions will be required to achieve this. Notes that shipping can be an efficient mode of freight transport, despite the recorded emissions from the sector.
Climate Change Sector Adaptation Action Plan: Marine and Fisheries (2011)[82]	Sets out a number of objectives including raising awareness of climate change to the wider marine stakeholder community (through the Marine Strategy Forum). Also aims to build evidence to support future adaptation action and build further policies that respond to impacts.

[80] Climate change (Scotland) Act 2009[available online] http://www.legislation.gov.uk/asp/2009/12/contents
[81] Scottish Government (2009) Climate Change Delivery Plan [available online] http://www.scotland.gov.uk/Resource/Doc/276273/0082934.pdf
[82] Scotland's Climate Change Adaptation Framework Marine and Fisheries Sector Action Plan [available online] http://www.scotland.gov.uk/Resource/Doc/175776/0114919.pdf

Appendix 2. Third-Party Proposals for Nature Conservation MPAs

Submitter	Code	Region	NC MPA proposal name	Features identified as the basis for the proposed NC MPA (MPA search feature priorities in bold)	Overlapping MPA proposal	Progression
Small Isles Community Council (SICC)	SICC1	III	Sound of Canna	It is proposed that the Sound of Canna is designated for its benthic communities, notably its deep **burrowed mud** (**fan mussel**, burrowing anemone and **northern feather star**), maerl and infralittoral reefs.	Small Isles	Yes
Community of Arran Seabed Trust (COAST)	COAST1	III	Isle of Arran	The proposed MPA will protect priority marine features including habitats such as maerl beds, seagrass beds and **burrowed mud** substrates and the species reliant upon these habitats	South Arran	Yes
Scottish Sea Angling Conservation Network (SSACN)	SSACN1	III	Firth of Lorn	Proposal is made for **common skate**.	Loch Sunart to Sound of Jura	Yes
	SSACN2	III	Loch Etive	Proposal is made for spurdog.	-	No
	SSACN3	III	Sound of Jura	Proposal is made for **common skate.**	Loch Sunart to Sound of Jura	Yes
	SSACN4	III	Sound of Mull	Proposal is made for **common skate**.	Loch Sunart to Sound of Jura	Yes
	SSACN5	III	Loch Sunart	Proposal is made for **common skate** and spurdog.	Loch Sunart to Sound of Jura	Yes
Marine Conservation Society (MCS)	MCS1	III	Loch Carron	The purpose of this Marine Protected Area would be to protect the following features in Loch Carron: **flame shell beds**, horse mussel beds, maerl beds, and **burrowed mud** communities.	-	No
	MCS2	III	Loch Duich, Long, Alsh, Beg.	The purpose of this Marine Protected Area would be to protect the excellent example of **burrowed mud** communities.	Lochs Duich, Long and Alsh	Yes
	MCS3	III	Upper Loch Fyne	The purpose of this Marine Protected Area would be to protect the following features in Loch Fyne: **burrowed mud**, **flame shell beds**, maerl beds and reefs.	Upper Loch Fyne and Loch Goil	Yes
	MCS4	III	Loch Sunart	The purpose of this Marine Protected Area proposal is to ensure the protection of the following features in Loch Sunart: **flame shell beds,** northern sea fan and sponge communities.	Loch Sunart & Loch Sunart to Sound of Jura	Yes

Submitter	Code	Region	NC MPA proposal name	Features identified as the basis for the proposed NC MPA (MPA search feature priorities in bold)	Overlapping MPA proposal	Progression
Marine Conservation Society (MCS)	MCS5	III	Loch Sween	The purpose of this Marine Protected Area would be to protect the unusual assemblages of marine life found in the various arms and narrows of Loch Sween including the following MPA search features: **burrowed mud, inshore deep mud with burrowing heart urchins,** maerl beds**,** seagrass beds**, native oysters.**	Loch Sween	Yes
	MCS6	III	Loch Torridon	The purpose of this Marine Protected Area proposal is to ensure that information is included that can contribute to the protection of the following features in Loch Torridon: maerl beds, **burrowed mud**, seagrass beds.	-	No
	MCS7	III	Isle of Coll	The purpose of this Marine Protected Area would be provide protection to an excellent example of the following MPA search features: kelp and seaweed communities on sublittoral sediment, tide-swept algal communities (kelp and seaweed communities in tide-swept sheltered conditions) and seagrass beds.	Skye to Mull	Not in this format - further work is ongoing on the Skye to Mull search location but for mobile species only
Whale & Dolphin Conservation Society (WDCS) & Hebridean Whale and Dolphin Trust (HWDT) & Cetacean Research and rescue Unit (CRRU)	WDCS1	II	Aberdeenshire coast	The proposal is being put forward for the protection of **white-beaked dolphin.**	-	No - but this proposal will be considered as part of a regional review for cetaceans
	WDCS2	III	Northern Minch	The proposal is being put forward for the protection of **Risso's dolphin & white-beaked dolphin.**	Eye Peninsula to Butt of Lewis	Yes - further work ongoing on this MPA search location
	WDCS3	III	Southern Hebrides	This proposal put forward for the protection of **minke whale.**	Skye to Mull & Small Isles	Yes - further work ongoing on this MPA search location
	WDCS4	II	Southern Moray Firth	The proposal is being put forward for the protection of **minke whale.**	Southern Trench	Yes - further work ongoing on this MPA search location
	WDCS5	III	Outer Hebrides	The proposal is being put forward for the protection of **white-beaked dolphin.**	-	No

Submitter	Code	Region	NC MPA proposal name	Features identified as the basis for the proposed NC MPA (MPA search feature priorities in bold)	Overlapping MPA proposal	Progression
Royal Society for the Protection of Birds (RSPB)	RSPB1	III	Abbey Burn Foot to Balcary Pt	The proposal is made for bird species including fulmar, guillemot and razorbill.	-	No
	RSPB2	III	Mull of Galloway	The proposal is made for bird species fulmar and razorbill.	-	No
	RSPB3	III	Sanda Islands	The proposal is made for bird species razorbill.	Clyde Sea Sill	Not for razorbill - for black guillemot and fronts
	RSPB4	III	Scare Rocks	The proposal is made for bird species gannet	-	No
	RSPB5	III	Treshnish Isles	The proposal is made for bird species manx shearwater, puffin, razorbill, guillemot and fulmar.	Skye to Mull	Not in this format - further work is ongoing on the Skye to Mull search location but for cetacean and basking shark only
	RSPB6	II	Whiting Ness to Ethie Haven	The proposal is made for bird species fulmar and puffin.	-	No
National Trust for Scotland (NTS)	NTS1	III	Lochs Duich, Long and Alsh	Proposal is made for benthic habitats including blue mussel beds, **burrowed mud**, tall sea-pen, fireworks anemone, **inshore deep mud with burrowing heart urchins**, horse mussel beds, low or variable salinity habitats, maerl beds, **northern sea fan, flame shell beds**, kelp and seaweed communities in tide-swept sheltered conditions, **northern feather star, fan mussel**, and **ocean quahog.**	Lochs Duich, Long and Alsh	Yes

Submitter	Code	Region	NC MPA proposal name	Features identified as the basis for the proposed NC MPA (MPA search feature priorities in bold)	Overlapping MPA proposal	Progression
Gairloch and Wester Ross Community	GWR1	III	Gairloch & Loch Ewe	Harbour seal, **sandeels**, grey seal, European spiny lobster, **common skate**, **black guillemot**, **northern feather star, ocean quahog**, **native oysters**, seagrass beds, kelp and seaweed communities on sublittoral sediment, tide-swept algal communities, sea loch egg wrack**, burrowed mud**, **northern sea fan and sponge communities**, maerl beds, **horse mussel beds**, blue mussel beds, herring spawning grounds, **basking shark, minke whale**, harbour porpoise, terns, black-throated divers, red-throated divers, great northern diver.	North-west sea lochs and Summer Isles	Yes (in part - Loch Ewe but not Loch Gairloch)

Appendix 3. Assessment Tables

SEA Objectives	
Biodiversity, flora and fauna	Key: environmental effects
Obj 1: to safeguard (and, where appropriate, enhance) marine and coastal ecosystems, including species and habitats, and their interactions	
Obj 2: to maintain or work towards good ecological/environmental status of water bodies	Work against SEA objective
Obj 3: to maintain and protect the character and integrity of the seabed	No change
Geodiversity	Mixed effects
Obj 4: to safeguard (and, where appropriate, enhance) geodiversity features	Promote SEA objective
Climatic factors	Uncertain
Obj 5 – To reduce greenhouse gas emissions from vessels	

Possible MPA	**Objective 1**	**Objective 2**	**Objective 3**	**Objective 4**	**Objective 5**
Territorial waters					
Clyde Sea Sill (CSS) *Biodiversity protected features - black guillemot; circalittoral sand and coarse sediment communities; fronts* *Geodiversity protected features - Marine Geomorphology of the Scottish Shelf Seabed*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of diver-operated hydraulic gear from *circalittoral sand and coarse sediment communities* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
East Caithness Cliffs (ECC) *Biodiversity protected features - black guillemot*	protection of MPA features	not applicable	not applicable	not applicable	not applicable
Fetlar to Haroldswick (FTH) *Biodiversity protected features - black guillemot; circalittoral sand and coarse sediment communities; horse mussel beds; kelp and seaweed communities on sublittoral sediments; maerl beds; shallow tide-swept coarse sands with burrowing bivalves* *Geodiversity protected features - Marine Geomorphology of the Scottish Shelf Seabed*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of diver-operated hydraulic gear from *circalittoral sand and coarse sediment communities; horse mussel beds; kelp and seaweed communities on sublittoral sediments; maerl beds; shallow tide-swept coarse sands with burrowing bivalves* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				

Possible MPA	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Loch Creran (LCR) *Biodiversity protected features - flame shell beds* *Geodiversity protected features - Quaternary of Scotland*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of diver-operated hydraulic gear from *flame shell beds* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
Lochs Duich, Long and Alsh (DLA) *Biodiversity protected features - burrowed mud, flame shell beds*	protection of MPA features	protection of MPA features	protection of MPA features	not applicable	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of diver-operated hydraulic gear from *burrowed mud* and *flame shell beds* and mobile gear from *burrowed mud* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
Loch Sunart (LSU) *Biodiversity protected features - flame shell beds; northern feather star aggregations on mixed substrata; serpulid aggregations*	protection of MPA features	protection of MPA features	protection of MPA features	not applicable	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear from *serpulid aggregations* and diver-operated hydraulic gear from *flame shell beds* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
Loch Sunart to the Sound of Jura (SJU) *Biodiversity protected features - common skate* *Geodiversity protected features - Quaternary of Scotland*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	not applicable
Loch Sween (LSW) *Biodiversity protected features - burrowed mud; maerl beds; native oysters; sublittoral mud and mixed sediment communities*	protection of MPA features	protection of MPA features	protection of MPA features	not applicable	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear from *burrowed mud* and *native oysters* and diver-operated hydraulic gear from *burrowed mud, maerl beds, native oysters* and *sublittoral mud and mixed sediment communities* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				

Possible MPA	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Monach Isles (MOI) *Biodiversity protected features - black guillemot* *Geodiversity protected features - Marine Geomorphology of the Scottish Shelf Seabed; Quaternary of Scotland*	protection of MPA features	not applicable	not applicable	protection of MPA features	not applicalbe
Mousa to Boddam (MTB) *Biodiversity protected features – sandeels* *Geodiversity protected features - Marine Geomorphology of the Scottish Shelf Seabed*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear and diver-operated hydraulic gear from *sandeels* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
North-west sea lochs and Summer Isles (NWS) *Biodiversity protected features - burrowed mud; circalittoral muddy sand communities; flame shell beds; kelp and seaweed communities on sublittoral sediments; maerl beds; maerl or coarse shell gravel with burrowing sea cucumbers; northern feather star aggregations on mixed substrata* *Geodiversity protected features - Marine Geomorphology of the Scottish Shelf Seabed; Quaternary of Scotland; Seabed Fluid and Gas Seep; Submarine Mass Movement*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear from *burrowed mud, maerl or coarse shell gravel with burrowing sea cucumbers* and diver-operated hydraulic gear from *flame shell beds, kelp and seaweed communities on sublittoral sediments, maerl beds, maerl or coarse shell gravel with burrowing sea cucumbers* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
Noss Head (NOH) *Biodiversity protected features - horse mussel beds*	protection of MPA features	protection of MPA features	protection of MPA features	not applicable	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of marine disposal and diver-operated hydraulic gear from *horse mussel beds* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				

Possible MPA	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Papa Westray (PWY) *Biodiversity protected features - black guillemot* *Geodiversity protected features - Marine Geomorphology of the Scottish Shelf Seabed*	protection of MPA features	not applicable	not applicable	protection of MPA features	not applicable
Small Isles (SMI) *Biodiversity protected features - black guillemot; burrowed mud, circalittoral sand and mud communities; fan mussel aggregations; horse mussel beds; northern feather star aggregations on mixed substrata; northern sea fan and sponge communities; shelf deeps; white cluster anemones* *Geodiversity protected features - Quaternary of Scotland*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear from *burrowed mud* and diver-operated hydraulic gear from *horse mussel beds* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
South Arran (ARR) *Biodiversity protected features - burrowed mud; herring spawning grounds; kelp and seaweed communities on sublittoral sediments; maerl beds; maerl or coarse shell gravel with burrowing sea cucumbers; ocean quahog; seagrass beds; shallow tide-swept coarse sands with burrowing bivalves*	protection of MPA features	protection of MPA features	protection of MPA features	not applicable	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear from *burrowed mud, maerl or coarse shell gravel with burrowing sea cucumbers, ocean quahog, seagrass beds and* diver-operated hydraulic gear from *kelp and seaweed communities on sublittoral sediments, maerl beds, maerl or coarse shell gravel with burrowing sea cucumbers, ocean quahog, seagrass beds* and *shallow tide-swept coarse sands with burrowing bivalves* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
Upper Loch Fyne and Loch Goil (LFG) *Biodiversity protected features - burrowed mud; flame shell beds; horse mussel beds; ocean quahog; sublittoral mud and mixed sediment communities*	protection of MPA features	protection of MPA features	protection of MPA features	not applicable	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear from *burrowed mud, ocean quahog* and diver-operated hydraulic gear from *flame shell beds, horse mussel beds, ocean quahog* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				

Possible MPA	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Wyre and Rousay Sounds (WYR) *Biodiversity protected features - kelp and seaweed communities on sublittoral sediment; maerl beds* *Geodiversity protected features - Marine Geomorphology of the Scottish Shelf Seabed*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of diver-operated hydraulic gear from *kelp and seaweed communities on sublittoral sediment, maerl beds* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
Offshore waters					
Central Fladen (CFL) *Biodiversity protected features - burrowed mud* *Geodiversity protected features - Quaternary of Scotland*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear from *burrowed mud* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
East of Gannet and Montrose Fields (EGM) *Biodiversity protected features - ocean quahog aggregations (including sands and gravels as their supporting habitat); offshore deep sea muds*	protection of MPA features	protection of MPA features	protection of MPA features	not applicable	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear from *ocean quahog aggregations (including sands and gravels as their supporting habitat)* and of mobile and static gear from *offshore deep sea muds* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
Faroe-Shetland sponge belt (FSS) *Biodiversity protected features - continental slope; deep-sea sponge aggregations; ocean quahog aggregations; offshore subtidal sands and gravels* *Geodiversity protected features - Marine Geomorphology of the Scottish Deep Ocean Seabed; Quaternary of Scotland; Submarine Mass*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear from *deep-sea sponge aggregations; ocean quahog aggregations; offshore subtidal sands and gravels* and static gear from *deep-sea sponge aggregations* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				

Possible MPA	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Firth of Forth Banks Complex (FOF) *Biodiversity protected features - ocean quahog aggregations; offshore subtidal sands and gravels; shelf banks and mounds* *Geodiversity protected features - Quaternary of Scotland*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear from *ocean quahog aggregations*; *offshore subtidal sands and gravels* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
Geikie Slide and Hebridean slope (GSH) *Biodiversity protected features - burrowed mud; continental slope; offshore deep-sea muds, offshore subtidal sands and gravels* *Geodiversity protected features - Submarine Mass Movement*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear from *burrowed mud, offshore deep-sea muds, offshore subtidal sands and gravels* and static gear from *offshore deep-sea muds* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
Hatton-Rockall Basin (HRB) *Biodiversity protected features - deep-sea sponge aggregations; offshore deep-sea muds* *Geodiversity protected features - Marine Geomorphology of the Scottish Deep Ocean Seabed*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile and static gear from *deep-sea sponge aggregations, offshore deep-sea muds* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
North-east Faroe Shetland Channel (NEF) *Biodiversity protected features - continental slope; deep-sea sponge aggregations; offshore deep-sea muds; offshore subtidal sands and gravels* *Geodiversity protected features - Cenozoic Structures of the Atlantic Margin; Marine Geomorphology of the Scottish Deep Ocean Seabed; Quaternary of Scotland; Submarine Mass Movement*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile and static gear from *deep-sea sponge aggregations, offshore deep-sea muds* and mobile gear from *offshore subtidal sands and gravels* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				

Possible MPA	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
North-west Orkney (NWO) *Biodiversity protected features – sandeels* *Geodiversity protected features - Marine Geomorphology of the Scottish Shelf Seabed*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile and diver-operated hydraulic gear from *sandeels* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
Norwegian boundary sediment plain (NSP) *Biodiversity protected features - ocean quahog aggregations (including sands and gravels as their supporting habitat), offshore subtidal sands and gravels*	protection of MPA features	protection of MPA features	protection of MPA features	not applicable	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear from *ocean quahog aggregations*; *offshore subtidal sands and gravels* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
Rosemary Bank Seamount (RBS) *Biodiversity protected features - deep-sea sponge aggregations; seamount features; seamount communities* *Geodiversity protected features - Cenozoic Structures of the Atlantic Margin; Marine Geomorphology of the Scottish Deep Ocean Seabed; Quaternary of Scotland; Submarine Mass Movement*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile and static gear from *deep-sea sponge aggregations, seamount communities* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
South-east Fladen (SEF) *Biodiversity protected features - burrowed mud* *Geodiversity protected features - Seabed Fluid and Gas Seep*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear from *burrowed mud* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				

Possible MPA	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
South-west Sula Sgeir and Hebridean slope (SSH) *Biodiversity protected features - burrowed mud; continental slope; offshore deep-sea muds; offshore subtidal sands and gravels* *Geodiversity protected features - Quaternary of Scotland; Submarine Mass Movement*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear from *burrowed mud, offshore subtidal sands and gravels* and of mobile and static gear from *offshore deep-sea muds* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
The Barra Fan and Hebrides Terrace Seamount (BHT) *Biodiversity protected features - burrowed mud; continental slope; offshore deep-sea muds; offshore subtidal sands and gravels; orange roughy; seamount; seamount communities* *Geodiversity protected features - Cenozoic Structures of the Atlantic Margin; Marine Geomorphology of the Scottish Deep Ocean Seabed; Quaternary of Scotland; Submarine Mass Movement*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear from *burrowed mud, offshore subtidal sands and gravels* and of mobile and static gear from *offshore deep-sea muds, seamount communities* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
Turbot Bank (TBB) *Biodiversity protected features - sandeels, offshore subtidal sands and gravels, shelf banks and mounds*	protection of MPA features	protection of MPA features	protection of MPA features	not applicable	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear and diver-operated hydraulic gear from *sandeels* and of mobile gear from *offshore subtidal sands and gravels* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				
West Shetland Shelf (WSS) *Biodiversity protected features - offshore subtidal sands and gravels*	protection of MPA features	protection of MPA features	protection of MPA features	not applicable	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear from *offshore subtidal sands and gravels* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				

Possible MPA	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Western Fladen (WFL) *Biodiversity protected features - burrowed mud* *Geodiversity protected features - Quaternary of Scotland*	protection of MPA features	protection of MPA features	protection of MPA features	protection of MPA features	There is potential for increased GHG emissions from increased journey lengths, should these occur. Significance of such increases is uncertain.
	Potential for displacement of mobile gear from *burrowed mud* may result in adverse effects on benthic species/habitat in another location. Alternative locations remain to be identified. Significance is therefore uncertain.				

ISBN: 978-1-78256-807-0 (web only)

The Scottish Government
St Andrew's House
Edinburgh
EH1 3DG

Produced for the Scottish Government by APS Group Scotland
DPPAS14579 (08/13)

Published by the Scottish Government, August 2013