

Management Proposals of Inshore Fisheries Groups

Strategic Environmental Assessment Environmental Report

August 2013

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Scottish Government

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**The Scottish
Government**
Riaghaltas na h-Alba

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Non-Technical Summary

Introduction

1. Marine Scotland is consulting on the proposals in the Inshore Fisheries Groups (IFGs) Management Plans that may have a significant environmental effect. These proposals have been subject to a strategic environmental assessment (SEA), and the results are set out in the Environmental Report. This document is the Non-Technical Summary of that Environmental Report.

The IFG Management Proposals

2. The *Strategic Framework for Scottish Inshore Fisheries* established six pilot Inshore Fisheries Groups (IFGs), who have prepared Management Plans for their areas (Outer Hebrides; Clyde; South East; North West; Small Isles and Mull; and Moray Firth IFGs). In general the proposals in the plans cover the following areas of activity:
 - activities to support the opening of new and/or closed fisheries, including the collection of baseline information.
 - fisheries management measures e.g. permit control, increases in minimum landing sizes, restrictions on gear, reduction of discards/bycatch
 - conflict resolution mechanisms e.g. codes of conduct
 - economic activities e.g. marketing, labelling, sustainable fisheries accreditation, measures to support economic diversification
3. As part of the Inshore Fisheries Strategy 2012, Scottish Ministers will support and focus on the priorities identified in the IFG Management Plans.

The Strategic Environmental Assessment

4. SEA identifies the likely environmental impacts of plans and policies, and alternatives to them. SEA provides opportunities for the public, including those who might be affected by the proposals, to consider this information and use it to inform their views.
5. Some of the IFG management proposals are considered to have no or minimal environmental effects, for example, measures relating to marketing. These will be implemented locally by the IFGs. The remainder (Tables 1a and 1b) have the potential to give rise to significant environmental effects and it is these that have been subject to SEA, in accordance with the Environmental Assessment (Scotland) Act 2005.
6. The SEA has focused on potential effects on biodiversity, flora and fauna¹, climate change and the marine historic environment.

¹ includes ecological/environmental status, pollution issues, and marine geology, sediment and coastal processes

Table 1a. Strategic actions with potential for significant environmental effects

Item	Area						Focus of Action	Potential Effect?
	Clyde	Small Isles & Mull	Outer Hebrides	Moray Firth	South East	North West		
Fisheries accreditation	√		√	√	√	√	sustainability accreditation	benefit
Increase minimum landing size								
Brown Crab	√		√		√		population management	benefit
Velvet Crab	√	√	√					benefit
Lobster	√		√			√		benefit
Nephrops			√			√		benefit
Crawfish (Establish best practice maximum landing size)		* √	√					benefit
Razor fish (from 110mm to 175mm)	√							benefit
return and v-notch berried lobsters	√		√			√		benefit
Return berried creel caught Nephrops	√		√			√		benefit
Crawfish - no landing of berried females		√	√					benefit
Lobsters – reduce maximum landing size for females			√					benefit
Velvet Crab – return berried females	√						benefit	
Evaluate effects of increased creel mesh size & escape panels			√		√	√	benefit	
Develop Mackerel and/or Herring Fishery		√	√	√	√	√	new fishery	adverse
Establish a small scale sprat fishery				√	√		new fishery	adverse
Investigate whether existing fisheries can be developed based on sound management (Squid, Cockles)				√	√		fishery development	mix: potential adverse and beneficial effects on

Item	Area						Focus of Action	Potential Effect?
	Clyde	Small Isles & Mull	Outer Hebrides	Moray Firth	South East	North West		
								biodiversity and fish stocks
Razorfish - In addition to local reporting wider scientific research programme and investigate the potential for specialised gear to be developed and used in razor fishery				√	√		fishery development	mix: potential adverse and beneficial effects on biodiversity and fish stocks
Clam fishery – Investigate whether existing fishery can be developed based on sound management					√	√	fishery development	mix: potential adverse and beneficial effects on biodiversity and fish stocks
Participate in national and regional management of Nephrops					√	√	fisheries management	
Investigate separate management of Moray Firth functional unit					√	√	fisheries management	
Investigate static gear only zones for Nephrops in areas with multiple resource use					√	√	fisheries management	
Hobby fishermen – controlling or	√ (1)				√ (2)	√ (3)	population	Uncertain;

Item	Area						Focus of Action	Potential Effect?
	Clyde	Small Isles & Mull	Outer Hebrides	Moray Firth	South East	North West		
monitoring of activity 1. Creel limits need clear signage and/or quota restrictions 2. Monitor activity and ensure clear creel marking 3. Lobster/Crabs/ Scallops							management	may benefit
Access/regulatory measures for licensed fishermen in IFG areas								
Cap creel vessel numbers		√					population management	benefit
Nephrops permits; closed areas						√		benefit
Introduce permit for shell fisheries					√			benefit
Effort control within shellfish licensed fleet				√				benefit
Review access arrangements in all fisheries (e.g. zoning/spatial management & consultation code)	√		√					benefit

Table 1b. Scientific surveys/ development of new fisheries/ management measures with potential for significant environmental effects

Area	Strategic Action	Focus of Action	Potential effect?
Clyde	Data gathering in order to develop fishery with appropriate stock assessment, management systems and measures (Cockles, Mussels, Winkles, Oysters, Scallops, Razorfish) Data gathering in order to develop pilot fisheries with appropriate management measures (Brown shrimp, Paelamon Prawns, Squat lobsters, Otter shell, other Bivalves) Reduce discards – cod recovery	fishery development identification of fisheries management measures	mix: potential adverse and beneficial effects on biodiversity and fish stocks
Moray Firth	Explore funding for new fishing techniques/trials Stock assessments and under-utilised species Sprat fishery – determine and evaluate the economic viability of development of sprat fishery within the area Whelk - Investigate whelk stock in area Lobster - Establish lobster stock’s status to establish possible management measures Green Crab – establish importance of commercial fishery Mussel - determine if significant sub tidal mussel beds exist with the MFIFG area establish importance of commercial fishery within area to determine developing opportunities Native Oyster – Investigate whether existing fishery can be developed based on sound management Queen scallop – establish if scallops can be developed as a targeted fishery or form a by-catch from other fishing activity Plaice – establish stocks in local area Clam – identify stocks within the area and determine if existing fishery can be developed Seek to secure appropriate funding and support for the development of sustainable fishing techniques, exploratory fishery trials, stock	fishery development new fishing techniques identification of fisheries management measures potential infrastructure proposals	mix: potential adverse and beneficial effects on biodiversity and fish stocks

Area	Strategic Action	Focus of Action	Potential effect?
	<p>assessment/dynamic research and market evaluation of market opportunities for under-utilised species</p> <p>Investigate the potential for jigging and squid fishery</p> <p>Monitor by catch discards</p> <p>Explore limiting quota allocation or specifying gear type to reduce by-catch/discards/poor stock quality</p> <p>Haddock – develop reporting system to record discard levels and develop management measures haddock by catch</p> <p>Landing and supporting infrastructure – ensure requirements of fishing fleet are identified</p>		
South East	<p>Scientific survey to establish whether a fishery can be established (Bivalve, Sprat, Brown/Pink shrimp, Smelt)</p> <p>New fisheries & unmanaged fisheries - Surveys to collect baseline data which can be used to calculate fishing effort. These methods can better ensure sustainable fishing</p> <p>Investigate winter cod fishery</p> <p>Lobster stock enhancement</p>	<p>fishery development</p> <p>identification of fisheries management measures</p>	<p>mix: potential adverse and beneficial effects on biodiversity and fish stocks</p>
Outer Hebrides	<p>Establish a small scale mackerel and herring fishery</p> <p>Squid - seek review of current prohibitions</p> <p>Brown shrimp – identify vessels to take part in pilot fishery</p> <p>Cockles – Develop cockle fisheries – surveys of cockle beds</p> <p>Razorfish – Stock surveys to develop fishery</p> <p>Support fuel efficiency measures</p> <p>Promote use of eco – dredge; scallop dredgers to work to UK Scallop Code of Conduct</p> <p>Support for new gear for pilot fisheries</p>	<p>fishery development</p> <p>energy management</p> <p>fisheries techniques</p> <p>identification of fisheries management measures</p>	<p>mix: potential adverse and beneficial effects on biodiversity and fish stocks</p>

Area	Strategic Action	Focus of Action	Potential effect?
Small Isles and Mull	Squid and Crawfish - Pilot fisheries with Marine Scotland observers to gather data Velvet crab – establish scientific base for fishery Wrasse fishery – Establish scientific base to identify management requirements in the developing wrasse fishery Catch sampling of crab, lobster, velvet crab and Nephrops Ensure appropriate use of collected fisheries data	fishery development identification of fisheries management measures	mix: potential adverse and beneficial effects on biodiversity and fish stocks
North West	Wrasse - Ensure any potential wrasse fishery is carried out responsibly Determine biological status of stocks (Brown crab, Velvet crab) Scallops - Investigate cause of scallop decline	fishery development identification of fisheries management measures	mix: potential adverse and beneficial effects on biodiversity and fish stocks

State of the Environment

7. 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.
8. 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.
9. Scotland's seas are mostly classed as being of good or better status under the Water Framework Directive. 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 spillage and sewage, and pollution of coastal waters resulting from activities on land, in particular from agricultural activities.
10. 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 our coastlines. Greenhouse gas emissions from the fishing fleet are influenced by a number of factors including abundance of fish (stocks), the steaming distance to fishing grounds and the size of boats and type of fishing gear.
11. Scotland's seas and coasts support a wide range of historic and archaeological sites. These are found on the foreshore and the seabed, ranging from the remains of ships and aircraft lost at sea to harbours, lighthouses and other structures along the coast.

Pressures

12. There are many pressures on marine biodiversity. Pressures from fishing and climate change are described in Box 1. Management of fisheries can be undertaken to address biodiversity issues; for example, there are restrictions on catching sandeels off the east coast of Scotland to protect seabird populations; in some areas the use of bottom trawling or similar towed nets is prohibited, to protect deep-sea habitats such as corals and sponges.
13. Fishing methods that affect the seabed can also result in the damage and/or loss of historic environment features. Conversely, such sites have the potential to be a hazard for other marine users, for example, through snagging fishing nets and obstructing navigation.

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

The Results of the SEA

14. This SEA has undertaken a high-level assessment of the IFG management proposals. A summary is provided in the following paragraphs.

Biodiversity

15. The key issues for biodiversity from fishing are:
- The removal of stock, with direct effects on populations and indirect effects on predators
 - Bycatch, both fish and other species such as birds and cetaceans
 - Damage to the seabed and benthic communities from fishing gear, particularly trawling and dredging gear
16. Some of the proposals are likely to contribute to the maintenance of fish stocks, e.g. measures to increase minimum landing size, to v-notch and return “berried” fish (i.e. females with eggs) and to manage bycatch and discards. This will depend on how they are implemented. For example, increasing minimum landing size may help to improve stocks, as long as there is no increase in the catch of the larger shellfish. For Nephrops, it may be necessary to increase the mesh sizes of fishing gear, to allow undersized individuals to escape. Proposals for new fisheries may reduce pressures on other stocks, providing that stock levels are currently able to support new fisheries. However, if these measures were to increase total fishing activity

(and catch) on all stock, this could increase the pressure on stocks and ecosystems and be detrimental.

17. There are few measures proposed that would reduce damage to the seabed, apart from those which propose to investigate “static gear only” zones for Nephrops in areas with multiple resource use, and to explore funding for new fishing techniques/trials. The effect of proposed static sector controls on the seabed is uncertain, as there is little evidence to suggest that disruption of the seabed from creels is significant. In consequence, the possible benefit of reducing fishing intensity (through reducing creel numbers) is uncertain. Larger benefits may occur, should these measures extend to other methods of fishing as well, e.g. bottom trawling.
18. The proposal to promote the use of an eco-dredge is a measure that may have a positive effect, through the reduction of damage to the seabed. However, this gear is still in development and its effectiveness remains to be proven. The accompanying proposal that fishermen should work to the UK Scallop Code of Conduct (the UK Scallop Industry Good Practice Guide) may also have such benefits. However, although the negative effects of scallop dredging may be reduced, there will likely remain some impact on the seabed and the habitat that it supports.
19. Some of the effects on biodiversity are uncertain. For example, the proposals for controls on the static sector (such as the introduction of creel limits) may have a beneficial effect where at present few or no management measures are in place, by providing management and protecting stocks. (Note that Nephrops are fished against quota.) However, it is not clear that control of the creel fishery alone would improve shellfish stocks, given that mobile gear is used by 20% of the inshore fleet, and these vessels catch many more fish and shellfish.
20. Any proposals to open new wrasse fisheries in support of aquaculture (to effect biological control of sea lice) will need to be carefully considered in terms of sustainability of wild stocks. It is recognised that wild populations alone are unlikely to be able to sustain such a requirement and data gathering will be required to assist with improved understanding of stocks and biology.
21. The proposal to pursue sustainable fisheries accreditation may have positive effects on biodiversity in general and stock levels in particular, given that the principles of sustainable accreditation schemes include that a fishery must be conducted in a manner that does not lead to over-fishing or depletion of exploited stocks, and should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem on which the fishery depends. The latter may also result in reduced damage to the seabed from trawling and dredging activities.

Climate Change

22. Proposed measures to support fuel efficiency through, for example, the use of lighter gear, or investigating the possibility of using alternative fuels such as

hydrogen, have the potential for a positive effect on climatic factors, through the reduction of carbon dioxide emissions. Future iterations of the IFG Management Plans would likely benefit from considering the impact of climate change on inshore fisheries, e.g. in terms of trip length, catch volumes, etc.

Cultural Heritage

23. None of the proposals are directed to the enhancement of the historic marine environment or the avoidance of coastal and marine archaeology. Any measures that will maintain and protect the integrity of the seabed will be of benefit to the historic environment, through reducing loss of and/or damage to features of importance. Some of the proposals may reduce damage to the seabed, through changes in gear type or intensity. The key proposal with benefits for the historic environment is fishery accreditation.

General

24. The proposal to ensure that the landing and infrastructure requirements of the fishing fleet are identified may have negative effects, particularly during construction, e.g. the loss of and/or damage to habitat and/or marine archaeology, disturbance of fish and mammals, increased pollution risks, etc. It is likely that such development would require planning and/or licensing consent, and such negative environmental effects would be dealt with on a case-by-case basis as part of this process.

Cumulative Effects

25. The potential for cumulative environmental effects of the proposals has been considered. Some of the proposals are likely to complement one other and result in a significant positive effect. For example, increasing minimum landing size, the v-notching and return of berried fish, and seeking fisheries accreditation should lead to a greater positive effect on stocks. This would also be supported by measures to reduce bycatch and/or discards.
26. Few of the proposals would increase damage to the seabed, apart from proposals to open new cod fisheries, and the effect of this would depend on the gear to be used. However, there are few measures proposed to reduce damage to the seabed, apart from exploration of funding to support gear change and support for use of the eco-dredge

Conclusion

27. Taken together, some of the proposals may result in positive effects on fish stocks, depending on how they are implemented. There are few measures proposed that would reduce damage to the seabed, and few resulting benefits for the seabed and its biodiversity and historic environment interests. Proposals to reduce carbon dioxide emissions will be of benefit to climate change. A key measure with overall benefits is the proposal to pursue sustainable fisheries accreditation.

28. It should be noted, however, that implementation of this and many other of these measures will require substantial data gathering and analysis, both for existing stocks and potential new ones. It is likely that this will require significant time and resources, and the potential environmental benefits are therefore more likely to be realised in the long-term, rather than immediately.
29. It should also be noted that, although the majority (over 75%) of inshore fishermen use static gear, principally creels, it is not the only form of fishing with an environmental impact on inshore waters. Mobile gear, especially dredges and trawls, is used by some 20% of vessels and these vessels catch many more fish and shellfish. They also have an impact on the marine environment and there will be an expectation that mobile fishing would feature more prominently in IFGs' considerations in the future.

Next Steps

30. Marine Scotland will take into account views raised in response to the consultation on the IFG management proposals and the Environmental Report, in deciding whether and/or how the proposals should be progressed.
31. A Post-Adoption Statement will be published once the consultation analysis is complete and decisions have been made. This will explain how issues raised in the environmental assessment, and associated views in response to the consultation, have been addressed.
32. Views on the IFG management proposals and the findings of the SEA are now being sought. Please provide your comments to the Inshore Fisheries Team (mailbox), by **10 October 2013**. Comments in writing should be made to:

Inshore Fisheries Groups
Marine Scotland
Area 1-B South
Victoria Quay
Edinburgh EH6 6QQ

or to IFG@scotland.gsi.gov.uk
34. Copies of the IFG Management Plan Proposals and the Environmental Report are available for viewing, during office hours, in the library at Saughton House:

Scottish Government, Saughton House
Broomhouse Drive
Edinburgh EH11 3XD
35. If you have any enquiries please send them to IFG@scotland.gsi.gov.uk or telephone 0131 244 4421.

1.0 Introduction

1.1 Purpose of this Report

1.1.1 This Environmental Report sets out the results of the strategic environmental assessment of the proposals contained in the pilot Inshore Fisheries Group (IFG) Management Plans.

1.2 Strategic Environmental Assessment

1.2.1 The Environmental Assessment (Scotland) Act 2005 ("the Act") 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 the Consultation Authorities². The IFG management proposals fall under Section 5(4) of the Act.

1.2.2 Marine Scotland undertook screening in May 2012 and determined, as the Responsible Authority, that some proposals suggested in the IFG Management Plans had the potential to give rise to significant environmental effects, both adverse and beneficial. An environmental assessment was therefore required. A Scoping Report was prepared and issued for consultation in August 2012 to the Consultation Authorities, setting out the proposed scope of and approach to the SEA.

1.2.3 The purpose of this Environmental Report is to document the findings of the SEA. The assessment of the proposals has been undertaken by the Scottish Government's Environmental Assessment Team, on behalf of Marine Scotland, in accordance with the requirements of the Act.

1.2.4 The views of the public and the Consultation Authorities on the management proposals and this Environmental Report are now being sought.

1.3 Content of this Report

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

- Following this introductory section (Section 1), Section 2 provides information on the management proposals.
- Section 3 discusses the approach to the SEA and the methods used.
- Section 4 provides an introduction to fishing, including methods, target species, management measures and the environmental effects of fishing.
- Section 5 describes the relevant components of the marine environment.
- Section 6 sets out the results of the assessment.
- Section 7 considers the next steps.

The Non-Technical Summary precedes Section 1.

² Scottish Environment Protection Agency (SEPA), Scottish Natural Heritage (SNH) and Historic Scotland.

2.0 The Inshore Fisheries Groups' Management Proposals

2.1 Introduction

2.1.1 As part of the Inshore Fisheries Strategy 2012³, the Cabinet Secretary for Rural Affairs and the Environment, Richard Lochhead, committed to support the IFG initiative and to focus on the priorities identified in the Inshore Fisheries Groups' Management Plans.

2.2 Background on Inshore Fisheries Groups

2.2.1 Since 1984, inshore fisheries in Scotland (between 0- 6 nautical miles offshore) have been regulated primarily through the Inshore Fisheries (Scotland) Act 1984 and the Sea Fisheries (Shellfish) Act 1967.

2.2.2 A strategic review of inshore fisheries began in 2002 and culminated in the publication of the *Strategic Framework for Scottish Inshore Fisheries*⁴ in 2005. This framework set out a strategy for the management of inshore fisheries, including the establishment of Inshore Fisheries Groups (IFGs) to plan the management of inshore fisheries at the local level. Included in the framework were five high-level objectives for the management of inshore fisheries (Table 1), which were intended to form the basis for local-level objectives.

Table 1. High-level objectives for the management of inshore fisheries

Topic	Objective
biological	to conserve, enhance and restore commercial stocks in the inshore and its supporting ecosystem.
economic	to optimise long-term and sustained economic return to communities dependent on inshore fisheries, and to promote quality initiatives.
environmental	to maintain and restore the quality of the inshore marine environment for fisheries and for wildlife.
social	to recognise historical fishing practices and traditional ways of life in managing inshore fisheries, to manage change, and to interact proactively with other activities in the marine environment.
governance	to develop and implement a transparent, accountable and flexible management structure that places fishermen at the centre of the decision-making process, and that is underpinned by adequate information, legislation and enforcement.

³ Available at: <http://www.scotland.gov.uk/News/Releases/2012/01/inshorefishing27012012>

⁴ Scottish Government (2006) A Strategic Framework for Inshore Fisheries in Scotland [online] Available at: <http://www.scotland.gov.uk/Publications/2005/03/20860/File-1>

2.2.3 IFGs are designed to provide those with interests in inshore fishing, ranging from commercial fishermen to wider stakeholders, the opportunity to shape the management of local fisheries. Six pilot IFGs were established in Scotland in 2009, and were charged with the preparation of Management Plans for their areas. These were:

- Outer Hebrides IFG,
- Clyde IFG,
- South East IFG
- North West IFG,
- Small Isles and Mull IFG
- Moray Firth IFG.⁵

2.2.4 Management Plans were prepared and submitted to Marine Scotland. In general the plans cover the following areas of activity:

- activities to support the opening of new and/or closed fisheries, including the collection of baseline information.
- fisheries management measures e.g. permit control, increases in minimum landing sizes, restrictions on gear, reduction of discards/bycatch
- conflict resolution mechanisms e.g. codes of conduct
- economic activities e.g. marketing, labelling, sustainable fisheries accreditation, measures to support economic diversification

2.2.5 Some of these measures are considered to have no or minimal environmental effects, for example, measures relating to marketing. These are summarised in Table 2 and will be implemented locally by the IFGs.

2.2.6 The remainder of the measures have the potential to give rise to significant environmental effects and have been subject to SEA. These measures are summarised in Tables 3a and 3b.

2.2.7 The policy context for the preparation of the IFG Management Plans is discussed in Section 2.3.

2.2.8 Key facts are summarised in Table 4.

⁵ Following on from this pilot, six new Inshore Fisheries Groups (IFGs) will cover all of the Scottish coast (except Shetland which has its own management arrangements).

Table 2. Strategic actions predicted to have no or minimal environmental effects

Item	Area						Focus of Action
	Clyde	Small Isles & Mull	Outer Hebrides	Moray Firth	South East	North West	
Engagement with other marine stakeholders	√	√	√	√	√		engagement
Establish code of conduct &/or conflict resolution mechanism	√	√	√	√	√		operational procedures
Marketing/labelling of local produce		√	√	√	√	√	branding/provenance
Funding and training for new entrants/existing	√	√		√	√		funding/training
Marketing– establish an area wide sustainable fisheries system for all appropriate stocks				√			sustainability accreditation
Map fishing activity	√	√				√	mapping baseline information
Develop website for IFG	√		√		√	√	website
Review & report progress of Management Plans	√		√		√		progress reports
Gear Marking –marking buoys to show ownership	√				√	√	operational procedures
Identification of creels					√		operational procedures
IFG membership of Scottish Marine Regions	√		√		√		marine planning partnership
Review all existing fishing prohibitions			√	√			review process ⁶
Develop log book/local reporting of catches	√	√	√	√		√	operational procedures
Promoting IFGs' work		√					marketing
Ensure levels of access to credit for fisheries sector			√				economic issue
Develop Outer Hebrides fisheries support scheme & community quota scheme			√				economic issue
Economic impact study of individual fisheries						√	economic issue
Support for fishing communities – identify opportunities for fishermen to diversify to economic activities within the marine environment				√	√		economic issue
Processing for new species					√		operational procedures
return and v-notch crippled lobsters	√	√	√			√	fisheries management
return crippled Crab	√	√			√		fisheries management

⁶ Subsequent action would be undertaken by regulation, any SEA would be done at that stage

Table 3a. Strategic actions, covering more than one Inshore Fishery Group management area, with potential for significant environmental effects

Item	Area						Focus of Action	Potential Effect?
	Clyde	Small Isles & Mull	Outer Hebrides	Moray Firth	South East	North West		
Fisheries accreditation	√		√	√	√	√	sustainability accreditation	benefit
Increase minimum landing size								
Brown Crab	√		√		√		population management	benefit
Velvet Crab	√	√	√					benefit
Lobster	√		√			√		benefit
Nephrops			√			√		benefit
Crawfish (Est best practice max landing size)		* √	√					benefit
Razor fish (from 110mm to 175mm)	√							benefit
return and v-notch berried lobsters	√		√			√		benefit
Return berried creel caught Nephrops	√		√			√		benefit
Crawfish - no landing of berried females		√	√					benefit
Lobsters – reduce maximum landing size for females			√					benefit
Velvet Crab – return berried females	√							benefit
Evaluate effects of increased creel mesh size & escape panels			√		√	√		benefit
Develop Mackerel and/or Herring Fishery		√	√	√	√	√		new fishery
Establish a small scale sprat fishery				√	√		new fishery	adverse
Investigate whether existing fisheries can be developed based on sound management (Squid, Cockles)				√	√		fishery development	mix: potential adverse and beneficial effects on biodiversity and fish stocks
Razorfish - In addition to local reporting wider scientific research programme and investigate the potential for specialised gear to be developed and used in razor fishery				√	√		fishery development	mix: potential adverse and beneficial effects on biodiversity and fish stocks

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Item	Area						Focus of Action	Potential Effect?
	Clyde	Small Isles & Mull	Outer Hebrides	Moray Firth	South East	North West		
Clam fishery – Investigate whether existing fishery can be developed based on sound management					√	√	fishery development	mix: potential adverse and beneficial effects on biodiversity and fish stocks
Participate in national and regional management of Nephrops					√	√	fisheries management	
Investigate separate management of Moray Firth functional unit					√	√	fisheries management	
Investigate static gear only zones for Nephrops in areas with multiple resource use					√	√	fisheries management	
Hobby fishermen – controlling or monitoring of activity 1. Creel limits need clear signage and/or quota restrictions 2. Monitor activity and ensure clear creel marking 3. Lobster/Crabs/ Scallops	√ (1)				√ (2)	√ (3)	population management	uncertain; may benefit
Access/regulatory measures for licensed fishermen in IFG areas								
Cap creel vessel numbers		√					population management	benefit
Nephrops permits; closed areas						√		benefit
Introduce permit for shell fisheries					√			benefit
Effort control within shellfish licensed fleet				√				benefit
Review access arrangements in all fisheries (e.g. zoning/spatial management & consultation code)	√		√					benefit

Table 3b. Scientific surveys/ development of new fisheries/ management measures with potential for significant environmental effects

Area	Strategic Action	Focus of Action	Potential effect?
Clyde	Data gathering in order to develop fishery with appropriate stock assessment, management systems and measures (Cockles, Mussels, Winkles, Oysters, Scallops, Razorfish) Data gathering in order to develop pilot fisheries with appropriate management measures (Brown shrimp, Paelamon Prawns, Squat lobsters, Otter shell, other Bivalves) Reduce discards – cod recovery	fishery development identification of fisheries management measures	mix: potential adverse and beneficial effects on biodiversity and fish stocks
Moray Firth	Explore funding for new fishing techniques/trials Stock assessments for under-utilised species Sprat fishery – determine and evaluate the economic viability of development of sprat fishery within the area Whelk - Investigate whelk stock in area Lobster - Establish lobster stock's status to establish possible management measures Green Crab – establish importance of commercial fishery Mussel - determine if significant sub tidal mussel beds exist with the MFIFG area establish importance of commercial fishery within area to determine developing opportunities Native Oyster – Investigate whether existing fishery can be developed based on sound management Queen scallop – establish if scallops can be developed as a targeted fishery or form a by-catch from other fishing activity Plaice – establish stocks in local area Clam – identify stocks within the area and determine if existing fishery can be developed Seek to secure appropriate funding and support for the development of sustainable fishing techniques, exploratory fishery trials, stock assessment/dynamic research and market evaluation of market opportunities for under-utilised species Investigate the potential for jigging and squid fishery Monitor by catch discards Explore limiting quota allocation or specifying gear type to reduce by-catch/discards/poor stock quality Haddock – develop reporting system to record discard levels and develop management measures haddock by catch Landing and supporting infrastructure – ensure requirements of fishing fleet are identified	fishery development new fishing techniques identification of fisheries management measures potential infrastructure proposals	mix: potential adverse and beneficial effects on biodiversity and fish stocks

Inshore Fisheries Groups' Management Proposals Environmental Report

Area	Strategic Action	Focus of Action	Potential effect?
South East	<p>Scientific survey to establish whether a fishery can be established (Bivalve, Sprat, Brown/Pink shrimp, Smelt)</p> <p>New fisheries & unmanaged fisheries - Surveys to collect baseline data which can be used to calculate fishing effort.</p> <p>Investigate winter cod fishery</p> <p>Lobster stock enhancement</p>	<p>fishery development</p> <p>identification of fisheries management measures</p>	<p>mix: potential adverse and beneficial effects on biodiversity and fish stocks</p>
Outer Hebrides	<p>Establish a small scale mackerel and herring fishery</p> <p>Squid - seek review of current prohibitions</p> <p>Brown shrimp – identify vessels to take part in pilot fishery</p> <p>Cockles – Develop cockle fisheries – surveys of cockle beds</p> <p>Razorfish – Stock surveys to develop fishery</p> <p>Support fuel efficiency measures</p> <p>Promote use of eco – dredge; scallop dredgers to work to UK Scallop Code of Conduct</p> <p>Support for new gear for pilot fisheries</p>	<p>fishery development</p> <p>energy management</p> <p>fisheries techniques</p> <p>identification of fisheries management measures</p>	<p>mix: potential adverse and beneficial effects on biodiversity and fish stocks</p>
Small Isles and Mull	<p>Squid and Crawfish - Pilot fisheries with Marine Scotland observers to gather data</p> <p>Velvet crab – establish scientific base for fishery</p> <p>Wrasse fishery – Establish scientific base to identify management requirements in the developing wrasse fishery</p> <p>Catch sampling of crab, lobster, velvet crab and Nephrops</p> <p>Ensure appropriate use of collected fisheries data</p>	<p>fishery development</p> <p>identification of fisheries management measures</p>	<p>mix: potential adverse and beneficial effects on biodiversity and fish stocks</p>
North West	<p>Wrasse - Ensure any potential wrasse fishery is carried out responsibly</p> <p>Determine biological status of stocks (Brown crab, Velvet crab)</p> <p>Scallops - Investigate cause of scallop decline</p>	<p>fishery development</p> <p>identification of fisheries management measures</p>	<p>mix: potential adverse and beneficial effects on biodiversity and fish stocks</p>

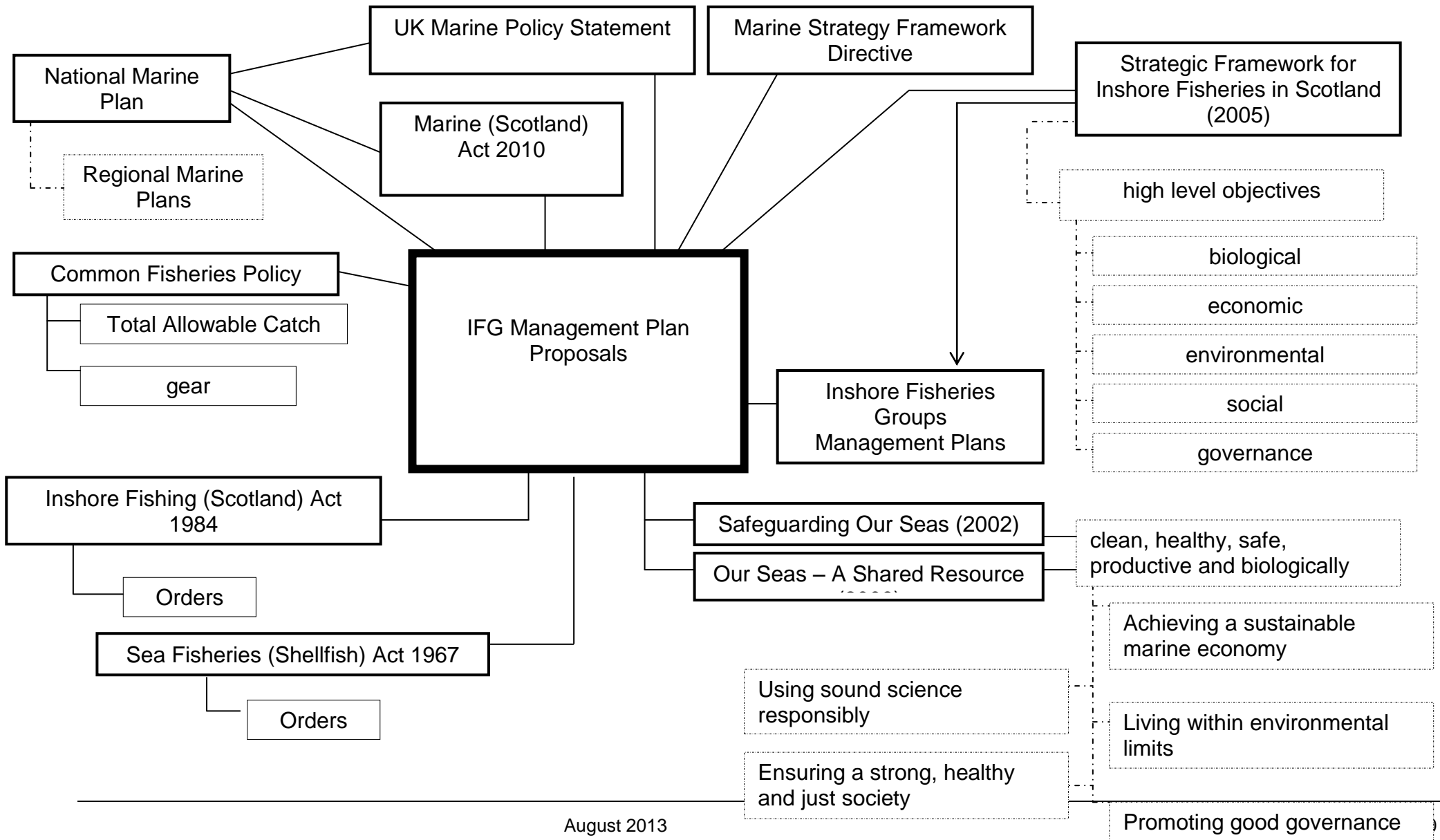
Table 4. Key facts about the IFG Management Plan Proposals

Responsible Authority	Marine Scotland
Title of PPS	Management Proposals of Inshore Fisheries Groups
Purpose of PPS	To set out measures from the IFG Management Plans that may be implemented.
What prompted the PPS	Strategic Framework for Scottish Inshore Fisheries
Subject	Inshore Fisheries
Period covered by PPS	Not defined
Frequency of updates	Not specified
Area covered by PPS	Scottish waters (0-6 nautical miles)
Summary of nature/content of PPS	The IFG Management Plan Proposals set out proposed measures for the management of inshore fisheries in Scotland that may have significant environmental effects.
Are there any proposed PPS objectives?	Yes. The IFG Management Plans focused on biological, economic, environmental, social and governance issues. The plans' objectives include a broad mix, focused on management issues and procedures as well as proposals for further research to improve the evidence base.
Contact	<p>Amanda Chisholm, Environmental Assessment Team 2J South Victoria Quay Edinburgh EH6 6QQ tel. 0131 244 7806 email: amanda.chisholm@scotland.gsi.gov.uk</p> <p>Malcolm MacLeod, Inshore Fisheries Management and Coastal Communities, 1B-South Victoria Quay Edinburgh EH6 6QQ tel: 0131 244 4421 email: Malcolm.macleod@scotland.gsi.gov.uk</p>

2.3 Relationship with Other Plans, Programmes or Strategies (PPS)

2.3.1 The Act requires that the Environmental Report include an outline of the relationships between the proposals and other relevant PPS. Figure 1 shows the range of policy and legislative drivers at the European, UK and Scottish levels that are of relevance to both the inshore fisheries sector, and to Scotland's wider marine environment.

Figure 1. Policy context for the IFG Management Plan Proposals



3.0 Assessment Methodology

3.1 Scope of the IFG Management Proposals to be Assessed

3.1.1 The measures contained in the IFG management proposals were reviewed to ascertain whether they would be likely to give rise to significant environmental effects. The results are set out in Tables 2, 3a and 3b.

3.1.2 Table 2 identifies measures that have been screened out of the assessment, because they are considered to be the kinds of strategic action that would result in no or minimal environmental effects. In general these comprise operational procedures (e.g. catch reporting, gear marking); economic activities (e.g. marketing, labelling, sustainable fisheries accreditation, measures to support economic diversification); funding and/or training activities; and engagement activities, including codes of conduct and conflict resolution mechanisms.

3.1.3 The SEA has therefore focused on the potential environmental effects of the measures summarised in Tables 3a and 3b. Table 3a summarises actions proposed by more than one IFG for managing catch size, including increasing minimum landing size and permits/access limits for Nephrops fisheries, amongst others. Table 3b summarises other measures, which include data gathering and/or scientific surveys to inform the potential establishment of new or re-opened fisheries, as well as measures to manage gear type, amongst others.

3.1.4 The Consultation Authorities were consulted on the proposed scope of the proposals to be assessed and, as a result of this consultation, fisheries accreditation measures have been included in the assessment (Table 3a).

3.2 Scope of the Environmental Topics to be Assessed

3.2.1 The potential environmental effects of the proposed measures were reviewed during the scoping exercise and are identified in Figure 2. The results were reviewed against the environmental topics set out in Schedule 3 of the Environmental Assessment (Scotland) Act 2005. Table 5 sets out the resulting scope of the environmental topics that have been addressed in the SEA.

3.2.2 The Consultation Authorities were consulted on the proposed scope of the environmental topics to be assessed, and agreed that the topics of soil and water could be considered as part of the assessment of "biodiversity". Air, material assets and landscape were scoped out as it was considered unlikely that the proposed measures would give rise to additional emissions, development or activities that would result in a significant effect on these environmental parameters.

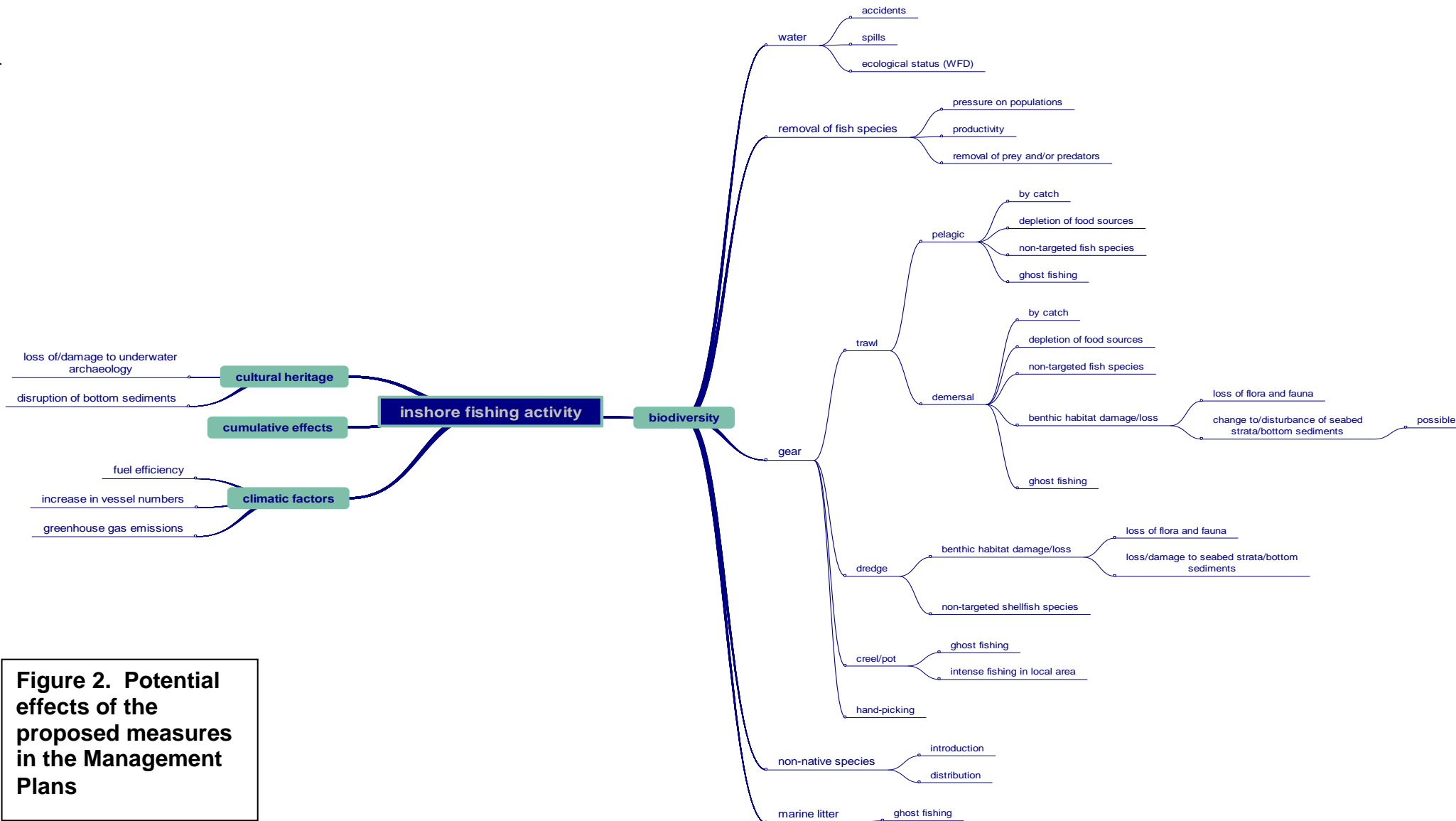


Figure 2. Potential effects of the proposed measures in the Management Plans

Table 5. Scope of environmental issues

SEA Topic	Scope: in/out	Reasons for inclusion / exclusion
Biodiversity, flora and fauna	In	Management proposals could have positive and negative effects on biodiversity. For example, measures to increase minimum landing size may have positive effects on fish populations, while the opening of new fisheries has the potential to have negative effects.
Population and human health	Out	We do not anticipate that measures will have significant effects on population and human health. It was agreed by the Consultation Authorities that this topic could be scoped out.
Water	Included in biodiversity	It was agreed by the Consultation Authorities that effects on ecological status ⁷ /potential be considered under "biodiversity". Pollution is also included under "biodiversity". Other effects on the physical and/or chemical aspects of water quality are not anticipated.
Soil	Included in biodiversity	Potential morphological and/or physiological changes to seabed strata and/or bottom sediments could affect ecological status/potential. It was agreed by the Consultation Authorities that these be considered under "biodiversity".
Air	Out	Local air quality issues were discussed and it was agreed that these would mainly arise from fishing vessels, particularly in port areas. It was agreed that the proposed measures are unlikely to have significant effects on local air quality, e.g. fuel efficiency measures, and that air quality could be scoped out.
Climatic factors	In	Fuel efficiency measures could reduce GHG emissions, which would result in significant positive effects.
Material assets	Out	Fish stocks could be considered to be a material asset, but it was agreed by the Consultation Authorities that this issue will be considered under "biodiversity". At this stage the measures do not include a requirement for supporting infrastructure and it was agreed therefore that this topic be scoped out.
Cultural heritage	In	Fishing methods may affect underwater archaeology in new and/or re-opened fisheries. Disruption of bottom sediments may also have a negative effect.
Landscape	Out	It was agreed by the Consultation Authorities that the proposals are unlikely to have significant effects on landscape, and that this topic could be scoped out.

⁷ ecological status under WFD 0-3 nm; environmental status under MSFD beyond 3 nm

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 IFG management proposals. 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 environmental protection objectives have been incorporated into the SEA objectives (Table 6).

3.4 Methods

3.4.1 Given the nature of the proposals, this SEA has been undertaken as a high-level assessment. Where appropriate, spatial information has been used.

3.4.2 The proposed measures have been assessed against the SEA objectives set out in Table 5. The results are set out in Chapter 6.

Table 6. SEA objectives

SEA Topics	SEA Objective
Biodiversity, flora and fauna ⁸	<ul style="list-style-type: none"> • To safeguard marine and coastal ecosystems, including species and habitats, and their interactions • To avoid pollution of the coastal and marine environment • To maintain or work towards good ecological/environmental status • To maintain integrity of sediment and coastal processes • To maintain and protect the character and integrity of the seabed
Climatic factors	To reduce greenhouse gas emissions from marine activities
Cultural heritage	<ul style="list-style-type: none"> • To protect and, where appropriate, enhance the historic marine environment • To avoid damaging coastal and marine archaeology
	<p>No SEA objectives are provided for the following topics, as they have been scoped out of the assessment:</p> <ul style="list-style-type: none"> • population and human health • chemical and physical water quality • air • landscape • material assets

⁸ includes ecological/environmental status, and marine geology, sediment and coastal processes (see Table 5)

3.5 Reasonable Alternatives

3.5.1 The Environmental Assessment (Scotland) Act 2005 requires that reasonable alternatives be assessed. At the scoping stage we envisaged that all the proposed management measures comprised all the reasonable alternatives identified through the IFG management plan preparation process, which involved considerable consultation⁹. This was agreed by the Consultation Authorities.

3.5.2 We also noted, in the scoping report, that should other reasonable alternatives be identified in the course of the assessment (including for mitigation purposes), these would be included. No additional alternatives have been identified in the course of this assessment.

⁹ For example, four public meetings were held in 2011 to consult on measures proposed for inclusion in the Outer Hebrides Management Plan (page 16).

4.0 Inshore Fisheries: Background Information

4.1 Introduction

4.1.1 This section of the report provides the following information on inshore fisheries¹⁰:

- target species and methods;
- fisheries management/regulatory framework; and
- the potential environmental effects of fishing.

4.1.2 At the end of 2011, there were 2,095 active vessels¹¹ in the Scottish fishing fleet. The fleet is dominated by vessels 10 metres and under (1,470 or 70%), with a total power of 78,000 kW. There were 625 vessels over 10 metres (30% of the fleet), with 80% of the fleet's total power (309,000 kW).

4.1.3 Between 2005 and 2011 there was an overall decrease in vessel numbers:

- The number of vessels in the 10 metre and under fleet decreased by 6%
- The number of vessels in the over-10 metre fleet decreased by 13%

4.1.4 Some 75-80% of the Scottish fishing fleet fishes in inshore waters. Most of these vessels are 10 metres or under in length.

4.1.5 The 625 vessels over 10 metres were involved in the following sectors:

- demersal (229);
- pelagic (24); and
- shellfish (372).

4.2 Target Species and Methods

4.2.1 The Scottish fleet comprises three main sectors: pelagic; demersal; and shellfish.

4.2.2 Pelagic fish move about throughout the water column and often occupy the open waters between the coasts and the edge of the continental shelf in depths of 20-400 metres. In Scotland the main pelagic species caught are herring and mackerel. Other species include blue whiting (*Micromesistius poutassou*), sprat (*Sprattus sprattus*) and horse mackerel (*Trachurus trachurus*).

4.2.3 Demersal fish (also known as whitefish or roundfish) live and feed on or near the bottom of the sea. The main species caught are monkfish, haddock and cod. Other species include whiting, saithe, ling and blue ling. A variety of demersal species are taken as by-catch, including plaice, lemon sole, dogfish, skates, witch, megrim, redfish, dab, hake, and turbot with lesser quantities of catfish, forkbeard, grenadier, tusk, halibut, turbot, Greenland halibut, brill and pollack.

¹⁰ This information has been taken from Scottish Sea Fisheries Statistics 2011.

¹¹ Scottish Sea Fisheries Statistics 2011 identifies active vessels as those which are both registered and licensed as of 31st December of the year of reference.

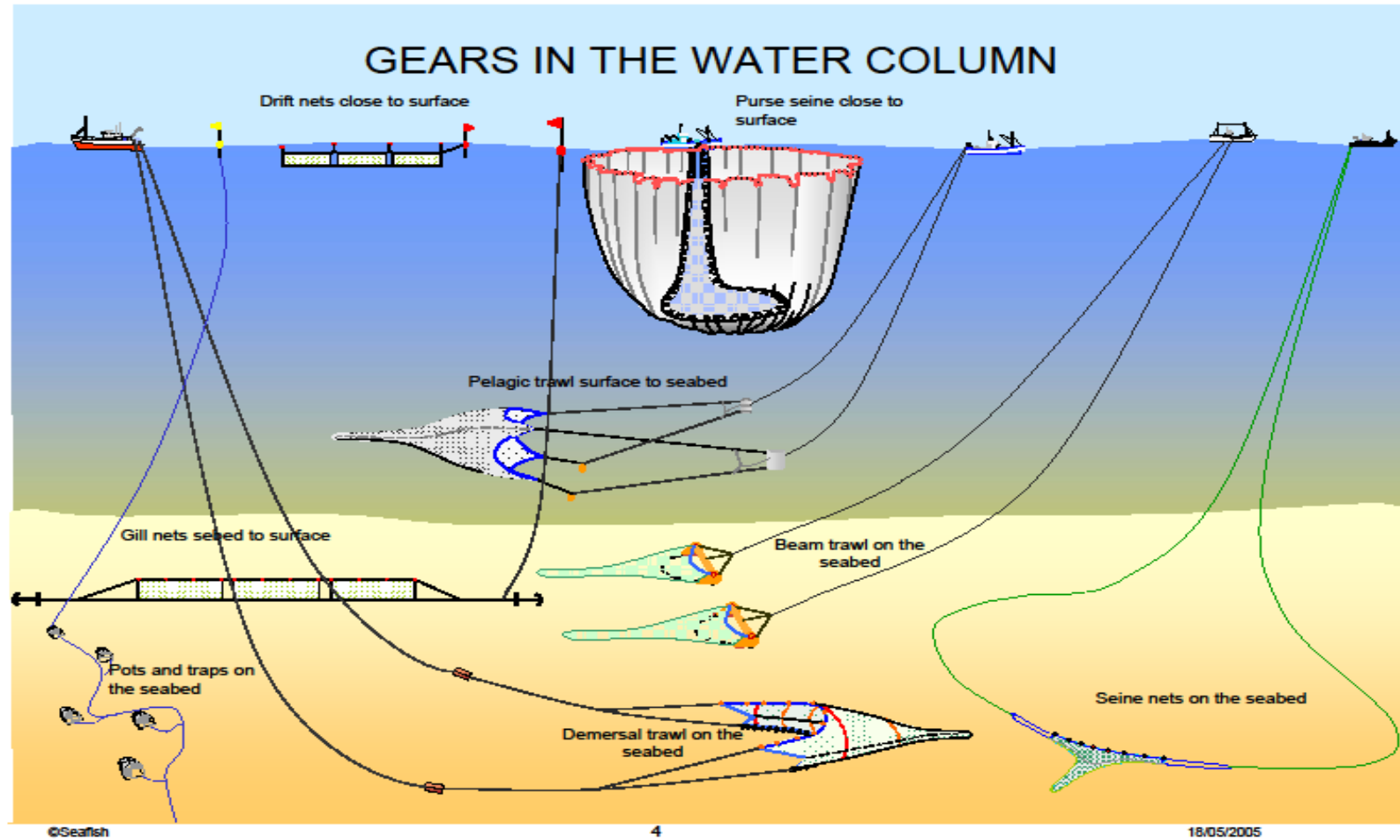
- 4.2.4 Shellfish comprise crustaceans and molluscs. Crustaceans include the Norway lobster (*Nephrops norvegicus*), lobster (*Homarus gamarus*), edible crab (*Cancer pagurus*) and velvet swimming crab (*Necora puber*). Other crustacean species fished include the shore crab (*Carcinus maenas*), the squat lobster (*Munida rugosa* and others) and crayfish (*Palunirus elegans*).
- 4.2.5 Molluscs include both bivalves and gastropods. Bivalves include king scallop (*Pecten maximus*), queen scallop (*Aequipecten opercularis*), razorfish (*Ensis* spp.), cockle (*Cerastoderma edule*) and a range of other bivalve species (including those described as surf clams). Gastropods include whelks (*Buccinum undatum*) and periwinkles (*Littorina littorea*).
- 4.2.6 The 10 metre and under fleet is dominated by vessels catching shellfish (1,416 vessels; approximately 96%). The key shellfish species for the inshore fleet is the Norway lobster, or *Nephrops norvegicus*. Scallops, brown crabs and lobsters are also important.¹² Of these 1,416 vessels, 1,285 (nearly 90 per cent) used creel fishing as their main fishing method in 2011. The remainder mostly used trawling. Table 7 provides more detail. Figures 3a and 3b show the different gears in the water column.

Table 7. Number of active Scottish-based vessels by main fishing method and length (2011)

Main fishing method	≤10m	> 10m	Total
Demersal single trawl	18	139	157
Demersal pair trawl	-	19	19
Seine net	-	28	28
Lines	31	15	46
Demersal gill nets	4	5	9
Demersal twin/multi trawl	-	16	16
Beam trawl	1	5	6
Other demersal	-	2	2
Demersal total	54	229	283
Purse seine	-	4	4
Pelagic trawl	-	20	20
Pelagic total	-	24	24
Creel fishing	1,285	118	1,403
Nephrops trawl	80	177	257
Mechanical dredging	16	71	87
Suction dredging	1	2	3
Shell fishing by hand	34	4	38
Shellfish total	1,416	372	1,788
Total	1,470	625	2,095

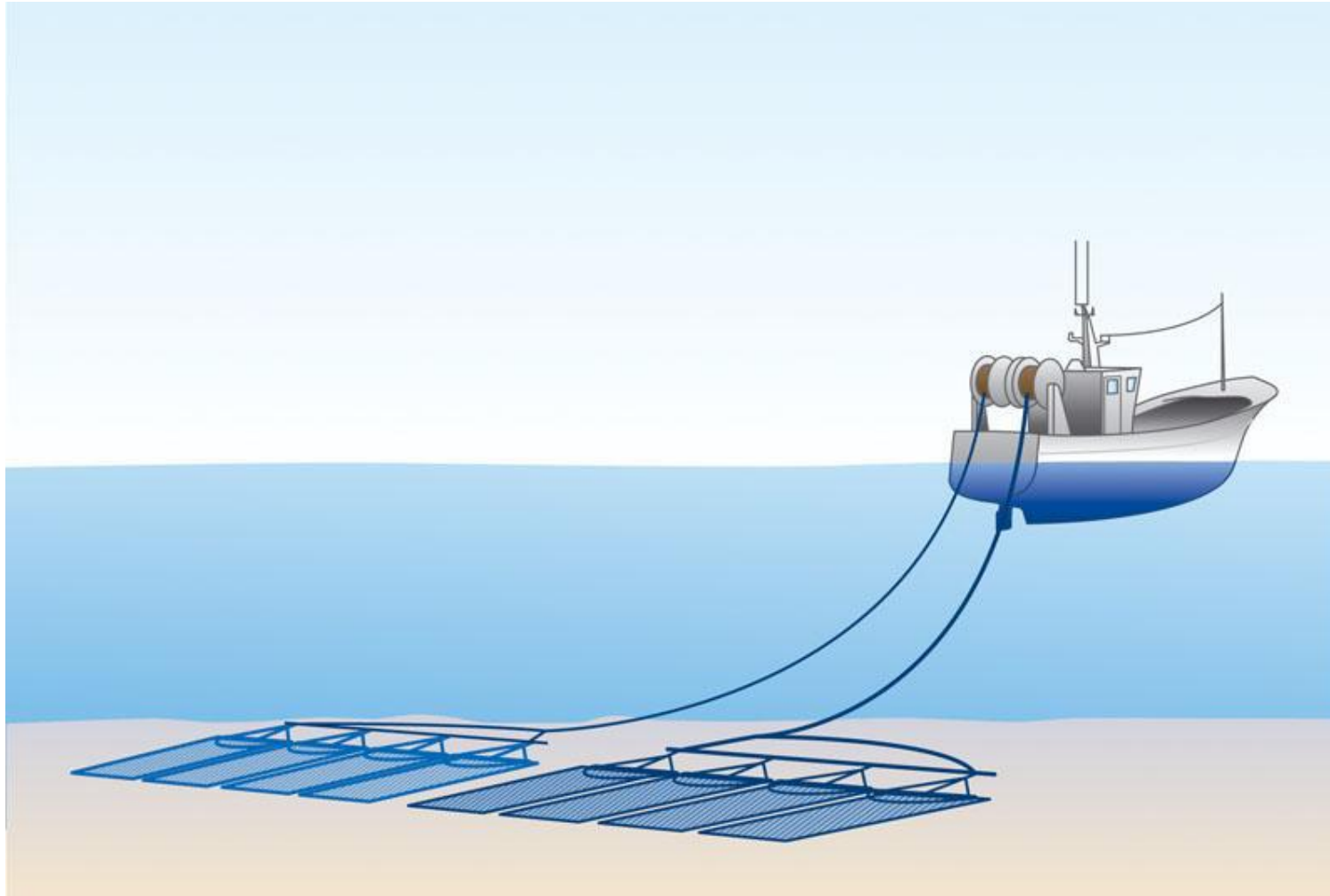
¹² Strategic Framework for Inshore Fisheries 2005, page 7

Figure 3a. Gears in the Water Column¹³



¹³ SEAFISH 2005 Fisheries Development Centre Basic Fishing Methods,

Figure 3b. Scallop Dredging Gear¹⁴



¹⁴ Marine Conservation Society <http://www.mcsuk.org/downloads/fisheries/FishingMethods.pdf>

- 4.2.7 There is also a small finfish fishery, which in previous years included both pelagic and demersal fishing. However, in 2011, the focus was on the demersal sector, pursued by 54 vessels (Table 7).
- 4.2.8 Of the over-10 metre fleet, 229 and 24 vessels were involved in the demersal and pelagic sectors respectively in 2011. Shellfish were targeted by 372 vessels (some 60%) during this period. The dominant fishing method for shellfish was trawling (177), followed by creel fishing (118) and mechanical dredging (71).
- 4.2.9 Target species, fishing methods and locations include:
- Nephrops are found in muddy sediment, and the main inshore Nephrops fisheries are in the Firth of Forth, Moray Firth, North Minch, South Minch and Clyde areas. Fishing is undertaken by both otter trawls and creels; on the west coast there is an extensive creel fishery, for example.
 - Scallops are found all around Scotland, and are generally fished with dredges by both local and nomadic vessels.
 - Fishing for crab and lobster with creels takes place all around the coast, and crabs are also fished in some offshore areas northwest of Scotland.
 - Trawling for squid, creeling for whelks, hydraulic dredging or diving for razorfish and surf clams, and collecting cockles by hand or mechanical means all take place in various locations around the coast of Scotland.
 - Finfish also feature in inshore landings and local Nephrops trawlers operate a small pair trawl fishery for sprat in the winter in some west coast sea lochs.¹⁵

Figure 4 shows the overall shellfish landings from around Scotland's coasts in 2011.

- 4.2.10 In terms of fishing fleet location, approximately one-third of the 10 metre or under vessels in Scotland are based on the west coast, another third on the east coast, and the remaining third in Shetland, Orkney and the Western Isles.¹⁶

4.3 Fisheries Management Measures

- 4.3.1 A number of mechanisms are used to manage Scottish fisheries, including restricted licensing, quotas and minimum landing sizes, and days at sea/closed areas. The following paragraphs summarise these mechanisms.

Inshore Fishing (Scotland) Act 1984

- 4.3.2 Since 1984, inshore fisheries in Scotland have been regulated primarily through the Inshore Fisheries (Scotland) Act 1984, which enables Ministers the powers to prohibit combinations of the following in inshore waters (i.e. within 0-6 nautical miles):
- All fishing for sea fish

¹⁵ Strategic Framework for Inshore Fisheries 2005

¹⁶ Ibid; Scottish Sea Fisheries Statistics 2011 Table 2.5

- Fishing for a specified description of sea fish
- Fishing by a specified method
- Fishing from a specified description of fishing boat
- Fishing from or by means of any vehicle, or any vehicle of a specific description, and
- Fishing by means of a specified description of equipment

Licences

4.3.3 UK fishing vessels engaged in commercial sea fishing are required by law to be registered with the Registry of Shipping and Seamen, part of the Maritime and Coastguard Agency. Licences authorise the sea areas in which a vessel can fish and the species that can be targeted. Restrictive licensing has been used as the main tool to control UK fishing opportunities to meet European Union (EU) regulations for sustainable fisheries management.¹⁷

Quotas

4.3.4 Most stocks exploited are managed under the Common Fisheries Policy (CFP) by the European Commission and an important part of this management is the use of Total Allowable Catch (TAC). Member States are allocated a TAC quota for different species and areas which are intended to allocate fish resources and to control the amount of fish removed each year.¹⁸

4.3.5 Nephrops is the only shellfish species targeted by UK fishers with a quota, and this applies to inshore waters (0-6 nautical miles) and waters further offshore (6-12 nautical miles). (The Northern prawn or pink shrimp - *Pandalus borealis* - is also managed by quota, but there were no landings of this species in 2011 by Scottish vessels.)

Minimum Landing Size

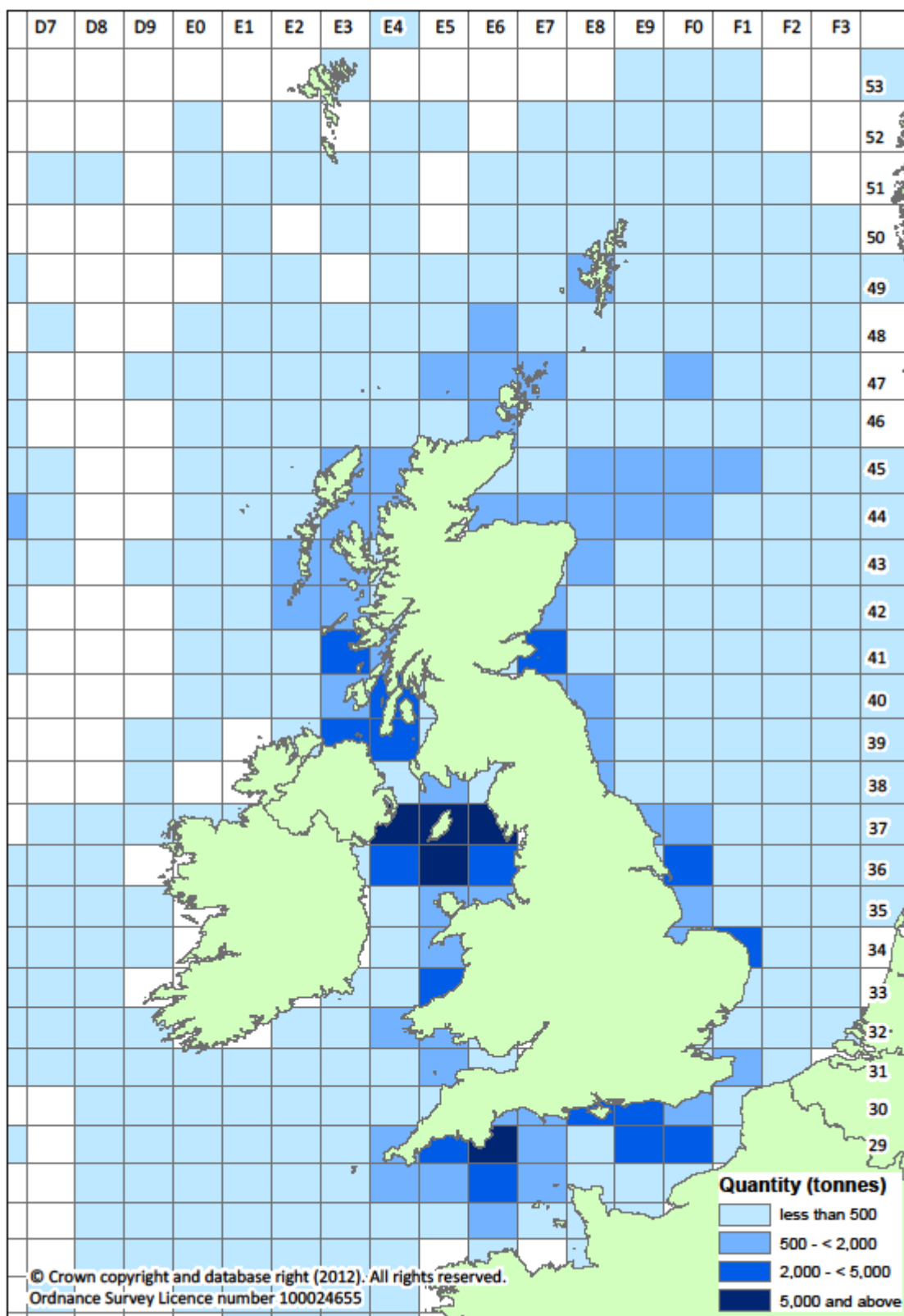
4.3.6 Another regulatory mechanism is minimum landing size (MLS) which is set out by the EU in Annex XII of Regulation 850/98 (Appendix 2). For both finfish and shellfish, undersized animals are not to be retained, transhipped, landed, transported, stored, sold, displayed or offered for sale. In addition, undersized animals must be returned immediately to the sea.¹⁹ Minimum landing size regulations exist chiefly to ensure sufficient mature individuals in a species are able to survive in order to reproduce.

¹⁷ Scottish Government (2012) Scottish Sea Fisheries Statistics 2011, A National Statistics Publication for Scotland [online] Available at: <http://www.scotland.gov.uk/Publications/2012/09/1840>

¹⁸ Scottish Government (2011) Marine and Fisheries, Total Allowable Catch & ICES advice [online] Available at: <http://www.scotland.gov.uk/Topics/marine/marine-environment/species/fish/TAC>

¹⁹ DEFRA, Scottish Executive, Welsh Assembly Government, Department for Agriculture and Rural Development (2002) General Fisheries Technical Conservation Rules, [online] Available at: www.scotland.gov.uk/Resource/Doc/46951/0028706.pdf

Figure 4. Shellfish landings (tonnes) by areas of capture (ICES rectangles)



Management of Crab and Lobster

- 4.3.7 Crab and lobster landings are not limited by quota. However, landings are restricted to those commercial fishermen whose licence allows them to catch crabs and lobsters (those holding a Shellfish Entitlement) and are subject to minimum landing size restrictions.

Spatial Management Measures

- 4.3.8 A number of sea areas in offshore waters are already closed to fishing to protect vulnerable marine ecosystems such as cold water corals on the Rockall Bank and Darwin Mounds. In addition, fisheries in some areas are limited or prevented altogether in order to protect breeding seabird populations. An example of this is the precautionary north-east UK sandeel fishery closure (Article 29a from Council Regulation No 850/98), which limits fishing on most of the Firth of Forth sandeel grounds and covers both inshore and offshore waters (Figure 6 includes closures around the Scottish coast). In Shetland, some 20 km² has been closed to scallop dredging to protect biogenic reefs²⁰. National measures can be put in place by Scottish Ministers but outside 6 nautical miles other EU Member States are not obliged to observe these closures.

Sustainability Accreditation

- 4.3.9 Schemes exist for the accreditation of fisheries as sustainable, in terms of stocks, environmental impact, and effective management. Examples include the scheme operated by The Marine Stewardship Council (Box 1) and the Responsible Fishing Scheme developed by the Sea Fish Industry Authority (Seafish)²¹.

²⁰ <http://www.nafc.ac.uk/innovative-closed-areas-to-scallop-fishing.aspx>

²¹ Scottish Government (2009) Sustainable Sea: Sustainable Scottish Fisheries and MSC Certification [online] Available at: <http://www.scotland.gov.uk/Publications/2009/05/13115802/2>

Box 1. Marine Stewardship Council's Fishery Accreditation Scheme

The Marine Stewardship Council (MSC) is an independent, global non-profit organisation which operates a third-party, voluntary fisheries certification and eco-labelling scheme. The MSC blue eco-label gives assurance that the product comes from a sustainable fishery. Fisheries are assessed in accordance with the MSC standard for fishing. This standard is based on three overarching principles:²²

- Sustainable fish stocks: The fishing activity must be at a level which is sustainable for the fish population. Any certified fishery must operate so that fishing can continue indefinitely and stocks are not overexploited.
- Minimising environmental impact: Fishing operations should be managed to maintain the structure, productivity, function and diversity of the ecosystem on which the fishery depends.
- Effective management: The fishery must meet all local, national and international laws and must have a management system in place to respond to changing circumstances and maintain sustainability.

These principles are supported by thirty-one detailed criteria against which fisheries are assessed.

4.4 Environmental Effects of Fishing

4.4.1 Fishing is known to result in a number of environmental effects, both direct and indirect. These are summarised in Figure 2 and discussed in the following paragraphs.

4.4.2 All fishing results in the removal of individuals from the population, which can have consequences for population sustainability. It also has indirect consequences for the availability of food for prey species such as cetaceans, birds and other fish.

4.4.3 The overexploitation of stocks can lead to depletion of stocks to unsustainable levels. It is important that fish stocks are managed effectively so that they can continue to provide a resource for future generations and safeguard the diversity of the marine ecosystem on which they depend.²³ In some instances specific management measures may be required to promote the recovery of over-exploited stocks. Since 2007, for example, Scotland has operated a system of "real time" closures of sea areas where there are concentrations of cod; this is designed to help the continuing recovery of cod stocks in the waters around Scotland.²⁴

²² Scottish Government (2012) Marine and fisheries, MSC: sustainability accreditation [online] Available at: <http://sh45inta/Topics/marine/science/Publications/TopicSheets/MSC/TopicSheet>

²³ Scottish Government (2012) Marine and fisheries, managing Scotland's fish stocks [online] Available at: <http://www.scotland.gov.uk/Topics/marine/Sea-Fisheries/19213>

²⁴ Scottish Government (2012) Marine and fisheries, regulation, real time closures [online] Available at: <http://www.scotland.gov.uk/Topics/marine/Sea-Fisheries/Regulation/closures>

Fishing Methods

- 4.4.4 The use of mobile fishing gear has become a source of concern, particularly because of the observed effects on:
- the seabed. Dredging for scallops and trawling for shellfish and demersal species modifies the seabed. The duration of effect depends on the method and the nature of the substrate affected.
 - benthic communities. The dredging and trawling methods referred to above may kill or injure benthic animals and destroy and/or damage habitat. Again, the duration of effect depends on the method and the nature of the affected communities.
 - non-target species, particularly removal.²⁵ Scottish Sea Fisheries Statistics identifies a number of species caught in this way, including lemon sole, pollack, etc.
- 4.4.5 Any fishing gear will affect the flora and fauna of a given location to some degree, but the magnitude and the duration depends on several factors including gear configuration, towing speed, water depth and the substrate over which the tow occurs.²⁶ The long-term viability of some fish and shellfish populations could also be threatened if essential fish habitat is degraded.²⁷

Discards and bycatch

- 4.4.6 As well as removing target species, fishing may also capture non-target species, including fish, seabirds and cetaceans (this is commonly known as bycatch).
- 4.4.7 Discards are the proportion of a catch of fish which is not retained on board during commercial fishing operations and returned to the sea. There are a number of reasons for discards: undersized fish below the legal minimum landing size; species with low or no market value; and/or a lack of quota.
- 4.4.8 Discards can include “bycatch”, a term usually used for fish caught unintentionally in the fishery. This can also include other untargeted species such as seabirds and cetaceans. One of the most serious threats facing small cetaceans is incidental capture or “bycatch” in fishing nets.²⁸ Council Regulation 812/2004 lays down measures concerning incidental catches of cetaceans by fisheries and requires Member States to report certain cetacean bycatches.²⁹ It has also been reported that perhaps the most serious threat to

²⁵ National Academy Press (2002) Effects of trawling and dredging on seafloor habitats, Committee on ecosystem effects of fishing: Phase 1: Effects of bottom trawling on seafloor habitats, Oceans Studies Board, [online] Available at: http://www.nap.edu/openbook.php?record_id=10323&page=18

²⁶ National Academy Press (2002) Effects of trawling and dredging on seafloor habitats, Committee on ecosystem effects of fishing: Phase 1: Effects of bottom trawling on seafloor habitats, Oceans Studies Board, [online] Available at: http://www.nap.edu/openbook.php?record_id=10323&page=18

²⁷ National Academy Press (2002) Effects of trawling and dredging on seafloor habitats, Committee on ecosystem effects of fishing: Phase 1: Effects of bottom trawling on seafloor habitats, Oceans Studies Board, [online] Available at: http://www.nap.edu/openbook.php?record_id=10323&page=18

²⁸ Scottish Government (2012) Marine and fisheries, marine mammals, cetaceans, whales, dolphins and porpoises [online] Available at: <http://www.scotland.gov.uk/Topics/marine/marine-environment/species/19887/20815> (accessed 08/11/2012)

²⁹ Scottish Government (2011) Scotland's Marine Atlas, Information for the national marine plan, Scottish Government pg 124

seabird populations worldwide is accidental mortality as a result of capture and drowning in fishing gear.³⁰

4.4.9 Discarding can impact on the environment, through:

- increased mortality of target and non-target species; and
- the alteration of food webs by supplying increased levels of food to scavenging organisms on the seafloor and to seabirds.³¹

The impact of discarding varies by species: some species including whitefish, such as cod and haddock, have low survival rates when discarded whereas other species including sharks or crustaceans (such as Nephrops) may have higher survival rates.³² Scotland actively promotes a fisheries management system which allows vessels to “catch less, land more”.³³

4.4.10 Gear technology can improve the selectivity of the catch and therefore reduce bycatch. For example, the main bycatch species from Nephrops trawling are whiting, haddock and cod.³⁴ Experiments have shown that the different behaviours exhibited by these species in the Nephrops trawl fisheries can be exploited through net design to improve the selectivity of trawls.³⁵ Fish behaviours in relation to fishing gears have been the subject of research at Marine Science Scotland (MSS) for many years.³⁶

Competition for resources and disturbance

4.4.11 In some instances fishing can lead to competition for resources and disturbance of species. Intertidal fisheries, for example, may cause disturbance to birds if they occur during low tides in areas where shorebirds feed and roost. Disturbance may exclude birds from areas they use for feeding, roosting or other activities.³⁷ In addition, there is evidence that in areas where traditional hand gathering of cockles takes place, even a reduction of less than 25% of available cockles will be enough to reduce spring oystercatcher numbers.³⁸ Closure orders to support seabird populations have been progressed in certain areas in Scotland, e.g. the sandeel fishery in the Firth of Forth environs.

³⁰ Jack Sewell, Rebecca Harris, Hilmar Hinz, Steven Votier and Keith Hiscock (2007) An assessment of the Impact on Selected Fishing Activities on European Marine Sites and a Review of Mitigation Measures The Marine Biological Association and the University of Plymouth.

³¹ Scottish Government (2012) Marine and fisheries, managing Scotland's fish stocks, discards [online] Available at: <http://www.scotland.gov.uk/Topics/marine/Sea-Fisheries/19213/discards>

³² Scottish Government (2012) Marine and fisheries, managing Scotland's fish stocks, discards [online] Available at: <http://www.scotland.gov.uk/Topics/marine/Sea-Fisheries/19213/discards>

³³ Scottish Government (2012) Marine and fisheries, managing Scotland's fish stocks, discards [online] Available at: <http://www.scotland.gov.uk/Topics/marine/Sea-Fisheries/19213/discards>

³⁴ Catchpole T.L, Revill A.S. (2006) Gear technology in nephrops trawl fisheries, Centre for Environment Fisheries & Aquaculture Science

³⁵ Catchpole T.L, Revill A.S. (2006) Gear technology in nephrops trawl fisheries, Centre for Environment Fisheries & Aquaculture Science

³⁶ Scottish Government (2012) Marine and fisheries, sustainable fisheries, fish behaviour [online] Available at: <http://www.scotland.gov.uk/Topics/marine/science/Research/sustainfish/fishcapture/behaviour>

³⁷ Jack Sewell, Rebecca Harris, Hilmar Hinz, Steven Votier and Keith Hiscock (2007) An assessment of the Impact on Selected Fishing Activities on European Marine Sites and a Review of Mitigation Measures The Marine Biological Association and the University of Plymouth.

³⁸ Jack Sewell, Rebecca Harris, Hilmar Hinz, Steven Votier and Keith Hiscock (2007) An assessment of the Impact on Selected Fishing Activities on European Marine Sites and a Review of Mitigation Measures The Marine Biological Association and the University of Plymouth.

Benthic habitat

4.4.12 Trawling and dredging can change the physical habitat and biological structure of ecosystems and can therefore have wide-ranging consequences. Mobile gear can reduce benthic habitat complexity by removing or damaging the actual physical structure of the seafloor and causing changes in species composition. The reduction of physical structure in repeatedly trawled areas can result in lower overall biodiversity. The effects of mobile gear on benthic habitats depends on the susceptibility of the habitat and on gear type used. Some habitats are extremely sensitive to disturbance; maerl beds, for example, are slow to recover from disturbance due to extremely low growth rates.³⁹ Recovery times vary according to the intensity and the frequency of the disturbance, the spatial scale of the disturbance and the physical characteristics of the habitat (sediment type, hydrodynamics). Superimposed on these human-related alterations are natural fluctuations caused by storms or long-term climate change, for example.⁴⁰

4.4.13 A silt cloud is also created by dredging, which settles in the surrounding area. Sediment settlement has been recorded as far as 21m away from the dredged area.⁴¹ Another study found that sediment plumes may settle to form layers (75 mm thick), which may smother the surrounding area.⁴² This changes superficial sediments and sediment organic matter, affecting the availability of organic matter for microbial food webs.⁴³

4.4.14 Potting and creels have relatively little impact on benthic habitat when compared to trawling and dredging. However, this depends on the number of creels and their location (including intensity of fishing effort). There are currently no limits on the number of pots and creels that can be placed at one time.

Ghost fishing

4.4.15 Derelict fishing gear, sometimes referred to as “ghost gear”, is any discarded, lost, or abandoned fishing gear in the marine environment. This gear has the potential to continue to fish and trap animals, entangle marine mammals, and act as a hazard to navigation. Fisheries remain one of the worst sources of marine litter and there are mixed views of the harm that this litter does to the environment.⁴⁴

³⁹ National Academy Press (2002) Effects of trawling and dredging on seafloor habitats, Committee on ecosystem effects of fishing: Phase 1: Effects of bottom trawling on seafloor habitats, Oceans Studies Board, [online] Available at: http://www.nap.edu/openbook.php?record_id=10323&page=18

⁴⁰ National Academy Press (2002) Effects of trawling and dredging on seafloor habitats, Committee on ecosystem effects of fishing: Phase 1: Effects of bottom trawling on seafloor habitats, Oceans Studies Board

⁴¹ Jack Sewell, Rebecca Harris, Hilmar Hinz, Steven Votier and Keith Hiscock (2007) An assessment of the Impact on Selected Fishing Activities on European Marine Sites and a Review of Mitigation Measures The Marine Biological Association and the University of Plymouth.

⁴² Jack Sewell, Rebecca Harris, Hilmar Hinz, Steven Votier and Keith Hiscock (2007) An assessment of the Impact on Selected Fishing Activities on European Marine Sites and a Review of Mitigation Measures The Marine Biological Association and the University of Plymouth.

⁴³ National Academy Press (2002) Effects of trawling and dredging on seafloor habitats, Committee on ecosystem effects of fishing: Phase 1: Effects of bottom trawling on seafloor habitats, Oceans Studies Board

⁴⁴ Scottish Government (2010) The Future of Fisheries Management in Scotland: Report of an Independent Panel [online] Available at: <http://www.scotland.gov.uk/Publications/2010/11/02103454/0>

Historic environment

4.4.16 Fishing methods that affect the seabed can also result in the damage and/or loss of historic environment features. Conversely, such sites have the potential to be a hazard for other marine users, for example, through snagging fishing nets and obstructing navigation.⁴⁵

⁴⁵ Scottish Government (2011) Scotland's Marine Atlas, Information for the national marine plan, Scottish Government pg 156

5.0 Environmental Baseline

5.1 Introduction

5.1.1 This section of the report contains detailed background information on Scotland's marine environment by environmental topic area.

5.2 Biodiversity, Flora and Fauna

5.2.1 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, excluding microbial flora⁴⁶.

Marine Habitats

5.2.2 The seabed is a critical component of marine ecosystems. Six broad habitat types occur in Scottish waters (Figure 5): intertidal rock, intertidal sediment, subtidal rock, shallow subtidal sediments, shelf subtidal sediments and deep-sea habitats. These are described in the following paragraphs⁴⁷.

5.2.3 Intertidal rock, which comprises approximately 48% of the Scottish coastline, includes bedrock, boulders and cobbles and is affected by a number of physical factors (e.g. wave exposure, salinity, temperature and tides). 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. These areas are popular resting and foraging places for many animals (e.g. grey seal, otter and various wading birds). For species at the limits of their range, pressures include climate change (e.g. increasing sea temperatures, changes to rainfall patterns) and invasive non-native species.

5.2.4 Intertidal sediments comprise around 50% of the Scottish coastline and include mobile shingle and gravel; sand or mud or combinations of these (including sandflats and mudflats); and saltmarsh in the upper shores. These habitats support communities of animals that are typically species-poor but highly productive (e.g. burrowing worms and bivalve molluscs). Pressures include physical disturbance, changes in wave regimes, sea-level rise, and damaging recreational activities. Some features in these areas are sensitive to fishing methods, e.g. seagrass beds are sensitive to suction dredging for cockles and blue mussel beds are sensitive to demersal fishing operations.

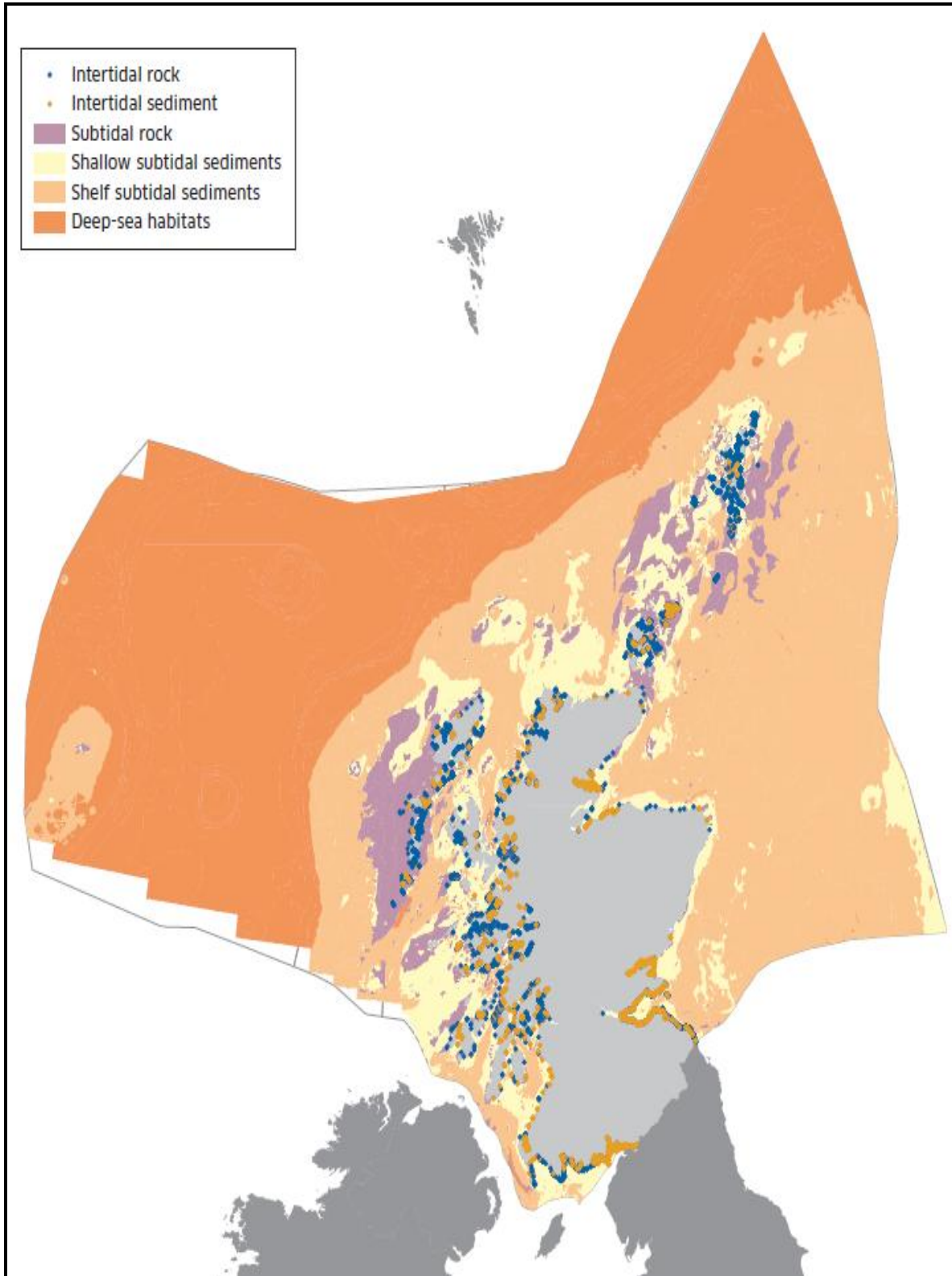
5.2.5 Subtidal rock habitats consist of bedrock, boulders and cobbles occurring below low water mark and the communities found in these areas are affected by the availability of light. Shallow areas are typically dominated by seaweeds; communities in deeper areas comprise exclusively marine animals. Subtidal rock is extensive on the west coast and around Shetland, but is only present in isolated pockets on the east coast. Flora and fauna supported by subtidal rock are vulnerable to physical damage (e.g. from bottom-fishing

⁴⁶ Marine Scotland (2011) Scotland's Marine Atlas: Information for The National Marine Plan, pg 71.

⁴⁷ Information in this section is taken from: Scottish Government (2011) Scotland's Marine Atlas, Information for the national marine plan. Scottish Government. pages 76-78.

gear, anchoring and coastal development) and to climate change, particularly increases in sea temperature.

Figure 5 : Modelled distribution of broad habitat types found in Scottish waters
(Source: Marine Atlas 2011)



5.2.6 Shallow (or inshore) and shelf subtidal sediment habitats cover an extensive area of the seabed, and include shingle, gravel, sand and mud. They extend to depths below the effects of wave patterns (around 50-70m) with shelf sediments extending to 200m depth. Inshore habitats also include lagoons and maerl beds. These habitats and the species they support are vulnerable to physical damage (e.g. from dredging, bottom trawling, seabed development, and anchoring) and to pollution.

Protected Marine Sites and Species

5.2.7 Scotland's marine biodiversity is protected by a range of European, UK and Scottish-level designations:

- Special Areas of Conservation (SAC), including both onshore and offshore SACs. These cover eight different habitat types (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) and three species (bottlenose dolphin, grey seal and common seal).
- Special Protected Areas, many of which are of international importance for bird species (i.e. seabirds, waders, ducks, geese and swans).
- Sites of Specific Scientific Interest, and
- Fisheries management areas (Tables 8 and 9).

In addition, Ramsar sites are designated for their internationally important wetlands, protected as SPAs or SACs, depending on their features.⁴⁸ These sites are summarised in Figure 6; details are provided in SNH/JNCC (2012).⁴⁹

5.2.8 The Habitats Directive⁵⁰ affords protection to certain species of plants and animals (European Protected Species). In the marine environment these include cetaceans, basking sharks and seals. Entanglement of baleen whales in static fishing gear has been observed in Scottish waters, i.e. 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 Scotland⁵¹.

5.2.9 The Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 introduced new powers to designate Marine Protected Areas (MPAs) and require that a network of MPAs in UK seas is created to protect biodiversity and geodiversity. This network will contribute to agreements with international partners to create an ecologically coherent network of well-managed MPAs in the North East Atlantic. SNH and JNCC are currently working with Marine Scotland on proposals for nature conservation MPAs; their report to the Scottish Parliament in December 2012 included 33 nature conservation MPA

⁴⁸ SNH (2012) Ramsar Sites [online] Available at: <http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/international-designations/ramsar-sites/> (accessed 12/11/2012)

⁴⁹ 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. Available at: <http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/national-designations/marine-protected-areas-%28mpa%29/scottish-mpa-network-advice/>

⁵⁰ Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora is transposed into Scots law through the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended).

⁵¹ Northidge, S., A Cargill, A Coram, L Mandelberg, S Calderan and B Reid. June 2010. Entanglement of minke whales in Scottish waters' an investigation into occurrence, causes and mitigation. Final Report to Scottish Government CR/2007/49.

proposals. Seventeen of these MPA proposals occur within territorial waters (Table 10; Figure 6). A further four MPA search locations remain to be fully assessed.⁵²

Table 8. Fisheries management areas (for nature conservation purposes)

OSPAR Region	Fisheries management area	Restriction summary
II	North-east UK sandeel closure (CA1)	Year round closure on sandeel fishing with the exception of a commercial monitoring fishery with a precautionary Total Allowable Catch. Sandeel fishery. EC No. 40/2008
III	Lamlash Bay	Year round prohibition of all fishing for sea fish within Lamlash Bay, Isle of Arran, regardless of the method of fishing employed. SSI No. 317/2008
V	North West Rockall	Vessels are prohibited from bottom trawling and fishing with static gear, including bottom set gill-nets and long-lines, for the protection of vulnerable deep-sea habitats such as corals and sponges. EC regulation No. 40 2008
V	Darwin Mounds	Vessels are prohibited from using any bottom trawl or similar towed nets operating in contact with the bottom of the sea for the protection of deepwater coral reefs. EC regulation No. 602/2004
V	West Rockall Mound	Vessels are prohibited from bottom trawling and fishing with static gear, including bottom set gill-nets and long-lines, for the protection of vulnerable deep-sea habitats such as corals and sponges. EC regulation No. 40 2008
V	Hatton Bank	

Table 9. Other existing fisheries management measures

OSPAR Region	Fisheries management area	Restriction summary
V	Blue Ling Management Area - edge of Rosemary Bank (FRA)	Restriction of blue ling catch during the spawning season
V	Blue Ling Management Area - edge of continental slope (FRA)	Restriction of blue ling catch during the spawning season

5.2.10 While not a statutory designation, Scotland's 29 Marine Consultation Areas (MCA) highlight areas of conservation priority in the near-shore marine environment. Located around the coastlines of Scotland's western and northern mainland and isles, these areas represent high quality and sensitive marine habitats and species. They will eventually be superseded by MPAs.

5.2.11 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

⁵² Scottish Government. 2012. Report to the Scottish Parliament on Progress to Identify a Scottish Network of Marine Protected Areas. Scottish Government.

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

5.2.12 SNH and JNCC have made recommendations to Scottish Ministers on PMFs, which comprises a list of PMFs for inshore and offshore waters⁵³. This includes such marine species as cod, herring, mackerel and ling. The Marine Atlas identifies key PMFs and the pressures affecting them (Table 11).

Shellfish stock levels

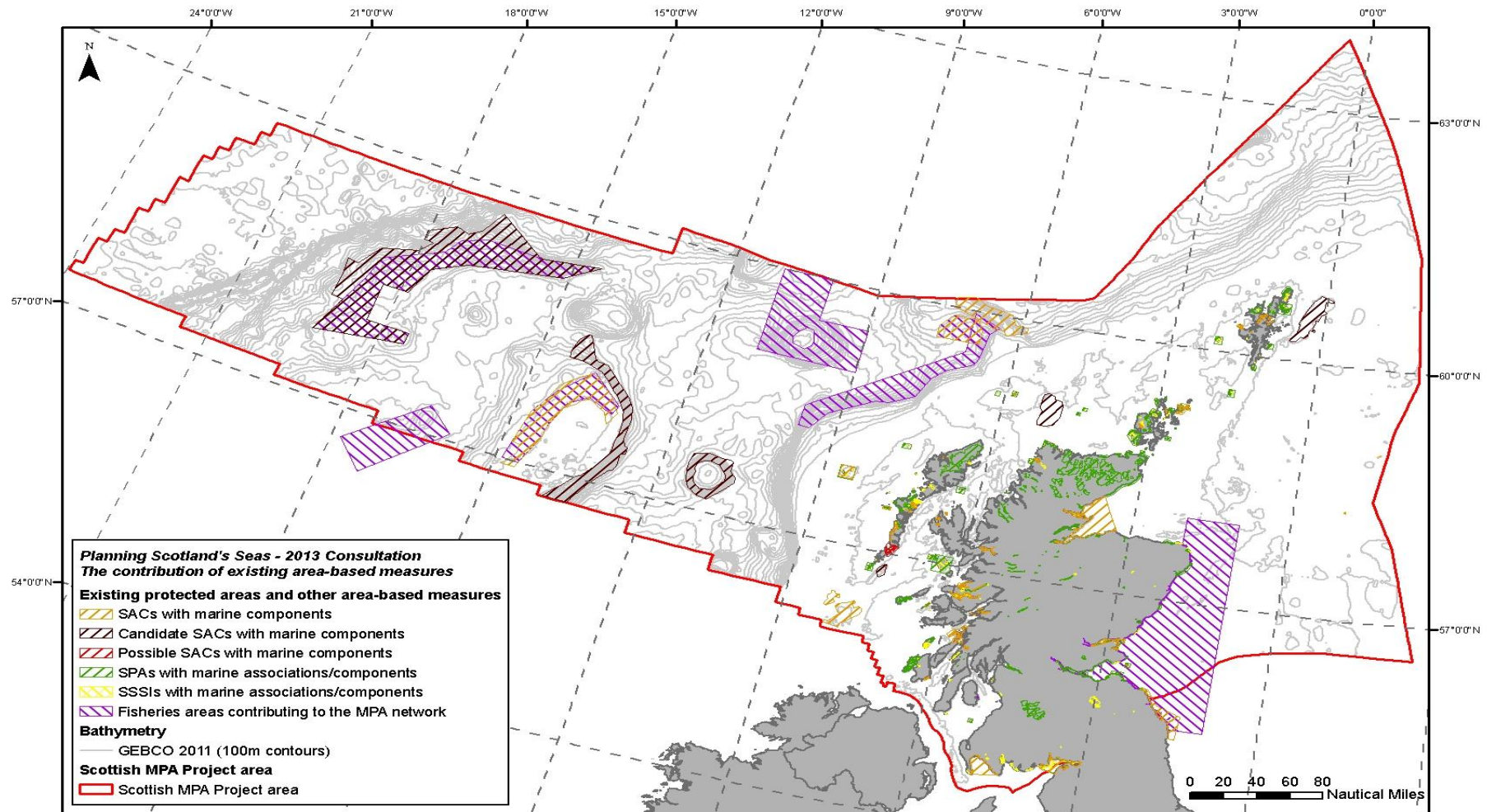
5.2.13 With the exception of squid which are highly mobile, shellfish species are widely distributed on the seabed. Different species have different habitat requirements and species distribution is dependent on the availability of suitable substrates.⁵⁴ The geographical distribution of different habitats around Scotland is highly complex, especially on the west coast, and in consequence shellfish populations are distributed patchily but in discrete aggregations.

5.2.14 The overall assessment of shellfish stocks provided by Scotland's Marine Atlas broadly suggests that those in the south and west are heavily exploited, compared to stocks in the more northerly and easterly part of Scottish waters which show signs of general improvement. Nephrops occur in areas of soft and sandy mud. On the west coast, the abundance of the three stocks (North Minch, South Minch and Clyde) declined in 2012.

⁵³ See <http://www.snh.gov.uk/protecting-scotlands-nature/safeguarding-biodiversity/priority-marine-features/priority-marine-features/>

⁵⁴ Scottish Government (2011) Scotland's Marine Atlas, Information for the national marine plan, Scottish Government pg 111

Figure 6. Existing protected areas, other area-based measures, possible Nature Conservation MPAs and MPA search locations



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 10. Possible Nature Conservation MPAs in Scottish territorial waters⁵⁵

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

⁵⁵ Marine Scotland. 2012. Report to the Scottish Parliament on Progress to Identify a Scottish Network of Marine Protected Areas. p.41

Name	Code	Protected features
North-west sea lochs and Summer Isles	NWS	<i>Biodiversity protected features</i> - 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 <i>Geodiversity protected features</i> - 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
Noss Head	NOH	<i>Biodiversity protected features</i> - Horse mussel beds
Papa Westray	PWY	<i>Biodiversity protected features</i> - Black guillemot <i>Geodiversity protected features</i> - Marine Geomorphology of the Scottish Shelf Seabed - sand wave field
Small Isles	SMI	<i>Biodiversity protected features</i> - 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 <i>Geodiversity protected features</i> - Quaternary of Scotland - glaciated channels/troughs, glacial lineations, meltwater channels, moraines, rock basins, streamlined bedforms
South Arran	ARR	<i>Biodiversity protected features</i> - 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
Upper Loch Fyne and Loch Goil	LFG	<i>Biodiversity protected features</i> - Burrowed mud; flame shell beds; horse mussel beds; ocean quahog; sublittoral mud and mixed sediment communities
Wyre and Rousay Sounds	WYR	<i>Biodiversity protected features</i> - Kelp and seaweed communities on sublittoral sediment; maerl beds <i>Geodiversity protected features</i> - Marine Geomorphology of the Scottish Shelf Seabed

Table 11. Key Priority Marine Features and Pressures (from the 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 and 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 and smothering as a result of scallop dredging and bottom trawling.
Maerl of coarse shell gravel with borrowing sea cucumbers	Especially damaging 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.

5.3 Water Quality and Ecological Status

5.3.1 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.^{56,57}
- River Basin Management Plans (RBMP)⁵⁸ have been prepared for the Scotland and Solway-Tweed River Basin Districts (RBD) 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.

5.3.2 In all, 63% of Scotland's water bodies were at good or better status in 2010. Of these, some 96% of coastal waters, 86% of estuaries, 63% of rivers and 54% of lochs were classed as in 'good' or 'better' condition in 2010.⁵⁹ While 96% of coastal waters in Scotland were classified as in excellent or good condition (grade A or B), 95% were reported as having achieved an improvement in condition.⁶⁰

5.3.3 However, some coastal water bodies and a particularly high proportion of transitional waterbodies (76%)⁶¹ remain at risk of not meeting the objectives of the Water Framework Directive by 2015. A further 480 rivers, 57 lochs and one estuary (Upper Forth estuary⁶²) were classed as being in 'poor' or 'bad' condition, with a further 407 rivers, 48 lochs, 5 estuaries (Girvan Harbour, Montrose Basin and Forth, Clyde, and Ythan estuaries) and 28 coastal waters classified as being in 'moderate' condition for the same period.

5.3.4 Much of the coast in the north, north-east, east, north-west, the Minch and west of the outer Hebrides is classified as being of high water quality (Figure 7). Waters in the Little Minch and south to the southern extent of the Mull of Kintyre are generally classified as 'good' quality, as are waters south of Argyll, around northern Orkney and the Shetland Isles, parts of the east coast and the outer Forth area. While these waters would be sensitive to any degradation in water quality, they may also have a greater capacity to withstand effects without it compromising quality status. Waters in the Inner Firth of Forth, Inner and Outer Firth of Clyde, Loch Linnhe and the Sound of

⁵⁶ JNCC (2011) Council Directive 2000/60/EC establishing a framework for Community action in the field of water policy (Water Framework Directive), [online] Available at: <http://jncc.defra.gov.uk/page-1375>

⁵⁷ European Commission (2011) EU Water Legislation and the Water Management Directive, [online] Available at: http://ec.europa.eu/environment/water/participation/notes_en.htm

⁵⁸ SEPA River Basement Management Plans, Available at : http://www.sepa.org.uk/water/river_basin_planning.aspx

⁵⁹ Scottish Government (2010) Implementation of the Water Environment and Water Services (Scotland) Act 2003 and the Flood Risk Management (Scotland) Act 2009: Annual Report to the Scottish Parliament – 2010, [online] Available at: <http://www.scotland.gov.uk/Publications/2011/03/21113203/3>

⁶⁰ SEPA (2011) Water Classification Report 2007 - 2010. [online] Available at: http://www.sepa.org.uk/water/monitoring_and_classification.aspx

⁶¹ Defined as extending out to 3 nautical miles for the purposes of the WFD.

⁶² Scottish Government (2011) Scotland's Marine Atlas, Information for the national marine plan, Scottish Government pg 41

Mull, Solway Firth and the coastal area off Fraserburgh are all classified as having 'moderate' quality.

5.3.5 Reported pollutant discharges from boats are recorded annually for the Maritime and Coastguard Agency (MCA). In Scotland, the records for 2009⁶³ show the following incidents were reported:

- In western Scotland (Dumfries and Galloway, Ayrshire, Inverclyde, Argyll and Bute, and the Highlands and Islands region to Cape Wrath) a total of nine vessel-source pollution incidents were reported.
- In Orkney and the Shetland Islands one vessel-sourced pollution incident was reported.
- In eastern Scotland (the northern and eastern shores of the Highlands and Islands region from Cape Wrath, Moray, Aberdeenshire, Angus, Fife, Lothian and Scottish Borders) reported some 29 discharges from vessels.

5.3.6 Future trends in the number of oil spills are difficult to predict as these are related to industrial activity and arise mainly from accidents, either as oil spills in fuelling activities, running aground or as chemical discharges from oil and gas installations.

Seabed and sediments

5.3.7 The quality of the water environment is closely linked with both the quality of sediments and biodiversity. Marine sediments play a key role in marine ecosystems, in supporting the benthos and ultimately in maintaining life throughout the water column.

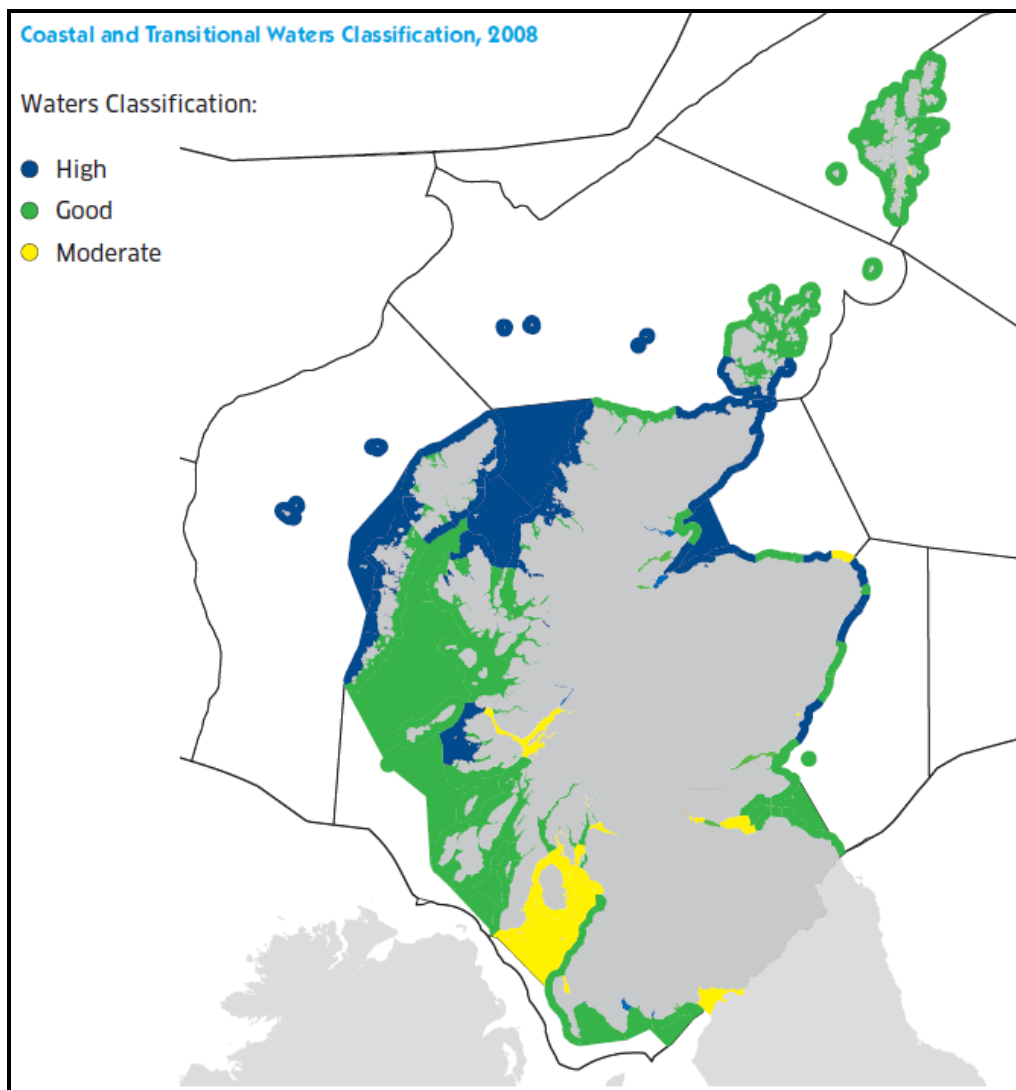
5.3.8 In general, the marine sediments around Scotland are sandy or gravelly and originate from deposits during the Quaternary glaciation. Strong currents and wave action may also have prevented deposition of recent muddy sediment or have winnowed it to leave a coarse-grained lag deposit. Muddy sediments occur principally nearshore or, further offshore, in depressions on the sea floor, where currents may be relatively weak. They also occur beyond the shelf break (200 m water depth) to the west of Scotland. The concentration of calcareous material varies greatly in seabed sediments reflecting the amount of shell material in different areas; locally, they can be very high.⁶⁴

5.3.9 Some methods of fishing, such as bottom trawling and dredging, can cause physical damage to the seabed and surrounding area (see paragraph 4.4.12).

⁶³ Advisory Committee on Protection of the Sea (ACOPS) Annual survey of Reported Discharges attributed to vessels and offshore oil and gas installations operation in the United Kingdom Pollution Control Zone 2010 [online] Available at: <http://www.acops.org.uk/documents/annual-marine-pollution-survey-2010.pdf>

⁶⁴ Taken from Marine Scotland (2008) Scotland's Seas: Towards Understanding their State, Chapter 2.

Figure 7: Coastal and Transitional Waters Classification (Source: Scotland's Marine Atlas⁶⁵)



5.4 Climate Change

5.4.1 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 our coastlines. Since 1961, average temperatures in all parts of Scotland have risen for every season⁶⁶ and over the last three decades, sea-surface temperatures around the UK coast have also risen by approximately 0.7°C.⁶⁷ 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

⁶⁵ Scottish Government (2011) Scotland's Marine Atlas, Information for the national marine plan, Scottish Government pg 41

⁶⁶ Sniffer (2006) A Handbook of Climate Trends Across Scotland, [online] Available at: www.sniffer.org.uk

⁶⁷ UKCIP (2011) Recent Climate Trends [online] Available at: <http://www.ukcip.org.uk/essentials/climate-trends/>

acidity is already causing concern for marine ecosystems and many organisms that share it.⁶⁸

- 5.4.2 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 has been higher than this.⁶⁹ Under projections from the UKCIP09 model⁷⁰, further rises of between 12 and 76 cm are projected by 2095⁷¹, 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.
- 5.4.3 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. Even now, climate change is already impacting on the marine environment, and increasing the vulnerability of some habitats and species to future pressures.

Impacts of climate change on fisheries

- 5.4.4 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.⁷² Risks from pests, diseases and invasive species may increase. There may also be a decline in ocean primary production and the effects on increased ocean acidity.⁷³

Vessel fuel emissions

- 5.4.5 Carbon dioxide (CO₂) is the primary greenhouse gas emitted through human activities. The main human activity that emits CO₂ is the combustion of fossil fuels (coal, natural gas and oil). Red diesel is used by the majority of fishing vessels (also known as marine diesel or gas oil). There are 2,095 vessels in the Scottish fleet and 68% of them (1,415) fish in the inshore area. The predominant fishing method used is static gear (pots and creels) with 1,042 (74%) operating with static gear only, 264 vessels (19%) operating mobile gear only and 109 (8%) using both types of gear.⁷⁴
- 5.4.6 Greenhouse gas emissions from the fishing fleet are influenced by a number of factors including abundance of fish (stocks), the steaming distance to

⁶⁸ Scottish Government (2012) Climate Change and Ocean Acidification [online] Available at:

<http://www.scotland.gov.uk/Topics/marine/science/atlas/climatechange>

⁶⁹ UKCIP (2011) Recent Climate Trends [online] Available at: <http://www.ukcip.org.uk/essentials/climate-trends/>

⁷⁰ 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>

⁷¹ 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>

⁷² 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

⁷³ 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>

⁷⁴ Marine Scotland (2012) Weekly Marine Briefing, Marine Analytical Unit [online] Available at:

<http://www.scotland.gov.uk/Topics/Statistics/Browse/Agriculture-Fisheries/Seafisheriesdata/wkbrieflist/Dec5thWeeklyBrief>

fishing grounds and the technology used.⁷⁵ For example, there are 105 Nephrops trawlers of an average length of 15m and under 250 kW (engine size) operating in the west of Scotland. On average, vessels consumed 390 litres of fuel per day at sea costing £158 per day.⁷⁶ There are 993 vessels under 10m using pots and traps (based at ports in the UK). On average vessels consumed 134 litres per day at sea costing £54 per day.⁷⁷

5.5 Cultural Heritage

5.5.1 Given Scotland's geographical position on a nodal sea route linking northern Europe with the world, its seas have historically also been of international importance.⁷⁸ A wide range of archaeological sites can be found on the foreshore and seabed, ranging from the remains of ships and aircraft lost at sea to harbours, lighthouses and other structures at the coastal fringe. These historic assets are a non-renewable resource, and their survival is conditioned by a complex interplay of natural and man made factors.

5.5.2 Coastal erosion poses a major threat to archaeological sites in many areas, a threat that likely to be exacerbated given predictions of the likely effects of global warming (i.e. sea level rise, increased intensity of storms, erosion and risk of flooding). However, man-made activities such as anchoring, certain types of fishing, and coastal and marine development are also known drivers of change in the marine historic environment.⁷⁹

5.5.3 Many sites lie wholly within the marine environment; however, it is believed that there are many more unprotected sites of interest on and around the coastline.⁸⁰ The Orkney and Shetland coasts, in particular, contain many Neolithic and Mesolithic structures that are now below sea level. As such, Scotland's seabeds and inter-tidal areas contain the remains of many important historic assets, ranging from artefacts and structures deposited on the seabed, structures built on the seabed or in inter-tidal areas, and submerged sites that were previously above sea level.

5.5.4 While the survival of prehistoric remains is likely to be mainly focused in the sheltered sea lochs and enclosed bays of the east coast of the Shetlands, Orkney and Fair Isle⁸¹, and in submerged caves and gullies, the following potential locations for the survival of prehistoric archaeological material on the seabed have also been identified⁸²:

⁷⁵ 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>

⁷⁶ 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

⁷⁷ 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

⁷⁸ Historic Scotland (undated) Towards a Strategy for Scotland's Marine Historic Environment [online] Available at: www.historic-scotland.gov.uk/marine-strategy.pdf

⁷⁹ Historic Scotland (undated) Towards a Strategy for Scotland's Marine Historic Environment [online] Available at: www.historic-scotland.gov.uk/marine-strategy.pdf

⁸⁰ Scottish Government (2011) Scotland's National Marine Plan Interim sustainability appraisal report [online] Available at: <http://www.scotland.gov.uk/Publications/2011/03/16135933/0>

⁸¹ Dti (2004) The scope of Strategic Environmental Assessment of North Sea Area SEA5 in regard to prehistoric archaeological remains [online] Available at http://www.offshore-sea.org.uk/site/scripts/consultation_download_info.php?downloadID=62 (accessed 28/06/2012)

⁸² Dti (2007) SEA 7 Environmental Report 25th offshore oil and gas licensing round Strategic Environmental Assessment [online] Available at: http://www.offshore-sea.org.uk/consultations/SEA_7/SEA_7_Environmental_Report.pdf

- On the shelf to the west of the Hebrides.
- The Hawes Bank and seabed around Coll and Tiree.
- Around Islay, Jura, Colonsay and Oronsay.
- The Rum and Canna coastline.
- In sheltered inlets and reaches to the east of the Hebrides.
- In sheltered inlets around Skye.
- On submerged islands located between the Northern Irish coast and the south Hebridean islands.
- In the sea to the east of Orkney and Shetland.
- Off the east coast of the Scottish mainland.

Designated sites

5.5.5 While the number of heritage assets within the marine environment is significant, there are relatively few that have been afforded statutory protection through designation. At present Scotland has 34 statutory designated sites wholly within the marine environment. These include eight designated wreck sites around the coast, nine scheduled monuments including seven wrecks in Scapa Flow, four listed lighthouses and 13 sites designated under the Protection of Military Remains Act 1986.⁸³ Several battlefields have also been identified in coastal locations.

5.5.6 Coastal sites include World Heritage Sites (St Kilda and the Heart of Neolithic Orkney), scheduled monuments, gardens and designed landscapes, archaeological remains, listed buildings and other sites located in conservation areas.⁸⁴

5.5.7 The Marine (Scotland) Act 2010⁸⁵ provides for the designation of Historic MPAs. The designation process will include a review and transition of existing designated wreck sites and underwater scheduled monuments to MPA status and identification of further priority sites, in line with guidelines and criteria drawn up by Marine Scotland. Further guidance on the management of changes within MPA sites is also currently being progressed.

5.6 Evolution of the Environmental Baseline without the Management Proposals

5.6.1 The management proposals include measures to be taken forward at a national level with regard to the management of inshore fisheries and will therefore be a key delivery mechanism for such management. The majority of the proposed measures relate to the management of fisheries, and have the potential to promote sustainable stocks and healthy ecosystems. In the absence of the management proposals, over-fishing of some of the species that are close to being, or currently are, over-exploited is likely to continue; stocks of edible crabs, for example, are currently over-exploited in some areas.

⁸³ Scottish Government (2011) Scotland's National Marine Plan Interim sustainability appraisal report [online]

⁸⁴ *ibid*

⁸⁵ Scottish Government (2010) Marine (Scotland) Act 2010

- 5.6.2 Damage to benthic habitats, particularly from bottom trawling and dredging, is likely to continue, with or without the management proposals. There are likely to be some indirect benefits from proposed measures to continue to seek sustainable fisheries accreditation.
- 5.6.3 Current trends regarding the ecological status of some water bodies are likely to remain the same in the absence of the management proposals. The same applies to the historic environment.
- 5.6.4 Current climate change trends may continue in the presence or absence of the management proposals. Much depends on the realisation of other activities aimed at the mitigation of, and adaptation to, climate change, e.g. CO₂ emissions from terrestrial transport systems. The management proposals do not seek to address climate change, in terms of adaptation to changing conditions. However, they do include measures to improve fuel efficiency.

6.0 Results of the SEA

6.01 This section sets out the findings of the assessment of the environmental effects of the IFG proposals. Details are provided in the assessment tables in Appendix 3.

6.02 In undertaking the assessment, it became clear that the effects of some of the proposed measures would be uncertain. These comprise the control or monitoring of hobby fishermen and seeking a review of current squid prohibitions. For the former, there is a lack of information about the activities of hobby fishermen, and so it is not clear whether control or monitoring of their activities would give rise to environmental effects. For the latter, it is not clear whether the lifting of current prohibitions on squid fishing would result in environmental effects.

6.1 Biodiversity, flora and fauna

6.1.1 The key issues for biodiversity from fishing are:

- The removal of stock, with direct effects on populations and indirect effects on predators
- Bycatch, both fish and other species such as birds and cetaceans
- Damage to the seabed and benthic communities from fishing gear, particularly trawling and dredging gear

6.1.2 Several of the IFG management proposals have the potential to contribute to increased sustainability of fish stocks, a beneficial effect:

- Measures that increase the proportion of the stock that survive to reach reproductive size, such as increased MLS, management of bycatch and discards, and v-notching berried lobsters, may have a beneficial effect. For example, if stock is currently overfished, increasing MLS may reduce fishing mortality; v-notching and returning lobsters to the sea allows them to continue to breed until the notch grows out. The success of these measures, however, will depend on the survival rate of returned individuals. In addition, they will not succeed if there is a concomitant increase in fishing mortality for larger-sized individuals. For Nephrops, if increases in MLS are to have potential beneficial effects, gears with increased mesh sizes may be required to allow undersized individuals to escape.
- The development of new fisheries has the potential to have a beneficial effect, providing that they reduce pressure on other stocks (this assumes effort is diverted). However, if these measures were to increase total fishing activity (and mortality), this could increase the pressure on stocks and ecosystems. By-catch may also be an issue. This could be offset by following the principles set out in the fisheries accreditation schemes. It should also be noted that data regarding both existing and potential new inshore stocks is not available, and it would therefore be difficult to assess whether pressure on existing fished stocks was being reduced. Even with the data, there could only be a potential environmental benefit if all things stayed equal.

- 6.1.3 Proposals to gather data in support of opening new fisheries may have an adverse effect on the seabed, depending on the method utilised (e.g. dredge survey, use of environmentally intrusive sampling methods). It is not clear whether such effects would be significant. The potential positive and negative effects of opening new fisheries are discussed in paragraph 6.1.2.
- 6.1.4 Bottom trawling and dredging can change the physical habitat and biological structure of ecosystems, with some habitats extremely sensitive to disturbance, and can therefore have wide-ranging consequences. There are few measures proposed that would reduce damage to the seabed, apart from those which propose to investigate “static gear only” zones for Nephrops in areas with multiple resource use, and to explore funding for new fishing techniques/trials. The effect of proposed static sector controls on the seabed is uncertain, as there is little evidence to suggest that disruption of the seabed from creels is significant. In consequence, the possible benefit of reducing fishing intensity (through reducing creel numbers) is uncertain. Larger benefits may occur, should these measures extend to other methods of fishing as well, e.g. bottom trawling. Measures to support and investigate new gear (including to reduce bycatch and discards) may not only have a beneficial effect through improved selectivity and reduced by-catch, but could potentially reduce effects on the integrity of the seabed.
- 6.1.5 The proposal to promote the use of an eco-dredge is a measure that may have a positive effect, through the reduction of damage to the seabed. However, this gear is still in development and its effectiveness remains to be proven. The accompanying proposal that fishermen should work to the UK Scallop Code of Conduct (the UK Scallop Industry Good Practice Guide) may also have such benefits. However, although the negative effects of scallop dredging may be reduced, there will likely remain some impact on the seabed and the habitat that it supports.
- 6.1.6 For a variety of reasons, in this round of developing management proposals, IFGs have focused on controls on the static sector (such as the introduction of creel limits). These include capping the numbers of creels and/or vessels, the introduction of permits and effort control. These reflect the perception of fishermen that in some areas creel numbers have increased significantly in recent years, that the grounds are crowded with creels and catch rates are low. These initiatives may be beneficial where at present few or no management measures are in place, by providing management and protecting stocks. However, it is not clear that control of the creel fishery alone would improve shellfish stocks, given that mobile gear is used by 20% of the inshore fleet, and that these vessels catch many more fish and shellfish.
- 6.1.7 Any proposals to open new wrasse fisheries in support of aquaculture (to effect biological control of sea lice) will need to be carefully considered in terms of sustainability of wild stocks. It is recognised that wild populations alone are unlikely to be able to sustain such a requirement and data gathering will be required to assist with improved understanding of stocks and biology.

- 6.1.8 There is potential for current dredging and trawling methods to affect Priority Marine Features and the proposed Marine Protected Areas in territorial waters. This issue will be explored more thoroughly in the sustainability appraisal of the Marine Protected Areas, so will not be assessed further here. However, this is an issue that the IFGs may wish to be aware of and consider in the future, not only in terms of effects on Priority Marine Features and Marine Protected Areas, but also in terms of the effects of these fishing methods on the wider benthic environment and the potential for this to affect long-term viability of fishing grounds.
- 6.1.9 The proposal to continue to seek sustainable fisheries accreditation (the principles of which are discussed in Section 4) may have positive effects on biodiversity. The principles of accreditation include that a fishery must be conducted in a manner that does not lead to over-exploited stocks, and should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem on which the fishery depends. The criteria against which fisheries are assessed relate to stock status and management and reduce the effects of fishing on the ecosystem. For many inshore fisheries gaining, or working towards gaining, accreditation is likely to involve monitoring, stock assessments and changes in practices. Meeting these principles is likely to be beneficial for promoting sustainable stocks, working towards good ecological status and maintaining and protecting the integrity and character of the seabed. The latter is particularly relevant to trawling and dredging activities that disrupt the seabed.
- 6.2 Climatic Factors
- 6.2.1 Proposed measures to support fuel efficiency through, for example, the use of lighter gear, or investigating the possibility of using alternative fuels such as hydrogen, have the potential for a positive effect on climatic factors, through the reduction of carbon dioxide emissions.
- 6.2.2 Future iterations of the IFG Management Plans would likely benefit from considering the impact of climate change on inshore fisheries, e.g. in terms of trip length, catch volumes, etc.

6.3 Cultural Heritage

6.3.1 None of the proposals are directed to the enhancement of the historic marine environment or the avoidance of coastal and marine archaeology. Any measures that will maintain and protect the integrity of the seabed will be of benefit to the historic environment, through reducing loss of and/or damage to features of importance. Some of the proposals may reduce damage to the seabed, through changes in gear type or intensity. The main proposal with benefits for the historic environment is fishery accreditation; one of its key principles is to minimise environmental impact: "Fishing operations should be managed to maintain the structure, productivity, function and diversity of the ecosystem on which the fishery depends" (Box 1). This would include maintenance of seabed integrity, which is particularly relevant to reducing the risk of damage to archaeological features.

6.4 General

6.4.1 The IFG management proposals include a proposal to ensure that the landing and infrastructure requirements of the fishing fleet are identified. This could include such measures as seeking to investigate and support the maintenance and development of landing areas and supporting infrastructure (including quays and jetties for services such as access to fuel and storage facilities for gear). In the long- term, such development has potential negative effects, particularly during construction, e.g. the loss of and/or damage to habitat, disturbance of fish and mammals, increased pollution risks, etc. It is likely that such development would require planning and/or licensing consent, and such negative environmental effects would be dealt with on a case-by-case basis as part of this process.

6.5 Cumulative Effects

6.5.1 The Environmental Assessment (Scotland) Act 2005 requires the consideration of cumulative and synergistic effects that may arise, in this case, from the implementation of the measures detailed in the IFG management plans.

6.5.2 Some of the measures in the IFG management plans are likely to complement one other and result in a significant positive effect. For example, increasing minimum landing size, the v-notching and return of berried fish, and seeking fisheries accreditation should lead to a greater positive effect on stocks. This would also be supported by measures to reduce bycatch and/or discards.

6.5.3 Few of the proposals would increase damage to the seabed, apart from the possibility of opening a winter cod fishery, and the effect of this would depend on the gear to be used. However, there are few measures proposed to reduce damage to the seabed, apart from exploration of funding to support gear change and support for use of the eco-dredge.

6.6 Conclusion

- 6.6.1 The IFG management plans set out proposed measures that have the potential for significant environmental effect and have therefore been subject to strategic environmental assessment. The proposed measures focus primarily on ensuring the future of fisheries through measures to stocks, including:
- activities to support the opening of new and/or closed fisheries, including the collection of baseline information.
 - fisheries management measures e.g. permit control, increases in minimum landing sizes, restrictions on gear, reduction of discards/bycatch
- 6.6.2 Taken together, some of the proposals may result in positive effects on fish stocks, depending on how they are implemented. These may be of benefit to the long-term sustainability of fish stocks and therefore of the fishing industry which relies on them.
- 6.6.3 There are few measures proposed that would reduce damage to the seabed, and few resulting benefits for the seabed and its biodiversity and historic environment interests.
- 6.6.4 Proposals to reduce carbon dioxide emissions will be of benefit to climate change. A key measure with overall benefits is the proposal to pursue sustainable fisheries accreditation.
- 6.6.5 It should be noted, however, that implementation of this and many other of these measures will require substantial data gathering and analysis, both for existing stocks and potential new ones. It is likely that this will require significant time and resources, and the potential environmental benefits are therefore more likely to be realised in the long-term, rather than immediately.
- 6.6.6 It should also be noted that, although the majority (over 75%) of inshore fishermen use static gear, principally creels, it is not the only form of fishing with an environmental impact on inshore waters. Mobile gear, especially dredges and trawls, is used by some 20% of vessels and these vessels catch many more fish and shellfish. They also have impacts on the marine environment and there will be an expectation that mobile fishing would feature more prominently in IFGs' considerations in the future.

7.0 Next Steps

- 7.1 Marine Scotland will take into account views raised in response to the consultation on the IFG management proposals and the Environmental Report, in deciding whether and/or how the proposals should be progressed.
- 7.2 A Post-Adoption Statement will be published once the consultation analysis is complete and decisions have been made. This will explain how issues raised in the environmental assessment, and associated views in response to the consultation, have been addressed.
- 7.3 Proposals for monitoring will be set out in the Post-Adoption Statement.

How to respond to the consultation

- 7.4 Views on the IFG management plan proposals and this Environmental Report are now invited. The consultation on the IFG management plan proposals and the Environmental Report will last for eight weeks. Please provide your comments by **10 October 2013**.

- 7.5 Comments in writing should be made to:

Inshore Fisheries Groups
Marine Scotland
Area 1-B South
Victoria Quay
Edinburgh EH6 6QQ

or to IFG@scotland.gsi.gov.uk

- 7.6 Copies of the IFG Management Plan Proposals and the Environmental Report are available for viewing, during office hours, in the library at Saughton House:

Scottish Government
Saughton House
Broomhouse Drive
Edinburgh
EH11 3XD

- 7.7 If you have any enquiries please send them to IFG@scotland.gsi.gov.uk or telephone 0131 244 4421.

Appendix 1 Environmental Protection Objectives

Context for the SEA

The Environmental Assessment (Scotland) Act 2005 requires responsible authorities to identify the broader policy context and the environmental protection objectives relevant to the plan that is being assessed. The policy context for the development of the IFG 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 the following table.

Marine Policy

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

The international context sets the framework for the conservation, protection and sustainable use of biodiversity, flora and fauna. In relation to the coastal environment this includes planning for sustainable fisheries and mariculture, the protection of migratory species, including birds and fish stocks, protection of coastal wetland 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.

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

Water

There are numerous provisions for the protection of the water environment at an international, European and national level. A number of these specifically relate to controlling pollution from ships and off shore activities, and also relate to the dumping of waste. There is a strong positive framework for improving water quality including coastal areas and designated bathing waters.

Cultural Heritage

There is an international and national framework for the protection of archaeological and historic features and objects. Activities such as seabed development and certain fishing methods have the potential to damage seabed archaeology. There is a focus on protection, conservation and improving understanding of marine archaeology.

Legislation/Policy	Objectives
Marine Policy	
<i>International</i>	
UN Convention on the Law of the Sea 1982 (UNCLOS)	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.
<i>European</i>	
EU Marine Strategy Framework Directive 2007 (MSFD)	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 <i>"take necessary measures to achieve or maintain good environmental status in the marine environment by the year 2020..."</i> .
European Integrated Maritime Policy 2007	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 the effects of climate change on coastal regions.
<i>United Kingdom</i>	
Coast Protection Act 1949 (as amended by The Coast Protection (Notices) (Scotland) Regulations 1988 and The Coast Protection (Notices) (Scotland) Amendment Regulations 1996)	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	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 2009 ⁸⁶	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.
<i>Scotland</i>	
Marine (Scotland) Act 2010	Aims 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.

⁸⁶ <http://www.scotland.gov.uk/Resource/Doc/1057/0080305.pdf>

Legislation/Policy	Objectives
Biodiversity, Flora & Fauna	
<i>International</i>	
UN Convention on Biological Diversity (1992)	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, and the establishment of representative networks of protected areas in the maritime environment by 2012.
Bonn Convention on the Conservation of Migratory Species of Wild Animals 1979	Aims to conserve terrestrial, marine and avian species through international co-operation. Is of particular relevance to the conservation of cetaceans in and around Scottish waters
Convention on Wetlands of International Importance 1971 (amended 1982/87)	Otherwise known as the Ramsar Convention, this emphasises the special value of wetland, particularly as a key habitat for waterfowl. The Convention resulted in designation of sites for management and conservation.
Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention).	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 (MPAs). 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.
IMO International Convention on Ballast Water Management 2004	Aims to prevent the introduction of harmful aquatic organisms and pathogens to new environments and promote the development of measures to address aquatic invasive species in ballast water. Includes guidelines relating to ballast water sampling, reception facilities, exchange, emergency situations, and ballast water management systems. These guidelines are kept under review and are updated by the MEPC when the development of technologies and additional knowledge become available.
European Strategy on Invasive Alien Species 2003	<p>A Bern Convention initiative, the strategy aims to facilitate implementation of international commitments and best practice in management of invasive alien species (IAS). It covers terrestrial, freshwater and marine environments, and provides guidance for activities undertaken outside national jurisdiction (such as shipping), with the following objectives:</p> <ul style="list-style-type: none"> • Increase awareness and information on IAS. • Strengthen national and regional capacity for managing IAS issues. • Prevent the introduction of new IAS into and within Europe. • Support rapid response to detected incursions. • Reduce the adverse impact of existing invasive alien species. • Recover species, restore natural habitats and ecosystems that have been adversely affected by IAS. • Identify and prioritise key actions to be implemented at both the national and regional level.
Agreement on the Conservation of African-Eurasian Migratory Waterbirds 1995 (AEWA)	An independent international treaty developed under the auspices of the UNEP/Convention on Migratory Species. The AEWA covers 235 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.
Agreement on the Conservation of Small	An agreement on the protection of small cetaceans, noting that the migratory nature of dolphins, porpoises and

Legislation/Policy	Objectives
Cetaceans of the Baltic, North East Atlantic, Irish and North Seas 1992 (ASCOBANS)	whales means that they can be vulnerable to a range of marine activities and issues.
<i>European</i>	
Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive)	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) ensuring the protection of species and habitats of community interest.
Council Directive 79/409/EEC on the conservation of wild birds (the Birds Directive)	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)	Aimed to promote co-operation between European states to protect biodiversity.
The Pan-European Biological and Landscape Diversity Strategy (1995)	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. Emphasises the rapid decline of some key characteristics and resources, including traditional human-made landscapes, coastal zones, marine areas, wetlands, mountains and grassland.
EU Biodiversity Strategy (1998)	Aims to “anticipate, prevent and attack” any reduction or loss of species and habitats across Europe. Supports implementation of the Habitats and Birds Directives, supports the establishment of networks of protected sites, aims to achieve conservation by making plans for priority resources. Also notes the importance of biodiversity outside of protected areas. Refers to agriculture and its role in relation to biodiversity conservation.
<i>United Kingdom</i>	
Wildlife and Countryside Act 1981	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.
Conservation of Habitats and Species Regulations 2010 (as amended)	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.)
The Offshore Marine Conservation (Natural Habitats, &c) Regulations 2007	The Regulations extend protection to important species and habitats under the Birds and Habitats Directives beyond UK territorial waters (i.e. outside 12nm). Give protection to marine species, wild birds and habitats, mainly

Legislation/Policy	Objectives
(the Offshore Marine Regulations)	through the creation of offences and site protection mechanisms. Provide the definition of deliberate disturbance applicable to cetaceans, turtles and the Atlantic sturgeon
UK Biodiversity Action Plan 1994 (UKBAP)	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).
<i>Scotland</i>	
Marine (Scotland) Act 2010	Provides for the selection of Marine Protected Areas (MPAs) and the protection and conservation of seals in and in adjacent territorial seas. The Habitats Directive and the 1994 Regulations (see above) introduced additional measures for the protection of seals.
Nature Conservation (Scotland) Act 2004	<ul style="list-style-type: none"> 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)	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.
A Strategy for Marine Nature Conservation in Scotland's Seas (2011)	Sets out Scottish aims for protecting and, where possible, enhancing marine biodiversity by implementing these with the partnership of stakeholders over both the short-term (by 2012) and the long-term (by 2020). The Strategy adopts the three pillar approach for species conservation, site protection, and wider seas policies and measures. The strategy identifies the need for co-operation in the pursuit of shared marine objectives to meet international, UK and national obligations.
Water	
<i>International</i>	
IMO International Convention for the Prevention of Pollution from Ships 1973 (MARPOL)	Aims to prevent marine pollution from ships and in part from oil rigs and production platforms. It includes annexes covering pollution by oil, noxious liquids, harmful substances, sewage, garbage and air pollution. Recent changes focus on reducing the sulphur content and particulate emissions from fuel in the shipping sector. ⁸⁷
International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990	Provides a framework for international co-operation in combating major incidents or threats of marine pollution. Of particular relevance in relation to collision and grounding risk for vessels in Scottish waters.

Legislation/Policy	Objectives
London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (as amended)	Prohibits the dumping of certain hazardous materials, requires a prior special permit for the dumping of a number of other wastes, and a prior general permit for other wastes or materials. It also creates a basis in international law to allow and regulate carbon capture and storage (CCS) in sub-seabed geological formations.
<i>European</i>	
Water Framework Directive 2000/60/EC	This provides an overarching strategy, including a requirement for EU Member States to ensure that they achieve 'good ecological status' by 2015. River Basin Management Plans (RBMPs) were defined as the key means of achieving this. The Marine Strategy Framework Directive extends coverage of coastal waters beyond 1nm.
Bathing Waters Directive (2006/7/EEC)	Aims to protect the public and the environment from faecal pollution at waters used for bathing by large numbers of visitors. Achieves this by making information on quality public, and setting standards to be met by 2015.
<i>United Kingdom</i>	
The Merchant Shipping (Implementation of Ship-Source Pollution Directive) Regulations 2009 ⁸⁸	Implements Directive 2005/35/EC on ship-source pollution and on the introduction of penalties for infringements.
Merchant Shipping Act 1995	General provisions for merchant shipping, seamen, and safety. Part VI focuses on prevention of pollution, including oil pollution, and sets out responsibilities and liabilities. Also covers international incidents. Other issues include lighthouses, salvage and wrecks.
Environmental Protection Act 1990	Covers pollution control and waste management. Also covers litter, radioactive substances and genetically modified organisms. Pollution at sea is specifically controlled.
Pollution Prevention and Control Act 1999	Implements Directive 96/61/EC (Integrated Pollution Prevention and Control). Regulating industrial and commercial activities which may cause environmental pollution and to prevent and control emissions that are capable of causing any pollution. Fundamental aim is that environmental problems be addressed in an integrated way.
<i>Scotland</i>	
Environmental Liability (Scotland) Regulations 2009	Covers incidents of significant damage to biodiversity, water or land. In accordance with the European Environmental Liability Directive (2004/35/EC), aims to apply the polluter pays principle by requiring restoration in such instances.
Water Environment and Water Services (Scotland) Act 2003 (WEWS Act)	Transposes the Water Framework Directive into the Scottish context. Aims to protect the water environment by ensuring a reliable and high quality supply of water, reducing groundwater pollution, and protecting marine and other waters.
The Water Environment (Controlled Activities) (Scotland) Regulations 2005	Sets out the process by which activities that have the potential to affect Scotland's water environment are regulated. Authorisation under the CAR is required for discharging to waters, disposal of pollutants to land, abstractions, impoundments and engineering works affecting water bodies. Is of particular relevance to the plan in relation to physical works.
Pollution Prevention and Control (Scotland) Regulations 2000	Transposes the requirements outlined in the Pollution Prevention and Control Act 1999 and Directive 96/61/EC (Integrated Pollution Prevention and Control) in the Scotland regulatory system.

⁸⁷ http://www.opsi.gov.uk/si/si2009/uksi_20091210_en_1

Legislation/Policy	Objectives
SEPA (2008) River Basin Management Plans Scotland	Notes the key pressures and their environmental impacts on Scottish water bodies including coastal areas. Key issues affecting coastal areas include diffuse and point source pollution, organic matter and ammonia, faecal pathogens, toxic substances, and loss of intertidal areas. Some of these issues may be exacerbated by climate change. Objectives for specific water bodies can be found in an interactive map on SEPA's website ⁸⁹ . This also shows the variation in quality of coastal water bodies at present.
Scottish Executive Environment Group (2002) Scotland's Bathing Waters A Strategy for Improvement	Aims to reduce water pollution in order to specifically improve bathing water catchments. Measures include changes to agricultural practices to address diffuse pollution, ensuring compliance with controls of industrial discharges, and making more use of Sustainable Urban Drainage Systems (SUDS).
Bathing Waters (Scotland) Regulations 2008	Implements Bathing Waters Directive.
Flood Risk Management (Scotland) Act 2009	Includes new measures for sustainable flood risk management. This includes co-ordination and co-operation between relevant organisations, development of flood risk assessment and planning and tools for delivery and enforcement. Applicable to coastal flood protection measures.
Climatic Factors	
<i>United Kingdom</i>	
Climate Change Act 2009	Aims to improve carbon management and promote the transition towards a low-carbon economy in the UK. Includes provisions on carbon budgeting systems, and a legally binding target in cutting greenhouse gas emissions, including air and shipping emissions, by 2020 and 2050.
<i>Scotland</i>	
Climate Change (Scotland) Act 2009	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)	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.
Preparing for a Changing Climate (Consultation Paper) 2009	Second consultation on a climate change adaptation framework for Scotland. It focuses on developing a better understanding of exposure to climate change in Scotland, improving organisational adaptive capacity, and taking into account and addressing competing pressures. Further discussion of the issues raised in the paper is provided in the baseline section below.
Adapting Our Ways: Managing Scotland's	Makes various references to the need to assist natural resources with climate change adaptation, using examples

⁸⁸ http://www.sepa.org.uk/water/river_basin_planning.aspx

Legislation/Policy	Objectives
Climate Risk: Consultation to inform Scotland's Climate Change Adaptation Framework 2008	such as the habitat networks that are proposed within the NPF. Second consultation recently published.
Cultural Heritage	
<i>International</i>	
UNCLOS 1982 was ratified by the UK in 1997	Article 303 stipulates that 'states have the duty to protect objects of an archaeological and historical nature found at sea and shall co-operate for this purpose' and provides for coastal states to exert a degree of control over the archaeological heritage to 24 nautical miles
<i>United Kingdom</i>	
Joint Nautical Archaeology Policy Committee (JNAPC) Code of Practice for Seabed Developers (JNAPC 2007)	The JNAPC Code is voluntary but provides a framework that seabed developers can use in conducting their activities in an archaeologically sensitive manner. A guidance note on protocols to deal with the marine historic environment developed specifically for the offshore renewable energy sector has also been prepared.
Protection of Wrecks Act 1973	The 1973 Act provides protection for designated wrecks and for the designation of dangerous sites.
Protection of Military Remains Act 1986	The 1986 Act provides protection for military aircraft and designated vessel wrecks.
Ancient Monuments and Archaeological Areas Act 1979	Provides for the protection of archaeological heritage, including the scheduling of 'monuments'. The Act, which is administered by Historic Scotland, primarily deals with terrestrial locations but there is provision to designate submarine sites.
<i>Scotland</i>	
Scottish Historic Environment Policy (SHEP) (Updated 2009)	Provides the overarching framework for historic environment policy in Scotland, consolidating and replacing the previously separate SHEPs. Aims to promote effective conservation and to enhance enjoyment and understanding of the historic environment, linking it with the Scottish Government's central purpose. Recognises the importance of the historic environment as an economic resource and also states a Ministerial commitment to connecting the population with their cultural legacy.
Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997	Provides criteria and a framework for the designation and listing of historic buildings and conservation areas within Scotland, and rights of owners, enforcement and authorisation of works affecting listed buildings.
SHEP on the Marine Historic Environment (Consultation Document) 2008	Set proposals for new legislation on the marine historic environment to be incorporated into the Marine Bill (now enacted). This included provisions to broaden the types of sites which can be designated on the basis of their national importance, arrangements for consultation in advance of designation, and proposals for powers and provisions to allow for site maintenance.
Scottish Planning Policy (SPP) 2008	Sets out the framework for protecting the historic environment through the planning system.

Appendix 2 Council Regulation 850/98 ANNEX XII MINIMUM SIZES

- 1 Total carapace length
- 2 30 cm for industrial purposes only
- 3 No minimum size will apply to horse mackerel caught in waters adjacent to the Azores islands and under the sovereignty or jurisdiction of Portugal.
- 4 It is prohibited to land more than 15% in number of swordfish below 25kg or 125 cm
- 5 It is prohibited to land more than 15% in number of bluefin tuna below 6.4 kg or 70cm.
In addition it is prohibited to land any individual tuna below 1.8 kg.

Species	Minimum size	
	Regions 1 to 5 except Skagerrak/Kattegat	Skagerrak/Kattegat
Cod (<i>Gadus morhua</i>)	35 cm	30 cm
Haddock (<i>Melanogrammus aeglefinus</i>)	30 cm	27 cm
Saithe (<i>Pollachius virens</i>)	35 cm	30 cm
Pollack (<i>Pollachius pollachius</i>)	30 cm	-
Hake (<i>Merluccius merluccius</i>)	27 cm	30 cm
Megrim (<i>Lepidorhombus spp.</i>)	20 cm	25 cm
Sole (<i>Solea spp.</i>)	24 cm	24 cm
Plaice (<i>Pleuronectes platessa</i>)	27 cm	27 cm
Whiting (<i>Merlangius merlangus</i>)	27 cm	23 cm
Ling (<i>Molva molva</i>)	63 cm	-
Blue ling (<i>Molva dipterygia</i>)	70 cm	-
Bass (<i>Dicentrarchus labrax</i>)	36 cm	-
Norway lobster (<i>Nephrops norvegicus</i>) ₁ Norway lobster tails		130 (40) mm ₁
Mackerel (<i>Scomber spp.</i>)	20cm (30cm in North Sea)	20 cm ₂
Herring (<i>Clupea harengus</i>)	20 cm	18 cm
Horse mackerel (<i>Trachurus spp.</i>) ₍₃₎	15 cm	15 cm
Sardine (<i>Sardina pilchardus</i>)	11 cm	-
Lobster (<i>Homarus gammarus</i>)	87 mm	220 (78) mm ₁
Spinous spider crab (<i>Maia squinado</i>)	120 mm	-
Queen scallop (<i>Chlamys spp.</i>)	40 mm	-
Grooved carpetshell (<i>Ruditapes decussatus</i>)	40 mm	-
Carpetshell (<i>Venerupis pullastra</i>)	38 mm	-
Short-necked clam (<i>Ruditapes philippinarum</i>)	40 mm	-
Clam (<i>Venus verrucosa</i>)	40 mm	-
Hard clam (<i>Callista chione</i>)	6 cm	
Razor clam (<i>Ensis spp.</i>)	10 cm	
Surf clams (<i>Spisula Solidissima</i>)	25 mm	
Donax clams (<i>Donax spp.</i>)	25 mm	
Bean solen (<i>Pharus legumen</i>)	65 mm	
Whelk (<i>Buccinum undatum</i>)	45 mm	-
Octopus (<i>Octopus vulgaris</i>)	750 grammes	
Swordfish (<i>Xiphias gladius</i>) ₍₄₎	25kg or 125cm (lower mandible)	
Bluefin tuna (<i>Thunnus thynnus</i>) ₍₅₎	6.4 kg (or 70 cm)	
Crawfish (<i>Palinurus spp.</i>)	95 mm	
Deepwater rose shrimp (<i>Parapenaeus longirostris</i>)	22 mm (carapace length)	

Species	Minimum size, Regions 1-5 except Skagerrak/Kattegat
Norway lobster (<i>Nephrops norvegicus</i>)	Whole area, except Region 3 and ICES VIa, VIIa: total length 85 mm, carapace length 25 mm
	ICES VIa, VIIa; Region 3: total length 70 mm, carapace length 20 mm
Norway lobster tails	Whole area, except Region 3 and ICES VIa, VIIa 46 mm
	ICES VIa, VIIa; Region 3: 37 mm
Mackerel (<i>Scomber spp.</i>)	Whole area, except North Sea: 20 cm
	North Sea: 30cm
Anchovy (<i>Engraulis encrasicolus</i>)	Whole area, except ICES IXa east of longitude 7° 23' 48" W: 12 cm
	ICES IXa east of longitude 7° 23' 48" W: 10 cm
Edible Crab (<i>Cancer pagarus</i>)	Regions 1 and 2 north of 56° N: 140 mm
	Region 2 south of 56°N except ICES Divisions VIIId, e, f and ICES Divisions IVb, c south of 56°N: 130 mm
	ICES Divisions IVb, c south of 56°N: 130 mm (except for an area limited by a point at 53°28'22" N 0°09'24"E on the coast of England, a straight line joining this point with 53°28' 22"N 0°22' 24" E, the 6 mile boundary of the United Kingdom and a straight line connecting a point at 51°54'06" N 1°30' 30"E with a point on the coast of England at 51° 55' 48"N 1°17' 00" – the Eastern sea fisheries district – where the landing size shall be 115 mm).
	ICES Divisions VIIId, e, f: 140 mm
	Region 3: 130 mm
Scallop (<i>Pecten maximus</i>)	Whole area, except ICES VIIa, north of 52° 30' N VIIId: 100mm
	ICES VIIa, north of 52° 30' N VIIId: 110mm

Appendix 3. Assessment Tables

Appendix 3. Assessment Table (note: this table is in A3 landscape format)

SEA Objectives	
<i>Biodiversity, flora and fauna</i>	
Obj 1 – To safeguard marine and coastal ecosystems, including species and habitats, and their interactions	
Obj 2 – To avoid pollution of the coastal and marine environment	
Obj 3 – To maintain or work towards good ecological/environmental status	Key: environmental effects
Obj 4 – To maintain integrity of sediment and coastal processes	Work against SEA objective ■
Obj 5 – To maintain and protect the character and integrity of the seabed	No change ■
<i>Climatic factors</i>	Mixed effects ■
Obj 6 – To reduce greenhouse gas emissions from marine activities	Promote SEA objective ■
<i>Cultural heritage</i>	Uncertain ■
Obj 7 – To protect and, where appropriate, enhance the historic marine environment	
Obj 8 – To avoid damaging coastal and marine archaeology	

Proposed measure	SEA objectives								Summary
	Obj 1	Obj 2	Obj 3	Obj 4	Obj 5	Obj 6	Obj 7	Obj 8	
Fisheries accreditation	The principles of sustainable accreditation schemes include that a fishery must be conducted in a manner that does not lead to over-fishing or depletion of exploited stocks, and should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem on which the fishery depends.	In addition to the principles relating to good ecological status, another principle is that the fishery will be subject to an effective management system that respects local, national and international laws. Accreditation will therefore require the fishery to take account of EU, UK, and Scottish legislation including WFD.		The principles of the sustainable accreditation schemes include that a fishery should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem on which the fishery depends. For this assessment it has been assumed that this includes that the integrity of the sediment and seabed processes and character and integrity of the seabed will be maintained and protected. This principle is pertinent to trawling and dredging activities which disrupt seabed integrity and benthic communities.			Indirect benefit through the protection of the seabed, this is particularly pertinent to reducing the risk of damage to unknown archaeology		The principles of fisheries accreditation include: <ul style="list-style-type: none"> • Not overfishing or depleting exploited stocks; • The maintenance of the structure, productivity, function and diversity of the ecosystem on which the fishery depends. Seeking or continuing accreditation is therefore likely to be beneficial to biodiversity and the ecological status of water bodies. There is also the potential to have an indirect positive effect on the historic environment, especially unknown coastal and marine archaeology, through the protection of the seabed.

Proposed measure	SEA objectives								Summary
	Obj 1	Obj 2	Obj 3	Obj 4	Obj 5	Obj 6	Obj 7	Obj 8	
<p>Increase minimum landing size:</p> <ul style="list-style-type: none"> Brown Crab Velvet Crab Lobster Nephrops Crawfish Razor fish (from 110mm to 175mm) 	<p>Increasing minimum landing size (MLS) may help to improve yield if it reduces growth overfishing and increases the proportion of the stock that survive to reach reproductive size. If a stock is growth overfished, increasing MLS might reduce fishing mortality but only if returned individuals survive and only if there is no increase in fishing mortality on larger size categories.</p> <p>For Nephrops, gears with increased mesh sizes may be required to allow an increase in the escape of undersized individuals if this measure is to have potential benefits.</p> <p>V notching berried lobsters can help with future breeding as it is illegal to sell a V notched lobster, allowing them to continue to breed until the v notch grows out. Measures to return berried crawfish and velvet crab also have the potential to increase reproductive potential of stocks.</p>		<p>As Objective 1, ensuring that fisheries are sustainable will have benefits for exploited populations and will support healthy ecosystems.</p>						<p>These measures have the potential to have a beneficial effect on biodiversity by contributing to sustainable management of stocks. They may increase the proportion of individuals which survive to reproduce and to therefore extend reproductive potential.</p> <p>However, in some instances new gear is likely to be required. Also increasing MLS might lead to an increase in fishing mortality on larger size categories, which could have a negative effect.</p>
<p>Maximum landing size:</p> <ul style="list-style-type: none"> Crawfish: Establish best practice max landing size Lobster: reduce maximum landing size for females 									
<p>Berried fish:</p> <ul style="list-style-type: none"> Return and v-notch berried lobsters Return berried creel caught Nephrops Crawfish - no landing of berried females Velvet Crab – return berried females 									
<p>Hobby fishermen – controlling or monitoring of activity:</p> <ul style="list-style-type: none"> Creel limits need clear signage and where appropriate quota restrictions Monitor activity and ensure clear creel marking The above applies to Nephrops/ Lobster/ Crabs/ Scallops 	<p>A lack of knowledge means that this effects of this proposal are uncertain. There are differing views as to whether this measure would have a beneficial impact (through reducing the removal of stock outwith that of commercial fishing effort), an adverse effect, or have no effect.</p>		<p>A lack of knowledge means that this effects of this proposal are uncertain. There are differing views as to whether this measure would have a beneficial impact (through reducing the removal of stock outwith that of commercial fishing effort), an adverse effect, or have no effect.</p>						<p>A lack of knowledge means that this effects of this proposal are uncertain. There are differing views as to whether this measure would have a beneficial impact (through reducing the removal of stock outwith that of commercial fishing effort), an adverse effect, or have no effect.</p>

Proposed measure	SEA objectives								Summary
	Obj 1	Obj 2	Obj 3	Obj 4	Obj 5	Obj 6	Obj 7	Obj 8	
Access/regulatory measures for licensed fishermen in IFG areas									
<ul style="list-style-type: none"> • Small Isles – Cap creel vessel numbers • North West - Nephrops permits & closed areas • South East – Introduce permit for shellfisheries • Moray Firth – Effort control within shellfish licensed fleet • Clyde/Outer Hebrides – Review access arrangements in all fisheries (e.g. zoning/spatial management and consultation code) 	Measures to control fishing effort which have the potential to improve management and protect stocks may have a beneficial effect where at present few or no management measures are in place.		Measures to control fishing effort which have the potential to improve management and protect stocks may have a beneficial effect where at present few or no management measures are in place.	There is little evidence to suggest that disruption of the seabed from creels is significant, so the possible benefit of reducing fishing intensity (through reducing creel numbers) is uncertain.				Same as results for Objectives 4 and 5.	Proposed measures to cap creel and vessel numbers and review access to improve the economic value of Nephrops may have a beneficial impact on biodiversity. These positive impacts are likely to increase if the measures extend beyond creel fishing to include other methods such as bottom trawling.
	it is not clear that control of the creel fishery alone would improve shellfish stocks, given that mobile gear is used by 20% of the inshore fleet, and these vessels catch many more fish and shellfish.		it is not clear that control of the creel fishery alone would improve shellfish stocks, given that mobile gear is used by 20% of the inshore fleet, and these vessels catch many more fish and shellfish.	Larger benefits may occur, should these measures extend to other methods of fishing as well, e.g. bottom trawling.			Same as results for Objectives 4 and 5.		

Proposed measure	SEA objectives								Summary
	Obj 1	Obj 2	Obj 3	Obj 4	Obj 5	Obj 6	Obj 7	Obj 8	
Data gathering measures/ Investigate potential for new fisheries:									
<ul style="list-style-type: none"> To develop fisheries with appropriate management measures (Cockles, Mussels, Winkles, Oysters, Scallops, Razorfish) To develop pilot fisheries with appropriate management measures (Brown shrimp, Paelamon Prawns, Squat lobsters, Otter shell, other Bivalves) Scientific survey to establish whether a fishery can be established (Bivalve, Sprat, Brown/Pink shrimp, Smelt) New fisheries & unmanaged fisheries - Surveys to collect baseline data which can be used to calculate fishing effort. Determine biological status of stocks (Brown crab, Velvet crab) Scallops - Investigate cause of scallop decline where appropriate Investigate whether existing fishery can be developed based on sound management (Squid, Cockles) Stock assessments for under-utilised species Sprat fishery – determine and evaluate the economic viability of development of sprat fishery within the area Whelk - Investigate whelk stock in area Establish lobster stock's status to establish possible management measures Green Crab – establish importance of commercial fishery Mussel - determine if significant sub tidal mussel beds exist with the MFIFG area; establish importance of commercial fishery within area to determine developing opportunities Native Oyster – Investigate whether existing fishery can be developed based on sound management Queen scallop – establish if scallops can be developed as a targeted fishery or form a by-catch from other fishing activity Clam fishery – Investigate whether existing fishery can be developed based on sound management Plaice – establish stocks in local area Clam – identify stocks within the area and determine if existing fishery can be developed Seek to secure appropriate funding and support for the development of sustainable fishing techniques, exploratory fishery trials, stock assessment/dynamic research and market evaluation of market opportunities for under-utilised species Investigate the potential for jigging and squid fishery Cockles – Develop cockle fisheries – surveys of cockle beds Razorfish – Stock surveys to develop fishery Squid and Crawfish - Pilot fishery with Marine Scotland observers to gather data Velvet crab – establish scientific base for fishery Catch sampling of crab, lobster, velvet crab and Nephrops Wrasse fishery – Establish scientific base to identify management requirements in the developing wrasse fishery Ensure appropriate use of collected fisheries data 	<p>There is potential for opening new fisheries to reduce pressure on other stocks, providing that stock levels are currently able to support new fisheries. In addition, should these data be used as an evidence base to open new fisheries, sustainable fishing practices may also benefit ecological status and the integrity of the seabed. This could be achieved by following the principles set out in the fisheries accreditation schemes.</p>								<p>Data gathering will seek to inform decision making, and in itself could have adverse environment effects. However, if used to promote sustainable fisheries, this may have a beneficial effect by reducing pressure on other stocks.</p>
	<p>Data gathering may have an adverse effect on the seabed, depending on the method utilised (e.g. dredge survey/ using environmentally intrusive sampling methods). It is not clear whether such effects would be significant.</p> <p>If these measures increase total fishing activity (and mortality) this could increase the pressure on stocks and ecosystems. By-catch may also be an issue. This could be offset by following the principles set out in the fisheries accreditation schemes.</p> <p>If new infrastructure is required to support new fishing effort, there may be negative impact</p>								

Proposed measure	SEA objectives								Summary
	Obj 1	Obj 2	Obj 3	Obj 4	Obj 5	Obj 6	Obj 7	Obj 8	
Brown shrimp – identify vessels to take part in pilot fishery	The identification of vessels alone is not likely to have any environmental effect.								No environmental impact

Proposed measure	SEA objectives								Summary
	Obj 1	Obj 2	Obj 3	Obj 4	Obj 5	Obj 6	Obj 7	Obj 8	
Fishing gear/methods:									
<ul style="list-style-type: none"> Evaluate the effects of increased creel mesh size and escape panels. Explore funding for new fishing techniques/trials Razorfish - In addition to local reporting, initiate a wider scientific research programme and investigate the potential for specialised gear to be developed and used in razor fishery Investigate static gear only zones for Nephrops in areas with multiple resource use Support for new gear for pilot fisheries 	<p>Possible benefit through the provision of new more selective gear or gear adaptation for conservation purposes.</p> <p>Potential beneficial effects if measures to investigate static gear only zones for Nephrops lead to this proposal being implemented. This is a measure to investigate only, however, so at present this measure will result in no change.</p>			Potential beneficial effects if measures to investigate static gear only zones for Nephrops lead to this proposal being implemented.			As Objective 5. Any implementation of proposed measure could have an indirect benefit on marine archaeology through the protection of the seabed.		A measure to investigate the use of static gear only zones for Nephrops could have beneficial effects for the sea bed and benthic communities, as well as marine archaeology.
<ul style="list-style-type: none"> Promote more use of eco – dredge; scallop dredgers to work to UK Scallop Code of Conduct 	This measure has the potential to reduce adverse environmental effects through the use of more ecologically sound fishing methods. However, some negative effects of dredging may remain.			As Objective 1			As Objective 1		The promotion of more ecologically sound fishing methods may reduce adverse environmental effects occurring on the integrity of the seabed, benthic communities and coastal and marine archaeology. However, some negative effects of dredging may remain.

Proposed measure	SEA objectives								Summary
	Obj 1	Obj 2	Obj 3	Obj 4	Obj 5	Obj 6	Obj 7	Obj 8	
Bycatch/discards:									
<ul style="list-style-type: none"> Monitor by catch and discards Explore limiting quota allocation or specifying gear type to reduce by-catch/discards/poor stock quality Haddock – develop reporting system to record discard levels and develop management measures haddock by catch Reduce discards – cod recovery 	Reducing bycatch/discards will assist in maintaining stocks and may contribute to future increases by supporting increased reproductive capacity. This would support a move towards sustainable fisheries.		As Objective 1.						Beneficial effect on biodiversity through the reduction of discards.

Proposed measure	SEA objectives								Summary
	Obj 1	Obj 2	Obj 3	Obj 4	Obj 5	Obj 6	Obj 7	Obj 8	
<p>Establish fisheries:</p> <ul style="list-style-type: none"> Develop mackerel and/or herring fishery Establish a small scale mackerel and herring fishery Establish a small scale sprat fishery Investigate winter cod fishery Lobster stock enhancement 	<p>Providing sustainable fishing practices are adhered to and stock levels are currently able to support new fisheries this may have a beneficial effect by reducing pressures on other stocks (assumes effort is diverted).</p> <p>If these measures increase total fishing activity (and mortality) this could increase the pressure on stocks and ecosystems. However, this is unlikely as these are TAC species.</p> <p>By-catch may also be an issue, apart from fisheries using handlines.</p> <p>May also have a negative effect if new infrastructure is required. Need for this is uncertain.</p>		<p>Providing sustainable fishing practices are adhered to and stock levels are currently able to support new fisheries this may have a beneficial effect by reducing pressures on other stocks (assumes effort is diverted)</p> <p>If these measures increase total fishing activity (and mortality) this could increase the pressure on stocks and ecosystems. However, this is unlikely as these are TAC species.</p> <p>By-catch may also be an issue (as it is for every fishery).</p> <p>May also have a negative effect if new infrastructure is required.</p>	<p>Mackerel, herring and sprat are pelagic species and are caught in the water column. This is therefore likely to result in minimal damage to the seabed or marine archaeology.</p> <p>Cod are demersal species and therefore damage to the seabed may result, depending on the type of fishing gear used.</p>			<p>Mackerel, herring and sprat are pelagic species and are caught in the water column. This is therefore likely to result in minimal damage to the seabed or marine archaeology.</p> <p>Cod are demersal species and therefore damage to the seabed may result, depending on the type of fishing gear used.</p>		<p>There is the potential to have a beneficial effect on stocks, by reducing pressures on other stocks.</p> <p>However negative impacts include:</p> <ul style="list-style-type: none"> An increase in total fishing activity and mortality Potential for by catch Potential adverse effects should new infrastructure be required. <p>Effects on the seabed (with consequent effects for marine archaeology) will depend on gear type.</p> <p>Overall the effects of these proposed measures are mixed.</p>
<ul style="list-style-type: none"> Squid - seek review of current prohibitions 	<p>Current prohibitions protect juvenile cod, haddock and whiting from being caught in small meshed gears. If the squid fishery could be pursued, specifically rigged to avoid catches of juvenile white fish, then there is likely be no negative impact. This is provided current stock levels are able to sustain proposed fishing effort.</p>								<p>Measure alone is not likely to have any effect unless a change in the current prohibitions occurs.</p>
<ul style="list-style-type: none"> Wrasse – ensure any potential wrasse fishery is carried out responsibly 	<p>The use of wrasse in aquaculture to predate on sea lice has promoted interest in a potential new fishery. Wild populations are unlikely to be able to fulfil such a requirement. It is recognised that there is a need to collect data on the fishery to assist with improved understanding of stocks and biology. This is therefore seen as an opportunity to ensure that such a fishery is established on a sustainable basis.</p>		<p>As Objective 1</p>						<p>The use of wrasse in aquaculture to predate on sea lice has promoted interest in a potential new fishery. Wild populations are unlikely to be able to fulfil such a requirement. It is recognised that there is a need to collect data on the fishery to assist with improved understanding of stocks and biology. This is therefore seen as an opportunity to ensure that such a fishery is established on a sustainable basis.</p>

	SEA objectives								
Proposed measure	Obj 1	Obj 2	Obj 3	Obj 4	Obj 5	Obj 6	Obj 7	Obj 8	Summary
<ul style="list-style-type: none"> Participate in national and regional management of Nephrops Investigate separate management of Moray Firth functional unit 	Proposed measures relate to the management of fishing effort of various stocks. The assumption is that measures would include the maintenance of sustainable stocks therefore this is likely to have a significant environmental effect.		As Objective 1						It is anticipated that these measures will lead to stocks being managed more sustainably, therefore there is likely to be a positive environmental effect.

	SEA objectives								
Proposed measure	Obj 1	Obj 2	Obj 3	Obj 4	Obj 5	Obj 6	Obj 7	Obj 8	Summary
<ul style="list-style-type: none"> Support fuel efficiency measures 						Proposed measures to support fuel efficiency through, for example, the use of lighter gear, or investigating the possibility of using alternative fuels such as hydrogen, have the potential for a positive effect on climatic factors, through the reduction of carbon dioxide emissions.			Likely to have a positive environmental effect, through reduction of carbon dioxide emissions.

SEA objectives	Obj 1	Obj 2	Obj 3	Obj 4	Obj 5	Obj 6	Obj 7	Obj 8	Summary
<ul style="list-style-type: none"> Landing and supporting infrastructure – ensure requirements of fishing fleet are identified 	Measures include seeking to investigate and support the maintenance and development of landing areas and supporting infrastructure (this includes quays and jetties for services such as access to fuel and storage facilities for gear). If required, the development of new infrastructure could have a negative impact on biodiversity through loss of and/or damage to habitat; on water quality through increased risk of pollution during construction; and on the seabed and benthic communities through loss of and/or damage to the seabed.						The development of new infrastructure (described under Objective 1) could result in the loss of and/or damage to historic environment features, including possible impacts on setting.	Possible negative impacts on the environment from the development of new infrastructure. These would need to be dealt with on a case-by-case basis at licensing/consenting stage.	