

Policy Framework and Site Selection Guidelines for Highly Protected Marine Areas

**Strategic Environmental Assessment
Environmental Report**

December 2022

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Environmental Report

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Report prepared by:



For:



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Non-Technical Summary

Introduction

The Scottish Government and the Scottish Green Party Parliamentary Group have agreed to work together over the next five years to build a green economic recovery from the COVID-19 pandemic, respond to the climate emergency and create a fairer country. This commitment includes the designation of at least 10% of Scotland's seas as Highly Protected Marine Areas (HPMAs) by 2026. HPMAs will build upon the existing network of Marine Protected Areas (MPAs) and provide a significant increase in the overall level of protection afforded to Scotland's seas.

HPMAs are proposed to be defined as designated areas of the sea that are strictly protected to allow the marine ecosystems within to recover and thrive. These areas safeguard all of their marine life for the benefit of the planet and current and future generations; providing opportunities for carefully managed enjoyment and appreciation.

The first phase of a programme of work to deliver on the Scottish Government's commitment involves developing a Policy Framework and Site Selection Guidelines to guide to the subsequent process of selecting, assessing and finally designating HPMAs. Marine Scotland as a directorate of the Scottish Government is now consulting on the draft Policy Framework and Site Selection Guidelines for HPMAs.

What is Strategic Environmental Assessment?

The Environmental Assessment (Scotland) Act 2005 ("the 2005 Act") requires that certain public plans, programmes and strategies 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 Authorities.

SEA identifies the likely significant environmental impacts of plans and policies and proposed reasonable alternatives to them. SEA also identifies mitigation measures that are required to avoid or minimise any significant adverse effects and highlights

opportunities for enhancements of beneficial effects. Taking place at an early stage in the plan or policy preparation process, it ensures that decision-making is informed by relevant environmental information. SEA provides opportunities for the public to consider this information and use it to inform their views on the draft plan or policy.

A screening and scoping exercise on the draft Policy Framework and Site Selection Guidelines was undertaken by Marine Scotland, in accordance with the requirements of the 2005 Act. Consultation Authorities confirmed the need for an SEA due to the potential for significant environmental effects to occur as a result of the implementation of the Policy Framework and Site Selection Guidelines. They also provided comment on the proposed scope and methodology of the assessment and consultation period for the Environmental Report. Their views are taken into account in this report which summarises the findings of the SEA.

What are the proposed Policy Framework and Site Selection Guidelines?

The draft Policy Framework which has been developed by Marine Scotland sets out the aim of HPMAs and how sites are selected, how socio-economic impacts will be considered and mitigated, and how stakeholders will be involved

The draft Site Selection Guidelines for HPMAs which have been jointly developed by NatureScot and the Joint Nature Conservation Committee (JNCC) aim to explore the potential contribution an area could make towards achieving the aims of HPMAs. The process is driven by the presence of specific functions and resources of significance to Scotland's seas and looks to optimise ecological, social and cultural benefits whilst minimising significant impacts where possible.

HPMAs will have strict limits on human activities in place to allow the protection and recovery of marine ecosystems. There will be activities which will not be allowed within HPMAs and activities which will be allowed within HPMAs at non-damaging levels. There are some damaging activities associated with essential/lifeline services which will need to go ahead within HPMAs where absolutely necessary.

How was the Strategic Environmental Assessment undertaken?

The SEA provides a high-level assessment of the potential environmental effects that are likely to result from the implementation of the Policy Framework and Site Selection Guidelines for HPMAs and consideration of a series of key questions ('SEA objectives'). These SEA objectives reflect the scope of the assessment as well the environmental protection objectives from relevant legislation

The assessment has identified the individual and overall (cumulative) beneficial and adverse effects of the proposals on a number of SEA topics, specifically marine biodiversity, flora and fauna; soil; water; and climatic factors. In order to recognise the interlinkages of these SEA topics, these have been collectively given consideration under the overarching topic 'biodiversity'.

The location of HPMAs have not yet been identified and, therefore, it is only possible to undertake an initial SEA at this stage involving a preliminary consideration of the type of impacts that could arise from the future designation of HPMAs and restriction/limitation placed on activities within HPMAs. Once sites have been selected and are proposed to be taken forward for designation, it will be possible to undertake an updated SEA involving a more detailed site specific assessment of the potential environmental effects.

Social and economic effects, including those on other users of the marine environment, have been assessed by the Socio-economic Impact Assessment (SEIA) which is reported separately. The Sustainability Appraisal (SA), which is also reported separately, considers the potential environmental, economic and social effects of implementing the draft Policy Framework and Site Selection Guidelines, drawing on information contained in the SEA and SEIA.

Which reasonable alternatives have been assessed?

The SEA has undertaken a high-level preliminary assessment of the potential environmental effects that might arise from reasonable alternatives identified during the development of the Policy Framework and Site Selection Guidelines for HPMAs. These

reasonable alternatives represent a more stringent alternative management option involving the exclusion of a greater number of marine activities from HPMAAs, including those that are not considered to be at damaging levels. This is anticipated to result in a maximum level of potential beneficial and adverse environmental effects.

What is the current state of the environment?

Scotland's marine environment supports a diverse complex of different habitats, which in turn support a wide range of marine plants and animals.

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; submerged or partially submerged sea caves; kelp beds; burrowed mud; maerl beds; seagrass; horse mussel beds; flame shell beds and Northern sea fan and sponge communities; offshore subtidal sands and gravels; offshore deep sea muds; subtidal sands and gravels; coral gardens; carbonate mound communities; and deep sea sponge aggregations. Key animal species include cetaceans (whales, dolphins and porpoises), seals, seabirds, fish (including sharks, skates and rays), turtles and otters. The current health and condition of a number of habitats and species has been declining. Existing and future pressures on marine biodiversity, flora and fauna are mainly from commercial fishing; non-native invasive species; marine litter; navigational dredging; marine transport; aquaculture; recreation; offshore renewables and climate change.

Scotland has a wide range of geological (rocks, minerals, fossils and structures), geomorphological (landforms and processes) and soil features that make up the marine and coastal landscape. Key protected features include quaternary of Scotland; submarine mass movement; marine geomorphology of the Scottish deep ocean seabed; seabed fluid and gas seep; Cenozoic structures of the Atlantic margin; and marine geomorphology of the Scottish shelf seabed. The condition of these features influence the quality of habitats and in turn the viability and health of both flora and fauna populations.

Scotland's seas are mostly classed as being of high or good ecological status under the Water Framework Directive. There are some poorer quality waters in certain areas. The key pressures to the quality of the water environment are from man-made barriers to fish migration, modifications to physical condition, rural diffuse pollution, waste water discharges and hydroelectricity generation. Water quality in the offshore regions is assessed against several different factors (descriptors) under the UK Marine Strategy Regulations. This includes assessment of the impact of a number of pressures from human activities, including oil and gas, chemical pollution and fishing.

Within Scottish seas multiple habitats are present that can be termed 'Blue Carbon Sinks' due to their ability to convert carbon dioxide to solid carbon in living material and incorporate or store this carbon into biomass. These include kelp forests, seagrass beds, maerl beds and biogenic reefs. Their effectiveness as carbon sinks is highly dependent upon their long-term capacity to store carbon. Climate change has the potential to affect the carbon regulating capacity of marine habitats.

What are the likely significant environmental effects of the proposed Policy Framework and Site Selection Guidelines?

This SEA has undertaken a high-level assessment of the draft Policy Framework and Site Selection Guidelines for HPMAs.

The implementation of the Policy Framework and Site Selection Guidelines will lead to the identification and designation of HPMAs which will remove/avoid certain activities and reduce/limit other activities to non-damaging levels. The key potential environmental effects that are likely to arise from the implementation of the proposals and were assessed are as follows:

- Potential benefits to marine biodiversity and the marine ecosystem;
- Potential spillover benefits beyond site boundaries;
- Potential adverse effects resulting from the displacement of activities from site boundaries into new areas and the intensification of activities in areas where these activities already occur; and

- Potential adverse effects as a result of the extension of any new cable or pipeline routes that need to avoid transecting HPMAs.

In addition, the designation of the sites will provide developers and marine users with a better understanding and certainty of the specific areas of the marine environment that are considered particularly sensitive and need to be protected. In terms of regulated activities, this may lead to the production of more effective Environmental Impact Assessments (EIAs) that consider appropriate mitigation where necessary and, therefore, potentially reduce pressures associated with these activities in the vicinity of HPMAs. Alternatively, developers may look to site their projects some distance from the HPMAs which would result in reduced harmful activities and potential environmental benefits within these sites.

The increased protection brought about by the HPMAs will also provide potential future benefits to the marine environment as they will restrict new activities that are prohibited or restricted from becoming established in HPMAs.

Overall, the environmental benefits of increased protection that will result from the designation of HPMAs for the overarching topic 'Biodiversity, Flora and Fauna' are anticipated to be greater than the adverse impacts associated with displacement and longer cable or pipeline routes. These environmental benefits will also contribute to the achievement of the SEA objectives.

What are the cumulative effects of the proposed Policy Framework and Site Selection Guidelines?

The cumulative beneficial effects associated with the designation of all HPMAs would be additive, as a larger spatial area of marine habitat and associated species would be under a greater level of protection. The designation of HPMAs, together with the wider MPA network and existing and proposed management measures, are likely to further benefit the marine environment as larger areas of habitat will be highly protected within Scottish waters. There may also be cumulative adverse effects on the environment from

the displacement of activities resulting from other plans that are currently under assessment in-combination with the designation of HPMAAs.

Once locations for proposed HPMAAs have been selected, an updated SEA will be undertaken which will include a site specific assessment of the potential environmental effects associated with the proposed sites alone and in-combination with other plans.

How do I respond to the consultation?

Views on the draft Policy Framework and Site Selection Guidelines and the findings of the SEA are now invited.

Please provide any comments on this environmental assessment in your responses to the consultation questionnaire, including any comments on general issues or cumulative effects.

Following the consultation period, the responses received will be analysed, and the findings from this analysis will be taken into account in the finalisation of the Policy Framework and Site Selection Guidelines.

A Post-Adoption SEA Statement will be prepared, reflecting the findings of the assessment and the views expressed in the consultation, and outlining how the issues raised have been considered.

Copies of the consultation documents and the Environmental Report are available for viewing during office hours at the Scottish Government library at Saughton House, Edinburgh (K Spur, Saughton House, Broomhouse Drive, Edinburgh, EH11 3XD).

Please send your response, with the completed Respondent Information Form, to:

By email to: HPMA@gov.scot or

By post to: HPMA Consultation
Scottish Government
Sea Fisheries and Marine Conservation Division
Area 1-B North
Victoria Quay
Edinburgh EH6 6QQ

On line: [Citizen Space](#)

If you have any enquiries please send them to HPMA@gov.scot

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1 Introduction

1.1 Background

- 1.1.1 The Scottish Government and the Scottish Green Party Parliamentary Group have agreed to work together over the next five years to build a green economic recovery from the COVID-19 pandemic, respond to the climate emergency and create a fairer country¹. As part of this, a Shared Policy Programme referred to as the Bute House Agreement has been agreed², which aims to build a greener, fairer, independent Scotland. The Scottish Government and the Scottish Green Party believe that the marine environment “*should be clean, healthy, safe, productive and diverse, and managed to meet the long term needs of nature and people*”³. The agreement sets out several commitments to help achieve this vision, including the designation of at least 10% of Scotland’s seas as Highly Protected Marine Areas (HPMAs) by 2026. HPMAs will build upon the existing network of Marine Protected Areas (MPAs)⁴ representing a significant increase in the overall level of protection afforded to Scotland’s seas.
- 1.1.2 The first phase of a programme of work to deliver on this commitment involves setting a Policy Framework and the development of Site Selection Guidelines. These documents provide a guide to the subsequent process of selecting, assessing and finally designating HPMAs. The draft Policy Framework has been produced by Marine Scotland as a directorate of the Scottish Government. NatureScot and the Joint Nature Conservation Committee (JNCC) have jointly produced the Site Selection Guidelines.
- 1.1.3 The proposed Policy Framework and Site Selection Guidelines for HPMAs are the subject of this Environmental Report, produced as part of a Strategic Environmental Assessment (SEA).

¹ Scottish Government (2021) [Scottish Government and Scottish Green Party Shared Policy Programme: Working together to build a greener, fairer, independent Scotland](#) (accessed 04/07/2022)

² Ibid (accessed 04/07/2022)

³ Ibid (accessed 04/07/2022)

⁴ NatureScot (2021) [The MPA Network](#) (accessed 04/07/2022)

1.1.4 As the location of HPMAs have not yet been identified, it is only possible to undertake an initial SEA at this stage involving a preliminary consideration of the type of impacts that could arise from the future designation of HPMAs and restriction/limitation placed on activities within HPMAs. Once sites have been selected and proposed for designation, it will be possible to undertake an updated SEA involving spatial analysis of specific potential sites and a more detailed assessment of the scale of potential environmental effects.

1.2 Strategic Environmental Assessment

1.2.1 The Environmental Assessment (Scotland) Act 2005 ('the 2005 Act') requires that qualifying public plans, programmes and strategies be assessed for their potential effects on the environment⁵. SEA is the process used to fulfil this requirement and includes consultation with both the public and the Consultation Authorities⁶. The Act also sets out the information that is required to be provided in this Environmental Report.

1.2.2 A screening and scoping exercise of an initial draft of the Policy Framework and Site Selection Guidelines for HPMAs was undertaken by Marine Scotland in accordance with the requirements of the 2005 Act. A combined Screening and Scoping Report was published in August 2022, setting out the proposed approach to the SEA, including the proposed scope and level of detail. Comments were invited from the Scottish Consultation Authorities⁷.

1.2.3 The outcome from the Screening and Scoping Report and the consultation responses confirmed the need for an SEA as there is potential for significant environmental effects to occur as a direct result of the implementation of the Policy Framework and Site Selection Guidelines for HPMAs. The proposed scope of the assessment and methodology was accepted by the Scottish Consultation Authorities (see Section 3).

⁵ [Environmental Assessment \(Scotland\) Act 2005](#), asp 15 Available at: accessed 04/07/2022)

⁶ Historic Environment Scotland (HES), NatureScot and Scottish Environment Protection Agency (SEPA).

⁷ *ibid*

1.2.4 Marine Scotland commissioned ABP Marine Environmental Research Ltd. (ABPmer) to undertake the assessment stage of the SEA and prepare this Environmental Report.

1.3 Purpose and Structure of this Report

1.3.1 The purpose of this Environmental Report is to document the findings of the SEA on the implementation of the Policy Framework and Site Selection Guidelines for HPMAs. A Socio-Economic Impact Assessment (SEIA) has also been undertaken and is reported separately. The key findings of both the SEA and the SEIA are summarised in an overall Sustainability Appraisal (SA) document.

1.3.2 The views of the public and the Consultation Authorities on the proposed management measures and the findings of this Environmental Report are now being sought.

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

- Section 2 provides background information on the Policy Framework and Site Selection Guidelines for HPMAs;
- Section 3 presents the approach to the SEA and the methods used;
- Section 4 describes the relevant components of the environment that could be affected by the Policy Framework and Site Selection Guidelines for HPMAs;
- Section 5 sets out the results of the assessment; and
- Section 6 considers the next steps in the implementation of the Policy Framework and Site Selection Guidelines and the SEA process.

1.3.4 The Non-Technical Summary precedes Section 1.

2 Proposals for Highly Protected Marine Areas

2.1 Background to Highly Protected Marine Areas

2.1.1 The Scottish Government and the Scottish Green Party have a shared vision that the marine environment “*should be clean, healthy, safe, productive and diverse, and managed to meet the long term needs of nature and people*”⁸. This includes managing Scottish seas sustainably to protect their rich biological diversity and to ensure that marine ecosystems continue to provide economic, social and wider benefits for people, industry and society. As part of this vision, the Scottish Government and the Scottish Green Party are determined to “*make a step change in marine protection and to deliver on their shared commitment to achieve and maintain good environmental status for all of Scotland’s seas, offshore and inshore*”⁹.

2.1.2 The Bute House Agreement sets out several commitments to help achieve this vision for the Scottish marine environment and its protection. This includes adding “*to the existing MPA network by **designating a world-leading suite of HPMAs covering at least 10% of our seas that:***

- Includes designations in both offshore and inshore waters;
- Exceeds the commitment to ‘strict protection’ by 2030 made in the EU Biodiversity Strategy by achieving this by 2026 for inshore waters (in respect of which Scottish Ministers have devolved powers) and, subject to the cooperation of the UK Government, by the same year for offshore waters (where the Scottish Parliament does not have legislative competence);
- Will provide additional environmental protection over and above the existing MPA network (including when all management measures are applied in MPAs as outlined above), by establishing sites which will provide protection from all extractive, destructive or depositional activities including all fisheries, aquaculture and other

⁸ Scottish Government (2021) [Scottish Government and Scottish Green Party Shared Policy Programme: Working together to build a greener, fairer, independent Scotland](#) (accessed 04/07/2022)

⁹ Ibid.

infrastructure developments, while allowing other activities, such as tourism or recreational water activities, at non-damaging levels (making them equivalent to ‘marine parks’); and

- In cases where these sites overlap with current MPAs, provide extra environmental protection additional to that afforded by existing MPAs. Our clear common purpose is to deliver a significant total increase in the level of environmental protection applicable to Scotland’s seas, in support of achieving and maintaining good environmental status for our waters.”¹⁰

2.1.3 The Bute House Agreement further states that the suite of HPMAs will be delivered “*through a policy and selection framework that provides for:*

- **Balanced representation of the ecology of Scotland’s seas** and their geographical spread from the coast to the deep sea, encompassing both inshore and offshore environments;
- **The recovery of priority marine features**, which mostly lie within inshore waters, as a core purpose of the designation criteria;
- **Ecosystem recovery and biodiversity enhancement**, including protection of blue carbon and critical fish habitats;
- **Account to be taken of socio-economic factors** affecting the resilience and viability of marine industries and the coastal communities which depend on them; and
- **Public engagement and consultation** at all key stages of policy development, site selection and assessment, and designation.”

2.1.4 To ensure the high levels of protection required for HPMAs, the Scottish Government will seek new powers to designate HPMAs in Scottish inshore or territorial waters (within 12 nautical miles of the coast). The Scottish Government will seek agreement from the UK Government to provide for equivalent powers to the Marine and Coastal Access Act 2009 for Scottish

¹⁰ Scottish Government (2021) [Scottish Government and Scottish Green Party Shared Policy Programme: Working together to build a greener, fairer, independent Scotland](#) (accessed 04/07/2022)

offshore waters (beyond 12 nautical miles from the coast out to Scotland's Continental Shelf and Exclusive Economic Zone, EEZ).

- 2.1.5 Where HPMA designations require the relocation of existing human activity, the Bute House Agreement recognises that there may in some instances be a need for a transitional 'phasing out' period following the point of designation, to ensure a fair and just transition to a state of high protection. Any such period would be time-limited with a clear end point.

Definition of HPMAs

- 2.1.6 HPMAs are proposed to be defined as designated areas of the sea that are strictly protected to allow the marine ecosystems within to recover and thrive. These areas safeguard all of their marine life for the benefit of the planet and current and future generations; providing opportunities for carefully managed enjoyment and appreciation.

Aims of HPMAs

- 2.1.7 HPMAs are one of the measures available to protect Scotland's seas and to help deliver the Scottish Government's vision for the marine environment. The commitment to introduce HPMAs will also make a significant contribution to the achievement of broader UK, regional and global conservation ambitions (Section 4). In particular, it aligns with the EU Biodiversity Strategy for 2030, which proposes that 10% of EU's seas should be under strict protection by 2030¹¹. Within the International Union for Conservation of Nature (IUCN) Guidelines for Applying Protected Area Management Categories to MPAs, such 'strict' or 'highly protected' areas are often associated with the definitions of categories Ia, Ib and II that seek to 'leave natural processes essentially undisturbed to respect an area's ecological requirements'¹².

¹¹ European Commission (2020) [Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. EU Biodiversity Strategy for 2030](#) (accessed 06/07/2022)

¹² IUCN (2008) [Guidelines for Applying the IUCN Protected Area Management Categories to Marine Protected Areas](#) (accessed 06/07/2022)

2.1.8 As part of the existing ‘three-pillar’ approach to marine nature conservation in Scotland (species conservation, site protection, and wider seas policies and measures)¹³, HPMAs aim to:

- Facilitate ecosystem recovery and enhancement ;
- Enhance the benefits that coastal communities and others derive from our seas;
- Contribute to the mitigation of climate change impacts; and
- Support ecosystem adaptation and improve resilience.

2.1.9 The designation and management of HPMAs will protect all elements of the marine ecosystem within their boundaries, including the seabed, water column habitats and everything that lives in the protected area. This will protect not only the species and habitats within them, but also the complex web of interactions and processes that form a marine ecosystem.

2.2 Relationship with the existing MPA network

2.2.1 The Scottish MPA network consists of 247 sites, 233 of these are for nature conservation purposes and are designated under various legislative frameworks and include:

- Nature Conservation MPAs (NCMPAs);
- Special Areas of Conservation (SACs);
- Special Protection Areas (SPAs);
- Sites of Special Scientific Interest (SSSI); and
- Ramsar sites.

2.2.2 In addition, there is one Demonstration and Research MPA (D&R MPA), eight Historic MPAs (HMPAs), and five Other Area Based Measures (OABMs) recognised as part of the Scottish MPA network¹⁴. OABMs contribute to the

¹³ Scottish Government (2012) [A Strategy for Marine Nature Conservation in Scotland's Seas](#) (accessed 06/07/2022)

¹⁴ NatureScot (2021) [The MPA Network](#) (accessed 05/07/2022)

protection of biodiversity but were not set up specifically for this purpose (e.g. fisheries restrictions).

- 2.2.3 Scotland's existing MPA network has been developed to conserve a representative range of species and habitats in Scotland's waters. Conservation objectives are set for each MPA in order to conserve or recover listed features. There is a presumption for sustainable use of MPAs, meaning that activities can continue, providing they do not hinder achievement of the conservation objectives for a site.
- 2.2.4 NatureScot is responsible for providing advice on MPAs in Scottish inshore waters¹⁵, while the JNCC advise on possible designations in offshore waters¹⁶.
- 2.2.5 Given the twin biodiversity and climate crises, implementing HPMAs as an added component within the Scottish MPA network will help to support the recovery and resilience of Scotland's seas.
- 2.2.6 HPMAs will be selected in a way that complements and adds value to the existing MPA network
- 2.2.7 HPMAs may overlap either fully or partially with some existing MPAs in order to maximise the conservation benefits associated with stricter management approaches in a particular geographic location. HPMAs may also be located outside the current MPA network.

2.3 Development of Policy Framework and Site Selection Guidelines

- 2.3.1 Marine Scotland has developed a Policy Framework to guide the selection, assessment and designation of HPMAs. This sets out the aim of HPMAs and how sites are selected, how socio-economic impacts will be considered and mitigated, and how stakeholders will be involved.
- 2.3.2 NatureScot and the JNCC have jointly developed the Site Selection Guidelines for HPMAs. The application of the Site Selection Guidelines will aim to explore the potential contribution an area could make towards achieving the aims of

¹⁵ NatureScot (2022) [Marine Protected Areas \(MPAs\)](#) (accessed 05/07/2022)

¹⁶ JNCC (2022) [Marine Protected Area Advice](#) (accessed 05/07/2022)

HPMAs. The process is driven by the presence of specific functions and resources of significance to Scotland's seas and looks to optimise ecological, social and cultural benefits whilst minimising significant impacts where possible.

- 2.3.3 HPMAs will have strict limits on human activities in place to allow the protection and recovery of marine ecosystems. There will be activities which will not be allowed within HPMAs and activities which will be allowed within HPMAs at non-damaging levels.
- 2.3.4 The policy framework and accompanying site selection guidelines as a whole are intended to apply to both Scottish inshore waters (0-12 nautical miles from the coast) and Scottish offshore waters (beyond 12 nautical miles). The selection and designation of HPMAs in offshore waters is subject to the prior transfer of relevant powers by the UK Government to Scottish Ministers. Some of the marine activities, which take place in Scottish inshore and offshore waters, relate to matters which are currently reserved to the UK Government, i.e. are not in the competence of the Scottish Parliament. The prohibition or management of these reserved activities will be subject to agreement with the UK Government. The Scottish Government will work closely with the UK Government to realise their vision for HPMAs in relation to offshore waters and reserved matters.
- 2.3.5 There are some damaging activities associated with essential/lifeline services which will need to go ahead within HPMAs, and the legal powers that are being sought to designate and protect HPMAs will need to provide for these activities to go ahead where absolutely necessary. There will be a need to be able to distinguish between unplanned activities (such as anchoring in an emergency or oil spill response) and planned activities (such as construction of critical infrastructure). Consideration of what the designation of HPMAs will mean for different activities and sectors are set out in the Policy Framework document that has been published for consultation at the same time as this Environmental Report.
- 2.3.6 There will be some areas where HPMAs will not be selected because it will not be feasible to remove or relocate existing activities or infrastructure which are not compatible with HPMA status. These include areas earmarked for

renewable developments (such as ScotWind option agreement areas and Offshore Wind for Innovation and Targeted Oil and Gas Decarbonisation (INTOG) areas) and associated cable routes where they are known, existing active renewables and oil and gas infrastructure, existing ports and harbours, and some areas where defence activities are carried out.

- 2.3.7 HPMAs will be developed using best available evidence, and involving stakeholders. Socio-economic factors alongside ecological data will also be considered as part of the site selection process.

2.4 Finalisation and adoption of Policy Framework and Site Selection Guidelines

- 2.4.1 The draft Policy Framework and Site Selection Guidelines has been developed with input from stakeholders and are now subject to a formal consultation period together with this Environmental Report. Following this, the documents will be finalised and published.

- 2.4.2 NatureScot, JNCC and Marine Scotland will then work with stakeholders to apply the Policy Framework and Site Selection Guidelines to identify a suite of HPMA proposals for consideration by Scottish Ministers. Stakeholders will also be given the opportunity to propose areas for consideration as HPMA through third party site proposals. A final public consultation on the proposed locations for HPMA will be then be held, expected to be in 2025.

2.5 Policy context overview of proposals for HPMA

- 2.5.1 The 2005 Act requires Responsible Authorities to define the plan's broader policy context, particularly any relevant environmental protection objectives that will influence the plan's development and implementation.

- 2.5.2 The immediate policy context for the development of the Policy Framework and Site Selection Guidelines for HPMA is described in Sections 2.1 to 2.4. This policy context is illustrated in Figure 1. Appendix A includes a detailed review of the broader policy context in which the Policy Framework and Site Selection Guidelines sit, beginning with a summary of relevant marine policies and followed by an overview of policies relating to the SEA topics that have been

scoped into the assessment: Biodiversity, Flora and Fauna; Soil (assessed under Biodiversity, Flora and Fauna); Water (assessed under Biodiversity, Flora and Fauna); and Climatic Factors (assessed under Biodiversity, Flora and Fauna)¹⁷ (Section 3.3).

¹⁷ Although it is proposed that Soil, Water and Climatic Factors be scoped in under 'Biodiversity, Flora and Fauna', relevant policies relating to each are presented under their own headings for clarity.

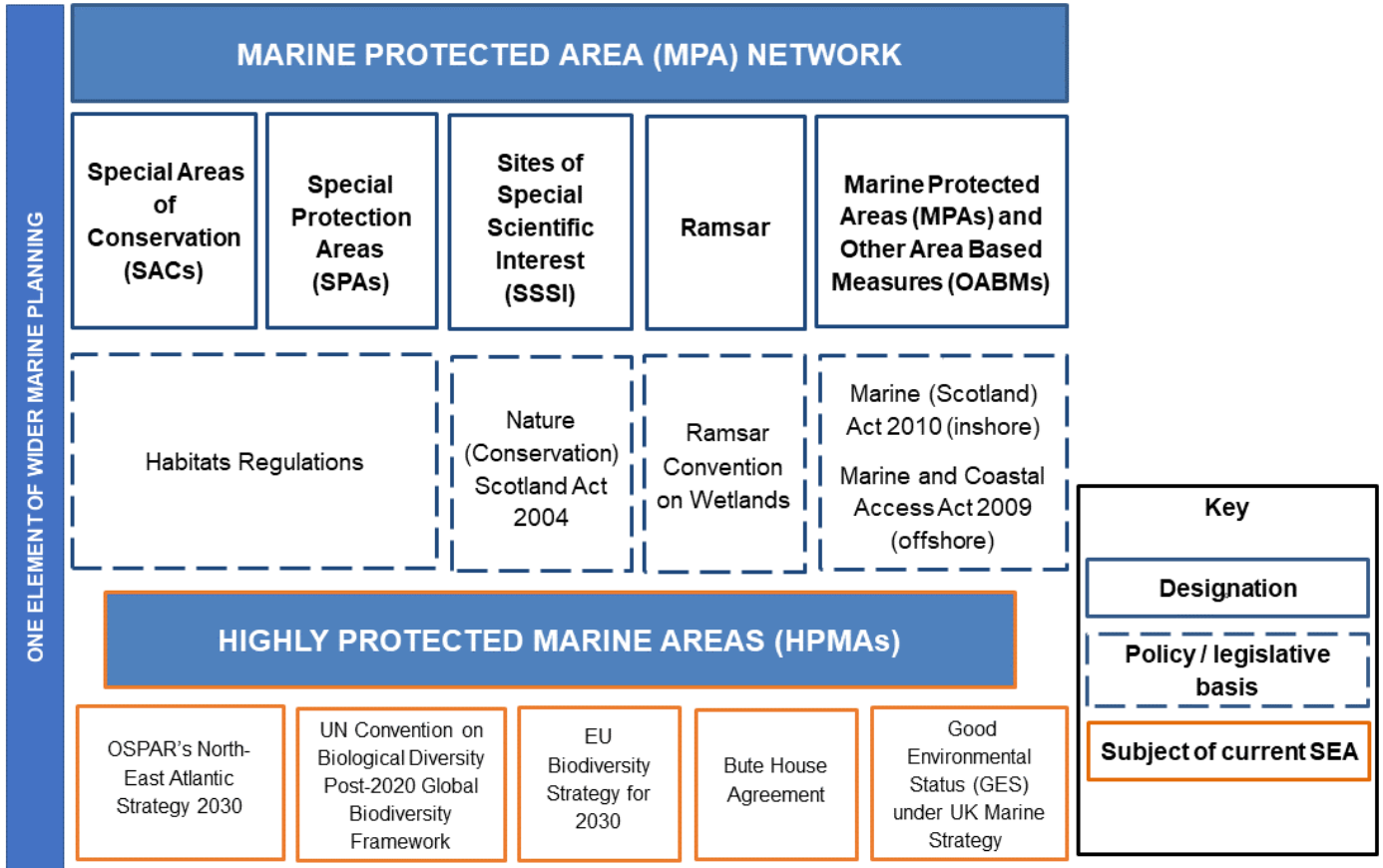


Figure 1. Key policy context of proposals for HPMAs

3 Approach to the Assessment

3.1 Purpose of the assessment

3.1.1 The purpose of this SEA is to assess the potential for likely significant environmental effects associated with the adoption of the Policy Framework and Site Selection Guidelines for HPMAs. This will allow corresponding mitigation measures to be identified where necessary and highlight opportunities for enhancement in cases where beneficial effects are likely.

3.2 Scope of the proposals to be assessed

- 3.2.1 The Policy Framework and Site Selection Guidelines will lead to the identification and designation of HPMAs which will remove/avoid certain activities and reduce/limit other activities to non-damaging levels (Section 2.3). There may be some damaging activities which will still need to take place within HPMAs (e.g. activities relating to defence, national security and lifeline services). Based on the previous and ongoing SEA work that has been undertaken (Section 3.6), it is considered that the scope of potentially significant environment effects resulting from the implementation of HPMAs is largely limited to beneficial effects to the marine environment within the HPMAs, spillover benefits beyond the boundaries of HPMAs and potential adverse effects as a result of the displacement of any activities that are excluded or restricted, as well as from the extension of any new cable or pipeline routes that need to avoid transecting HPMAs. Displacement is likely to be assessed in terms of activities moving to new areas or the intensification of activities in areas where they already occur. Should there be a situation in future where a new cable or pipeline installation need to be re-routed to avoid an HPMA, the extension of the route will have potential adverse effects associated with installation, operation and maintenance of a greater length of cable or pipeline.
- 3.2.2 The location of HPMAs have not yet been identified and, therefore, it is only possible to undertake an initial SEA at this stage involving a preliminary consideration of the type of impacts that could arise from the future designation of HPMAs and restriction/limitation placed on activities within HPMAs. Once sites have been selected and are proposed to be taken forward for designation,

it will be possible to undertake an updated SEA involving a more detailed site specific assessment of the potential environmental effects.

- 3.2.3 It is not considered within the scope of this SEA to evaluate the effectiveness of the Policy Framework and Site Selection Guidelines in identifying HPMAs that meet the commitments made in the Bute House Agreement. The HPMAs will have their own reporting and monitoring requirements, in line with the legislation from which they arise.
- 3.2.4 The potential economic and social impacts that may result from the implementation of the Policy Framework and Site Selection Guidelines does not form part of the scope of this SEA. The SEIA and overarching SA, the latter of which this SEA is a part, will address any potential economic and social impacts.

3.3 Scope of the assessment

- 3.3.1 An initial review of the environmental topics set out in Schedule 3 of the 2005 Act¹⁸ suggests that potentially significant environmental effects as a result of the implementation of the Policy Framework and Site Selection Guidelines for HPMAs would be focused on the SEA topics of Biodiversity, Flora and Fauna; Water; Soil; and Climatic factors. The Screening and Scoping Report¹⁹ proposed that the SEA should consider all these topics under the overarching topic of 'Biodiversity, Flora and Fauna' given their strong linkages. The rationale for scoping in and out each of the SEA topics is provided in Box 1.
- 3.3.2 This approach to defining the scope of the assessment reflects the approach taken during the previous and ongoing SEAs (see Section 3.6).

¹⁸ [Environmental Assessment \(Scotland\) Act 2005](#). Schedule 3 Information for Environmental Reports (accessed 06/07/2022)

¹⁹ Marine Scotland (2022) SEA of Policy Framework and Site Selection Guidelines for Highly Protected Marine Areas – Strategic Environmental Assessment Screening and Scoping Report August 2022.

Box 1 - Proposed scoping in/out of SEA topics

Biodiversity, Flora and Fauna – scoped in

The Policy Framework and Site Selection Guidelines for HPMAs will enable the identification and designation of HPMAs which are considered to be inherently beneficial to marine biodiversity through their strict protection and exclusion/restriction of activities. There may also be spillover benefits to marine species and habitats outwith the boundaries of the HPMAs. It is not, however, within the scope of this SEA to assess the potential effectiveness of the HPMAs at conserving or recovering the marine ecosystem. It is recognised that the displacement of activities from areas that are selected as HPMAs as a result of the implementation of the Policy Framework and Site Selection Guidelines could adversely affect marine biodiversity. This could be as a result of activities moving to new areas or due to the intensification of activities in areas where they already occur. Overall, the potential impacts on the SEA topic of 'Biodiversity, Flora and Fauna' have the potential to be significant and, therefore, this topic has been scoped into the assessment.

Geodiversity is proposed to be scoped into the assessment under the SEA topic of 'Biodiversity, Flora and Fauna' as the viability and health of both flora and fauna populations are highly dependent upon the availability of good quality habitats, which in turn is influenced by the condition of underlying geodiversity features.

The potential impacts on the SEA topic of 'Soil' are intrinsically linked to the SEA topic of 'Biodiversity, Flora and Fauna' as any improvements to or decline in the condition of the seafloor will inevitably alter its suitability as a habitat. In recognition of these cross-cutting impacts, it is proposed that the 'Soil' topic be scoped in under the 'Biodiversity, Flora and Fauna' topic (see below).

Biodiversity is a key consideration underlying the environmental quality objectives of the Water Framework Directive (WFD) and the UK Marine Strategy Regulations. As such, it is proposed that impacts on the SEA topics of 'Soil' and 'Water' as they relate to meeting these objectives are also scoped in under the 'Biodiversity, Flora and Fauna' topic (see below).

In addition, it is proposed that the potential impacts of the Policy Framework and Site Selection Guidelines on the capacity of the marine environment to mitigate and adapt to climate change under the SEA topic of 'Climatic Factors' also receive consideration under the 'Biodiversity, Flora and Fauna' topic, as such impacts are likely to focus on marine flora and fauna to serve as long term carbon stores (see below).

Population and Human Health – scoped out

The SEA topic of 'Population and Human Health' is proposed to be scoped out of the assessment as the adoption of the Policy Framework and Site Selection Guidelines for HPMAs is unlikely to lead to any significant environmental impacts on this topic. The SEIA and overarching SA of which this SEA is a part of will address any potential socio-economic impacts.

Soil – scoped in

The Policy Framework and Site Selection Guidelines for HPMAs will allow for the identification and designation of HPMAs which could contribute towards Scotland's marine waters achieving and maintaining Good Status under the WFD in inshore waters (in terms of hydromorphological elements) and Good Environmental Status (GES) under the UK Marine Strategy Regulations in offshore waters (in terms of the indicator relating to protecting and improving the condition of the seafloor in order to support the health of the wider marine environment). Given the close links between geodiversity features and the condition of the overall ecosystem, we propose to cover issues such as seafloor condition under the 'Biodiversity, Flora and Fauna' topic.

Water – scoped in

The Policy Framework and Site Selection Guidelines for HPMAs could benefit WFD objectives, particularly in terms of improving the ecological status of River Basin Management Plan (RBMP) water bodies. Given this link, the potential impacts on ecological status are proposed to be addressed under 'Biodiversity, Flora, and Fauna'.

Scotland has a commitment under the UK Marine Strategy Regulations to achieve GES within its marine environment. This involves satisfying several qualitative descriptors relating to biodiversity. Given this link, it is proposed that the role that the Policy Framework and Site Selection Guidelines for HPMAs have in working towards GES be covered under the topic of 'Biodiversity, Flora and Fauna'.

Air – scoped out

Displacement of some activities (e.g. fisheries) as a result of the eventual designation of HPMAs that result from the adoption of the Policy Framework and Site Selection Guidelines may result in longer journey times/lengths and thus lead to increased greenhouse gas (GHG) emissions. However, relative to current marine vessel emissions within Scottish waters, these increases are not considered to be significant. The SEA topic 'Air' is, therefore, proposed to be scoped out.

Climatic Factors – scoped in

Marine habitats may play a role in climate change regulation by acting as long-term carbon stores. The Policy Framework and Site Selection Guidelines for HPMAs could result in a potential change in marine carbon sequestration/blue carbon processes and in turn climate change mitigation and adaptation. The SEA topic 'Climatic Factors' has, therefore, been scoped into the assessment. Given the close link between marine carbon sequestration/blue carbon and marine habitats, the potential impact of the proposals on 'Climatic Factors' will be addressed within the topic of 'Biodiversity, Flora and Fauna'. This will include, as far as possible, a consideration of generic impacts on carbon stocks outwith the boundaries of the HPMAs due to the displacement of certain activities that result in the potential re-suspension of stored carbon in the water where it can more easily break down.

Material assets – scoped out

No environmental impacts on the 'Material Assets' SEA topic are likely to result from the Policy Framework and Site Selection Guidelines for HPMAs. This topic has, therefore, been scoped out of the assessment. The socio-economic effects of the proposals on other users of the marine environment, both adverse and beneficial, will be assessed by the SEIA and overarching SA of which this SEA is a component.

Cultural heritage – scoped out

The regulation of certain marine activities and forms of development as a result of the designation of HPMAs could mean that environmentally damaging activities move out of the HPMAs or else are never introduced, thereby indirectly benefiting any submerged cultural heritage. However, this benefit is contingent upon the HPMA overlapping cultural heritage resources, the true extent of which can be difficult to determine as some of these features remain undiscovered, particularly in the offshore marine area. Further, conservation and cultural heritage objectives would need to be compatible (e.g. some historic features may require excavation in order to ensure their preservation, which may be at odds with conservation interests). At this time, the impacts of the adoption of the Policy Framework and Site Selection Guidelines and eventual designation of HPMAs are not predicted to be significant and so it is proposed that Cultural Heritage be scoped out of the assessment.

Landscape/seascape – scoped out

It is possible that the seascape may benefit from the Policy Framework and Site Selection Guidelines and resultant designation of HPMAs as they will result in the removal/restriction of certain activities (e.g. aquaculture sites). However, at this time, such impacts are not predicted to be significant and so it is proposed that the 'Landscape/Seascape' SEA topic be scoped out of the assessment.

3.4 Reasonable alternatives

- 3.4.1 In accordance with the 2005 Act, there is a requirement to consider reasonable alternatives that fulfil the objective of the plan as part of the SEA. The reasonable alternatives that have been identified as part of the development of the Policy Framework and Site Selection Guidelines for HPMAs have been assessed.
- 3.4.2 In advance of identifying any potential HPMAs, reasonable alternatives are considered to be high level considerations of alternative management options that meet the aims of HPMAs, for example, options for different activities that are not considered compatible with HPMAs and activities that are allowed at non-damaging levels. As part of the process for selecting HPMAs, the options considered for where sites are located could be considered reasonable alternatives. It is expected that the suitability of alternative management scenarios and alternative decisions on where sites are located will be explored and informed by the SEA as the assessment progresses.

3.5 Assessment methodology

Assessment of potential effects

- 3.5.1 Based on the available data and strategic nature of SEAs, a generic high-level and qualitative assessment of potential effects arising from the proposed Policy Framework and Site Selection Guidelines and reasonable alternatives has been undertaken.
- 3.5.2 The Policy Framework and Site Selection Guidelines will be used to identify and propose HPMAs in the next phase of the process. It will, therefore, not be possible for this initial SEA to undertake a spatial analysis of specific potential sites or quantify the likely scale/magnitude of environmental effects. This preliminary assessment will be updated once site boundary proposals are available. This will form part of a separate future updated SEA on the proposed designation of HPMAs.

- 3.5.3 The key potential environmental effects or impact pathways that are likely to arise from the implementation of the Policy Framework and Site Selection Guidelines for HPMAs are as follows:
- Potential benefits to marine biodiversity and the marine ecosystem;
 - Potential spillover benefits beyond site boundaries;
 - Potential adverse effects resulting from the displacement of activities from site boundaries into new areas and the intensification of activities in areas where these activities already occur; and
 - Potential adverse effects as a result of the extension of any new cable or pipeline routes that need to avoid transecting HPMAs.
- 3.5.4 The assessment of potential benefits to marine habitats and species has considered in generic terms how the pressures on the marine environment might reduce as a result of the adoption of the Policy Framework and Site Selection Guidelines and designation of HPMAs and reasonable alternatives.
- 3.5.5 The assessment of potential for spillover benefits beyond site boundaries has considered how the change in pressures within HPMAs might result in spillover benefits taking account of the latest available evidence.
- 3.5.6 For the assessment of adverse environmental effects, a high level qualitative review of activities that might be displaced and future cable or pipeline routes that might be extended due to the Policy Framework and Site Selection Guidelines for HPMAs and the potential implications of that displacement on the marine environment has been undertaken
- 3.5.7 The assessment has included consideration of the potential for transboundary effects on EU Member States as a result of the displacement of activities outwith Scottish jurisdiction.

Assessment criteria

- 3.5.8 For the purposes of this preliminary assessment, only indicative criteria to define the nature or type of potential effects that may result from the Policy Framework and Site Selection Guidelines and reasonable alternatives have been used (i.e. beneficial, adverse or neutral). It is not possible to determine the

potential scale/magnitude of these effects in advance of identifying the proposed site boundaries for HPMAs and undertaking a spatial analysis of site specific information. This will be undertaken as part of a separate future updated SEA on the proposed designation of HPMAs.

SEA objectives

- 3.5.9 The potential implications of the Policy Framework and Site Selection Guidelines and reasonable alternatives have also been assessed against SEA objectives. The SEA objectives that have been applied in this assessment are presented in Box 2. These have built on those used to inform recent related marine assessments (see Section 3.6). Those objectives reflected the scope of their respective assessments as well as environmental protection objectives found across relevant legislation (see Appendix A) and remain applicable to the present assessment.

Box 2 - Proposed SEA Objectives

Biodiversity, Flora and Fauna; Soil; Water; and Climatic Factors

- To protect and recover marine ecosystems, including species, habitats, and their interactions²⁰
- To maintain and protect the character and integrity of the seabed
- To avoid the pollution of seabed strata and/or bottom sediments
- To avoid pollution of the marine water environment
- To maintain or work towards achieving 'Good Environmental Status' of the marine environment
- To preserve and enhance existing marine carbon stocks and carbon sequestration potential.

3.6 Building on previous assessments

- 3.6.1 This SEA builds on previous and ongoing SEAs that have been undertaken on proposed fisheries management measures in inshore waters and marine

²⁰ The SEA objective used in previous and ongoing SEAs that have been undertaken by the Scottish Government (Section 6) "*To safeguard and enhance marine ecosystems...*" has been amended to reflect more closely the terminology that has been used in the draft Policy Framework.

conservation work undertaken by the Scottish Government. This includes the following:

- The designation of Nature Conservation MPAs (assessed in 2013)²¹;
- Phase one (assessed in 2014)^{22,23} and proposals for phase two (currently under assessment) of the implementation of management measures for inshore MPAs;
- The designation of an additional suite of marine SPAs (assessed in 2018)²⁴;
- The designation of four additional MPAs (assessed in 2019)²⁵;
- The designation of a deep sea marine reserve as an offshore MPA (assessed in 2019)²⁶;
- Proposals for management measures applying to Priority Marine Features (PMFs) (currently under assessment)²⁷; and
- Proposals for management measures in offshore MPAs (currently under assessment).

3.6.2 As some of this SEA work is ongoing, it is likely these concurrent assessments will be used to inform the current assessment as far as possible, providing a more complete understanding of cumulative effects in particular.

3.6.3 Other relevant sources of information include the SEAs undertaken on the Sectoral Marine Plans for Offshore Renewable Energy in Scottish Waters²⁸, the

²¹ Scottish Government (2013) [Planning Scotland's Seas: 2013 – Possible Nature Conservation Marine Protected Areas Consultation Overview – Strategic Environmental Assessment Report](#) Available at: (accessed 20/01/2022)

²² Scottish Government (2014) [2014 Consultation on the Management of Inshore Special Areas of Conservation and Marine Protected Areas Overview](#) (accessed 20/01/2022)

²³ Scottish Government (2014) [MPA/SAC Consultation Environmental Assessment](#) (accessed 20/01/2022)

²⁴ Scottish Government (2018) [SEA of Marine Proposed Special Protection Areas Strategic Environmental Assessment Environmental Report](#) (accessed 20/01/2022)

²⁵ Marine Scotland (2019) [Sustainability Appraisal of proposed Marine Protected Areas Sustainability Appraisal](#) (accessed 20/01/2022)

²⁶ Marine Scotland (2019) [Proposed Deep Sea Marine Reserve Strategic Environmental Assessment Environmental Report](#) (accessed 20/01/2022)

²⁷ Marine Scotland (2018) [SEA of Proposed Inshore PMF Management Measures Strategic Environmental Assessment Screening and Scoping Report](#) (accessed 20/01/2022)

²⁸ Scottish Government (2013) [Planning Scotland's Seas: Draft Sectoral Marine Plans for Offshore Renewable Energy in Scottish Waters – Strategic Environmental Assessment: Environmental Report and Appendix A](#) (accessed 20/01/2022)

more recent Sectoral Marine Plan for Offshore Wind Energy²⁹, Management Proposals of Inshore Fisheries Groups³⁰, and the Seaweed Policy Statement³¹. In addition, the ongoing SEA that is being undertaken for the Sectoral Marine Plan for INTOG will also be considered.

²⁹ Scottish Government (2019) [SEA of Sectoral Marine Plan for Offshore Wind Energy Strategic Environmental Assessment Environmental Report](#) (accessed 20/01/2022)

³⁰ Scottish Government (2014) [Management Proposals of Inshore Fisheries Groups: Strategic Environmental Assessment Post Adoption Statement](#) (accessed 20/01/2022)

³¹ Scottish Government (2016) [Wild seaweed harvesting: strategic environmental assessment - environmental report](#) (accessed 20/01/2022)

4 Environmental Baseline

4.1 Introduction

- 4.1.1 This section of the Environmental Report describes the character of the environment which may be affected by the designation of HMPAs following the implementation of the Policy Framework and Site Selection Guidelines. The focus of this baseline information is, therefore, on Biodiversity, Flora and Fauna; Soil (geodiversity); Water (the ecological status of WFD water and environmental status of the marine region under the UK Marine Strategy Regulations); and Climatic Factors (carbon cycling, storage and sequestration), reflecting the scope of the assessment as described in Section 3.3.
- 4.1.2 Scotland's location at the edge of the continental shelf means that it is subject to both subpolar and subtropical influences. The North Atlantic current brings warm water from the Gulf of Mexico to the west coast of Scotland. These warm waters mix with cooler polar waters from the Arctic in the north and east that are rich in nutrients. This unique geographic position means that the seas around Scotland contain a wide variety of habitats and species.
- 4.1.3 Scotland has over 18,000 km of coastline and its inshore and offshore areas are among the largest of any country in the European continent, representing 13% of all European seas.

4.2 Biodiversity, flora and fauna

- 4.2.1 Scotland's marine environment supports a diverse complex of different habitats, which in turn support a wide range of marine plants and animals. Estimates suggest there are around 6,500 species of animals and plants (excluding microbial flora and seabirds) in Scotland's seas³².

Marine habitats

- 4.2.2 Benthic (seafloor) habitats are vital natural resources, as many marine species rely, directly or indirectly, on the seafloor to feed, hide, rest or reproduce.

³² Marine Scotland (2011) Scotland's Marine Atlas: Information for The National Marine Plan

Generally benthic habitats are characterised by low mobility species³³. Marine habitats within the Scottish marine environment can be characterised into three broad groups: intertidal habitats; subtidal (inshore and shelf sea); and deep sea habitats. These broad groups can be further broken down by substrate type.

- 4.2.3 The seabed is a critical component of marine ecosystems. Overall, mud, sand and coarse sediment are found in the North Sea, to the west of the Hebrides and in the north of Scotland. The seabed in the far west and north of Scotland is characterised by mud and fine clay, with coarser sediments in shallower water and on banks and seamounts³⁴.
- 4.2.4 The information presented in Figure 2 on predicted seabed habitats is provided by National Marine Plan Interactive (NMPI) and European Marine Observation and Data Network (EMODnet) Seabed Habitats. The layer is a predictive European Nature Information System (EUNIS) seabed habitat map for the UK continental shelf, which has been created using five pre-processed input datasets: substrate, biological zone, energy, salinity and biogeographic region (Figure 2 and key below).

Mobile species

- 4.2.5 Scotland's marine environment supports a wide range of mobile species with several populations considered to be either of international or national importance. Several mobile species within Scottish waters are already protected through designation or classification of areas within Scottish waters or around Scottish coastlines as discussed below under 'Protected habitats and species'. Mobile species in Scottish waters include the following groups:

- Seals (grey and harbour seals);
- Cetaceans (27³⁵ species have been recorded in Scottish waters over the last 25 years; of these, 11 are regularly sighted);
- Birds (both breeding seabirds and overwintering waterbirds);

³³ OSPAR. 2017. [Condition of Benthic Habitat Communities: Subtidal habitats of the Southern North Sea](#) (accessed 19/07/22)

³⁴ UK Marine Monitoring and Assessment Strategy (UKMMAS) (2010) Charting Progress 2: An assessment of the state of UK seas.

³⁵ [NBN Atlas Scotland](#) (2022) (accessed 22/02/2022)

- Fish, including sharks, rays and skates; and
- European otter.

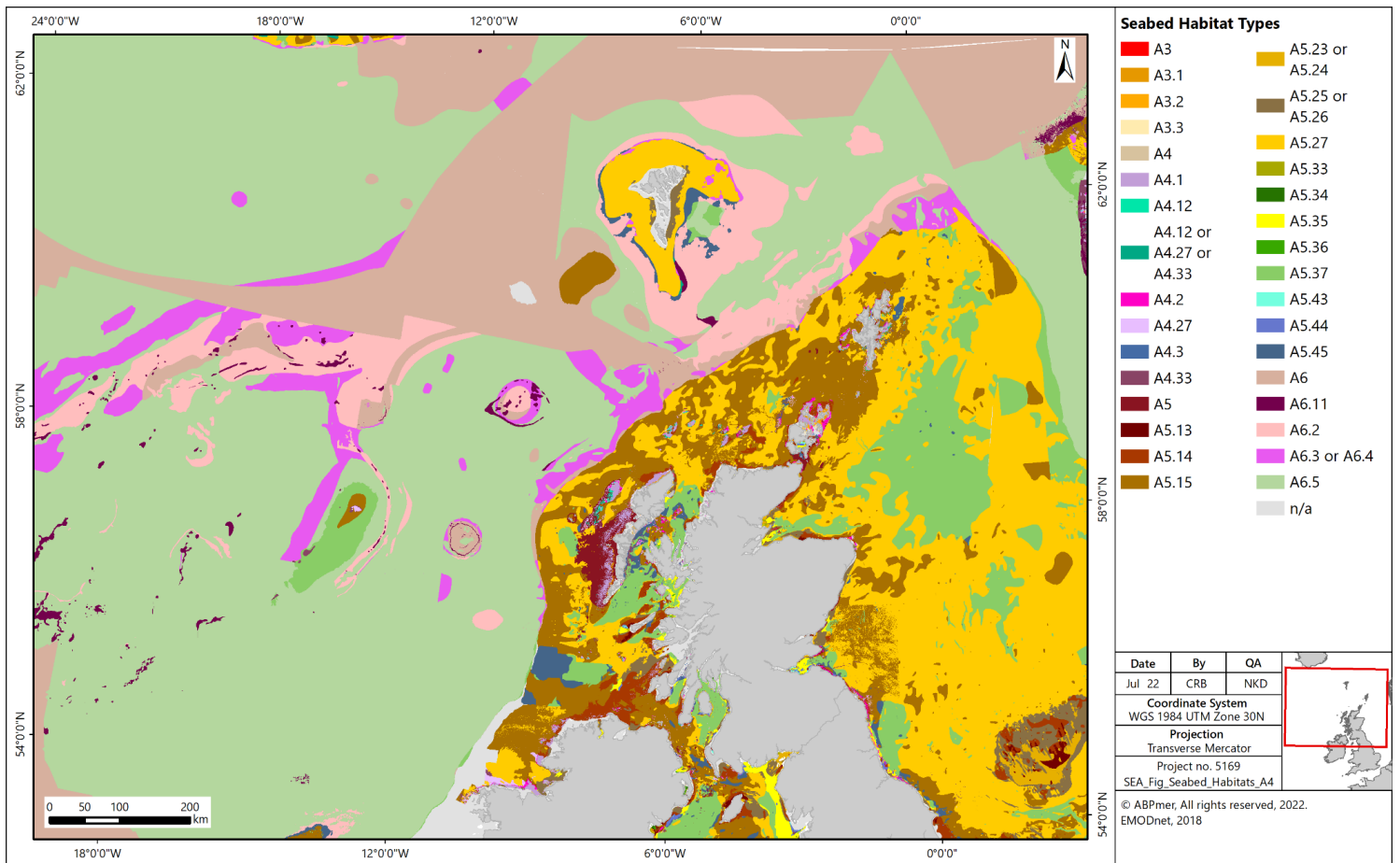


Figure 2 Seabed habitats in Scottish waters [Full key is provided below]

Infralittoral rock and biogenic reef	A3, A3.1, A3.2, A3.3
Circalittoral rock and biogenic reef	A4, A4.1, A4.2, A4.3
Offshore circalittoral rock and biogenic reef	A4.12 or A4.27 or A4.33, A4.27, A3.33
Infralittoral coarse sediment	A5.13
Circalittoral coarse sediment	A5.14
Offshore circalittoral coarse sediment	A5.15
Infralittoral sand	A5.23 or A5.24
Circalittoral sand	A5.25 or A5.26
Offshore circalittoral sand	A5.27
Infralittoral mud	A5.33, A5.33 or A5.34, A5.34
Circalittoral mud	A5.35, A5.35 or A5.36, A5.36
Offshore circalittoral mud	A5.37
Infralittoral mixed sediment	A5.43
Circalittoral mixed sediment	A5.44
Offshore circalittoral mixed sediment	A5.45
Upper bathyl sediment	A6, A6.2, A6.3, A6.4, A6.4 or A6.5
Upper bathyl rock and biogenic reef	A6.11
Not applicable (land)	Na

Marine mammals (cetaceans, seals and otters)

4.2.6 Marine mammals are widely distributed around the Scottish coastline. Species distributions are a function of prey availability and habitat distribution. Eleven species of cetacean are regularly sighted around Scottish seas. These comprise species with important resident populations, such as bottlenose dolphin, alongside more migratory species passing through Scottish seas, such as sperm whale. Key marine mammal species in Scottish seas include:

- Grey seal;
- Harbour seal;
- Harbour porpoise;
- Bottlenose dolphin;
- White-beaked dolphin;
- Fin whale;
- Minke whale;
- Short-beaked common dolphin;
- Atlantic white-sided dolphin;
- Risso's dolphin;
- Long-finned pilot whale;
- Killer whale;
- Sperm whale; and
- European otter.

4.2.7 All of the above species are considered to be PMFs, as discussed below under 'Priority Marine Features'.

4.2.8 Information regarding cetaceans in the deep sea environment in offshore Scottish waters is limited, although some species present in Scottish waters are known to dive to significant depths and could, therefore, have some interaction with the offshore environment. For example, it is known that most migrating

individuals of humpback whales remain in deep water off the continental shelf³⁶, with increasing records year on year³⁷. However, the current understanding of the interaction of cetaceans in offshore waters is limited.

Fish

- 4.2.9 Scotland's inshore waters support approximately 250 different species of fish, with additional species occurring in deeper waters within the Scottish marine area. Some species are commercially important to the Scottish fishing industry, and others, such as sandeel, are key prey species for seabirds, marine mammals and larger fish species, including some shark species. There are several migratory anadromous fish species within Scottish waters which use Scottish rivers for spawning, including Atlantic salmon, shad, sea trout and lamprey. Thirty-one species of fish are identified as PMFs within Scottish waters³⁸.
- 4.2.10 Of the 250 species of fish identified in Scottish waters, 40 are cartilaginous fish (Chondrichthyes), incorporating species of shark, rays and skates. Within Scottish seas, there are nationally important populations of basking sharks. Significant numbers of sightings are concentrated around the Inner Hebridean islands of Coll, Tiree, Canna and Hyskeir and have been highlighted as potential breeding grounds.
- 4.2.11 There are also a number of fish species present in the offshore waters of Scotland. JNCC has reviewed literature available on eleven species of fish present in the deep waters to the west and north of Scotland³⁹: the gulper shark, Atlantic halibut, orange roughy, porbeagle shark, spurdog, leafscale gulper shark, Portuguese dogfish, the roundnose grenadier, blue ling, anglerfish

³⁶ Whaletrack. UiT (2018) [In: The Arctic University of Norway](#) (accessed 21/02/2022)

³⁷ O'Neil, Katie E. Cunningham, Emily G. Moore, Daniel M. (2019) Sudden seasonal occurrence of humpback whales *Megaptera novaeangliae* in the Firth of Forth, Scotland and first confirmed movement between high-latitude feeding grounds and United Kingdom waters- Marine Biodiversity Records- 12 - 1

³⁸ Tyler-Walters, H., James, B., Carruthers, M. (eds.), Wilding, C., Durkin, O., Lacey, C., Philpott, E., Adams, L., Chaniotis, P.D., Wilkes, P.T.V., Seeley, R., Neilly, M., Dargie, J. & Crawford-Avis, O.T. 2016. [Descriptions of Scottish Priority Marine Features \(PMFs\)](#). Scottish Natural Heritage Commissioned Report No. 406. (accessed 19/07/2022)

³⁹ Priede, I.G. (2018) Deep sea Fishes Literature Review. JNCC Report No. 619. JNCC, Peterborough. ISSN 0963-8091

and Greenland halibut. Of the species, the gulper shark, leafscale gulper shark, Portuguese dogfish and orange roughy are included in the OSPAR list of threatened and declining species and habitats⁴⁰.

- 4.2.12 Fish which are known to use the offshore area and are also designated as PMFs comprise anglerfish, Atlantic halibut, Atlantic herring, black scabbardfish, blue ling, blue whiting, cod, European hake, Greenland halibut, Horse mackerel, ling, Norway pout, orange roughy, round-nose grenadier, saithe, sandeel and whiting⁴¹.
- 4.2.13 Sharks and rays which are known to use the offshore marine area include the basking shark, sandy ray, thresher shark and blackmouth shark⁴². The basking shark is a PMF which migrates over large distances in both Scottish offshore and coastal waters at depths from the surface to over 750m. They are particularly associated with tidal fronts on the continental shelf and shelf edge where they feed on plankton. The sandy ray is a PMF, which occurs at depths from 70 to 275m, and is typically found on sandy or muddy sea beds to the north-west of Scotland. The thresher shark is typically found 40 to 75 miles offshore and is considered rare in Scottish waters. The blackmouth shark is found throughout Scottish waters but is more abundant in deeper offshore waters.

Birds

- 4.2.14 Scotland, and its coastline, is important for marine and coastal birds, including seabirds, seaducks, divers, grebes, waders and waterfowl. Scotland provides an essential feeding station for migrating birds; a safe winter haven for ducks, geese and shorebirds; and provides nesting sites for seabird species. It holds internationally significant numbers of 24 species of breeding seabirds, with additional migratory species of waterbird overwintering on Scotland's coasts⁴³.

⁴⁰ OSPAR commission, 2019. [List of Threatened and / or Declining Species and Habitats](#) (accessed 28.02.2022)

⁴¹ Marine Scotland (2011) Scotland's Marine Atlas: Information for The National Marine Plan.

⁴² *ibid.*

⁴³ Scottish Government, 2011, Scotland's Marine Atlas: Information for the National Marine Plan.

- 4.2.15 Seabirds respond to a range of factors, such as changes in food availability, weather, predation and pollution. Breeding abundance and productivity is assessed for a number of the species that breed in Scotland based on a representative sample of colonies around Scotland, which are monitored as part of the UK Seabird Monitoring Programme⁴⁴.
- 4.2.16 Scotland hosts large numbers of wintering seaduck, divers and grebes. Seaducks undertake surface diving to capture molluscs such as mussels and clams as well as crustacea. Divers and grebes are predominantly piscivores or in some cases insectivores, preying on a variety of small fish such as clupeids, sandeel and small gadoids by undertaking pursuit diving.
- 4.2.17 The highly pathogenic avian influenza (HPAI) virus H5N1 is circulating widely within wild bird populations in Scotland⁴⁵. The situation is rapidly evolving and there is concern about the impact of HPAI on vulnerable bird species, particularly in waterfowl, seabirds and raptors. The outbreak has resulted in significant declines in the Svalbard population of barnacle geese, northern gannet and great skua. Twenty-eight species of wild birds have tested positive during the current outbreak, including gulls, terns, auks and Manx shearwater.

Protected habitats and species

- 4.2.18 The importance of Scotland's marine ecosystems is reflected in the range of designations which protect them at the international and national levels. All designations are included and incorporated into Scotland's MPA network, covering approximately 37% of Scottish seas⁴⁶. The current designations in Scottish inshore and offshore waters are:
- SACs: These include both inshore and offshore SAC and cover eleven different marine habitat types which occur in Scotland (sandbanks which are slightly covered by seawater all the time; estuaries; mudflats and sandflats not covered by seawater at low tide; coastal lagoons; large shallow inlets and bays; reefs;

⁴⁴ JNCC (2022) [Seabird Monitoring](#). (accessed 19/08/2022)

⁴⁵ Nature Scot (2022) [Highly pathogenic avian influenza \(bird flu\) - Guidance for site managers](#). (accessed 19/08/2022)

⁴⁶ Nature Scot (2020) [NatureScot has today welcomed the designation of 12 Special Protection Areas \(SPAs\) and four Marine Protected Areas \(MPAs\) in Scotland's seas](#). (accessed 21/02/2022)

submarine structures made by leaking gases; and submerged or partially submerged sea caves). Seven marine species that occur in Scotland are also protected (bottlenose dolphin, harbour porpoise, grey seal, harbour seal, sea lamprey, Atlantic salmon and otter);

- SPAs: These protect and are of international importance for a number of bird species (e.g. seabirds, waders, ducks and geese);
- NCMPAs: These protect habitats and species such as maerl beds, coral gardens and common skate;
- SSSIs: These are nationally designated sites which protect species such as seabirds and seals, and habitats such as sea caves and rocky shores; and
- Ramsar sites: There are designated for their internationally important wetlands. Each Ramsar site is also be designated as either a SPA or SAC, depending on the features present.

4.2.19 Existing and proposed SACs, NCMPAs, and SPAs sites are shown in Figure 3.

4.2.20 There are 58 SACs with marine components in Scotland, 47 of which are in inshore waters, nine are completely in offshore waters, and a further two sites which have parts in both inshore and offshore waters.

4.2.21 Scotland currently has 56 marine SPAs with marine or coastal components, 53 of which are wholly within Scottish inshore waters and three which overlap both inshore and offshore waters.

4.2.22 The Scottish Government has designated 36 NCMPAs, 13 of which are offshore⁴⁷. There is also a Demonstration and Research MPA around Fair Isle⁴⁸.

4.2.23 There are 65 SSSIs⁴⁹ with marine components in Scotland. These include land and the foreshore generally only down to mean low water spring tide level.

⁴⁷ JNCC (2022) [Nature Conservation Marine Protected Areas](#) (accessed 19/08/2022)

⁴⁸ NatureScot (2022) [Fair Isle MPA](#) (accessed 07/09/2022)

⁴⁹ Nature Scot (2022). [The MPA Network](#) (accessed 21/02/2022).

- 4.2.24 There are also 51 Ramsar sites in Scotland designated as internationally important wetlands, covering a total area of about 326,719 hectares⁵⁰, of which 16 form part of the MPA network⁵¹.
- 4.2.25 The Habitats Regulations⁵² as amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019^{53,54} also affords protection to certain species of plants and animals (European Protected Species). In the marine environment these include cetaceans and otters.

⁵⁰ Scottish Government (2022) [Ramsar sites contributing to the MPA Network](#) (accessed 18/02/2022)

⁵¹ Nature Scot (2022). [The MPA Network](#) (accessed 21/02/2022)

⁵² The Conservation of Habitats and Species Regulations 2017, the Conservation of Offshore Marine Habitats and Species Regulations 2017, and the Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 are collectively known as the Habitats Regulations

⁵³ [The Conservation of Habitats and Species \(Amendment\) \(EU Exit\) Regulations 2019](#) (accessed 07/07/2022)

⁵⁴ Scottish Government (2020). [EU Exit: habitats regulations in Scotland](#) (accessed 07/07/2022)

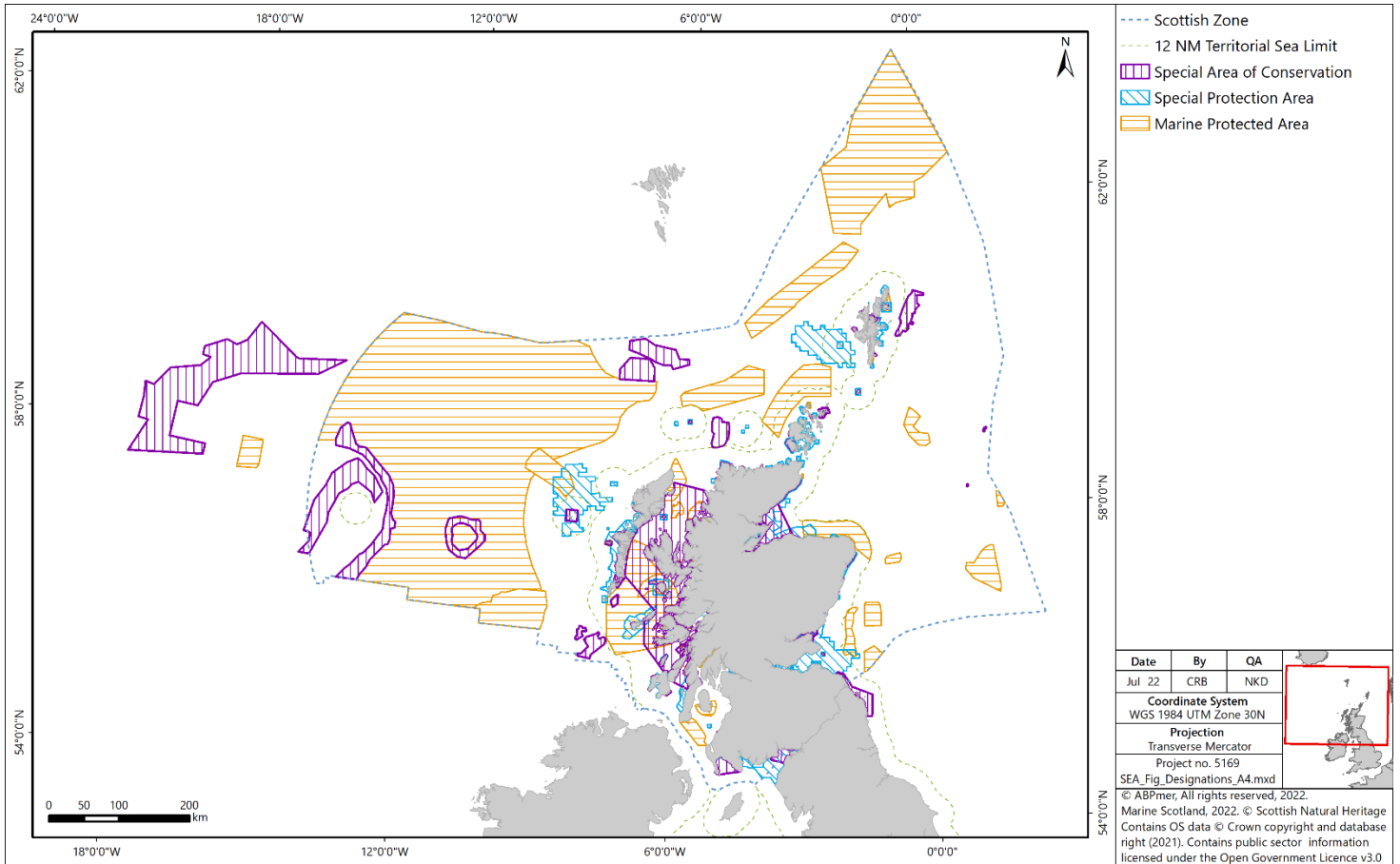


Figure 3 Nature conservation sites

Priority marine features

- 4.2.26 In July 2014, Scottish Ministers adopted a list of 81 PMFs. PMFs are species and habitats which have been identified as being of conservation importance to Scotland⁵⁵. Most are a subset of species and habitats identified on national, UK or international lists. The National Marine Plan includes a policy (GEN 9 Natural Heritage) for safeguarding PMFs whereby '*Development and use of the marine environment must not result in significant impact on the national status of PMFs*'⁵⁶.
- 4.2.27 The list of 81 PMFs comprises 26 broad habitats (e.g. burrowed mud), seven low or limited mobility species (e.g. ocean quahog) and 48 mobile species, including fish (e.g. blue ling) and marine mammals (e.g. minke whale).
- 4.2.28 Available PMF data relevant to the inshore and offshore waters of Scotland are presented in Figure 4 to Figure 7. The information has been collated in a computer database called GeMS (Geodatabase for Marine Habitats and Species adjacent to Scotland)⁵⁷.
- 4.2.29 Kelp beds, burrowed mud, sand banks, maerl beds, seagrass, horse mussel beds, flame shell beds and Northern sea fan and sponge communities are PMF habitats identified within the Scottish inshore area (Figure 4). PMF species identified within the Scottish inshore area include basking shark, sand goby, whiting, harbour seal, grey seal, saithe, whiting, ocean quahog, northern feather star, flapper and blue skate and anglerfish (Figure 6).
- 4.2.30 Regarding PMF habitats within the Scottish offshore area, offshore subtidal sands and gravels can be identified in the north and south east. Larger patches of burrowed mud can be found to the east, and smaller patches are identified to the west of the Scottish offshore area. Offshore deep sea muds are identified in the north, with smaller patches to the west (Figure 5). Further offshore in western waters, habitats include offshore subtidal sands and gravels, coral

⁵⁵ Nature Scot (2020). [Priority marine features in Scotland's seas](#). (accessed 22/02/2022)

⁵⁶ The Scottish Government, 2015. [Scotland's National Marine Plan. A single framework for managing our seas](#). (accessed 22/02/2022)

⁵⁷ Scottish Government (2019) [GeMS – Scottish Priority Marine Features \(PMF\). Version 10 iteration 26](#) (accessed 15/07/2022).

gardens, carbonate mound communities and deep sea sponge aggregations. PMF species that inhabit the Scottish offshore area include Norway pout which is wide ranging in the west, as well as sandeel, whiting, Atlantic herring, harbour porpoise and horse mackerel (Figure 7).

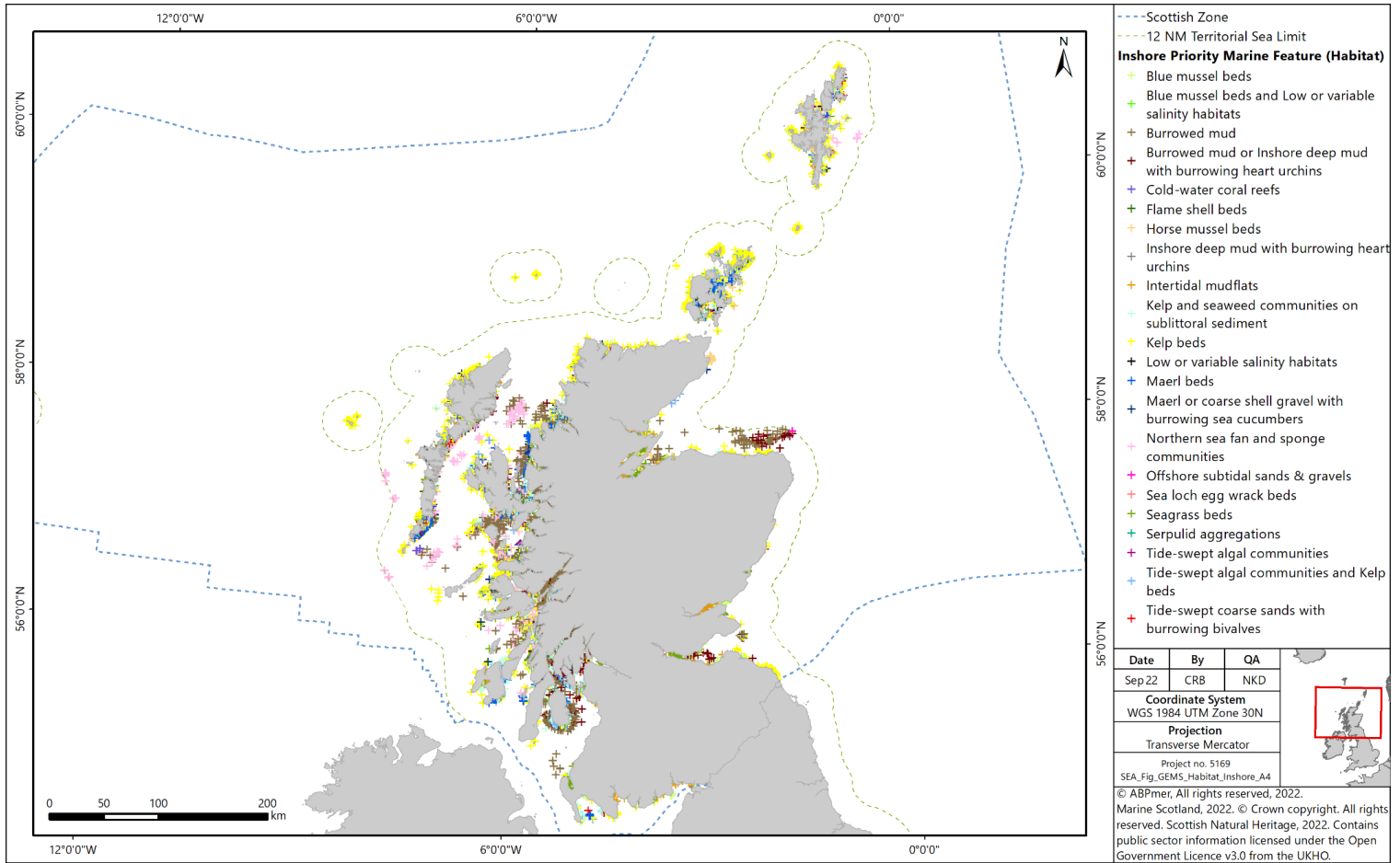


Figure 4 GEMS habitat data in inshore Scottish waters

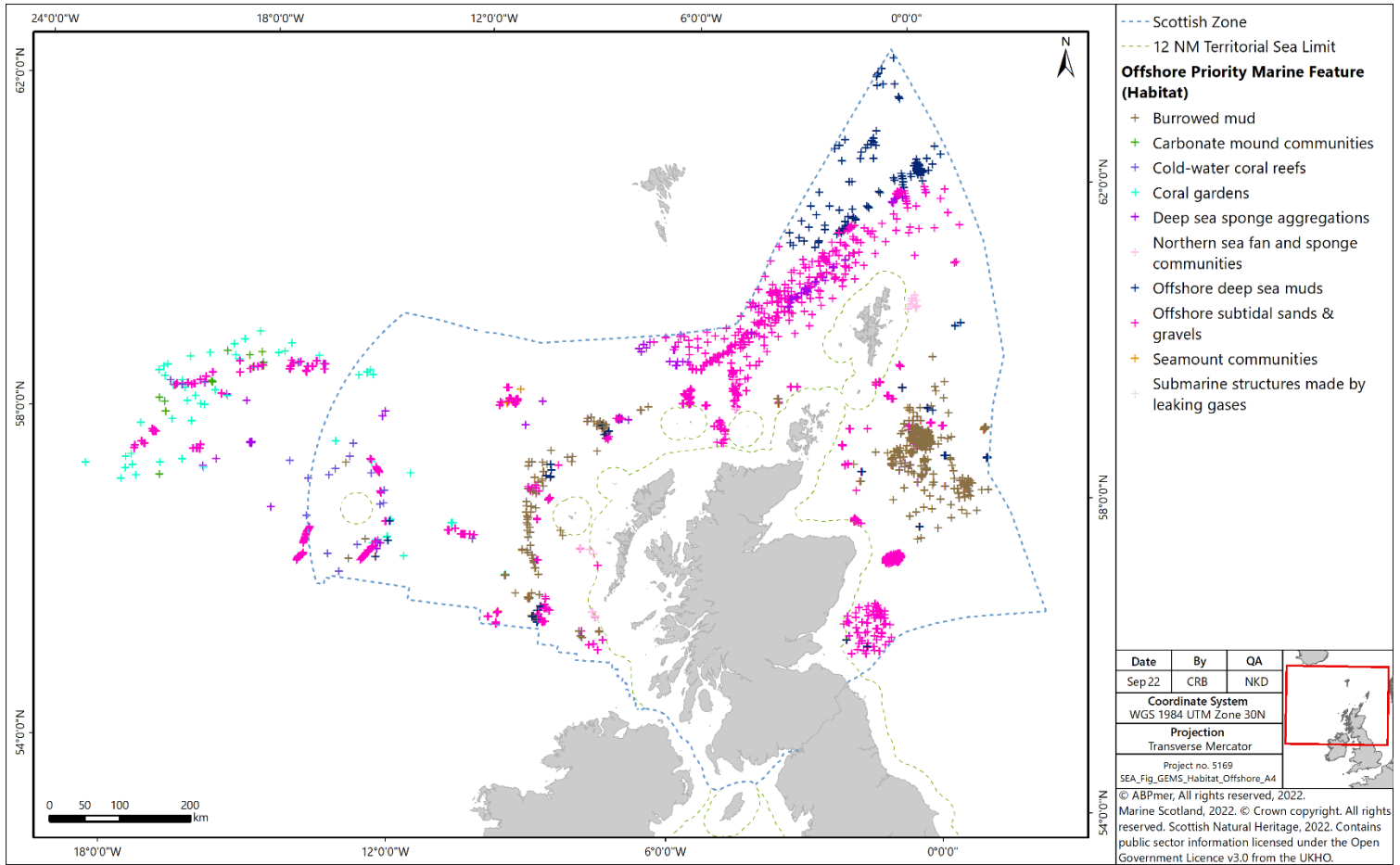


Figure 5 GEMS habitat data in offshore Scottish waters

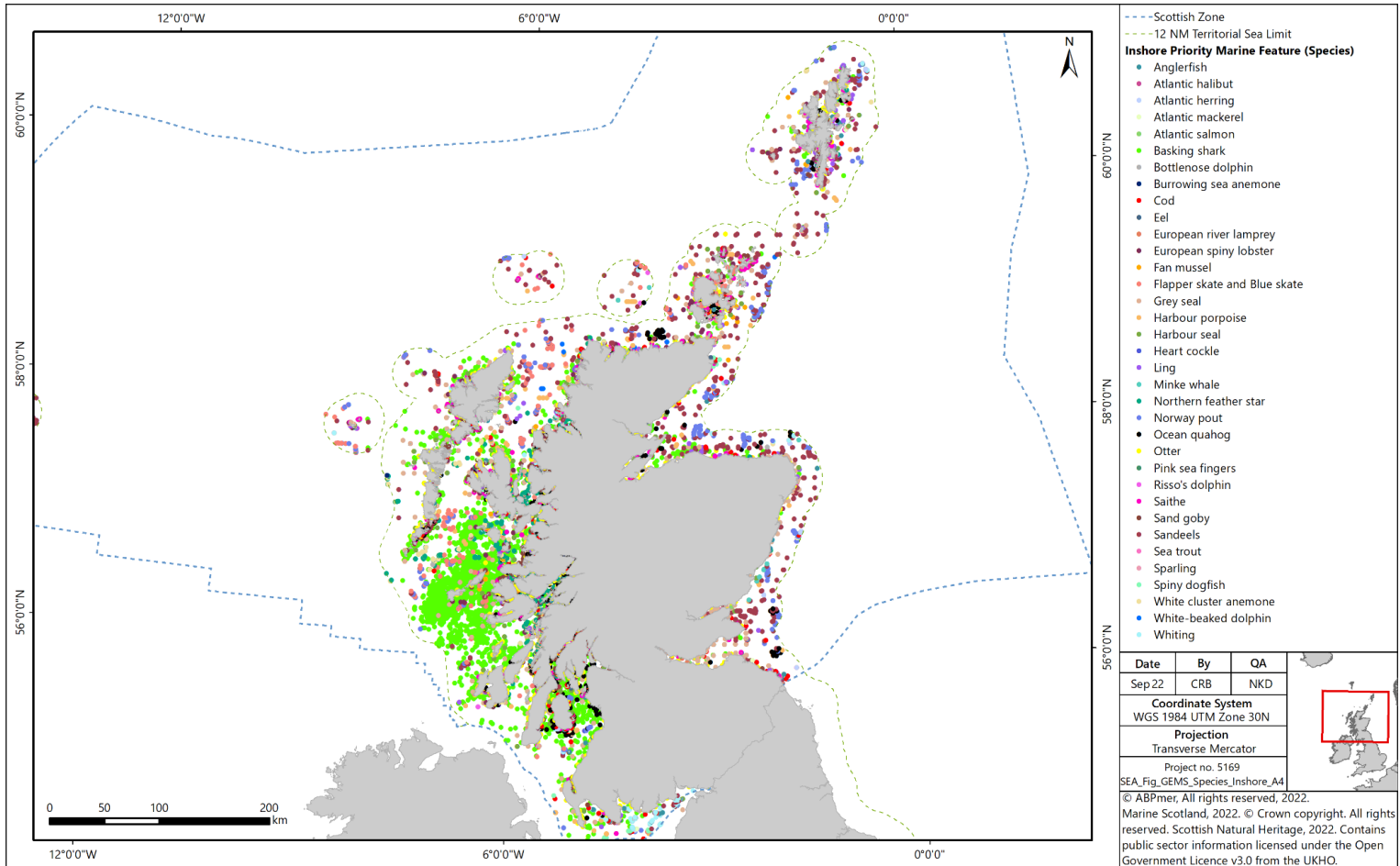


Figure 6 GEMS species data in inshore Scottish waters

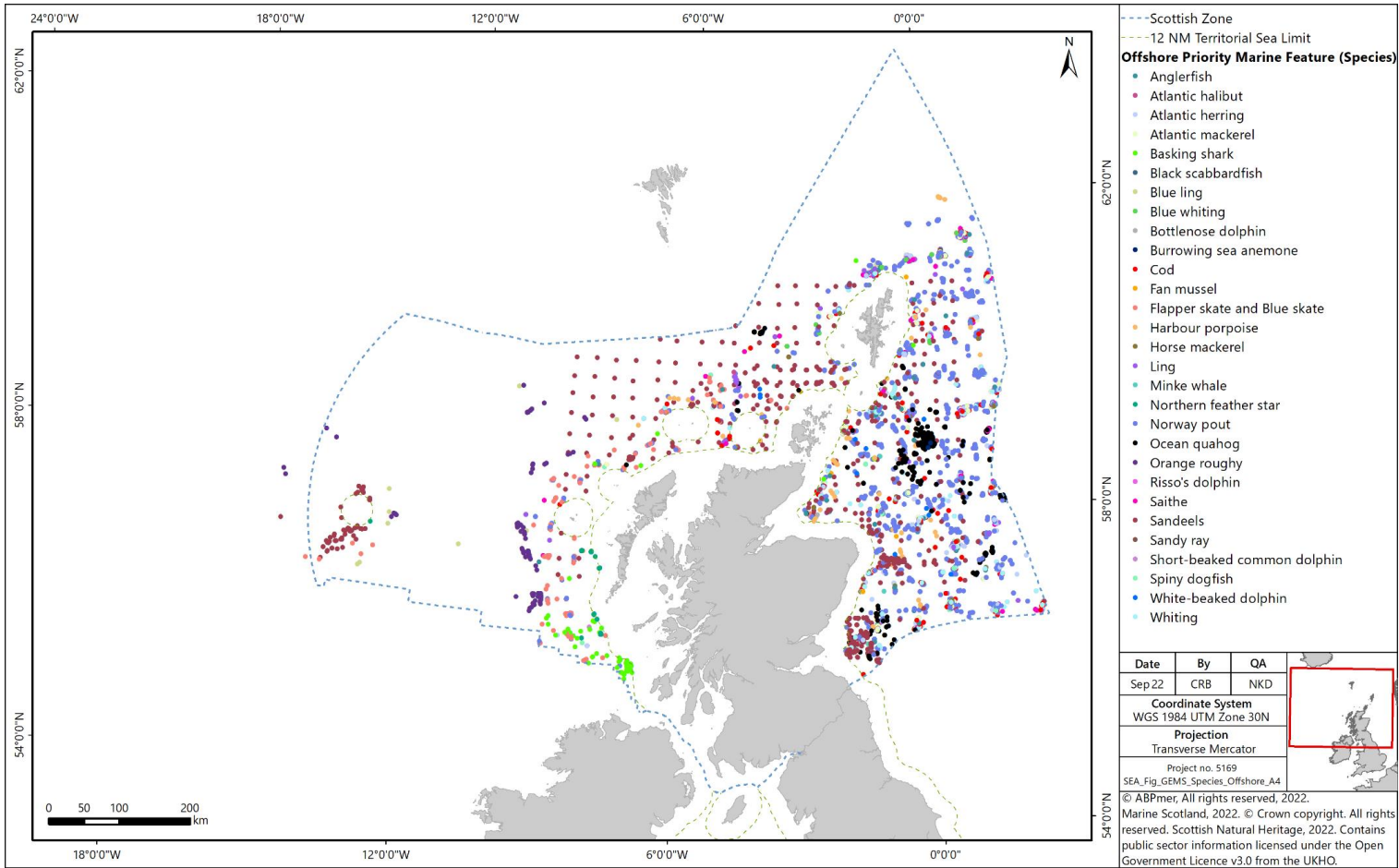


Figure 7 GEMS species data in offshore Scottish waters

- 4.2.31 There are a range of management measures already in place to protect the most vulnerable deep-sea marine ecosystems, not least through gear restrictions in deep waters, and a range of inshore and offshore MPAs have been designated to protect habitats, species and large-scale features. Fisheries management measures have been introduced in many of the inshore MPAs⁵⁸, which also serve to protect PMFs.
- 4.2.32 Although many PMFs are protected within the MPA network, there is a need to ensure adequate protection of PMFs outwith the MPA network. Management measures involving no use of bottom-contacting mobile fishing gears have, therefore, been proposed for 11 of the most vulnerable PMFs and these are currently being assessed as part of a separate SEA (see Section 3.6).

Trends and pressures

- 4.2.33 Within the marine environment there are a number of pressures on biodiversity, flora and fauna. Scotland's Marine Atlas presented an assessment of the condition of Scotland's seas and a summary of significant pressures and the impacts of human activity⁵⁹. It was based on scientific evidence from available data and analysis, supported by expert judgement and taking account of key data gaps⁶⁰.
- 4.2.34 The Marine Atlas reviewed the condition of the five major seabed habitat types in Scottish waters. There were few or no concerns about subtidal rock. Intertidal rock and sediments show evidence of deterioration, with one concern being the introduction of non-native invasive species such as wireweed (*Sargassum muticum*), a brown alga. The most significant level of concern related to the condition of shallow and shelf subtidal sediments, mainly as a result of fishing practices such as demersal fishing (trawling) and scallop dredging. There were also some concerns about the effects of trawling on deep sea habitat, although such activity has since been banned at depths greater than 800 m. Vulnerable

⁵⁸ Scottish Government (2016) [Inshore MPAs/SACs](#) (accessed 18/01/2022)

⁵⁹ Marine Scotland (2011) Scotland's Marine Atlas: Information for The National Marine Plan

⁶⁰ Marine Scotland (2013) [Marine Atlas Data Sources: General & Overall Assessment](#). (accessed 22/02/22)

marine ecosystems are also closed to bottom gear fishing at depths greater than 400 m.

- 4.2.35 The Marine Atlas also assessed the condition of a number of species groups. Those that are relevant to the assessment are summarised below together with other available data sources.

Cetaceans

- 4.2.36 There is limited information in the Marine Atlas with regard to the condition of cetacean populations within Scottish waters. However, where the condition can be assessed, the populations are considered to be favourable (namely harbour porpoise, bottlenose dolphin, minke whale, white-beaked dolphin and fin whale).

Seals

- 4.2.37 Due to Covid restrictions through summer 2020, no recent large-scale surveys of Scottish harbour seal populations have been undertaken⁶¹. Populations of harbour seals along the east coast of Scotland and in the Northern Isles have generally declined since the early 2000s. Though declining at different intensities, all areas had a current population size at least 40% below the pre-2002 level. Populations in North Coast & Orkney Seal Management Unit (SMU) and in the Tay and Eden SAC are continuing to decline. Although declines are not evident in Shetland or the Moray Firth, there is no indication of recovery. Populations in western Scotland are either stable or increasing. Counts in the central and northern sections of the large West Scotland SMU and the Southwest Scotland SMU have been increasing since the 1990s and in all other areas they have remained stable.
- 4.2.38 Grey seal populations are considered to have a stable population, albeit fluctuating within Scottish waters.

⁶¹ [Scientific Advice on Matters Related to the Management of Seal Populations: 2021](#) (2021). (accessed 22/08/2022).

Fish

- 4.2.39 Populations of sharks/rays are declining and, as these animals are slow growing, late to reach maturity, and typically have low fecundity, populations take some time to recover from pressures such as overfishing.
- 4.2.40 The Marine Atlas also noted that populations of many commercial fish species are declining and that this is of particular concern in the Solway Firth, North Channel, Clyde, Minches and Malin Sea, North Scotland coast and West Shetland. The decline in the availability of sandeels associated with changes in oceanographic conditions is considered to have had a major influence on changes in seabird numbers on the east coast and in the Northern Isles.

Birds

- 4.2.41 Prior to the outbreak of bird flu, the seabird populations of Scotland were increasing in some areas (Solway Firth and the Clyde, for example) and decreasing in others. In East and West Shetland and along the North Scotland coast, this decrease was considered to be related to a shortage of prey species (e.g. sandeels) resulting from changes in oceanographic conditions.
- 4.2.42 Like seabirds, waterbirds (wildfowl and waders) were also both increasing and decreasing, depending on the species. The reasons for declines were considered in part to have been a result of the redistribution of wintering birds across northwest Europe due to climate change effects.
- 4.2.43 However, as noted earlier, the influenza virus H5N1 is circulating fast amongst wild bird populations in Scotland and is anticipated to result in significant declines in a number of species⁶².

Current and future pressures

- 4.2.44 Box 3 sets out some of the key current and future pressures on marine biodiversity, flora and fauna. The Feature Activity Sensitivity Tool (FEAST) provides more comprehensive information on the relevant pressures associated

⁶² Nature Scot (2022) [Highly pathogenic avian influenza \(bird flu\) - Guidance for site managers](#). (accessed 19/08/2022)

with a range of marine activities and the sensitivity of protected features to these activities and pressures⁶³.

Box 3 - Pressures on marine biodiversity, flora and fauna

Commercial fishing:

- Removal of target fish species may affect the sustainability of fish stocks, particularly where catches are above the level consistent with achieving maximum sustainable yield;
- Discards of fish are a waste of the resource, and also encourage scavenger species;
- Bycatch of both non-target fish and other species,
- Abrasion of the seabed and its benthic habitat by mobile fishing gear, with the consequent loss of marine plants and animals; and
- Removal of target species may also decrease the availability of prey species, leading to declines in populations of other species (e.g. birds).

Non-native invasive species:

- May outcompete native species, thereby displacing them from the marine environment.

Marine litter:

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

Navigation dredging:

- Can result in loss of and/or damage to the seabed and the habitat that it supports
- May give rise to suspended sediments, resulting in decreased water quality, reduced visibility for foraging fauna and/or smothering of the seabed if these sediments settle out in a different area; and
- May disturb marine animals, including through increased noise levels.

Marine transport:

⁶³ The Scottish Government (2013) [FEAST – Feature Activity Sensitivity Tool](#). (accessed 22/02/22)

- Risk of collision of vessels with marine animals, resulting in their injury and/or death;
- May result in increased coastal erosion through the action of vessel wakes; and
- Vessel noise can impact marine animal behaviour and result in disturbance and / or displacement, including displacement of bird species from the water.

Aquaculture:

- May give rise to elevated nutrient levels in and on the seabed from fish faeces and excess animal feed, which can result in changes to community composition and/or smothering of the seabed;
- Elevated concentrations of contaminants used in sea lice treatment, fish health and anti-fouling;
- Nets associated with aquaculture can result in the injury and / or death of marine animals through entanglement;
- Can damage the seabed and its habitat through anchoring of infrastructure;
- May affect wild salmon through transmission of sea lice; and
- May disturb marine animals, including through increased noise levels associated with Acoustic Deterrent Device (ADD) operations at finfish aquaculture sites.

Marine wildlife watching:

- May result in increased disturbance and displacement to populations of marine animals such as whales, dolphins and bird species; and
- May give rise to collision risk of mobile species with vessels (e.g. birds, mammals etc.).

Recreation:

- May result in loss of and/or damage to the seabed and its habitat through anchoring
- May give rise to increased levels of marine litter;
- May disturb marine animals if the Scottish Marine Wildlife Watching Code is not adhered to through human and/or vessel presence; and
- May give rise to collision risk of mobile species with vessels (e.g. birds, mammals etc.).

Offshore renewables:

- May result in loss of and/or damage to the seabed and its habitat, through anchoring of infrastructure;
- May give rise to collision risk (e.g. with birds, mammals, etc.);
- Could result in changes to sediment transport through changes in energy levels in the water; and
- May disturb marine animals, particularly through increased noise levels associated with construction activities (e.g. percussive piling) and survey activities.

Climate change (increasing sea temperatures, acidification, changes to rainfall patterns, increased extreme weather events etc.):

- May result in populations of marine animals and plants moving further north;
- May result in increased levels of seabird mortality (including large scale events such as seabird wrecks), due to increased levels of extreme weather events;
- May give rise to population decline; and
- May result in new competitors arriving in Scottish waters, including non-native invasive species.

Survey Activities

- May disturb marine animals, through increased noise levels in the marine environment associated with the use of acoustic survey equipment; and
- May give rise to collision risk of mobile species with vessels (e.g. birds, mammals etc.).

Coastal Development

- May result in loss of and/or damage to the seabed and its habitat, through construction of infrastructure;
- Could result in changes to sediment transport through changes in coastal processes; and
- May disturb marine animals, through increased noise levels in the marine environment associated with construction activities.

4.3 Soil (Geodiversity)

Seafloor geodiversity

- 4.3.1 Geodiversity is defined as the natural range (diversity) of geological features (rocks, minerals, fossils and structures), geomorphological features (landforms and processes) and soil features that make up the landscape both on land and below water. The condition of underlying geodiversity features such as sand banks and seabed influence the quality of habitats which in turn affects the viability and health of both flora and fauna populations.
- 4.3.2 There are six protected features of Scottish geodiversity:
- Quaternary of Scotland;
 - Submarine Mass Movement;
 - Marine Geomorphology of the Scottish Deep Ocean Seabed;
 - Seabed Fluid and Gas Seep;
 - Cenozoic Structures of the Atlantic Margin; and
 - Marine Geomorphology of the Scottish Shelf Seabed.
- 4.3.3 Each feature has a variety of components, such as continental slope channels, iceberg ploughmark fields, moraines, slide deposits, sand wave fields, pockmarks, seamounts, sand banks and mega-scale glacial lineation. Major physiographical features of the Scottish marine environment are shown in Figure 8.
- 4.3.4 Scottish waters are geomorphologically distinct between the east and west coasts. The east coast presents mostly uniform depths and shallow inclines interspersed with localised trenches, while the seabed off Scotland's west coast shelves steeply away from the coast, and deep waters occur relatively close to the land.
- 4.3.5 Data from the British Geological Society (BGS) indicates that Scottish waters have a wide range of seabed habitats, ranging from scoured rock or coarse sediment to muddy gravel or fine sand in some areas (Figure 9). A description of the key habitat types in Scottish waters is provided in the section on 'Marine Habitats' above.

- 4.3.6 In general, marine sediments are sandy or gravelly and originate from deposits during the Quaternary glaciation. 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, and can locally be very high⁶⁴.
- 4.3.7 Throughout the west of Scotland and north-east of the Wyville-Thomson Ridge, topographic features influence the prevailing currents and consequently, the sediment types present^{65,66,67,68,69}. In general, deep sea, subsurface currents are weaker when compared with surface flows but are intensified around topographic features such as seamounts, the continental slope and the Rockall Bank^{70,71}. In deeper areas, away from large topographic features and with low or negligible currents, finer, muddy sediments are present⁷². The highly varied topography in the region of the Faroe-Shetland Channel results in complex current patterns, which in turn influence sediment distribution patterns. Within the Faroe-Shetland Channel, stronger currents are present as the channel narrows toward the Wyville-Thomson Ridge; this results in coarser sediments being located at greater depths compared with the deep sea to the west of

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

⁶⁵ Inall, M.E. & Sherwin, T.J. (2006). SEA7 Technical Report - Hydrography. SAMS Report No. 251, 76pp.

⁶⁶ Holmes, R., Fraser, J., Gunn, V., Henni, P., Jacobs, C., Shannon, P. & Unnithan, V. (2002). DTI Strategic Environmental Assessment Area 7 (SEA7) Geological Metadata. British Geological Survey, Commissioned Report CR/02/275, 123pp.

⁶⁷ Holmes, R., Cooper, R. & Jones, S. (2003). DTI Strategic Environmental Assessment Area 4 (SEA4): Continental shelf seabed geology and processes. British Geological Survey Commercial Report CR/03/081.

⁶⁸ Masson, D.G. (2003). [Seafloor sediments and sedimentary processes on the outer continental shelf, continental slope and basin floor](#). DTI SEA4 Report, 49pp. (accessed 22/08/2022)

⁶⁹ Bett, B.J. (2012). [Seafloor biotope analysis of the deep waters of the SEA4 region of Scotland's seas](#). JNCC Report No. 472, JNCC, Peterborough, ISSN 0963-8091. (accessed 22/08/2022)

⁷⁰ Marine Scotland (2011) Scotland's Marine Atlas: Information for The National Marine Plan

⁷¹ Holmes, R., Fraser, J., Gunn, V., Henni, P., Jacobs, C., Shannon, P. & Unnithan, V. (2002). DTI Strategic Environmental Assessment Area 7 (SEA7) Geological Metadata. British Geological Survey, Commissioned Report CR/02/275, 123pp.

⁷² Holmes, R., Cooper, R. & Jones, S. (2003). DTI Strategic Environmental Assessment Area 4 (SEA4): Continental shelf seabed geology and processes. British Geological Survey Commercial Report CR/03/081.

Scotland⁷³. Low sediment deposition rates in the Faroe-Shetland Channel also play a role in determining which sediments are present⁷⁴. Overall, there is a trend of increasing mud content from the southwest to the northeast within the Faroe-Shetland Channel. There are higher percentages of sands and gravels around such features as the Rockall Bank, the continental slope and around the Wyville Thomson Ridge.

- 4.3.8 Several geological sedimentary features exist in Scottish offshore waters. These features may take the form of slide deposits, iceberg plough marks, sediment drifts, sediment wave fields, sand contourites and barchan sand wave fields⁷⁵, mud diapirs⁷⁶ / mounds and sediment plains. Within the Faroe-Shetland Channel, including the approach to the Wyville-Thomson Ridge, Bett (2012)⁷⁷ illustrates the distribution of the known sedimentary physical features. Below 800 m these include contourite deposits, barchan sand dunes, gravel / cobble deposits, landslide debris (mud blocks) and mud diapirs and mud mounds.
- 4.3.9 Sediments along the Hebridean slope to the west of Scotland show a general decrease in grain size with increasing depth and are described as being thickest within the eastern Rockall Trough and along the Hebridean slope and thinnest in the western Rockall Trough and on the Rockall Plateau⁷⁸. A survey to locate rocky reef features on the Rockall Bank also recorded this gradation in sediment type, identifying mud habitats at the base of the bank in ~1,100 –

⁷³ Masson, D.G. (2003). [Seafloor sediments and sedimentary processes on the outer continental shelf, continental slope and basin floor](#). DTI SEA4 Report, 49pp. (accessed 22/08/2022)

⁷⁴ Hughes, A.J., Narayanaswamy, B.E. & Bett, B.J. (2003). [SEA 4: An introduction to the benthic ecology of the Faroe-Shetland Channel](#). 63pp. (accessed 22/08/2022)

⁷⁵ Barchan sand dunes are crescent-shaped and can be found in high-energy areas. The 'horns' of the crescent face down current. The dunes may be up to 120 m across and the slopes can support abundant fauna such as sea pens and anemones.

⁷⁶ Mud diapirs are vertical intrusions of mud through fractures or zones of weakness of over-lying brittle rock layers. The resulting structures can be mushroom-shaped, mound-like or elongated 'dykes' depending on the geological materials involved.

⁷⁷ Bett, B.J. (2012). [Seafloor biotope analysis of the deep waters of the SEA4 region of Scotland's seas](#). JNCC Report No. 472, JNCC, Peterborough, ISSN 0963-8091. (accessed 22/08/2022)

⁷⁸ Davies, A.J., Narayanaswamy, B.E., Hughes, D.J. & Roberts, J.M. (2006). [An introduction to the benthic ecology of the Rockall – Hatton Area \(SEA 7\). A Report for the Department of Trade and Industry](#). (accessed 22/08/2022)

1,600 m depth⁷⁹. Along the continental slope, sediments change from sands at 700 m to silty mud and mud between 700 – 1,000 m depth with gravel patches being rare and cobbles and boulders even rarer⁸⁰. Sediments extending into the Rockall Trough are described as being mainly mud with some areas of coarse sand and gravel.

Coastal geodiversity

4.3.10 Much of Scotland's landscape and coastline was initially formed through the processes of glacial erosion and deposition. Today the coast continues to change as a result of coastal processes such as wave action, sediment movement, erosion and accretion. The 2004 European Initiative for Sustainable Coastal Erosion Management (EuroSION) survey of Scotland's coastline reported that it comprises predominantly hard coasts of rocks and cliffs (70%); soft coasts that are potentially susceptible to erosion impacts, consisting of unconsolidated gravels, sand and silts (29%); and artificial coasts such as harbours and sea walls (less than 1%).

Trends and Pressures

4.3.11 Coasts are dynamic environments, continually changing in response to variations in weather, land use and the supply of sediment. This capacity to change encourages landholders to try to design schemes to restrict and control this natural dynamism. Restricting coasts affects water and sediment flows, which can destroy wildlife habitat and reduce landscape value and diversity. Intervention at one point of a coast can have a negative knock-on effect at another point in the dynamic landscape.

⁷⁹ Howell, K.L., Davies J.S., Jacobs, C. & Narayanaswamy, B.E. (2009). [Broadscale Survey of the Habitats of Rockall Bank, and mapping of Annex I Reef Habitat](#). JNCC Report No. 422, JNCC, Peterborough, ISSN 0963-8091. (accessed 22/08/2022)

⁸⁰ Davies, A.J., Narayanaswamy, B.E., Hughes, D.J. & Roberts, J.M. (2006). [An introduction to the benthic ecology of the Rockall – Hatton Area \(SEA 7\). A Report for the Department of Trade and Industry](#). (accessed 22/08/2022)

4.3.12 Pressures on geodiversity features in Scottish seas arise from multiple activities, including fishing, infrastructure development, seafloor exploration activities, oil and gas extraction and renewable energy development⁸¹

⁸¹ SNH (2013) [Assessing the sensitivity of geodiversity features in Scotland's seas to pressures associated with human activities](#). Report 590. (accessed 22/08/2022)



Figure 8 Extent of Scotland's seas, showing bathymetry and locations of major physiographical features

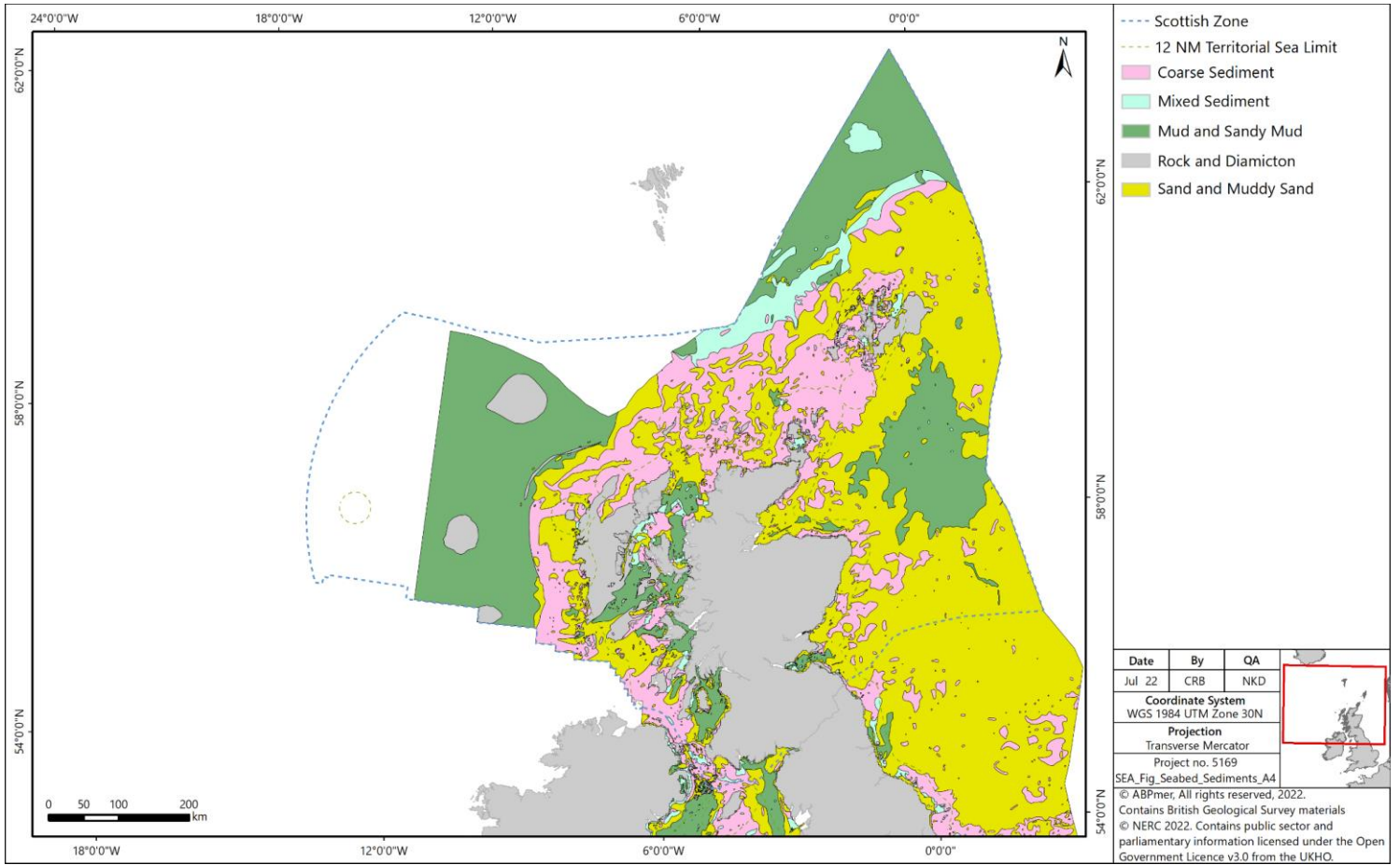


Figure 9 Seabed sediments

4.4 Water

Ecological status of WFD water bodies

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

- The WFD 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’;
- River Basin Management Plans (RBMPs) have been prepared for the Scotland and Solway-Tweed River Basin Districts to address the requirements of the WFD 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. The plans have been updated since the first cycle (2009 – 2015) and are currently in the second cycle (2015 – 2027); and
- Scotland’s coastal waters are monitored by Scottish Environment Protection Agency (SEPA) to measure performance and compliance with targets for coastal water quality status under the WFD.

4.4.2 Coastal and transitional water bodies are classified in terms of their ecological and chemical quality. For those water bodies not designated as heavily modified or artificial, this ecological quality is described in terms of ‘ecological status’, which defines how much ecological quality deviates from natural conditions. The quality elements used to assess ecological status are:

- Biological quality elements (water, plants and animals);
- Chemical and physicochemical elements (e.g. oxygen and nutrient levels); and
- Hydromorphological quality elements (water flows and levels; the condition of beds, banks and shores; and the continuity of rivers for fish migration).

4.4.3 For good status, the chemical, physicochemical and hydromorphological quality of the water body must achieve the standards and conditions necessary for the biological quality elements to be in good condition. The ecological status of a water body is determined by the lowest-classed quality element.

- 4.4.4 Scotland’s coastal and transitional water bodies are mostly classed as being of “high” or “good” ecological status under the WFD⁸². As part of the latest assessment undertaken in 2020, over 99% of coastal water bodies were in good or better condition (143 high, 312 good, 1 moderate and 1 poor) and 88% of transitional water bodies were in good or better condition (11 high, 31 good, 5 moderate and 1 poor). The poor quality coastal water body occurs at ‘Leith Docks to Port Seton’ respectively (Figure 10). The poor quality transitional water body occur at ‘Solway Estuary’.
- 4.4.5 In terms of protected areas under the WFD, there are 85 designated bathing waters and 80 designated shellfish waters in Scotland. The latest available classification data from 2021 assessed 67 (79%) bathing waters as excellent or good status, 17 (20%) as sufficient status, and 1 (1%) as poor status⁸³. The latest available classification from 2014, assessed 29 shellfish waters as at target objective, with the remaining 51 assessed as not at target objective⁸⁴.

Environmental status of marine region

- 4.4.6 The mechanism in place for monitoring and managing the quality of Scottish offshore waters is the UK Marine Strategy Regulations. The North-East Atlantic Ocean marine region and the Celtic Seas and Greater North Sea sub regions that overlap Scottish waters are shown on Figure 11.
- 4.4.7 Achieving GES under the UK Marine Strategy involves satisfying several elements (known as descriptors (D)), namely D1 biological biodiversity (cetaceans, seals, birds, fish, pelagic habitats and benthic habitats); D2 non-indigenous species; D3 commercially-exploited fish and shellfish; D4 food webs (cetaceans, seals, birds, fish and pelagic habitats); D5 eutrophication; D6 sea-floor integrity (pelagic habitats and benthic habitats); D7 hydrographical conditions; D8 contaminants; D9 contaminants in fish and other seafood for

⁸² SEPA (2022) [Water Classification Hub](#) [online (accessed 22/08/2022)]

⁸³ SEPA (2022) [Bathing Waters Classifications](#) (accessed 22/08/2022)

⁸⁴ SEPA (2022) [Water Classification Hub](#) (accessed 22/08/2022)

human consumption; D10 litter and D11 introduction of energy, including underwater noise⁸⁵.

Trends and Pressures

- 4.4.8 Since the first RBMPs in Scotland were published in 2009, the condition of water bodies has generally improved. However, a wide range of pressures are continuing to impact on the condition of specific water bodies and protected areas. The most widespread pressures on the water environment in the Scotland River Basin District (RBD) are man-made barriers to fish migration, modifications to physical condition, rural diffuse pollution, waste water discharges and hydroelectricity generation⁸⁶. The main reasons for water bodies in the Solway Tweed RBD not being in good condition are pollution from agriculture and rural land management, changes to water levels and flows, modifications to physical condition, including man-made barriers to fish migration, and invasive non-native species⁸⁷.
- 4.4.9 The updated UK Marine Strategy Part 1 published in 2019 presents the progress that has been made towards achieving GES in the North-East Atlantic Ocean marine region since the first assessment was undertaken in 2012⁸⁸. In summary, GES has been achieved for eutrophication, changes in hydrographical conditions, contaminants, and contaminants in seafood⁸⁹. GES has been partially achieved for cetaceans, seals, pelagic habitats, food webs and input of anthropogenic sound. GES has not been achieved for birds, fish, benthic habitats, non-indigenous species, commercial fish and shellfish, and litter.
- 4.4.10 Since 2012, environmental status has declined for birds, and has remained stable for cetaceans, pelagic habitats, benthic habitats, non-indigenous

⁸⁵ Defra (2019) [Marine Strategy Part One: UK updated assessment and Good Environmental Status](#). October 2019 (accessed 22/08/2022)

⁸⁶ SEPA (2021). [River Basin Management Plan for Scotland 2021-2027](#) (accessed 22/08/2022).

⁸⁷ Environment Agency and SEPA (2021). [River Basin Management Plan for the Solway Tweed River Basin District: 2021 Update](#) (accessed 22/08/2022).

⁸⁸ UKMMAS (2022) [Introduction to UK Marine Strategy](#) (accessed 21/02/2022)

⁸⁹ UKMMAS (2022) [Summary of progress towards Good Environmental Status](#) (accessed 21/02/2022)

species, eutrophication, changes in hydrological conditions, litter and input of anthropogenic sound⁹⁰. Environmental status has improved since 2012 for seals, fish, commercial fish and shellfish, food webs, contaminants, and contaminants in seafood.

- 4.4.11 Potential pressures against the UK Marine Strategy include increases in fishing activity, increases in oil and gas activity (and associated chemical discharges), increases in seabed extractive activities (i.e. seabed mining) and increases in offshore renewable development.

⁹⁰ UKMMAS (2022) [Summary of progress towards Good Environmental Status](#) (accessed 21/02/2022)

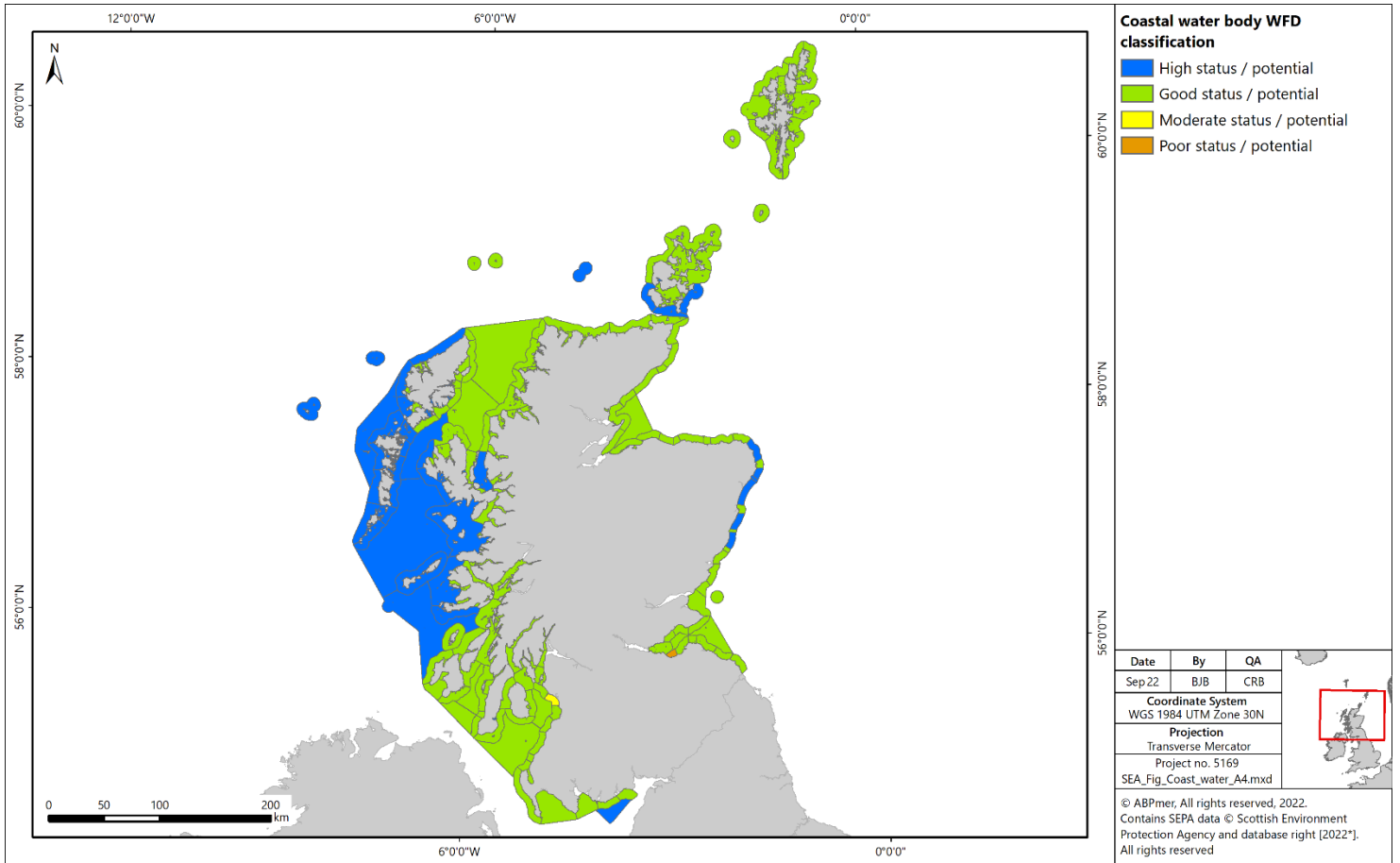


Figure 10 Coastal water body WFD classification in 2020

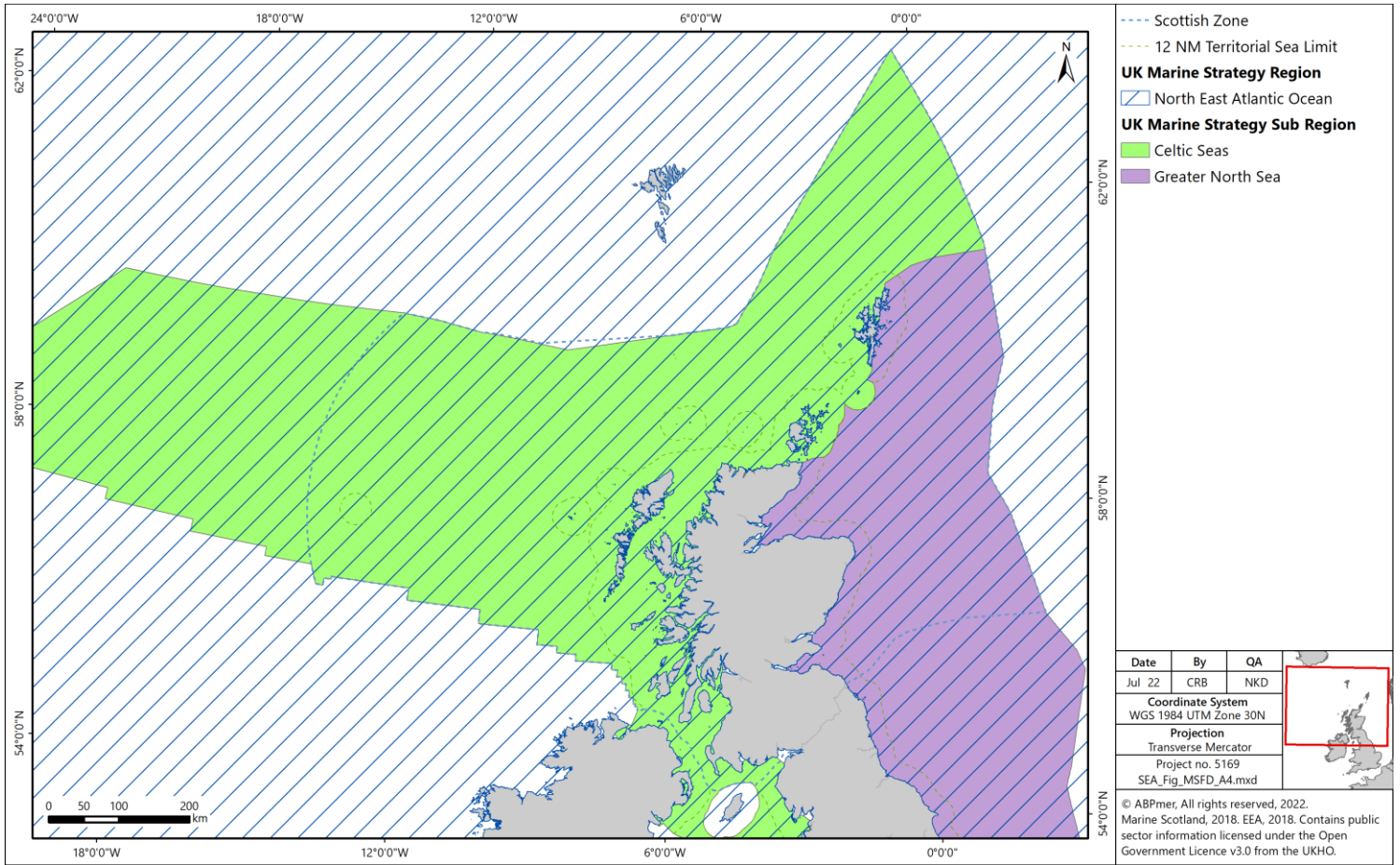


Figure 11 UK Marine Strategy region and subregions

Climatic factors (including carbon cycling, storage and sequestration)

- 4.4.12 The term ‘carbon cycle’ refers to the circulation of carbon in the environment. In the context of this report, it focusses on the exchange of carbon between the ocean and the atmosphere. The proportion of carbon incorporated into biomass is said to be ‘stored’; thus, marine ecosystems such as kelp forests, maerl beds and marine sediments are able to store carbon. The addition of solid carbon to these long-term stocks is referred to as sequestration, and the conversion of atmospheric carbon dioxide to solid carbon in living material is referred to as fixation. The stored carbon can be released, however, through physical disturbance, bacterial decomposition of organic matter or respiratory processes within the food chain.
- 4.4.13 A significant proportion of carbon sequestration occurs through fixation during oceanic photosynthesis and the subsequent long-term storage of the produced organic material. In addition to carbon being sequestered within the oceanic sediments, another important portion is stored within living marine organisms. These organisms include taxa that possess calcium carbonate skeletons and shells such as coral and molluscs, with other carbon captured and stored in plant dominated habitats such as seagrass beds, kelp forests and maerl.
- 4.4.14 Within the marine environment, habitats and processes capable of carbon fixation and sequestration are defined as ‘blue carbon sinks’. Multiple habitats across Scottish seas and coastal areas can be termed blue carbon sinks due to their fixation and sequestration ability. Their effectiveness as carbon sinks is highly dependent upon their long-term capacity to store carbon. Habitats present in Scottish waters that are classed as blue carbon sinks are⁹¹:
- Kelp forests;
 - Intertidal and sub-canopy macroalgae;
 - Saltmarshes;
 - Seagrass beds;

⁹¹ Burrows, M.T., Hughes, D.J., Austin, W.E.N., Smeaton, C., Hicks, N., Howe, J.A., Allen, C., Taylor, P. & Vare, L.L. 2017. Assessment of Blue Carbon Resources in Scotland’s Inshore Marine Protected Area Network. Scottish Natural Heritage Commissioned Report No. 957

- Maerl beds;
- Horse mussel beds (*Modiolus modiolus*);
- Flame shell beds (*Limaria hians*);
- Lophelia pertusa reef;
- Tubeworm (*Serpula vermicularis*) reef;
- Blue mussel beds (*Mytilus edulis*);
- Brittlestar beds;
- Sediments; and
- Phytoplankton.

4.4.15 The largest contribution to carbon fixation and sequestration in Scottish waters comes from phytoplankton, via photosynthesis and subsequent deposition of the produced organic matter in seabed sediments. This may occur either directly through the export of phytoplankton or indirectly through the consumption of phytoplankton by other organisms and subsequent export of this organic matter through the food chain⁹².

4.4.16 Carbon stored in shallow shelf sediment tends to be ephemeral and constantly exchanged due to the dynamic nature of such habitats. Therefore, the potential for shallow shelf sediments to provide long term carbon storage is a function of sedimentation rates and the degree of recycling of organic carbon. The rate of recycling of organic carbon is driven by the level of oxygen available for bacterial and chemical breakdown of organic matter⁹³, which is primarily influenced by disturbance of seabed sediments and the oxygen content of the seawater above the seabed.

4.4.17 Deeper sediments are less mobile and dynamic and, therefore, are able to store carbon to a greater extent, but the rate of uptake into the sediment is slower as sedimentation rates in deeper waters are reduced.

⁹² Kröger S, Parker R, Cripps G & Williamson P (Eds.) 2018. [Shelf Seas: The Engine of Productivity, Policy Report on NERC-Defra Shelf Sea Biogeochemistry programme](#). Cefas, Lowestoft. DOI: 10.14465/2018.ssb18.pbd (accessed 22/02/2022)

⁹³ *ibid*

- 4.4.18 Kelp forests, ubiquitous along the rocky shore common around Scotland, are identified as a significant carbon store. However, the fate of carbon within kelp (i.e. whether it is eventually sequestered permanently) is not quantified, and the majority of stored carbon in kelp is understood to be recycled rather than sequestered⁹⁴. In addition, brittlestar beds are identified as one of the largest components of inorganic carbon fixation (18,000 tonnes per year)⁹⁵.
- 4.4.19 Several of the other habitats listed, including maerl beds, are more efficient at carbon fixation and sequester a larger proportion of carbon relative to their physical extent, but as their total extent across Scotland is low, they do not contribute as much to the Scottish estimate.

Trends and pressures

- 4.4.20 Climate change has the potential to affect the carbon sequestration capacity of marine habitats. Kelps and seagrasses are likely to be vulnerable to increases in the frequency of severe storms which have the potential to cause physical damage and reduce habitat extents and hence reduce carbon storage potential. For seagrasses, reductions in canopy density resulting from physical damage may also decrease this habitat's ability to trap sediment and deflect wave energy away from the bed. Carbon-storing sediments are, therefore, likely to be more vulnerable to wave scour and subsequent resuspension during severe storms. Resuspension events increase the opportunity for organisms to recycle any biologically available carbon from the sediment, reducing sequestration in the sediment once it re-settles on the seabed.
- 4.4.21 Such storm events are also likely to increase the turbidity of the water through increased sediment resuspension, which could potentially reduce available light for photosynthesis, reducing growth rates and, therefore, reducing the overall carbon sequestration capacity of marine habitats. However, in offshore areas, storm events will have no influence on turbidity due to the water depths.

⁹⁴ Kröger S, Parker R, Cripps G & Williamson P (Eds.) 2018. Shelf Seas: The Engine of Productivity, Policy Report on NERC-Defra Shelf Sea Biogeochemistry programme. Cefas, Lowestoft. DOI: 10.14465/2018.ssb18.pbd

⁹⁵ Burrows, M.T., Hughes, D.J., Austin, W.E.N., Smeaton, C., Hicks, N., Howe, J.A., Allen, C., Taylor, P. & Vare, L.L. 2017. Assessment of Blue Carbon Resources in Scotland's Inshore Marine Protected Area Network. Scottish Natural Heritage Commissioned Report No. 957.

- 4.4.22 Several marine activities (e.g. fishing, deep sea mining, oil and gas activities and renewable energy development) physically disturb the seafloor. As previously stated, any physical damage caused to a habitat has the potential to disturb, remove or release any carbon held within that store. However, it may also increase other nutrient levels, which could in turn increase the levels of primary production. The level of impact will depend on the specific area affected. For example, the trawling of ephemeral, gravelly areas will release negligible amounts of carbon, but a trawl across deep sea carbon rich sediments may have greater impacts. In general, direct physical disturbance from marine activities has the potential to affect how Scotland's marine environments regulate atmospheric carbon levels.
- 4.4.23 Shelf seas around the UK are predicted to be 1°C to 4°C warmer by the end of the 21st century⁹⁶. Warmer sea temperatures could result in a shift in distribution of certain habitats and species. Climate change may also favour some species, leading to a potential increase in the diversity of seabed marine life⁹⁷. Biodiversity and benthic biomass in the deep oceans, however, are generally predicted to decrease as a result of climate change⁹⁸.
- 4.4.24 An increase in atmospheric carbon dioxide will lead to a subsequent increase in dissolved CO₂ concentrations within the ocean, increasing ocean acidity. This has the potential to hinder calcium carbonate producing organisms, and, therefore, their ability to sequester carbon in the long term. In addition, following mortality of such organisms, there is increased potential for carbonate shells or skeletons to dissolve faster, in both shallow shelf seas and deeper ecosystems, and, therefore, recycle greater amounts of carbon before they can be sequestered in seabed sediments. This pathway is particularly significant where

⁹⁶: Tinker, J.P. and Howes, E.L. (2020) [The impacts of climate change on temperature \(air and sea\), relevant to the coastal and marine environment around the UK](#). MCCIP Science Review 2020, 1–32 (accessed 28/02/2022)

⁹⁷ Hiscock, K., Southward, A., Tittley, I., Hawkins, S., 2001 The impact of climate change on subtidal and intertidal benthic species in Scotland. Report to Scottish Natural Heritage from the Marine Biological Association of the UK.

⁹⁸ Sweetman, A. K. et al 2017 Major impacts of climate change on deep-sea benthic ecosystems. *Elem Sci Anth*, 5: 4, [DOI](#)

the carbonate pump forms a considerable portion of the carbon export to deep sea sediments.

4.5 Future trends in marine sectors

- 4.5.1 Within the marine environment, it is expected that pressures associated with marine activities have the potential to increase or decrease, depending on larger scale trends within that industry.
- 4.5.2 The designation of the HMPAs increases the protection afforded to the marine ecosystem through exclusion of all extractive, destructive or depositional activities while only allowing other activities at non-damaging levels.
- 4.5.3 The Policy Framework sets out what the HPMAs will mean for different sectors in terms of whether activities will be restricted, and key issues and considerations for each sector. The sectors considered are commercial fishing, recreational activities, aquaculture (finfish, shellfish and seaweed), seaweed harvesting, oil and gas sector, renewable energy, carbon capture utilisation and storage, subsea cables, aggregate extraction, ports and harbours, shipping and ferries and military and defence. The future development of marine sectors has the potential to introduce or increase pressure on the receptors identified above, as described in Box 1. The future trends in these sectors will be considered in the updated SEA once the locations of the HPMAs have been selected.

5 Results of the SEA

- 5.1.1 The purpose of this section is to report the results of the SEA.
- 5.1.2 The designation of HPMAs will provide additional environmental protection over and above the existing MPA network, by establishing sites which will provide protection from all extractive, destructive or depositional activities including all fisheries, aquaculture and other infrastructure developments, while allowing other activities, such as tourism or recreational water activities, at non-damaging levels. As such, it is considered that the designation of HPMAs through the implementation of the Policy Framework and Site Selection Guidelines has the potential to lead to significant beneficial environmental effects.
- 5.1.3 A high level overview of the implications of the designation of the HPMAs on the environment, namely the Biodiversity, Flora and Fauna headline topic and component topics (see Section 3.2) and SEA objectives, is provided in this section.
- 5.1.4 As part of the assessment of reasonable alternatives which is a requirement of the 2005 Act, consideration has also been given in this section to the potential impacts that could arise from the implementation of a more stringent alternative management option that meets the aims of the HPMAs, for example increasing the number of marine activities that are not considered compatible with HPMAs and reducing the number of marine activities that are allowed at non-damaging levels.
- 5.1.5 As the location of proposed HPMAs have not yet been selected, it has only been possible to undertake an initial SEA at this stage involving a preliminary consideration of the type or nature of impacts that could arise from the future designation of HPMAs and restriction/limitation placed on activities within HPMAs. Once sites have been identified that are proposed for designation, an updated SEA will be undertaken which will include a more detailed site specific spatial assessment of the proposed sites and will quantify the scale/magnitude of potential environmental effects. This will include detailed consideration of the

current nature/scale/intensity of existing activities and the baseline environment found within and near to the proposed HPMAs.

5.2 Environmental effects

5.2.1 The designation of HPMAs in Scottish waters is likely to have significant environmental effects on the environment through the exclusion or restriction of certain marine activities. The key potential environmental effects or impact pathways that are likely to arise from the implementation of the Policy Framework and Site Selection Guidelines for HPMAs are as follows:

- Potential benefits to marine biodiversity and the marine ecosystem;
- Potential spillover benefits beyond site boundaries;
- Potential adverse effects resulting from the displacement of activities from site boundaries into new areas and the intensification of activities in areas where these activities already occur; and
- Potential adverse effects as a result of the extension of any new cable or pipeline routes that need to avoid transecting HPMAs.

5.2.2 In generic terms, the adoption of the Policy Framework and Site Selection Guidelines and designation of HPMAs will result in overall beneficial effects on the overarching topic Biodiversity, Flora and Fauna and contribute to the achievement of the SEA objectives as the HPMAs will target the removal of damaging marine activities or restriction of marine activities to non-damaging levels. In other words, the HPMAs will remove a number of pressures and/or reduce their magnitude that currently, or might otherwise in the future, occur within site boundaries. This will allow for ecosystem recovery and biodiversity enhancement, including the recovery of PMFs, and the protection of blue carbon and critical fish habitats.

5.2.3 In turn, the change in pressures within HPMAs may also result in the potential for spillover benefits beyond the boundaries of the sites. One of the benefits of restricting certain harmful activities in sensitive areas is the potential spill over

of marine species from protected areas into unprotected areas⁹⁹. Spill over occurs when there is a population surplus in the newly protected area and the carrying capacity of that area is surpassed. As the protected area cannot support all of the individuals present, a migration away from the more densely populated area will occur and this movement may be outwith the area of protection. This migration can result in a net increase in the number of marine species outwith the protected area¹⁰⁰. There is, however, variation in the level of effectiveness and scale of benefits that removal of an activity (e.g. fisheries closure) can have and these are site dependent^{101,102}. The current conditions encountered within a site (e.g. current stock level, species present, nursery and spawning areas for those species, and level of fishing activity/pressure prior to exclusion/restrictions being implemented) need to be characterised in order to be able to undertake a detailed assessment of the potential for spill over benefits to occur.

- 5.2.4 In addition, the adoption of the Policy Framework and Site Selection Guidelines are likely to support the development of more effective Environmental Impact Assessments (EIAs). EIAs are required to be undertaken on regulated activities such as oil and gas activities or marine renewable developments. These assess the likely significant environmental effects of a project, including on current and proposed nature conservation sites. The evidence-based selection of proposed HPMAAs and their subsequent designation will provide developers with a better understanding and appreciation of the marine ecosystem that needs to be protected. This greater clarity and confidence will help to ensure that developers undertake more effective EIAs for future developments. This in turn may reduce pressures associated with regulated activities that take place near to but outside the boundaries of the HPMAAs.

⁹⁹ Buxton, C.D., Hartmann, K., Kearney, R. and Gardner, C., 2014. When is spillover from marine reserves likely to benefit fisheries?. *PloS One*, 9(9), p.e107032.

¹⁰⁰ Kerwath, S.E., Winker, H., Götz, A. and Attwood, C.G., 2013. Marine protected area improves yield without disadvantaging fishers. *Nature Communications*, 4, p.2347.

¹⁰¹ Starr RM, Wendt DE, Barnes CL, Marks CI and others (2015) Variation in responses of fishes across multiple reserves within a network of marine protected areas in temperate waters. *PLoS ONE* 10: e0118502

¹⁰² Hillborn, R. (2017) Are MPAs effective? *ICES Journal of Marine Science*, Volume 75, Issue 2, P1160-1162

- 5.2.5 Alternatively, developers may look to avoid progressing consented developments that have not been built and re-locating regulated activities some distance from HPMAAs as they will require further assessment and the consideration of appropriate mitigation measures. The avoidance of development near to the HPMAAs by potentially harmful activities would, therefore, result in future environmental benefits within and outside of the HPMAAs.
- 5.2.6 Although a number of particularly vulnerable habitats and species are already protected as PMFs (e.g. maerl beds, flame shell beds), the designation of HPMAAs will provide a greater level of certainty on the specific areas of the marine environment that are considered particularly sensitive and need to be avoided by any potentially damaging activities. This certainty could, therefore, provide some potential marginal environmental benefits in terms of avoiding any future risk of damaging these sensitive habitats and species and also helping to support their recovery.
- 5.2.7 HPMAAs may overlap either fully or partially with some existing MPAs in order to maximise the conservation benefits associated with stricter management approaches (Section 2.2). HPMAAs may also occur fully outwith existing MPAs. The overall environmental benefits may be potentially greater where HPMAAs are located in areas outwith existing MPAs and are not subject to any existing conservation management, although this will depend on the biodiversity and ecosystem features being protected and their current value and condition.
- 5.2.8 The increased protection brought about by the HPMAAs will also provide potential future benefits to the marine environment as they will restrict new activities that are prohibited or restricted from becoming established in HPMAAs.
- 5.2.9 In terms of potential adverse environmental effects, the adoption of the Policy Framework and Site Selection Guidelines and designation of HPMAAs will result in the displacement of certain marine activities and their associated pressures outwith the boundaries of the HPMAAs. This could result in potential adverse environmental effects in other areas, where such activities are not managed. This includes the potential for transboundary effects to occur on EU Member States where activities are displaced outwith Scottish jurisdiction.

- 5.2.10 The designation of HPMA s may also result in future cable or pipeline routes being extended to avoid these protected areas. A longer cable or pipeline route is likely to involve a greater spatiotemporal scale of disturbance during installation, operation and maintenance which could potentially result in significant adverse environmental effects depending on the sensitivity of marine habitats and species outside the HPMA s that would be affected. There are a large number of marine cables that will be required in Scottish Waters in the near future, including areas earmarked for renewables development (such as ScotWind option agreement areas and INTOG areas). There may also be new pipeline routes for CCUS technologies. HPMA s will look to avoid these areas and associated cable or pipeline routes where they are known but in many cases these future routes are unknown (Section 2.3).
- 5.2.11 Overall, the environmental benefits of increased protection that will result from the designation of HPMA s are anticipated to be greater than the adverse impacts associated with displacement and longer cable or pipeline routes. The scale or magnitude of this impact will be assessed in detail for each HPMA that is selected and proposed for designation as part of a future updated SEA.
- 5.2.12 The overall impacts of HPMA s on the overarching topic Biodiversity, Flora and Fauna, in terms of their anticipated contribution to the achievement of the SEA objectives, is assessed at a qualitative level in 4.

Box 4 - Impact of HPMA s on SEA objectives

1. To protect and recover marine ecosystems, including species, habitats, and their interactions (Objective met)

Protection of marine species and habitats within HPMA s could contribute to the achievement of this objective by minimising or avoiding the disturbance and/or damage of marine species and habitats.

2. To maintain and protect the character and integrity of the seabed (Objective met)

Protection of marine species and habitats within HPMA s could contribute to the achievement of this objective by reducing or preventing destruction of the seafloor.

3. To avoid the pollution of the seabed strata and/or bottom sediments (Objective met)

Protection of marine species and habitats within HPMAs could contribute to the achievement of this objective by reducing or preventing the potential disturbance and re-settling of sediment-bound contaminants and reducing contamination from marine activities that are excluded or restricted.

4. To avoid pollution of the marine water environment (objective met)

Protection of marine species and habitats within HPMAs could contribute to the achievement of this objective by reducing disturbance of the seabed and potential for increased suspended sediment levels and sediment-bound contaminants in the water column and reducing contamination from marine activities that are excluded or restricted.

5. To maintain or work towards achieving ‘Good Environmental Status’ of the marine environment (objective met)

Protection of marine species and habitats within HPMAs could contribute to the achievement of this objective by minimising or avoiding pressures that could result in a change to quality elements used to assess ecological status under the WFD and environmental status under the UK Marine Strategy Regulations.

6. To preserve and enhance existing marine carbon stocks and carbon sequestration potential (objective met)

Protection of areas that include habitats that are blue carbon sinks due to their fixation and sequestration ability could contribute to the achievement of this objective by reducing or preventing damage of these habitats.

5.3 Reasonable alternatives

5.3.1 Further to the potential benefits afforded by the designation of HPMAs described in Section 5.2, a high level preliminary assessment of the potential environmental effects that might arise from a more stringent alternative

management option has been undertaken. This is anticipated to result in a maximum level of potential beneficial and adverse environmental effects.

- 5.3.2 The exclusion of a greater number of marine activities from HPMA, including those that are not considered to be at damaging levels, such as wildlife watching, navigation/transit by vessels, and anchoring/mooring for recreational purposes, may have some additional benefits on marine habitats and species within the HPMA and the wider marine ecosystem although these are likely to be limited particularly for activities that are considered to be occurring at non-damaging levels. Excluded activities are likely to be displaced to other areas outwith the HPMA boundary. The overall effect on the marine environment of excluding a greater number of marine activities, including those that are not considered to be at damaging levels in the wider region may be significant and will need to be assessed in more detail once HPMA have been selected for designation and a site specific assessment can be undertaken.
- 5.3.3 In addition, there is potential for future benefits under a more stringent alternative management scenario from the prevention of the establishment of a larger number of marine activities in HPMA.

5.4 Cumulative effects

- 5.4.1 There is the potential for cumulative effects to arise from the implementation of the Policy Framework and Site Selection Guidelines for HPMA as a whole and also alongside other plans and programmes likely to be undertaken in Scottish seas.

Cumulative effects of the HPMA as a whole

- 5.4.2 In terms of the combined effects associated with the designation of all HPMA, the benefits would be additive, as a larger spatial area of marine habitat and associated species would be under greater protection. The designation of a larger spatial area also provides for potential inclusion of a wider range of species and habitats within the wider MPA network. The scale of the displacement of existing activities to other areas, where such activities are not managed, as a result of the HPMA will also depend on the spatial area of the HPMA and their overlap with existing or future potential marine activities that

would be excluded or restricted. These assumptions will need to be confirmed once the proposed HPMA have been selected and their geographic location is known so that the potential environmental effects can be assessed as part of a future updated SEA.

Cumulative effects of the HPMA with other plans

- 5.4.3 The designation of HPMA will, together with the wider MPA network and existing protection measures, further benefit the overarching topic of Biodiversity, Flora and Fauna in Scottish waters and contribute to the achievement of SEA objectives.
- 5.4.4 The boundaries of the HPMA that are selected could overlap with current MPAs, some of which could already have existing fisheries management measures (Phase 1 measures in inshore MPAs) or measures that are being proposed and considered for adoption (e.g. Phase 2 proposed measures in inshore MPAs, proposed measures for PMFs and proposed measures in offshore MPAs). These measures have been or are in the process of being assessed separately and have the potential for cumulative effects with the proposed HPMA. The HPMA will extend the exclusion of fishing activities to a number of other marine activities. The overall environment benefits are, therefore, likely to be greater than those associated with the proposed fisheries management measures for MPAs, with larger areas of habitat highly protected within Scottish Seas as a result of the HPMA.
- 5.4.5 There may also be cumulative adverse effects on the environment from the displacement of activities resulting from other plans in-combination with the designation of HPMA. These include the existing fisheries management measures and proposed measures which are currently under assessment and yet to be fully consulted upon (Section 3.6). In addition, other plans which could potentially interact with the proposed measures for offshore MPAs include wider marine spatial planning including the Crown Estate Scotland's first round of Offshore Wind Leasing in Scottish Waters (ScotWind), the Scottish Government's Sectoral Marine Plan for INTOG, National Grid Electricity System Operator's (ESO) Holistic Network Design (HND) under the Offshore Transmission Network Review (OTNR) and development and deployment of

Carbon Capture, Utilisation and Storage (CCUS) in Scotland. All these other plans are currently under assessment and will be considered in the updated SEA that will be undertaken once the proposed HPMA have been identified.

5.5 Mitigation and monitoring

5.5.1 Monitoring proposals will be considered in more detail as part of the updated SEA that will be undertaken once sites have been selected as proposed HPMA. They are likely to focus on any significant adverse environmental effects that are identified by the SEA and on implementation of mitigation measures, where appropriate. Where possible, existing data sources and indicators will be linked with relevant indicators, to minimise resourcing requirements for additional data collection.

5.5.2 There are no anticipated significant adverse effects on the environment from the designation of HPMA, with adverse effects related to displacement of fishing activity likely to be less than the environmental benefits of increased protection that will result from the designation of HPMA. It is, however, expected that a monitoring strategy will be required to help address research priorities, such as:

- Understanding recovery from historic disturbance;
- Understanding the value of the HPMA for and effect on fish stock recovery;
- Enabling an enhancement of our understanding of the marine ecosystem;
- Understanding the role the HPMA plays at the ocean processes scale and the interaction between the physical, chemical and biological processes; and
- Acting as a resource against which EIAs can be evaluated.

5.5.3 This monitoring strategy will build on the monitoring that is currently undertaken at existing MPAs (i.e. seabed habitat surveys and fish community surveys). It will be developed through cooperation with the research community (including public sector bodies, non-governmental organisations and research institutions), in order to develop projects which address the research priorities

above. Based on monitoring that is already undertaken at existing MPAs, it is expected that fish surveys will continue to be undertaken biannually and benthic surveys every 12 years.

5.6 Conclusion

- 5.6.1 The implementation of the Policy Framework and Site Selection Guidelines will lead to the identification and designation of HPMAs which will remove/avoid certain activities and reduce/limit other activities to non-damaging levels. This in turn could result in potential significant environmental effects and, therefore, the Policy Framework and Site Selection Guidelines are subject to SEA.
- 5.6.2 In summary, the implementation of the Policy Framework and Site Selection Guidelines will result in potential beneficial effects to the marine environment within the HPMAs, spillover benefits beyond the boundaries of HPMAs and potential adverse effects as a result of the displacement of any activities that are excluded or restricted, as well as from the extension of any new cable or pipeline routes that need to avoid transecting HPMAs. The displacement could be to new areas not previously affected by these activities or it could lead to the intensification of activities in areas where they already occur. The extension of any new cable or pipeline routes will have potential adverse effects associated with installation, operation and maintenance of a greater length of cable or pipeline.
- 5.6.3 In addition, the designation of the sites will provide developers and marine users with a better understanding and certainty of the specific areas of the marine environment that are considered particularly sensitive and need to be protected. In terms of regulated activities, this will help to ensure that developers undertake more effective EIAs that consider appropriate mitigation where necessary and, therefore, potentially reduce pressures associated with these activities in the vicinity of HPMAs. Alternatively, developers may look to site their projects some distance from the HPMAs to avoid undertaking further assessment and mitigation. This in turn would result in reduced harmful activities and potential environmental benefits within these sites.

- 5.6.4 The increased protection brought about by the HPMAs will also provide potential future benefits to the marine environment as they will restrict new activities that are prohibited or restricted from becoming established in HPMAs.
- 5.6.5 Overall, the environmental benefits of increased protection that will result from the designation of HPMAs for the overarching topic 'Biodiversity, Flora and Fauna' are anticipated to be greater than the adverse impacts associated with displacement and longer cable or pipeline routes. These environmental benefits will also contribute to the achievement of the SEA objectives.
- 5.6.6 In accordance with the 2005 Act, consideration has also been given to the potential impacts that could arise from the implementation of a more stringent alternative management option that meets the aims of the HPMAs. There may be some marginal benefits on marine habitats and species and the wider marine ecosystem associated with such an alternative option but the overall effect is unlikely to be significant.
- 5.6.7 In terms of the cumulative effects associated with the designation of all HPMAs, the benefits would be additive, as a larger spatial area of marine habitat and associated species would be protected. The designation of HPMAs, together with the wider MPA network and existing and proposed management measures, are likely further benefit the marine environment as larger areas of habitat will be highly protected within Scottish waters. There may also be cumulative adverse effects on the environment from the displacement of activities resulting from other plans that are currently under assessment in combination with the designation of HPMAs.
- 5.6.8 As the location of proposed HPMAs have not yet been selected, an initial SEA has been undertaken at this stage. Once sites have been selected, an updated SEA will be undertaken which will include a site specific assessment of the potential environmental effects associated with the proposed sites alone and in combination with other plans.

6 Next Steps

- 6.1.1 The consultation on the Policy Framework and Site Selection Guidelines for HPMA's and the accompanying Environmental Report is now open and will close on 20 March 2023. Views and opinions on this Environmental Report, the draft Policy Framework, Site Selection Guidelines and other accompanying impact assessments (including Socio-economic, partial Business and Regulatory and partial Island Communities screening), are now invited.
- 6.1.2 As the location of HPMA's have not yet been identified, it is only possible to undertake an initial SEA at this stage involving a preliminary consideration of the type of impacts that could arise from the future designation of HPMA's and restriction/limitation placed on activities within HPMA's. Once sites have been selected and proposed for designation, it will be possible to undertake an updated SEA involving spatial analysis of specific potential sites and a more detailed assessment of the scale of potential environmental effects.
- 6.1.3 Please provide any comments on this environmental assessment in your responses to the consultation questionnaire, including any comments on general issues or cumulative effects.
- 6.1.4 Following the consultation period, the responses received will be analysed, and the findings from this analysis will be taken into account in the finalisation of the Policy Framework and Site Selection Guidelines.
- 6.1.5 A Post-Adoption SEA Statement will be prepared, reflecting the findings of the assessment and the views expressed in the consultation, and outlining how the issues raised have been considered.
- 6.1.6 Copies of the consultation documents and the Environmental Report are available for viewing during office hours at the Scottish Government library at Saughton House, Edinburgh (K Spur, Saughton House, Broomhouse Drive, Edinburgh, EH11 3XD).
- 6.1.7 Please send your response, with the completed Respondent Information Form, to:

By email to: HPMA@gov.scot or

By post to: MPA Management Consultation
Scottish Government
Marine Planning and Policy Division
Area 1-A South
Victoria Quay
Edinburgh EH6 6QQ

On line: [Citizen Space](#)

6.1.8 If you have any enquiries, please send them to HPMA@gov.scot

Appendix A - Policy Context of the Policy Framework and Site Selection Guidelines for Highly Protected Marine Areas

This appendix sets out the wider policy context in relation to the Policy Framework and Site Selection Guidelines for HMPAs, beginning with a summary of relevant marine policies and followed by an overview of policies relating to the SEA topics that have been scoped into the assessment: Biodiversity, Flora and Fauna; Soil (assessed under Biodiversity, Flora and Fauna); Water (assessed under Biodiversity, Flora and Fauna); and Climatic Factors (assessed under Biodiversity, Flora and Fauna)¹⁰³.

It should be noted that as the UK is no longer a member of the EU, EU legislation, as it applied to the UK on 31 December 2020, is now a part of UK domestic legislation as set out in the EU (Withdrawal) Act 2018¹⁰⁴.

Overarching marine policy

Species and habitat conservation is one of several key areas of interest underlying greater marine policy in Scotland¹⁰⁵. Additional policy areas relate to topics such as aquaculture, marine renewable energy, and the management of commercial and recreational fisheries¹⁰⁶. In recent years, Scotland has also embarked on a programme of national marine planning in accordance with national legislation and a growing international recognition of the need to balance competing interests and aims in the marine environment, including conservation. Examples of this wider marine policy are presented below, beginning with international policies and moving on to UK and domestic policies.

¹⁰³ Although it is proposed that Soil, Water and Climatic Factors be scoped in under 'Biodiversity, Flora and Fauna', relevant policies relating to each are presented under their own headings for ease of reading.

¹⁰⁴ [European Union \(Withdrawal\) Act 2018](#) (accessed 06/07/2022)

¹⁰⁵ Scottish Government (undated). [Marine environment: Conservation \(MPAs\)](#) (accessed 06/07/2022)

¹⁰⁶ OSPAR Commission (undated) [OSPAR Convention](#) (accessed 05/24/07/2022)

At an international level, the **United Nations Convention on the Law of the Sea (UNCLOS)** is an international agreement adopted in 1982 that establishes a legal framework for all marine and maritime activities. It lays down a comprehensive regime of law and order in the world's oceans and seas establishing rules governing all uses of the oceans and their resources¹⁰⁷. It embodies in one instrument traditional rules for the uses of the oceans and at the same time introduces new legal concepts and regimes and addresses new concerns. The Convention also provides the framework for further development of specific areas of the law of the sea. The convention introduced a number of provisions. The most significant issues covered were setting limits, navigation, archipelagic status and transit regimes, Exclusive Economic Zones (EEZs), continental shelf jurisdiction, deep seabed mining, the exploitation regime, protection of the marine environment, scientific research, and settlement of disputes¹⁰⁸.

UN Sustainable Development Goal 14: Life Below Water was adopted in 2015 as an integral aspect of the 2030 Agenda for Sustainable Development and its set of 17 transformative goals¹⁰⁹. Goal 14 stresses the need to conserve and sustainably use the world's oceans, seas and marine resources¹¹⁰. Advancement of Goal 14 is guided by specific targets that focus on an array of ocean issues, including reducing marine pollution, protecting marine and coastal ecosystems, minimising acidification, ending illegal and over-fishing, increasing investment in scientific knowledge and marine technology, and respecting international law that calls for the safe and sustainable use of the ocean and its resources. The 2022 UN Ocean Conference, co-hosted by the Governments of Kenya and Portugal, comes at a critical time as the world is seeking to address many of the deep-rooted problems of our societies laid bare by the COVID-19 pandemic and which will require major structural transformations and common shared solutions that are anchored in the Sustainable Development Goals¹¹¹. To mobilise action, the Conference will seek to propel much

¹⁰⁷ International Maritime Organization (IMO) [United Nations Convention on the Law of the Sea](#) (accessed 11/07/2022)

¹⁰⁸ UNCLOS (2022) [United Nations Convention on the Law of the Sea of 10 December 1982 Overview and full text](#) (accessed 11/07/2022)

¹⁰⁹ UN (2022) [Do you know all 17 SDGs?](#) (accessed 08/07/2022)

¹¹⁰ UN (2022) [About the 2022 UN Ocean Conference](#) (accessed 11/07/2022)

¹¹¹ *ibid*

needed science-based innovative solutions aimed at starting a new chapter of global ocean action. Solutions for a sustainably managed ocean involve green technology and innovative uses of marine resources. They also include addressing the threats to health, ecology, economy and governance of the ocean – acidification, marine litter and pollution, illegal, unreported and unregulated fishing, and the loss of habitats and biodiversity.

The **Convention for the Protection of the Marine Environment of the North-East Atlantic (the ‘OSPAR Convention’)** integrated and updated the 1972 Oslo and 1974 Paris Conventions on land-generated sources of marine pollution¹¹². The first Ministerial Meeting of the OSPAR Commission in 1998 adopted Annex V ‘On the protection and conservation of the ecosystems and biodiversity diversity of the maritime area’ to the Convention, to extend the cooperation of the Contracting Parties to cover all human activities that might adversely affect the marine environment of the North-East Atlantic. In 2003, Recommendation 2003/3 was adopted (amended in 2010 by Recommendation 2010/2), relating to the establishment of an ecologically coherent network of MPAs in the North East Atlantic¹¹³ and in 2010, Recommendation 2010/5¹¹⁴ on the assessment of environmental impacts on threatened and/or declining species was adopted.

The OSPAR Convention is implemented through OSPAR’s **North-East Atlantic Environmental Strategy 2030** which was adopted in October 2021 in Portugal¹¹⁵. This Strategy sets out collective objectives to tackle the triple challenge facing the ocean; biodiversity loss, pollution and climate change¹¹⁶. Its implementation is part of OSPAR’s contribution to the achievement of the United Nations (UN) 2030 Agenda for Sustainable Development and its Sustainable Development Goals¹¹⁷. The

¹¹² OSPAR Commission (undated) [OSPAR Convention](#) (accessed 05/07/2022)

¹¹³ OSPAR Commission (undated) [Marine Protected Areas](#) (accessed 06/07/2022)

¹¹⁴ OSPAR Commission (undated) [The OSPAR Acquis: Decisions, Recommendations & Agreements](#) (accessed 06/07/2022)

¹¹⁵ OSPAR (2021) [North-East Atlantic Environment Strategy](#) (accessed 07/07/2022)

¹¹⁶ OSPAR (2021) [North-East Atlantic Environment Strategy 2030 – Tackling Biodiversity Loss, Pollution, And Climate Change](#) (accessed 07/07/2022)

¹¹⁷ UN (2022) [Do you know all 17 SDGs?](#) (accessed 08/07/2022)

Strategy sets out OSPAR's vision, strategic and operational objectives. Surrounding four themes (clean seas, biologically diverse seas, productive and sustainably used seas and seas resilient to climate change and ocean acidification), the operational objectives of the Strategy set out qualitative and quantitative targets to support achievement of the strategic objectives¹¹⁸. The introduction of HPMA's will support and contribute to the strategic objectives set out in the Strategy.

The UK reports progress towards Good Environmental Status (GES) through the **UK Marine Strategy**¹¹⁹. This Strategy contributes to delivering the vision of the UK Marine Policy Statement (see below). It consists of a simple 3-stage framework for achieving GES in order to protect the marine environment, prevent its deterioration and restore it where practical, while allowing sustainable use of marine resources¹²⁰. The strategy covers 11 elements (known as descriptors) including: biodiversity; non-indigenous species; commercial fish; food webs; eutrophication; sea-floor integrity; hydrographical conditions; contaminants; contaminants in seafood; marine litter and underwater noise. Wherever possible, indicators and monitoring programmes have been carried out together with OSPAR countries using agreed methods and assessment criteria to provide a coordinated approach across the North East Atlantic¹²¹. The introduction of HPMA's should help to contribute to achieving GES.

The **Marine (Scotland) Act 2010** acts as a framework to help balance competing demands on Scotland's inshore seas¹²². It introduced a duty to protect and enhance the marine natural and historic environment while at the same time streamlining the marine planning and licensing system¹²³.

The **Marine and Coastal Access Act 2009** devolved marine planning and conservation powers to Scottish Ministers in the offshore region (12-200nm) and also

¹¹⁸ OSPAR (2021) [North-East Atlantic Environment Strategy 2030 – Tackling Biodiversity Loss, Pollution, And Climate Change](#) (accessed 07/07/2022)

¹¹⁹ UKMMAS (2021). [Introduction to UK Marine Strategy](#) (accessed 06/07/2022)

¹²⁰ *ibid*

¹²¹ *ibid*

¹²² Scottish Government (2017) [Marine \(Scotland\) Act](#) (accessed 08/07/2022)

¹²³ *ibid*

provide a framework for the cooperative management of the marine environment between Scottish Ministers and UK Government¹²⁴.

The **UK Marine Policy Statement** provides a vision of ‘clean, healthy, safe, productive and biologically diverse oceans and seas’ that is shared by all UK countries and used to guide their respective marine management strategies¹²⁵.

Scotland’s **National Marine Plan** fulfils joint requirements under the Marine (Scotland) Act 2010 and Marine and Coastal Access Act 2009 to prepare marine plans, providing a cohesive approach to the management of both inshore and offshore waters¹²⁶. It enacts the principles of EU Directive 2014/89/EU¹²⁷ on maritime spatial planning, which recognise that a comprehensive and consistent approach to maritime planning can prevent conflicts between sectors, increase cross-border cooperation, and protect the environment by identifying potential impacts early and pursuing opportunities for multiple uses of space¹²⁸. The National Marine Plan also seeks to promote development in a way that is compatible with the protection and enhancement of the marine environment¹²⁹.

More recently, in 2021, the Scottish Government and the Scottish Green party Parliamentary Group have agreed to work together over the next five years to build a green economic recovery from COVID-19, respond to the climate emergency and create a fairer country¹³⁰. A Shared Policy Programme, known as the **Bute House Agreement** was agreed which focuses on areas of mutual interest to improve the way Scotland is governed and create a stable platform to meet the challenges Scotland faces¹³¹. It details collaboration on the climate emergency, economic

¹²⁴ [Marine and Coastal Access Act 2009](#) (accessed 24/01/2022)

¹²⁵ HM Government (2011) [UK Marine Policy Statement](#) (accessed 24/01/2022)

¹²⁶ Scottish Government (2015) [Scotland’s National Marine Plan – A Single Framework for Managing Our Seas](#) (accessed 06/07/2022)

¹²⁷ [Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning](#) (accessed 06/07/2022)

¹²⁸ European Commission (2017). [Maritime spatial planning](#) (accessed 06/07/2021)

¹²⁹ Scottish Government (2015) [Scotland’s National Marine Plan – A Single Framework for Managing Our Seas](#) (accessed 06/07/2022)

¹³⁰ Scottish Government (2021). [News: Agreement with Scottish Green Party](#) (accessed 08/07/2022)

¹³¹ Scottish Government (2021) [Scottish Government and Scottish Green Party Shared Policy Programme: Working together to build a greener, fairer, independent Scotland](#) (accessed 08/07/2022)

recovery, child poverty, the natural environment, energy and constitution. It includes commitments to a strengthened framework of support for the marine renewables and offshore wind sectors and enhance marine environmental protection. In addition, the Bute House Agreement promises a “*step change in support for [...] new protections for our marine areas*” and changes that would make “*Scotland an international leader in this field*”. It identifies a number of much-needed actions to recover the health of Scotland’s seas, namely delivering fisheries management measures for all of Scotland’s MPAs; designating a suite of HPMAs covering 10% of Scotland’s seas (as further detailed in Section 2 of the main report); increasing protection for the inshore seafloor that falls outwith protected areas; and recovering PMFs¹³².

Biodiversity, Flora and Fauna policy

International policies provide a framework for the conservation, protection and sustainable use of biodiversity, flora and fauna. In relation to the marine environment, this includes planning for sustainable fisheries and mariculture, the protection of migratory species, including birds and fish stocks, the protection of marine habitats, and the management of non-native invasive species. These are often set out in the context of taking an ecosystem approach to the management and restoration of marine environments. Scottish policy reflect the objectives of an ecosystem approach and emphasise action for priority species and habitats, with particular reference to the protection of seals and the sustainable management of fish stocks. Building resilience to climate change is also a cross-cutting theme.

At an international level, the UN **Convention on Biological Diversity (CBD)**, signed by 150 government leaders at the 1992 Rio Earth Summit, is dedicated to promoting sustainable development¹³³. The Conference of the Parties is the governing body of the Convention, and advances implementation of the Convention through the

¹³² Scottish Wildlife Trust (2022) [How Scotland’s seas will be affected by the Programme for Government](#) (accessed 22/02/2022)

¹³³ Convention on Biological Diversity (2022) [The Convention on Biological Diversity](#) (accessed 11/07/2022)

decisions it takes at its periodic meetings¹³⁴. The 15th meeting of the Conference of the Parties (COP 15) to the CBD is being held in Kunming, China in two parts. Part one took place virtually between 11 and 15 October 2021¹³⁵. Part two will be an in-person meeting in Canada in December 2022. The first part of COP15 addressed agenda items considered essential for the continuation of the operations of the Convention and the Protocols¹³⁶. It included meetings about administrative matters and technical issues related to the CBD programmes, as well as the development of the **Post-2020 Global Biodiversity Framework** which aims to put nature on a path to recover by 2030. The Framework comprises 21 targets and 10 ‘milestones’ proposed for 2030, en route to ‘living in harmony with nature’ by 2050¹³⁷. The second part of COP15 is expected to address the remaining agenda items, including the completion and adoption of the Post-2020 Global Biodiversity Framework. Designating HPMA in Scottish Waters will make a significant contribution to achieving this aim in Scotland.

The **OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic** is an important driver in the protection and conservation of marine ecosystems and biodiversity¹³⁸, including the establishment of an ecologically coherent network of MPAs in the North East Atlantic¹³⁹. The OSPAR List of Threatened and/or Declining Species and Habitats¹⁴⁰ identifies species and habitats that are considered to be priorities for protection.

The **EU’s Biodiversity Strategy for 2030** is a comprehensive, ambitious and long-term plan to protect nature and reverse the degradation of ecosystems¹⁴¹. The

¹³⁴ Convention on Biological Diversity (undated). [Conference of the Parties](#) (COP) (accessed 06/07/2022)

¹³⁵ *ibid*

¹³⁶ NatureScot (2021) [Countdown to COP15](#) (accessed 06/07/2022)

¹³⁷ Convention on Biological Diversity (2022) [A new global framework for managing nature through 2020: First detailed draft agreement debuts](#) (accessed 22/07/2022)

¹³⁸ Scottish Government (2014) [Scotland’s National Marine Plan – A Single Framework for Managing Our Seas](#) (accessed 24/01/2022)

¹³⁹ OSPAR Commission (undated) [Marine Protected Areas](#) (accessed 06/07/2022)

¹⁴⁰ OSPAR Commission (undated) [List of Threatened and/or Declining Species & Habitats](#) (accessed 06/07/2022)

¹⁴¹ European Commission (2022) [Biodiversity Strategy for 2030](#) (accessed 08/07/2022)

strategy aims to put Europe’s biodiversity on a path to recovery by 2030, and contains specific actions and commitments including a target of ‘strict protection’ of 10% of the EU’s seas by 2030. The commitment to introduce comparable high protection to 10% of Scotland’s seas by 2026 through the designation of HPMAs exceeds this EU target.

The requirements of the Habitats Regulations¹⁴² as amended by the **Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019**^{143,144} focus on the maintenance and enhancement of biodiversity, with an emphasis on protecting rare and endangered wild species and natural habitats of European significance. This UK site network¹⁴⁵ comprises terrestrial and marine SPAs and SACs. Scottish Government is committed to ensuring there will be no loss of protection for these protected sites and species in Scotland¹⁴⁶.

The **2020 Challenge for Scotland’s Biodiversity**¹⁴⁷ is Scotland’s response to the international UN Aichi Targets for 2020¹⁴⁸ and the EU Biodiversity Strategy to 2020¹⁴⁹.

The **Strategy for Marine Nature Conservation in Scotland’s Seas** is currently the main tool for enacting the principles of the 2020 Challenge within the marine environment¹⁵⁰. It supports the development of an ecologically coherent network of MPAs in support of strategic aims such as meeting GES under the UK Marine

¹⁴² The Conservation of Habitats and Species Regulations 2017, the Conservation of Offshore Marine Habitats and Species Regulations 2017, and the Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 are collectively known as the Habitats Regulations

¹⁴³ [The Conservation of Habitats and Species \(Amendment\) \(EU Exit\) Regulations 2019](#) (accessed 07/07/2022)

¹⁴⁴ Scottish Government (2020). [EU Exit: habitats regulations in Scotland](#) (accessed 07/07/2022)

¹⁴⁵ *ibid*

¹⁴⁶ *ibid*

¹⁴⁷ Scottish Government (2013) [2020 Challenge for Scotland’s Biodiversity: A Strategy for the conservation and enhancement of biodiversity in Scotland](#) (accessed 07/07/2022)

¹⁴⁸ Convention on Biological Diversity (2010) [Aichi Biodiversity Targets](#) (accessed 07/07/2022)

¹⁴⁹ European Commission (2011) [The European Biodiversity Strategy to 2020](#) (accessed 07/07/2022)

¹⁵⁰ Scottish Government (2011) [A Strategy for Marine Nature Conservation in Scotland’s Seas](#) (accessed 06/07/2022)

Strategy and satisfying the requirements of the Birds and Habitats Directives¹⁵¹. It also proposed the PMF system to guide the identification of MPAs and provide focus for marine planning and other activities.

In 2020, Scottish Government published a **Scottish Biodiversity Strategy Post-2020: Statement of Intent** which sets the direction for a new biodiversity strategy which will respond to the increased urgency for action to tackle the twin challenges of biodiversity loss and climate change¹⁵². A consultation on the new **Scottish Biodiversity Strategy** consultation opened on 20 June 2022 and closed on 12 September 2022¹⁵³. This Strategy aims to end biodiversity loss by 2030 and restore / regenerate biodiversity by 2045¹⁵⁴. It will ensure that conditions are in place to drive the transformation needed to manage and restore terrestrial, freshwater and marine biodiversity resources in Scotland, as well as providing a framework for prioritising and coordinating actions and investments¹⁵⁵.

Soil policy

At present, there is no legislative or policy tool developed specifically for the protection of soil¹⁵⁶. However, designations and their associated management agreements and operations often extend protection to soil as a means of enhancing the biodiversity, geodiversity, landform value and cultural resources of the site¹⁵⁷. For example, marine geology forms part of the basis for the designation of MPAs within Scottish waters¹⁵⁸. Specifically, MPAs strive to protect rare and representative marine species, habitats and geodiversity, the latter defined as the variety of landforms and natural processes that underpin the marine landscape. Similarly,

¹⁵¹ *ibid*

¹⁵² Scottish Government (2020). [Scottish biodiversity strategy post-2020: statement of intent](#) (accessed 06/07/2022)

¹⁵³ Scottish Government (2022). [Scottish Biodiversity Strategy 2022](#) (accessed 08/07/2022)

¹⁵⁴ Scottish Government (2022). [Biodiversity strategy: consultation](#) (accessed 06/07/2022)

¹⁵⁵ Nature Scot (undated). [Scotland's Biodiversity Strategy Consultation](#) (accessed 06/07/2022)

¹⁵⁶ Scottish Government (2009) [The Scottish Soil Framework](#) (accessed 07/07/2022)

¹⁵⁷ *ibid*

¹⁵⁸ SNH (2013) [The selection of Nature Conservation Marine Protected Areas \(MPAs\) in Scotland - assessment of geodiversity interests. Commissioned Report No. 633](#) (accessed 07/07/2022)

SSSI¹⁵⁹ are those areas of land and water that best represent Scotland's natural heritage in terms of its flora, fauna, geology, geomorphology, and/or a mixture of these natural features, as designated by NatureScot under the **Nature Conservation (Scotland) Act 2004**¹⁶⁰.

The **UK Marine Strategy** covers 11 elements or descriptors, including sea-floor integrity (Descriptor 6 (D6)) comprising pelagic habitats and benthic habitats¹⁶¹. In terms of benthic habitats, the high level objective for GES is to ensure the health of seabed habitats is not significantly adversely affected by human activities¹⁶². In order to achieve this objective, there is an operational target to complete a well-managed ecologically coherent MPA network¹⁶³.

Water policy

The EU's **Water Framework Directive (2000/60/EC) (WFD)** was introduced as a more comprehensive approach to managing and protecting Europe's water bodies. It sets out a goal of bringing all European waters to 'good' chemical and ecological status. Scotland fulfils its water protection obligations under the WFD primarily through the **Water Environment and Water Services (Scotland) Act 2003**, which defines the establishment of **River Basin Management Plans**, and the **Water Environment (Controlled Activities) (Scotland) Regulations 2011**¹⁶⁴. Other relevant legislation includes the **Pollution Prevention and Control (Scotland) Regulations 2012**, which applies specifically to pollution originating from industry discharges¹⁶⁵.

¹⁵⁹ SNH (2017) [Sites of Special Scientific Interest](#) (accessed 04/06/2018)

¹⁶⁰ *ibid*

¹⁶¹ UKMMAS (undated) [Introduction to UK Marine Strategy](#) (accessed 07/07/2022)

¹⁶² Defra (2019) [Marine Strategy Part One: UK updated assessment and Good Environmental Status October 2019](#) (accessed 07/07/2022)

¹⁶³ *ibid*

¹⁶⁴ SEPA (undated) [Water](#) (accessed 08/07/2022)

¹⁶⁵ [The Pollution Prevention and Control \(Scotland\) Regulations 2012, SSI No. 360](#) (accessed 08/07/2022)

The **UK Marine Strategy**¹⁶⁶ extends the requirements of the WFD into seas beyond 1nm. The **UK Marine Strategy** covers 11 elements or descriptors, including eutrophication (D5), hydrographical conditions (D7) and contaminants (D8)¹⁶⁷. In terms of eutrophication (D5), the high level objective for GES is to minimise human-induced eutrophication in UK marine waters¹⁶⁸. For hydrographical conditions (D7), the GES objective is to ensure that the nature and scale of any permanent changes to hydrographical conditions resulting from anthropogenic activities do not have significant long-term impacts on UK habitats and species. For contaminants (D8), the GES objective is that concentrations of specified contaminants in water, sediment or marine biota, and their effects, are lower than thresholds that cause harm to sea life, and are not increasing.

Climatic factors policy

In November 2016, the United Nations Framework Convention on Climate Change (UNFCCC) **Paris Agreement** came into force¹⁶⁹. The Paris Agreement is the first legally binding global climate deal and sets out aims to limit global warming to well below 2°C as well as pursue further efforts to limit it to 1.5°C¹⁷⁰. A further long-term goal is to achieve net-zero levels of global GHG emissions by the second half of this century. The Agreement also covers a range of other issues such as mitigation through reducing emissions, adaptation, and loss and damage¹⁷¹.

The **British Energy Security Strategy** sets out how Great Britain will accelerate homegrown power for greater energy independence¹⁷². The Strategy recognises the importance of accelerating the transition away from oil and gas which depends critically on the development and deployment of offshore wind farms¹⁷³. It seeks to

¹⁶⁶ UKMMAS (2021). [Introduction to UK Marine Strategy](#) (accessed 06/07/2022)

¹⁶⁷ UKMMAS (undated) [Introduction to UK Marine Strategy](#) (accessed 07/07/2022)

¹⁶⁸ Defra (2019) [Marine Strategy Part One: UK updated assessment and Good Environmental Status October 2019](#) (accessed 07/07/2022)

¹⁶⁹ UNFCCC (2016) [The Paris Agreement](#) (accessed 07/07/2022)

¹⁷⁰ European Commission (2016) [Paris Agreement](#) (accessed 07/07/2022)

¹⁷¹ *ibid*

¹⁷² UK Government (2022) [Policy paper: British energy security strategy](#) (accessed 11/07/2022)

¹⁷³ *ibid*

cut the processing time for offshore renewable development by over half through a number of initiatives, including reducing consent time from up to four years down to one year, making environmental considerations at a more strategic level allowing us to speed up the process while improving the marine environment, introducing strategic compensation environmental measures including for projects already in the system to offset environmental effects and reduce delays to projects, and implementing a new Offshore Wind Environmental Improvement Package including an industry-funded Marine Recovery Fund and nature-based design standards to accelerate deployment whilst enhancing the marine environment.

The **Climate Change (Emissions Reduction Targets) (Scotland) Act 2019**¹⁷⁴ received Royal Assent on 31 October 2019. The Act amends the Climate Change (Scotland) Act 2009 setting targets to reduce Scotland's emissions of all to net-zero by 2045 at the latest, with interim targets for reductions of at least 56% by 2020, 75% by 2030, 90% by 2040¹⁷⁵. An update to **Scotland's 2018-2032 Climate Change Plan** has recently been published¹⁷⁶, which reflects the increased ambition of the new targets for Scotland. Achievement of these targets will require the expansion of renewable energy in Scotland, of which offshore wind is likely to form a significant contribution.

The **Marine (Scotland) Act 2010** specifies a duty for Ministers and the public sector to manage and progress actions within the marine environment in a way "*best calculated to mitigate and adapt to climate change so far as is consistent with the proper exercise of that function*"¹⁷⁷. Scotland's **National Marine Plan**¹⁷⁸ considers climate change in terms of how actions undertaken within the Plan can help to mitigate GHG emissions, in addition to how these actions need to be adapted to take into account the effects of climate change. The Plan also stipulates that the

¹⁷⁴ [Climate Change \(Emissions Reduction Targets\) \(Scotland\) Act 2019](#) (accessed 07/07/2022)

¹⁷⁵ Scottish Government (2021). [Climate Change: Reducing greenhouse gas emissions](#) (accessed 07/07/2022)

¹⁷⁶ Scottish Government (2020). [Securing a green recovery on a path to net zero: climate change plan 2018–2032 – update](#) (accessed 07/07/2022)

¹⁷⁷ [Marine \(Scotland\) Act 2010](#), asp 5 (accessed 07/07/2022)

¹⁷⁸ Scottish Government (2015) [Scotland's National Marine Plan](#) (accessed 07/07/2022)

development and use of the marine environment should not have a significant impact on the national status of PMFs. Many of these are known for their role in carbon sequestration, including within MPAs.

Climate Ready Scotland: climate change adaptation programme 2019-2024¹⁷⁹, is a five year programme to prepare Scotland for the challenges it will face as the climate continues to change. One of the outcomes of the programme is that the coastal and marine environment is valued, enjoyed, protected, and enhanced, and has increased resilience to climate change.

The UK hosted the 26th UN Climate Change Conference of the Parties (COP26) in Glasgow between 31 October and 12 November 2021¹⁸⁰. The COP26 summit brought parties together to accelerate action towards the goals of the Paris Agreement and the UN Framework Convention on Climate Change. The outcomes achieved are outlined in the COP26 Glasgow Climate Pact¹⁸¹.

¹⁷⁹ Scottish Government (2019). [Climate Ready Scotland: climate change adaptation programme 2019-2024](#) (accessed 07/07/2022)

¹⁸⁰ UN Climate Change Conference UK 2021 (undated) [COP26](#) (accessed 07/07/2022)

¹⁸¹ UN Climate Change Conference UK 2021 (undated) [COP26: The Glasgow Climate Pact](#) (accessed 07/07/2022)

Appendix B Abbreviations

Acronym	Definition
ABP	Associated British Ports
ADD	Acoustic Deterrent Device
BGS	British Geological Survey
CBD	Convention on Biological Diversity
CCUS	Carbon Capture, Utilisation and Storage
D&R	Demonstration and Research
EC	European Commission
ESO	Electricity System Operator
EU	European Union
EUNIS	European Nature Information System
FEAST	Feature Activity Sensitivity Tool
GEMS	Global and regional Earth-system (atmosphere) Monitoring using Satellite and <i>in situ</i> data
GEN	General Planning Policy
GES	Good Environmental Status
GHG	Greenhouse Gas
HND	Holistic Network Design
HPAI	Highly Pathogenic Avian Influenza
HPMA	Highly Protected Marine Area
INTOG	Innovation and Targeted Oil and Gas Decarbonisation
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Council
MPA	Marine Protected Area
OSPAR	Oslo-Paris Conventions
OTNR	Offshore Transmission Network Review
PMF	Priority Marine Features
RBD	River Basin District
RBMP	River Basing Management Plan
SA	Sustainability Appraisal
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SEIA	Socio-economic Impact Assessment
SEPA	Scottish Environment Protection Agency

Acronym	Definition
SMU	Seal Management Unit
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
UK	United Kingdom
UN	United Nations
UNCLOS	United Nations Law of the Sea
UNFCCC	United Nations Framework Convention on Climate Change
WFD	Water Framework Directive



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