# SEIA of Policy Framework and Site Selection Guidelines for Highly Protected Marine Areas

## Socio-Economic Impact Assessment – Methodology Report

December 2022

Scottish Government
Riaghaltas na h-Alba

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**Report prepared by:**

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**For:**

Scottish Government
Riaghaltas na h-Alba

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# Non-Technical Summary

## Introduction

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". The Bute House 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) representing a significant increase in the overall level of protection afforded to Scotland's seas.

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 will provide a guide to the subsequent process of selecting, assessing and finally designating HPMAs. The Policy Framework is being produced by Marine Scotland Directorate. NatureScot and the Joint Nature Conservation Committee (JNCC) are jointly producing the Site Selection Guidelines.

As the location of HPMAs have not yet been identified, it is only possible to undertake an initial socio-economic impact assessment (SEIA) at this stage involving a preliminary consideration or scoping of the type of impacts that could arise from the future designation of HPMAs and restrictions/ requirements placed on activities within HPMAs. Once sites have been selected and proposed for designation, it will be possible to undertake an updated SEIA involving spatial analysis of specific potential sites and a more detailed assessment of the scale of potential socio-economic effects. This report therefore carries out an initial scoping of potential impacts, and sets out the methodology for assessing the social and economic effects once locations have been identified.

## What is Socio-Economic Impact Assessment?

Socio-economic impact assessment (SEIA) aims to identify and assess the potential economic and social effects of a proposed development or policy on the lives and circumstances of people, their families and their communities. The assessment investigates the potential cumulative economic benefits and costs, and associated potential social impacts, of implementing a proposed policy or plan.

**What are the HPMAs?**

HPMAs are designated areas of the sea that are strictly protected to allow the marine ecosystems within them 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.

HPMAs will be selected in a way that complements and adds value to the existing MPA network and is mindful of decisions that have already been made and/or are underway regarding wider marine management regimes in Scottish waters. They 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.

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.

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 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.

**How will the Socio-Economic Impact Assessment be undertaken?**

The SEIA seeks to estimate the effects of the designation and management of the HPMAs both at site level and for the suite of HPMAs as a whole in terms of:

- Potential economic impacts to marine activities;
- Potential social impacts;
- Potential impacts on the public sector; and

- Potential environmental impacts (costs and benefits, including social benefits through ecosystem services).

Lower, intermediate and upper estimates will be developed to assess the potential range of impacts, reflecting a range of assumptions and possible management options that may be applied.

The estimates are used to assess the potential range in impacts associated with designation of the proposed sites. The assessment period for considering the impacts of designation is 60 years, in line with HM Treasury Green Book guidance. Within this timeframe, costs to industry are quantified and valued over a period of 20 years.

The following activities and communities are considered:

- Aggregate Dredging;
- Aquaculture (finfish);
- Aquaculture (shellfish and seaweed);
- Aviation;
- Carbon Capture Utilisation and Storage;
- Coast Protection and Flood Defence;
- Commercial Fisheries (including salmon and sea trout);
- Energy Generation;
- Military and Defence;
- Oil and Gas (including exploration, production, interconnectors, gas storage);
- Ports and Harbours;
- Power Interconnectors and Transmission Lines;
- Recreational Fishing;
- Recreational Boating;
- Seabed Mining;
- Wild Seaweed Harvesting
- Shipping;
- Telecom Cables;
- Tourism (including heritage assets); and
- Water Sports (including surfing, windsurfing, sea kayaking, small sail boat activities (such as dinghy sailing) and scuba diving)
- The wider community.

To consider potential economic costs, an initial scoping has been undertaken, identifying individual impact pathways for each sector. Aggregate dredging, aviation and wild seaweed harvesting were scoped out of the assessment. There is currently no existing or planned marine aggregate extraction in Scottish waters, aviation is not considered to require management measures, and wild seaweed harvesting predominantly takes place above mean low water springs (MLWS) and therefore would be outside of the boundaries of HPMAs.

Detailed assessment methods and assumptions for each sector and impact pathway are set out in Appendix B. Input from stakeholders and consultees will support further development and finalisation of the methods and assumptions. All the methods generally entail making estimates of the cost of implementing restrictions and/or the impact of implementing the restrictions on operating revenues. Where possible, all impacts are quantified in monetary terms, with these values converted to current prices using the relevant Gross Domestic Product (GDP) deflators. Where impacts on economic activities have the potential to give rise to a change in the level of output, direct and indirect impacts on Gross Value Added (GVA) and employment are estimated using appropriate multipliers.

There may also be potential economic benefits for some marine sectors, and these are considered and identified where appropriate. However, quantification of economic benefits is uncertain as it is harder to predict if or where new businesses may establish, or existing businesses may expand.

Scoping and assessment methods are provisional at this stage and will be reviewed and refined in light of specific HPMA proposals.

The social impacts generated by the proposed management scenarios will be strongly connected to the nature, scale and distribution of the economic impacts (on both income and employment) and of potential benefits. Any significant loss of employment, for example generated as a result of restrictions on fishing activity, can have significant social impacts (e.g. on health, crime) and therefore negatively impact wellbeing.

Similarly, social benefits may arise that positively impact wellbeing. These could stem from new employment opportunities (e.g. in alternative fishing activities, or related to recreation or research), or from knowledge that there is a healthy/recovering marine ecosystem.

Public sector costs are estimated at national level using agreed assumptions for all sites combined and based on discussions with Marine Scotland Directorate, NatureScot and JNCC. Costs in the following broad areas are considered:

- Site monitoring;
- Compliance and enforcement;
- Loss of revenue from seabed leases;
- Promotion of public understanding; and
- Regulatory and advisory costs associated with licensing decisions.

The ecosystem features of an HPMA contribute to the delivery of a range of ecosystem services. Management of the HPMA may improve the quantity and quality of the beneficial services provided, which may increase the value (contribution to economic welfare) of them. Impacts on the value of natural capital and ecosystem services may occur as a result of the management and/or improvement in condition of the ecosystem. However, both impacts can be uncertain for several reasons, including because the baseline conditions are not always known.

The ecosystem services analysis provides a qualitative description of the potential changes in ecosystem service provision associated with the implementation of HPMAs and associated management measures.

The cumulative impact of designating the pHPMAs will take an additive approach (i.e. it assumes that the cumulative impact is equivalent to the sum of the individual impacts within each site). In areas where there are several sites affecting a particular activity, further consideration will be given to the potential cumulative impact to describe qualitatively whether the overall impact might be larger or smaller than the sum of the individual impacts.

An in-combination assessment will also give consideration to how the significance of these impacts might vary when taking account of the total impact as a result of all pHPMAs combined with other current or planned developments to date, such as renewable energy generation development and the designation and management of other MPAs (e.g. NCMPAs and SACs), particularly where there is overlap between or proximity of these and new pHPMAs.

A series of appendices to the report provide the outcome of the scoping assessment, proposed methodologies for assessing cost impacts to sectors, and a template of the site assessment tables for reporting results for each individual pHPMA.

# Table of Contents

# Tables



# Figures

# 1 Introduction

## 1.1 Background

1.1.1 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"[1]. The Bute House 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)[2] 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 will provide a guide to the subsequent process of selecting, assessing and finally designating HPMAs. The Policy Framework is being produced by Marine Scotland Directorate. NatureScot and the Joint Nature Conservation Committee (JNCC) are jointly producing the Site Selection Guidelines.

1.1.3 The proposed Policy Framework and Site Selection Guidelines for HPMAs are the subject of this Socio-Economic Impact Assessment (SEIA) methodology report.

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

[2] NatureScot (2021) The MPA Network

1.1.4 As the location of HPMAs have not yet been identified, it is only possible to undertake an initial SEIA at this stage involving a preliminary consideration or scoping of the type of impacts that could arise from the future designation of HPMAs and restrictions/requirements placed on activities within HPMAs. Once sites have been selected and proposed for designation, it will be possible to undertake an updated SEIA involving spatial analysis of specific potential sites and a more detailed assessment of the scale of potential socio-economic effects. This report therefore carries out an initial scoping of potential impacts, and sets out the methodology for assessing the social and economic effects once locations have been identified.

## 1.2 Social and Economic Impact Assessment

1.2.1 The purpose of the SEIA is to identify and assess the potential economic and social effects of a proposed development or policy on the lives and circumstances of people, their families and their communities. It considers the potential economic benefits and costs, and their distribution among different groups, to inform the assessment of potential impacts on individuals, businesses, communities and society.

1.2.2 The SEIA for HPMAs aims to assess the potential economic and social impacts of the proposed designation and management of HPMAs. It will be informed by relevant guidance, due to be published for MPAs.

1.2.3 The objectives of the SEIA are, for each individual HPMA:

- Identify the activities taking place, and the activities that could be affected by designation of each proposed site and how;
- Identify and estimate the costs to potentially affected activities, specifically arising from the proposed management scenarios for each pHPMA;
- Identify any communities and social groups that may be adversely or positively affected by designation proposals, and quantify the scale of such impacts where possible;
- Estimate the costs to government (public sector costs) associated with the designation and management of the sites;
- Identify, describe and quantify the potential costs and benefits to society as a whole associated with designation of each individual site.

1.2.4 Based on the individual HPMA impact assessments, a combined assessment is also required to estimate the potential aggregate costs of designation and management of the HPMAs as a whole and the combined impact on potentially affected marine activities, communities, social groups and Government.

1.2.5 A cumulative assessment is also required to present information on the potential total impact as a result of all HPMAs and other planned projects such as renewable energy development to date.

1.2.6 The assessment provides Marine Scotland Directorate with evidence on economic and social effects to inform a Business and Regulatory Impact Assessment (BRIA), and a Sustainability Appraisal for the proposals. Within the assessment, understanding of the distribution of impacts will include identification of whether any island communities in Scotland could be affected in a significantly different way from mainland communities, as required by the Islands Act 2018.

## 1.3 Purpose and Structure of this Report

1.3.1 The purpose of this report is to present the proposed methodology for undertaking the SEIA on the proposed HPMAs, when proposals are available. A Strategic Environmental Assessment (SEA) of the proposed HPMAs will also be undertaken and the proposed methodology for the SEA is reported separately. The key findings of both the SEA and the SEIA will be summarised in an overall Sustainability Appraisal (SA) document.

1.3.2 The remainder of this SEIA Methodology Report is structured as follows:

- Section 2 provides information on the background to HPMAs and their policy context;
- Section 3 describes the approach to the SEIA and the proposed methods;
- Section 4 describes the general approach to the assessment;
- Section 5 describes the scoping of impacts and presents an initial scoping exercise; and
- Section 6 describes the proposed methodology for the assessment of costs and benefits.

1.3.3 The Non-Technical Summary precedes Section 1. Further detailed information is provided in Appendices as follows:

- Appendix A: Outcome of Scoping;
- Appendix B: Sector Considerations and Assessment Methods;
- Appendix C: Site Assessment Tables Template (template for providing detailed assessments for each site); and
- Appendix D: Abbreviations.

# 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"[3].

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 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."[4]

[3] Scottish Government (2021) Scottish Government and Scottish Green Party Shared Policy Programme: Working together to build a greener, fairer, independent Scotland

[4] ibid

2.1.3 The Bute House Agreement further states that the suite of HPMAs will be delivered “though 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 to amend the Marine (Scotland) Act 2010 to add 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 for Scottish Ministers to designate HPMAs in Scottish 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.

## 2.2 Definition of HPMAs

2.2.1 HPMAs are proposed to be designated areas of the sea that are strictly protected to allow marine ecosystems to recover and thrive[5]. 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.

## 2.3 Aims of HPMAs

2.3.1 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 2030[6]. 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'[7].

2.3.2 As part of the existing 'three-pillar' approach to marine nature conservation in Scotland (species conservation, site protection, and wider seas policies and measures)[8], HPMAs aim to:

- Facilitate ecosystem recovery and enhancement via the removal of pressures and/or active restoration;
- Enhance the benefits that coastal communities and others derive from our seas;
- Contribute to the mitigation of climate change impacts; and

[5] Marine Scotland Directorate (in press) Highly Protected Marine Areas Policy Framework.

[6] 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

[7] IUCN (2008) Guidelines for Applying the IUCN Protected Area Management Categories to Marine Protected Areas

[8] Scottish Government (2012) A Strategy for Marine Nature Conservation in Scotland's Seas

- Support ecosystem adaptation and improve resilience, including to climate change.

2.3.3 The designation and management of HPMAs 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.

## 2.4 Relationship with existing MPA network

2.4.1 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.

2.4.2 In addition, there is one demonstration and research MPA, eight historic MPAs (HMPAs), and five Other Area Based Measures (OABMs) recognised as part of the Scottish MPA network[9]. OABMs contribute to the protection of biodiversity but were not set up specifically for this purpose (e.g. fisheries restrictions).

2.4.3 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 adversely affect protected features or hinder achievement of the conservation objectives for a site.

[9] NatureScot (2021) The MPA Network

2.4.4 NatureScot is responsible for providing advice on MPAs in Scottish inshore waters[10], while the JNCC advise on possible designations in offshore waters[11].

2.4.5 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.

2.4.6 HPMAs will be selected in a way that complements and adds value to the existing MPA.

2.4.7 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.

## 2.5 Development of Policy Framework and Site Selection Guidelines

2.5.1 Marine Scotland Directorate 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.

2.5.2 NatureScot and the JNCC have jointly developed the Site Selection Guidelines for HPMAs. The application of the Site Selection Guidelines will 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.

[10] NatureScot (2022) Marine Protected Areas (MPAs)

[11] JNCC (2022) Marine Protected Area Advice

2.5.3 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.

2.5.4 There are some extractive, destructive and depositional 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). Detailed consideration of what the designation of HPMAs will mean for different activities and sectors will be set out in the Policy Framework document that is currently being developed.

2.5.5 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 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.

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

## 2.6 Finalisation and adoption of Policy Framework and Site Selection Guidelines

2.6.1 The Policy Framework and Site Selection Guidelines have been developed with input from stakeholders and will be subject to a formal consultation period. Following this, the documents will be finalised and published.

2.6.2 NatureScot, JNCC and Marine Scotland Directorate 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 HPMAs through third party site proposals. A final public consultation on the proposed locations for HPMAs will be then be held, expected to be in 2025.

# 3 Approach to the Assessment

## 3.1 Introduction

3.1.1 The methodology to be applied builds on previous marine socio-economic assessments for MPAs, particularly the assessment of Scottish Nature Conservation MPAs[12], the draft assessment of phase 2 fisheries management measures in Nature Conservation MPAs[13], the assessment of four new Nature Conservation MPAs[14], the assessment of a proposed deep sea marine reserve[15] and the assessment of fisheries management measures in offshore MPAs[16]. It is consistent with Better Regulation Executive guidance on impact assessment, the Green Book methodology[17] for economic assessment and Scottish Government guidance on Business and Regulatory Impact Assessment (BRIA)[18] and seeks to incorporate forthcoming guidance on SEIA for inshore MPAs proportionately. An overview of the approach is shown in Figure 1.

3.1.2 The designation of HPMAs requires an adjustment to the process for identifying the impacts of MPAs. For most other MPAs, designation takes place and then management measures are considered, allowing them to take into account stakeholder and community evidence and views. For HPMAs, management measures (to be 'Highly Protected') are part of the designation, so the impacts of designation and management are being considered in one step.

[12] Marine Scotland, 2013. Planning Scotland's Seas: 2013 - The Scottish Marine Protected Area Project – Developing the Evidence Base tor Impact Assessments and the Sustainability Appraisal Final Report.

[13] Marine Scotland, 2018. Proposed Inshore MPA/SAC Fisheries Management Measures – Phase 2. Socio-Economic Impact Assessment. October 2018. Report prepared by ABPmer & eftec for the Scottish Government.

[14] Marine Scotland, 2019. SEIA of Proposed Marine Protected Areas. Socio-Economic Impact Assessment. January 2019. Prepared by ABPmer & eftec for Marine Scotland.

[15] Marine Scotland, 2019. Development of a Deep Sea Marine Reserve, West of Scotland. Socio-Economic Impact Assessment. September 2019. Accessed 21 July 2022.

[16] Marine Scotland, in prep. SEIA of Offshore Marine Protected Areas in Scottish Waters.

[17] HM Treasury, 2022. The Green Book. Central Government Guidance on Appraisal and Evaluation.

[18] Scottish Government, 2015 Business and Regulatory Impact Assessments (BRIA): guidance

3.1.3 Therefore, the analysis and discussions that would normally occur between designation and implementation of management measures, need to happen in the pre-designation process for HPMAs. However, the identification of the impacts of HPMAs will still be an iterative process involving several sources of evidence, including, but not limited to:

- Data on activities within and adjacent to the sites, such as fisheries, fish farming, and energy sectors (Section 5.2);
- Assessment of social impacts and views of communities affected by the expected impacts (Section 5.3);
- Impacts on the public sector (Section 5.4); and
- Evidence on potential benefits of designation (Section 5.5).

3.1.4 This document describes the proposed methods for gathering these different sources of evidence, and the process for using them to produce an SEIA for the proposed HPMAs.

3.1.5 It should be noted that prior to undertaking the SEIA, Marine Scotland are planning to consult with affected communities on the HPMA policy through a series of themed workshops. These will work with stakeholders on the approach to identifying HPMAs, including considering their potential socio-economic impacts. Information from this consultation process will inform the SEIA in an iterative manner, helping to identify issues of concern to communities that may be affected and supporting the assessment of social impacts.

3.1.6 Following this, Marine Scotland will then identify the possible HPMA sites, which will be subject to SEIA.

3.1.7 The starting point for the SEIA will be to gather relevant data on activities and evidence of potential benefits. This information is an important part of the SEIA, and helps identify communities affected. However, further social research will be undertaken to ensure relevant communities affected are identified, and their views are included in the SEIA. This is important to ensure that the way Government makes policies takes on board the views of people affected. This social research is described in Section 5.3.

3.1.8 In translating the evidence gathered from sectors and communities into the SEIA, two factors should be borne in mind. Firstly, it is easier to identify, ex-ante, costs to particular activities, than it is to identify potential benefits, including to activities that may not yet exist (e.g. new recreation activities). Secondly, the primary purpose of the SEIA is to identify the scale and distribution of impacts at a Scotland scale. Where the distribution of those impacts is significant for particular interest groups, this supports consideration of mitigation or other measures to complement the sites management, but developing those is beyond the purpose of the SEIA.

3.1.9 Finally, it is good practice to follow-up on the impacts identified in the SEIA through post-designation analysis. This can inform the need to change management or mitigation measures for sites.

3.1.10 The following sections provide further detail on overarching approaches to the assessment, specifically:

- General assumptions;
- Identifying the impact area, stakeholders affected and scoping; and
- Establishing a baseline against which impacts can be assessed.

3.1.11 Section 4 sets out an initial scoping of potential impacts of HPMAs, and section 5 sets out more detail on the approach to assessment of costs and benefits for each site, including:

- Economic impacts to marine activities;
- Social impacts on individuals, communities and society;
- Impacts on the public sector;
- Potential benefits (ecosystem services and natural capital); and
- Cumulative and combined assessment.

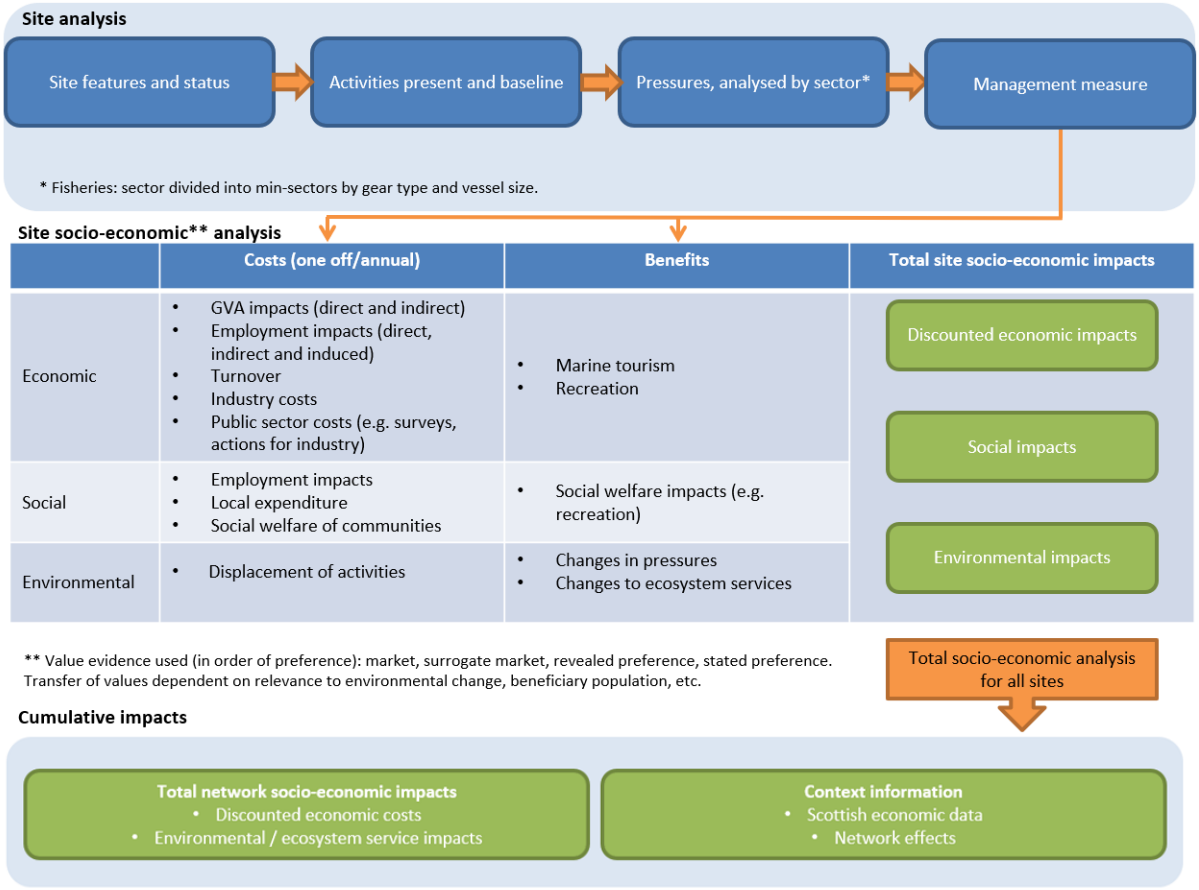


**Figure 1. Economic and social analysis process**

## 3.2 General Project Assumptions

3.2.1 A number of key assumptions will be needed to undertake the study. Current assumptions are set out in this report and accompanying appendices to inform the progression of the study.

3.2.2 A range of assumptions will be developed assess the potential range of impacts (e.g. lower, intermediate and upper estimates), which reflect uncertainties in the scale of costs and benefits. The assumptions for the estimates will be developed for the purposes of the assessment by Marine Scotland Directorate based on advice from NatureScot, JNCC and other sources. They take into account the scale and intensity of pressures associated with human activities, but do not anticipate final advice on management measures, nor do they reflect the management measures that may be adopted by the Scottish Government for HPMAs. The assumptions proposed for the assessment of impacts on each sector are documented in Appendix B. Impacts will be assessed for the lower, intermediate and upper estimates compared to the 'do nothing' option, i.e. not to proceed with proposed HPMA designations.

3.2.3 It is assumed that sites will be designated in 2026 and costs will be first experienced in 2026, with the exception of costs associated with additional licensing requirements which will apply from 2025 (when pHPMAs are identified, and will need to be taken into account in licensing decisions). Costs and GVA impacts are expressed in current prices (depending on when the assessment is undertaken) using the latest Gross Domestic Product (GDP) deflator data[19].

[19] GDP deflator data includes the forecasted percentage change in GDP deflator for future years. Taken from the Office for Budgetary Responsibility (OBR) forecasts for GDP deflator increases Economy supplementary tables.

3.2.4 The assessment period for considering the impacts of designation is 60 years, in line with HM Treasury Green Book guidance. Within this timeframe, costs to industry are quantified and valued over a period of 20 years. This is regarded as providing a reasonable time period within which the main impacts are likely to occur. Present values will be calculated as the sum of discounted impacts over 20 years. For the quantification of impacts, the 20-year time period is suggested because:

- Over a period of 20 years, all sectors will have time to adjust to management measures, and this will lower longer-term costs. For example, sectors need to reinvest in capital (e.g. repair and replace fishing boats), and this will enable different technologies and activities to be adopted over time, such that after 20 years, the costs of the management measures will reduce.
- In the fishing sector, habitat and fish stock recovery (and alterations due to climate change) would be expected to occur over 20 years, such that beyond 20 years the fishing sector could have different fishing opportunities.
- In general, uncertainty of impacts increases over time, and unanticipated changes could arise that alter the costs and benefits of the policy.
- Consistency with previous policy appraisals (a 20-year time period has been used in previous socio-economic appraisals for Marine Scotland Directorate, dating back to at least 2014).

3.2.5 Longer-term impacts, beyond this time period (i.e. from 20 to 60 years), socio-economic effects and environmental impacts become less certain. Although they are quantified where possible, they are mainly assessed in qualitative terms. For socio-economic effects, this is due to technological changes and the ability of industries to adapt (e.g. as capital depreciates and is replaced), amongst other things. For environmental impacts, environmental responses are harder to predict based on current knowledge and due to external influences (e.g. climate change). Monetary impacts are discounted over the assessment period using a 3.5% discount rate in line with the Green Book. Employment impacts are not discounted so that the full impact on employment is clear.

3.2.6 The assessment will seek to ensure consistency between the lower, intermediate and upper estimates used in the SEIA, and the reasonable alternatives assessed in the SEA.

## 3.3 Identifying the impact area, stakeholders affected and scoping

3.3.1 Based on the potential HPMA sites, the potential impact area will be identified. Initially this will be broad-based and generic, and will be refined as the assessment progresses and potential impacts are able to be more clearly identified or scoped out. For some sectors, this is likely to be place-based, using proximity or spatial overlap with pHPMA sites. For other sectors and interest groups, the spatial and geographic linkages may be less well defined, particularly for those marine users and industries that have social and economic ties to settlements potentially at some distance from the site itself. This is particularly the case for the fisheries sector, and analysis of fisheries data (see section 5.2 and Appendix B) can help to define potential ports and communities likely to be affected. Defining the impact area will be closely linked to the stakeholder mapping, as different stakeholder groups may have interests at different geographic levels (local, regional, Scotland, UK, beyond UK).

3.3.2 A stakeholder mapping exercise will be undertaken to identify groups and individuals who may be affected or have an interest in the proposed HPMAs. Initially this will identify generic stakeholder types (e.g. commercial fishers, aquaculture, tourism operators, port operators, seafood processors, wider community living near the pHPMA, interest groups such as environmental NGOs) at different geographic levels. This iwill be informed by early consultation and engagement with affected communities by Marine Scotland Directorate on the HPMA policy. Once potential impacts have been assessed for the proposed sites, and areas likely to experience greater impacts identified, more refined and detailed stakeholder mapping can be undertaken to identify specific groups and individuals for further engagement and discussion on the significance of the impacts and potential mitigation.

3.3.3 Scoping will identify the potential impacts that require further in-depth assessment. This will be undertaken to identify the impact pathways where assessment of economic costs is required for marine sectors and activities. Further detail is provided in section 4. Potential impacts on natural capital and ecosystem services are scoped in to all assessments and considered for each site.

## 3.4 Establishing a Baseline

3.4.1 In order to undertake the socio-economic assessment, a range of baseline information is required. Given that the assessment relates to impacts over time, a dynamic baseline is needed which indicates how baseline conditions might change over the time period of the assessment.

3.4.2 The baseline builds on the work previously carried out for the Nature Conservation MPA assessment[20], the assessment of four new Nature Conservation MPAs[21], the assessment of a proposed deep sea marine reserve[22], the SEIA for the Sectoral Marine Plan for offshore wind[23], and forthcoming work on the Innovation and Targeted Oil and Gas (INTOG) plan[24] in terms of the types of information required, but is focused on the specific geographical areas relating to the pHPMAs.

3.4.3 A range of baseline information will be collated, including:

- The distribution of ecosystem features within and adjacent to the pHPMAs and how this might change over the assessment period (in the absence of the intervention);

[20] Marine Scotland, 2013. Planning Scotland's Seas: 2013 - The Scottish Marine Protected Area Project – Developing the Evidence Base tor Impact Assessments and the Sustainability Appraisal Final Report.

[21] Marine Scotland, 2019. SEIA of Proposed Marine Protected Areas. Socio-Economic Impact Assessment. January 2019. Prepared by ABPmer & eftec for Marine Scotland.

[22] Marine Scotland, 2019. Development of a Deep Sea Marine Reserve, West of Scotland. Socio-Economic Impact Assessment. September 2019. Accessed 21 July 2022.

[23] Marine Scotland, 2019. Sectoral Marine Plan for Offshore Wind Energy; Social and Economic Impact Assessment Report – Final. December 2019.Accessed 25 August 2022.

[24] Marine Scotland, 2022. Initial Plan Framework Sectoral Marine Plan for Offshore Wind for Innovation and Targeted Oil and Gas Decarbonisation (INTOG). February 2022. Accessed 25 August 2022.

- The distribution and intensity (number of sites/volume/value) of human activities within and adjacent to the pHPMAs and how this might change over the assessment period (in the absence of the intervention); and
- Information on ecosystem service values associated with the marine environment, their current trends and how these may change over the assessment period (in the absence of the intervention).

3.4.4 These data will be used to assess the potential impacts of the proposed sites. For areas identified to be likely to experience greater impacts, additional contextual information on the social and economic profile of the area will be compiled, including where relevant the local industrial structure. This will help contextualise the potential impacts and their effect on the local community.

3.4.5 The baseline will be dynamic – it will take account of possible changes over time that would have occurred in the absence of HPMA designations. These possible changes will be considered for human activities and communities, and the state of the marine environment (natural capital) and the benefits it provides (ecosystem services).

3.4.6 For human activities, the dynamic baseline will consider changes in the distribution and intensity of human activity over the time period of the assessment. The dynamic baseline will be tailored to each sector and will be used to assess the potential scoped-in impacts (see section 4). This will draw on previous and forthcoming work to develop a dynamic baseline for the SEIA for the Sectoral Marine Plan for offshore wind[25], and the Innovation and Targeted Oil and Gas Decarbonisation (INTOG) Initial Plan Framework[26]. In considering potential future development activity, various assumptions will need to be made and will be documented.

3.4.7 Key data sources include:

[25] Marine Scotland, 2019. Sectoral Marine Plan for Offshore Wind Energy; Social and Economic Impact Assessment Report – Final. December 2019. Accessed 25 August 2022.

[26] Marine Scotland, 2022. Initial Plan Framework Sectoral Marine Plan for Offshore Wind for Innovation and Targeted Oil and Gas Decarbonisation (INTOG). February 2022. Accessed 25 August 2022.

- Marine Scotland Directorate (including data on the National Marine Plan Interactive, NMPi);
- Information from Crown Estate Scotland on Lease Areas, Lease Option Areas and Agreement-for-Lease locations where available;
- Kingfisher Cables;
- North Sea Transition Authority (NSTA) (previously Oil and Gas Authority, OGA) Oil and Gas licensing round awards, oil and gas pipeline data, CCUS appraisal and storage licences;
- British Geological Society CO2 Stored database27;
- Royal Yachting Association (RYA) Sailing/cruising routes;
- Coastal Protection and Flood Defence layers on NMPi;
- Eurosion Database;
- Automatic Identification System shipping data28;
- Processed UK commercial fisheries vessel monitoring system (VMS) ping data for a five year period[29] broken down by gear type and linked to estimated landings for vessels over 12m in length (provided by Marine Scotland Directorate);
- International Council for Exploration of the Sea (ICES) rectangle landings data for fishing vessels 12m and under broken down by gear type, for a five-year period (provided by Marine Scotland Directorate);
- Military practice and exercise areas (PEXA) and military establishments from Oceanwise (to be provided under Marine Scotland Directorate's licence).

[27] CO2 Stored Accessed 6 July 2022

[28] AIS data published under Open Government Licence. Reproduced with permission of the MCA and MMO.

[29] A five-year period from 2015-2019 would avoid the incorporation of 2020 which was an anomalous year for fishing activity due to the Covid-19 pandemic and would align with the data used for the SEIA of fisheries management measures in offshore MPAs, and potentially of ScotWind and INTOG assessments, and therefore would contribute to the consistency of the cumulative assessment.

3.4.8 The dynamic baseline for natural capital and ecosystem services will draw on previous and forthcoming work to develop a dynamic baseline for the Nature Conservation MPA assessment[30], the assessment of four new Nature Conservation MPAs[31], the assessment of a proposed deep sea marine reserve[32]. It will consider the expected effects of climate change on marine ecosystems (e.g. increasing water temperature) and other ongoing changes (e.g. related to changes in other pressures from human activities, such as coastal water pollution from land based sources),

## 3.5 Other Information Requirements

3.5.1 In addition to baseline data, a range of additional data and information informs the assessment. In particular, information on licensing costs and the cost of potential management measures is required to estimate cost impacts for activities, together with information on enforcement, surveillance and monitoring costs to estimate impacts on the public sector. Such information is obtained from the Nature Conservation MPA SEIA[33], Defra's Marine Conservation Zone Impact Assessment[34], and the Impact Assessment of the Scottish Marine Bill[35], and from consultation with specific marine sectors and regulators where required.

[30] Marine Scotland, 2013. Planning Scotland's Seas: 2013 - The Scottish Marine Protected Area Project – Developing the Evidence Base tor Impact Assessments and the Sustainability Appraisal Final Report.

[31] Marine Scotland, 2019. SEIA of Proposed Marine Protected Areas. Socio-Economic Impact Assessment. January 2019. Prepared by ABPmer & eftec for Marine Scotland.

[32] Marine Scotland, 2019. Development of a Deep Sea Marine Reserve, West of Scotland. Socio-Economic Impact Assessment. September 2019. Accessed 21 July 2022.

[33] Marine Scotland, 2013. ibid.

[34] Defra, 2012. Designation of Marine Conservation Zones in English Inshore Waters and English and Welsh Offshore Waters. Impact Assessment. IA No: Defra 1475. December 2012.

[35] Risk & Policy Analysts & ABPmer, 2009. Full Regulatory Impact Assessment: Scottish Marine Bill. Final Report. March, 2009.

# 4 Scoping of Impacts

## 4.1 Outline scoping

4.1.1 For the purpose of this initial scoping and methodology report, the human activities referred to above (Section 3) and in the Marine Scotland Directorate HPMA Policy Framework, are incorporated and considered under specific marine sectors. It is likely that each human activity will be relevant to multiple marine sectors, and therefore, their impacts are scoped accordingly. Definitions of each sector are provided in Appendix B.

4.1.2 A high-level summary of the outcome of initial scoping is provided in Table 1, and details of the scoping of individual impact pathways for each sector is provided in Appendix A. The initial scoping will be reviewed and refined in light of the specific HPMA proposals.

4.1.3 Aviation was scoped out of the baseline assessment on the basis that no management measures would be required for this sector. Marine aggregates has also been scoped out as there are no current marine aggregate licences or licence applications in Scottish waters. Wild seaweed harvesting has been scoped out because this predominantly occurs above mean low water springs (MLWS) and therefore would be outside of HPMAs.

4.1.4 In addition to whether each sector has been scoped in or out, Table 1 also provides high-level commentary on:

- Type(s) of impact, and whether a priori impacts are anticipated to be low, medium or high (although this can only be quantified once the assessment of proposed sites has been undertaken);
- Risk of upstream and downstream effects (i.e. cost impact only, or GVA impact);
- Potential for displacement of activity to other areas.

4.1.5 Note there is potential overlap with the ecosystem services analysis for coastal defence, fisheries and recreational (recreational fishing, tourism and water sports) impacts.

**Table 1 Outcome of Initial Scoping**

| Sector | Scoped in? | Comment | Types of impact | Anticipated scale of impact | Risk of upstream and downstream effects | Potential for displacement of activity to other areas |
|---|---|---|---|---|---|---|
| Aquaculture (finfish) | Yes | Potential overlap with existing or proposed aquaculture sites | • Removal/ relocation of sites<br>• Additional licensing costs<br>• Opportunity costs | High | Yes | Yes |
| Aquaculture (shellfish and seaweed) | Yes | Potential overlap with existing or proposed aquaculture sites | • Removal/ relocation of sites<br>• Additional licensing costs<br>• Opportunity costs | High | Yes | Yes |
| Aviation | No | No management would be required for this sector | | | | |
| Carbon Capture Utilisation and Storage | Yes | Potential overlap with potential CCUS locations | • Additional licensing costs<br>• Deviation of new pipelines<br>• Opportunity costs | Low | No | Yes |
| Coast Protection and Flood Defence | Yes | Potential overlap with coastal protection and flood defence measures if HPMAs are in inshore area | • Additional licensing costs | Low | No | No |
| Commercial Fisheries | Yes | Potential overlap with commercial fishing activity | • Loss of fishing grounds<br>• Minimal speed requirement<br>• Restriction on fixed engines and | High | Yes | Yes |

| Sector | Scoped in? | Comment | Types of impact | Anticipated scale of impact | Risk of upstream and downstream effects | Potential for displacement of activity to other areas |
|---|---|---|---|---|---|---|
| | | | net and coble fisheries | | | |
| Energy Generation | Yes | | • Additional licensing costs<br>• Deviation of new cable routes<br>• Additional mitigation costs<br>• Opportunity Costs | Medium | No | Yes (cables) |
| Marine Aggregate Extraction | No | No current marine aggregate licences or licence applications in Scottish waters | | | | |
| Military and Defence | Yes | Potential overlap of danger areas and practice and exercise areas | • Revision of MESA<br>• Compliance with MESAT revisions | Low | No | No |
| Oil and Gas | Yes | | • Additional licensing costs<br>• Deviation of new pipelines<br>• Additional costs for repairs and maintenance and decommissioning<br>• Opportunity costs | Medium | No | Yes (pipelines) |
| Ports and Harbours | Yes | | • Additional assessment costs | Low-Medium | No | Yes |

| Sector | Scoped in? | Comment | Types of impact | Anticipated scale of impact | Risk of upstream and downstream effects | Potential for displacement of activity to other areas |
|---|---|---|---|---|---|---|
| Power Interconnectors | Yes | Potential overlap with future interconnectors | • Additional assessment costs<br>• Deviation of new cable routes | Low-Medium | No | Yes |
| Recreational Fishing | Yes | Potential overlap with recreational fishing activities | • Loss of sea and shore fishing sites | Low | No | Yes |
| Recreational Boating | Yes | Potential overlap with marinas and anchorages | • Vessel speed restrictions<br>• Restrictions on anchoring<br>• Vessel number restrictions<br>• Additional licensing costs for marinas | Low | No | Yes |
| Seabed mining | Yes | No seabed mining activity currently, but potential management may preclude future activity of the sector in Scottish waters. | • Additional costs for marine license determinations<br>• Opportunity cost | Low | No | Yes |
| Wild Seaweed harvesting | No | Seaweed harvesting takes place above MLWS therefore no potential overlap. | | | | |
| Shipping | Yes | | • Restrictions on discharge of | Low | No | No |

| Sector | Scoped in? | Comment | Types of impact | Anticipated scale of impact | Risk of upstream and downstream effects | Potential for displacement of activity to other areas |
|---|---|---|---|---|---|---|
| | | | waste material and ballast water | | | |
| Telecom Cables | Yes | Potential overlap with future telecom cable routes | • Additional licensing costs (new cables in relation to lifeline services)<br>• Deviation of new cable routes | Low | No | Yes |
| Tourism (including heritage assets) | Yes | Potential overlap with wildlife watching areas | • Vessel speed restrictions<br>• Restrictions on numbers<br>• Comply with codes of practice | Low | No | Yes (if restrictions on numbers) |
| Water sports | Yes | Potential overlap with water sports areas | • Vessel speed restrictions<br>• Restrictions on numbers | Low | No | Yes (if restrictions on numbers) |

# 5 Assessment of Costs and Benefits

## 5.1 Introduction

5.1.1 This section, and the accompanying Appendix B, provides an overview of the proposed methodologies to be used in the SEIA. It is important to note that, as methodologies are constantly evolving, the methods used in the SEIA may also evolve in order to align with the latest guidance available at the time.

## 5.2 Economic Impacts to Marine Activities

5.2.1 Detailed assessment methods for relevant marine activities scoped in to the assessment are presented in Appendix B.

5.2.2 All the methods generally entail making estimates of the cost of implementing restrictions and/or the impact of implementing the restrictions on operating revenues.

5.2.3 Consistent unit costs are used within most marine activity sectors as a basis for estimating these impacts, although it is recognised that the actual costs that may be incurred by specific activities within individual sites may be higher or lower than these 'average' values.

5.2.4 For some sectors, there may also be impacts associated with delays in consenting as a result of the designations or impacts on investor confidence. However, it is not possible to quantify these potential impacts as it is not possible to predict whether or where they might occur. It is recognised that these costs could potentially be large for some sectors and possibly larger than some of the quantified costs.

5.2.5 Where possible, all impacts are quantified in monetary terms, with these values converted to current prices using the relevant GDP deflators. Where impacts on economic activities have the potential to give rise to a change in the level of output, direct and indirect impacts on Gross Value Added (GVA) and employment are estimated using appropriate multipliers. This is likely to be the case for the fisheries sector, for which the restrictions have the potential to affect output through loss of landings, and may be the case for the aquaculture sector, depending on whether existing affected sites are able to relocate to other areas, or if production at affected sites is lost. Impacts that are anticipated, but for which cost estimates were not possible, are described qualitatively.

5.2.6 The impacts for all the relevant activities for each site are documented in Tables 3 (cost impacts) and 4 (potential benefits) of the Site Assessment Tables (template in Appendix C). Sectors that are unaffected are recorded in Table 5 of Site Assessment Tables (Appendix C).

## 5.3 Social Impacts on Individuals, Communities and Society

5.3.1 Social impacts are effects on individuals, communities and society. They can vary in their desirability, scale, extent or duration (temporal and spatial), intensity and severity, as well as the extent to which they affect particular groups or are compounded by cumulative effects.

5.3.2 The social impact assessment will be based on the latest guidance available and will involve desk-based analysis of data on relevant impacts, and the collection and analysis of primary data, using appropriate social research methods and where relevant participatory engagement approaches with groups expected to be affected. It will also be informed by stakeholder engagement, including planned consultations by Marine Scotland on the approach to HPMA designations, and engagement with communities in areas identified to be likely to experience greater impacts.

5.3.3 Socio-economic variables will be considered as appropriate based on relevant guidance. Key variables from SEIA guidance for MPAs in inshore waters[36] (e.g. distribution and type of employment) are already reflected in the social impact analysis approach (as used for previous MPAs), covering the groups shown in Table 2, reported in Tables 6a and b in Appendix C. As described above, prior to undertaking the SEIA, Marine Scotland are planning to consult with affected communities on the HPMA policy through a series of themed workshops. These will work with stakeholders on the approach to identifying HPMAs, including considering their socio-economic impacts, and the distribution of those impacts across communities. This will help inform the content of the social analysis, described below.

[36] Marine Protected Areas in inshore waters: guidance for undertaking Socio-Economic Impact Assessments (SEIA) - gov.scot (www.gov.scot)

5.3.4 The social impacts generated by the proposed management scenarios will be strongly connected to the nature, scale and distribution of the economic impacts (on both income and employment). Any significant change in employment, for example generated as a result of restrictions on fishing activity, can have significant social impacts (e.g. on health, crime). Based on consideration of the distribution of economic impacts and potential benefits in desk-based analysis (as described in Sections 5.2 and 5.5), the assessment of social impact will then consider if any further socio-economic variables as per Box 1 of the SEIA guidance for MPAs in inshore waters[37] should be included in the analysis.

5.3.5 Employment is recognised as being a particularly important generator of social benefit. It is the key means by which individuals fulfil material wellbeing, as well as being central to social linkages, individual identity, social status and an important contributor to physical and mental health. Conversely, unemployment can be detrimental to physical and mental health and a key cause of deprivation and associated issues of community cohesion.

5.3.6 The distribution of impacts on employment focuses on the likely location on land where those employment impacts are likely to be felt. For the fishing sector, the registered Home Port Districts of the vessels affected can be considered as a proxy for likely location of employment; this can be explored further for sites where impacts likely to be greater than others. The distribution of impacts on the fish processing industry focuses on the ports of landing of the affected vessels' catches, as a proxy for the linkage between the catches made from an HPMA at sea, and where those catches are landed and processed. This can also be explored further for sites and ports where impacts are likely to be greater than others.

[37] Marine Protected Areas in inshore waters: guidance for undertaking Socio-Economic Impact Assessments (SEIA) - gov.scot (www.gov.scot)

5.3.7 The focus of the distributional analysis is predominantly on groups in Scotland, as this is where the majority of impacts are expected to occur. This includes impacts on specific locations (including regions, districts and ports) and on specific groups within Scotland's population (including, for example, different age groups, genders, minority groups, and parts of Scotland's income distribution). Table 2 summarises the list of groups that have been considered in the distributional analysis.

**Table 2. Groups who may be affected by management scenarios**

| Location | Fishing group | Groups distinguished by: | | | |
|---|---|---|---|---|---|
| | | Age | Income | Social groups | Gender |
| Region<br>Port<br>Rural/ urban/ mainland or island | Gear type<br>Vessel size | Children<br>Working age<br>Pensionable age | 10% most deprived<br>10% most affluent<br>Remaining 80% | e.g. Crofters<br>Ethnic minorities<br>With disability or long-term sick | Male<br>Female |

5.3.8 The social impact assessment uses the relevant impact-interaction tables (See Table 6a,b and c in Appendix C) to identify the potential social impacts of designating the pHPMAs, for the sectors where designation is expected to have GVA and employment impacts. The tables identify the potential distribution of economic impacts and are then combined with relevant quantitative (e.g. potential employment impacts) and qualitative information (e.g. assessment against a pre-defined scale of the severity of impacts). This information is used to assess whether social impacts are likely to occur, and if so, their potential significance. The relevance of mitigation measures for potentially significant social impacts are also highlighted.

5.3.9 The significance of the social impacts is assessed by putting the socio-economic impact, quantified through the methods described in Section 5.2, in context (e.g. employment impacts are assessed relative to total employment in the sector and/or community). The interpretation of this evidence is made using the following definitions:

- xxx/+++: significant negative/positive effect. This is defined as where it is probable that an impact will be noticed and is potentially significant;

- xx/++: possible negative/positive effect. This is defined as where it is possible than an impact will be noticed;
- +/-: minimal effect, if any. This is defined as where it is probable than an impact is unlikely to be sufficiently significant so as to be noticeable, but that some possibility exists that a negative/positive impact could occur; and
- 0: no noticeable effect expected.

5.3.10 The desk-based analysis of human activities affected in Section 5.2 and the potential benefits (Section 5.5), and the themed workshops, will be captured in stakeholder mapping. This will help identify affected communities, the ways they are impacted, and make reference to the available socio-economic data (from the desk-based analysis) that describes these impacts. This mapping will ensure engagement with interest groups is targeted to where impacts are greatest, and where it can help fill gaps in evidence.

5.3.11 Communities can be defined in different ways, including by:

- Place, groups in certain locations, local communities;
- Practice, groups who undertake particular activities; and
- Interests, groups who hold particular viewpoints (e.g. environmental NGO members).

5.3.12 The community engagement will gather evidence through the most appropriate and proportionate techniques for the groups and impacts being assessed. This may include more specific information on the distribution or timing of impacts, and may be gathered through group or individual meetings, surveys, or use of further evidence sources cited by interest groups. This mapping will enhance understanding of the distribution of impacts, allowing identification of whether any island communities in Scotland could be affected in a significantly different way from mainland communities, as required by the Islands Act 2018.

5.3.13 Evidence gathered from these communities will be included in the SEIA, including through more specific description of the communities expected to be affected by the management measures. This will be an iterative process: as the size, type and distribution of impacts become apparent during the work, appropriate social research skills will be used gather views from the most affected communities.

5.3.14 The engagement process will consider both the positive and negative impacts from HPMAs. While analysis of economic impacts will highlight costs to existing activities, the full range of social costs and benefits will be considered. The social benefits that may positively impact wellbeing could stem from new employment opportunities (e.g. in alternative fishing activities, or related to recreation or research), or from knowledge that there is a healthy/recovering marine ecosystem.

5.3.15 It is important that the community engagement will be undertaken by the appropriate people, which may differ at different stages of HPMA policy implementation and is expected to include:

- Scottish Government representatives, so communities see that officials are hearing their views;
- Those involved in generating the data on expected impacts of HPMAs; and
- Researchers with relevant social research skills, to implement the methods described above.

5.3.16 The social impact assessment is conducted for each individual pHPMA and for the suite of pHPMAs as a whole. The results of the social impact assessment for each site are reported in Table 6 of the Site Reports.

## 5.4 Impacts on the Public Sector

5.4.1 Following a decision to designate individual sites, costs may be incurred by the public sector in the following broad areas:

- Site monitoring;
- Compliance and enforcement;
- Loss of revenue from seabed leases;
- Promotion of public understanding; and

- Regulatory and advisory costs associated with licensing decisions and review of consents.

5.4.2 Standard assumptions have been developed for the estimation of public sector cost impacts based on information contained within the Final Regulatory Impact Assessment for the Marine (Scotland) Bill[38], information from the Marine Conservation Zones Impact Assessment[39], information from the previous impact assessment of Nature Conservation MPAs[40], the assessment of four new Nature Conservation MPAs[41], the assessment of a proposed deep sea marine reserve[42], the assessment of fisheries management measures in offshore MPAs[43], and informal discussions with Marine Scotland Directorate, NatureScot and JNCC. These agreed assumptions are then used to estimate costs to central government for all sites combined. A national-level assessment is used for public sector costs.

[38] Scottish Government, 2009. Final Regulatory Impact Assessment for the Marine (Scotland) Bill.

[39] Finding Sanctuary, Irish Seas Conservation Zones, Net Gain and Balanced Seas. 2012. Impact Assessment materials in support of the Regional Marine Conservation Zone Projects' Recommendations.

[40] Marine Scotland, 2013. Planning Scotland's Seas: 2013 - The Scottish Marine Protected Area Project – Developing the Evidence Base tor Impact Assessments and the Sustainability Appraisal Final Report.

[41] Marine Scotland, 2019. SEIA of Proposed Marine Protected Areas. Socio-Economic Impact Assessment. January 2019. Prepared by ABPmer & eftec for Marine Scotland.

[42] Marine Scotland, 2019. Development of a Deep Sea Marine Reserve, West of Scotland. Socio-Economic IMPACT ASSESSMENT. September 2019. Accessed 21 July 2022.

[43] Marine Scotland, in prep. SEIA of Offshore Marine Protected Areas in Scottish Waters.

## 5.5 Assessment of Potential Benefits

*Impacts on Ecosystem Services*

5.5.1 The biodiversity features of an HPMA are expected to contribute to the delivery of a range of ecosystem services. A natural capital approach will be applied to help assessment of these services[44]. This defines the sites and features being designated as natural capital assets. The designation and management of the HPMA may improve the extent and/or condition of these assets, which changes the quantity and quality of the beneficial services they provide in future, relative to a 'no designation' baseline. This in turn may change their value (contribution to economic welfare). Impacts on the value of ecosystem services may occur as a result of the management and/or achievement of the conservation objectives of the HPMA.

5.5.2 The ecosystem services analysis provides a qualitative description of the potential changes in ecosystem service provision associated with the implementation of management scenarios to support the achievement of conservation objectives for individual features. A healthy marine environment provides a large number of benefits to people. The benefits and the beneficiaries are not uniform and cover a wide range of ecosystem functions and interdependencies. The concept of 'ecosystem services' is used to capture the different benefits provided. Ecosystem services are the outcomes from ecosystems that directly lead to good(s) that are valued by people[45].

5.5.3 The ecosystem services list analysed is based on those in Marine Scotland Directorate's guidance[46], using the same definitions of ecosystem services as in previous Scottish MPA impact assessments where possible. The list of final ecosystem services considered is shown in Table 3, alongside some of the goods and benefits that those services support. It splits the benefits provided by UK environments into the following services:

[44] Marine Scotland, no date. Marine Protected Areas in inshore waters: guidance for undertaking Socio-Economic Impact Assessments (SEIA).

[45] Natural Capital Committee, 2013, State of Natural Capital Report. Natural Capital Committee, Defra.

[46] Scottish Government, 2020. Scotland's Marine Assessment 2020: Natural capital, ecosystem services and the Blue Economy. Accessed 5 Sept 2022.

- Provisioning Services – the tangible goods and associated benefits produced by an ecosystem;
- Regulating Services – the benefits from the regulation of ecosystem processes;
- Cultural Services – the non-tangible ecosystem benefits either from experience of the ecosystem or knowledge of its existence;
- Supporting Services – those services whose function underlie all other ecosystem service provision.

5.5.4 Supporting services are not measured separately in economic analysis, since their contribution is reflected in final services and benefits.

5.5.5 The services identified in Table 3 are defined as follows:

- Provisioning services:
    - Fish & shellfish stocks – harvestable wild fish and shellfish for commercial market or personal use / recreational fishing;
    - Harvestable seaweed – seaweed collectable for commercial or personal use;
    - Ornamental material (commercial & personal) – shells or other natural material collected for display or as trinkets/memorabilia, whether for commercial sale or personal use;
    - Genetic resources – species with potential use in, for example, biomedicine, food/nutrition or cosmetics, whether as raw material or isolation of genetic properties;
- Regulating services
    - Carbon storage & climate regulation – storage or sequestration of organic or inorganic carbon within biomass or sediment or geological material;
    - Storm protection / Natural coastal protection - habitats and geomorphology which attenuate or block wave energy from reaching parts of the coast and foreshore with sensitive natural or built assets.
    - Waste breakdown & detoxification of water & sediment – physical or chemical change to organic or inorganic contamination levels of water or sediment by species/habitats that remove contaminants through consumption or filtering, or otherwise help lock contaminants into substrate.

    - Sediment stabilisation - transfer of sediment from water column to seabed caused by the physical structure of habitats changing water movement that would otherwise keep sediment suspended.
- Cultural services
    - Knowledge / Knowledge and education – learning and information gained from study or activities in the marine environment.
    - Recreation / Tourism and recreation – peoples' use and enjoyment of the environment through direct, in-situ, physical and experiential interactions with. This includes services to both locals and non-locals (i.e. visitors, including tourists) and includes hunting and fishing.
    - Further cultural ecosystem services are listed by the Scottish Government (2020): Spirituality, Health and well-being, Creativity & Art, but no definitions are given for them. These values are partly captured in the 'Non-use cultural value' which is a broad category representing a type of value people hold for benefits not deriving from their own use of a resource.

5.5.6 The following services that have been part of past Scottish MPA impact assessments and/or are listed by the Scottish Government (2020), but are not analysed in this work for the reasons given.

- Energy – this is listed as an ecosystem service by Scottish Government (2020), but in this assessment is considered through impacts on the energy sector.
- Aggregate / sand – sediment and rock resources identified as for potential extraction and use in construction. This service is not included as there is currently no marine sand and gravel extraction in Scottish waters.

5.5.7 The typology in Table 3 has been used to identify the services for analysis in relation to the sites' proposed management scenarios.

**Table 3. Typology of Scottish marine final ecosystem services, and resulting goods and benefits**

| | Provisioning | Regulating | Cultural |
|---|---|---|---|
| **Final ecosystem services** | Fish & shellfish<br>Seaweed<br>Ornamental materials (commercial & personal)<br>Genetic resources | Climate regulation<br>Natural coastal protection<br>Waste breakdown / detoxification<br>Sediment stabilisation | Knowledge (science & education)<br>Tourism & recreation |
| **Goods/ benefits** | Food<br>Fish feed<br>Fertiliser<br>Ornaments (incl. aquaria)<br>Medicine, cosmetics & biotech<br>Construction materials | Healthy climate<br>Prevention of coastal erosion<br>Sea defence<br>Clean water & sediments<br>Immobilisation of pollutants | Non-use cultural values<br>Mental & physical health<br>Spiritual/cultural well-being<br>Creativity and art |

5.5.8 The analysis of changes to ecosystem services will consider both on-site and off-site impacts of management scenarios. Off-site impacts could be positive (e.g. by supporting healthier fish stocks in the area) or negative (e.g. due to the impacts of displaced fishing vessels). On-site costs could arise as a result of alternative fishing gears (e.g. pots) being deployed in MPAs where management has excluded other gears. In assessing impacts, we will clearly link the assessment scenarios to changes in ecosystem services and the economic value of these. The analysis will be summarised in an assessment table (Tables 9a and 9b in Appendix C), similar to that used in previous impact assessments of MPAs in Scottish, English and UK waters.

5.5.9 In addition to the summary of anticipated ecosystem services benefits under the lower, intermediate and upper estimates, the assessments will include four columns of information to clarify understanding of the qualitative changes in ecosystem services arising from the proposed management scenarios (see Tables 9a and 9b in the Site Reports in Appendix C):

- Relevance: Relating to the amount of ecosystem good or function arising from site;
- Value weighting: Categorisation of how valuable the amount of ecosystem good or function from the site is in providing benefits to human population;

- Scale of benefits: Consideration of actual potential to deliver benefits (for example considering location of benefits, delivery to human population, etc.);
- Confidence: Level of confidence in our current knowledge of all other categories (in other words, scale of benefit, level of improvement, etc.).

5.5.10 Based on the above categories, an overall level of each ecosystem service will be defined with its own confidence level. An overall level of total benefits has wil also be defined.

5.5.11 The parameters have been assigned a level for each service from a menu, defined as shown in Table 4.

5.5.12 The approach provides a qualitative summary of the expected ecosystem service benefits to ensure all relevant impacts are captured in the analysis.

**Table 4. Definition of ecosystem service levels**

| Level | Definition |
|---|---|
| Nil | Not present/none |
| Minimal | Present at a very low level, unlikely to be large enough to make a noticeable impact on ecosystem services |
| Low | Present/detectable, may have a small noticeable impact on ecosystem services, but unlikely to cause a meaningful change to site's condition |
| Moderate | Present/detectable, noticeable incremental change to site's condition |
| High | Present/detectable order of magnitude impact on sites condition |

*Valuation of Ecosystem Services*

5.5.13 There are limited valuation data for marine ecosystem services provided by MPA features. The National Ecosystem Assessment (NEA)[47] included a synthesis of data available up to 2010 for marine ecosystem services[48], and there have been subsequent reviews by Potts *et al.*[49] and Burdon *et al.*[50], expanding it to encompass additional features, including mobile features such as sandeel, basking shark, Risso's dolphin and minke whale.

5.5.14 A relevant source of evidence for the ecosystem services valuation is Defra's ENCA guidance[51]. Although its services databook contains limited relevant evidence, the assets databook does include marine and coastal margins evidence, including the studies referenced above. ENCA, and the literature on marine ecosystem services, will be checked for regular updates on the evidence base suitable for marine policy appraisal in the UK.

5.5.15 Recent work on specific UK marine ecosystem services has included:

- Work by the Office for National Statistics (ONS)52 which establishes overall UK marine values for seven ecosystem services. These provide useful context data, but are not yet subdivided to Scottish waters.
- Work on carbon storage in marine sediments (e.g. Smeaton et al 53, following the work of Burrows et al54).

[47] UK National Ecosystem Assessment (2011) The UK National Ecosystem Assessment Technical Report. UNEP-WCMC, Cambridge.

[48] Austen, M., Malcolm, S., Frost, M., Hattam, C., Mangi, S., Stentiford, G., 2011. Marine. In: The UK National Ecosystem Assessment Technical Report. UK National Ecosystem Assessment. Cambridge: UNEP-WCMC.

[49] Potts T, Burdon D, Jackson E, Atkins J, Saunders J, Hastings E, Langmead O., 2014. Do marine protected areas deliver flows of ecosystem services to support human welfare? *Marine Policy* 44; 139–148.

[50] Burdon D, Potts T, Barbone C, Mandera L., 2017. The matrix revisited: A bird's-eye view of marine ecosystem service provision. *Marine Policy* 77; 78–89.

[51] ENCA Asset Databook - August 2021

[52] ONS, 2021. Marine Accounts, Natural Capital, UK: 2021. Accessed 5 Sept 2022.

[53] Smeaton et al. (2020). Re-Evaluating Scotland's Sedimentary Carbon Stocks. Scottish Marine and Freshwater Science Vol 11 No 2, 16pp. Accessed 5 Sept 2022.

[54] E.g. Burrows et al. (2017). Assessment of Blue Carbon Resources in Scotland's Inshore Marine Protected Area Network.

- This work highlights the potential importance of marine habitats for carbon storage and other services, but does not provide a full understanding of sequestration rates, nor of the impacts MPA designation and management could have on the value of ecosystem services.

5.5.16 In addition, there are studies that use economic valuation techniques to assess the impacts of marine conservation measures, such as designation of and implementation of management measures in protected areas. There are a small number of such studies in the UK (e.g. McVittie and Moran[55]; Kenter *et al*,[56] Brouwer *et al*[57] and Borger *et al*[58]), and some further information is available from the NEA Follow-on Project[59] and from eftec *et al*[60].

## 5.6 Approach to assessing combined impacts

5.6.1 The combined assessment considers the combined impact of the suite of new pHPMAs.

5.6.2 For impacts to activities, the combined impact of the pHPMAs is estimated by summing the impacts for individual sites. In areas where there are adjacent sites affecting a particular activity (as identified by the distributional analysis), further consideration is given to the potential combined impact to describe qualitatively whether the combined impact might be larger or smaller than the sum of the individual impacts.

[55] McVittie, A., & Moran, D., 2008. Determining monetary values for use and non-use goods and services: Marine Biodiversity–primary valuation. Final Report to Defra.

[56] Kenter, J.O., Bryce, R., Davies, A., Jobstvogt, N., Watson, V., Ranger, S., Solandt, J.L., Duncan, C., Christie, M., Crump, H., Irvine, K.N., Pinard, M. & Reed, M.S., 2013. The value of potential marine protected areas in the UK to divers and sea anglers. UNEP-WCMC, Cambridge, UK.

[57] Brouwer, R., Brouwer, S., Eleveld, M. A., Verbraak, M., Wagtendonk, A. J., & Van Der Woerd, H. J., 2016. Public willingness to pay for alternative management regimes of remote marine protected areas in the North Sea.

[58] Börger, T., Hattam, C., Burdon, D., Atkins, J.P. and Austen, M.C., 2014. Valuing conservation benefits of an offshore marine protected area. Ecological Economics, vol. 108.

[59] UK National Ecosystem Assessment Follow-on, 2014. The UK National Ecosystem Assessment Follow-on: Synthesis of the Key Findings. UNEP-WCMC, LWEC, UK.

[60] eftec, ABPmer & University of Stirling, 2015. Valuing the UK Marine Environment – an Exploratory Study of Benthic Ecosystem Services. Project ME5106.

5.6.3 The scale of the sectors affected in Scotland is used to provide context for assessing the significance of combined impacts to activities. Information on key sectors is drawn (where available) from the Scottish Government's Economic Strategy, or from industry data. The significance of combined impacts is assessed taking account of the scale of the impacts incurred by different sectors and the relative importance of each sector to the Scottish economy (now and in the future).

5.6.4 For impacts to the public sector, a top-down approach is used to assess costs to the public sector, using national assumptions, applied at site level. Adopting an additive approach therefore provides a reasonable estimate of the combined costs.

5.6.5 For the social analysis, the assessment of combined impacts takes account of the distributional analysis to identify whether specific local communities or groups may be affected by multiple designations. Where there is the potential for multiple impacts, a qualitative assessment of the combined impacts on these communities or groups is provided.

5.6.6 For the environmental impacts, part of the rationale for an ecologically-coherent network of MPAs is the concept that the value of the network is greater than the sum of its parts. HPMAs are potentially an important part of such a network, supporting healthy ecological communities to increase the resilience and strength of the network. However, scientific understanding of the relationships between individual sites and the network is limited and it is therefore difficult to provide any quantification of the combined benefits. Therefore the network benefits of pHPMAs are expected to be reported in qualitative terms.

5.6.7 A benefit of maintaining healthy marine ecosystems is that they are more resilient to external pressures. An example of this is in relation to Avian Influenza (Bird Flu). Since autumn 2021 the UK has experienced its largest outbreak of avian influenza to date, which has affected commercial and wild birds, including our internationally important seabird colonies.

5.6.8 By contributing to maintaining healthy marine ecosystems, HPMAs will improve the resilience of Scotland's internationally important seabird populations to avian influenza. Data on the impacts of the current avian influenza outbreak is not currently available, so this benefit cannot be quantified.

5.6.9 The selection of pHPMAs will be based on the Scottish pHPMA Selection Guidelines[61]. These guidelines include a number of elements that relate to the wider benefits of a network, for example, replication supports resilience and connectivity supports linkages between marine ecosystems. These benefits will be reflected in Table 8 of the Site Reports in Appendix C.

5.6.10 Value Transfer techniques are used to apply existing valuation data for MPA networks to the proposals to designate the pHPMAs using a similar approach to that applied for the Nature Conservation MPA assessment[62] and drawing on the studies referenced at Paragraph 5.5.16 above.

5.6.11 In addition to the individual site assessments, the ecosystem services impacts of the proposed management scenarios are considered collectively. This is due to the quantification and valuation of changes in individual services often not being possible due to lack of evidence, and because valuation evidence relates to sites (e.g. Kenter *et al.*[63]), or networks of sites (e.g. Brander *et al*,[64]).

[61] JNCC, NatureScot, 2022. Draft Guidelines for the Identification of Highly Protected Marine Areas (HPMAs) in Scotland's Seas.

[62] Marine Scotland, 2013. Planning Scotland's Seas: 2013 - The Scottish Marine Protected Area Project – Developing the Evidence Base tor Impact Assessments and the Sustainability Appraisal Final Report.

[63] Kenter, J.O., Bryce, R., Davies, A., Jobstvogt, N., Watson, V., Ranger, S., Solandt, J.L., Duncan, C., Christie, M., Crump, H., Irvine, K.N., Pinard, M. & Reed, M.S., (2013). The value of potential marine protected areas in the UK to divers and sea anglers. UNEP-WCMC, Cambridge, UK.

[64] Brander *et al.,* 2015. The benefits to people of expanding Marine Protected Areas. IVM Institute for Environmental Studies.

## 5.7 Cumulative Assessment

5.7.1 A cumulative assessment gives consideration to how the significance of these impacts might vary when taking account of the total impact as a result of all pHPMAs combined, and current or planned renewable energy generation development to date, particularly where there is overlap between or proximity of these and new pHPMAs. Other developments including designation and management of other MPAs (e.g. NCMPAs and SACs) are also taken into account. Qualitative commentary is provided on whether this context might increase or decrease the significance of the impacts considered within this assessment.

5.7.2 This analysis will draw on information contained within:

- the Scottish Nature Conservation MPA assessment65;
- the socio-economic assessment for the draft plan for offshore wind, wave and tidal energy[66];
- monitoring of the impact of the implemented phase 1 measures in inshore MPAs67; and
- the SEIA of proposed phase 2 fisheries management measures in inshore MPAs68;
- the SEIA of proposed fisheries management measures in offshore MPAs69;
- the SEIA of four additional proposed Marine Protected Areas70;
- the SEIA of the Sectoral Marine Plan for offshore wind energy;
- the SEIA of the Sectoral marine Plan for Innovation of Targeted Oil and Gas Decarbonisation (INTOG).

[65] Marine Scotland, 2013. Planning Scotland's Seas: 2013 - The Scottish Marine Protected Area Project – Developing the Evidence Base tor Impact Assessments and the Sustainability Appraisal Final Report.

[66] Marine Scotland, 2013. Planning Scotland's Seas: Sectoral Marine Plans for Offshore Wind, Wave and Tidal Energy in Scottish Waters - Consultation Draft, July 2013.

[67] Marine Scotland Science, 2017. Scotland Marine Protected Areas Socioeconomic Monitoring. 2016 Report. Marine Analytical Unit, Marine Scotland Science, Scottish Government. Accessed 19 April 2018.

[68] Marine Scotland, 2018. Proposed Inshore MPA/SAC Fisheries Management Measures – Phase 2. Socio-Economic Impact Assessment. October 2018. Report prepared by ABPmer & eftec for the Scottish Government.

[69] Marine Scotland, in prep. SEIA of Offshore Marine Protected Areas in Scottish Waters.

[70] Marine Scotland, 2019. SEIA of Proposed Marine Protected Areas. Socio-Economic Impact Assessment. January 2019. Prepared by ABPmer & eftec for Marine Scotland.

5.7.3 This information helps to provide context for the additional impacts estimated to occur as a result of implementation of the pHPMAs, particularly where these additional impacts will affect activities and communities that will or are experiencing impacts as a result of earlier decisions on MPAs or offshore renewables developments.

5.7.4 Information on the total impact on ecosystem services as a result of all marine environment protected areas will also be presented to provide context for the estimated impacts of the new pHPMAs on specific marine activities and provide qualitative commentary on whether this context might increase or decrease the significance of the impacts considered within this assessment. The assessments for offshore renewables did not include an assessment of ecosystem service benefits of the proposals so this is not included in the analysis. While offshore renewables developments have the potential to lead to changes in the level of ecosystem services provided by the marine environment, these changes would be expected to be more minor than those associated with MPA and HPMA designations which specifically seek to protect more important national biodiversity and geodiversity interests.

# Appendix A Outcome of Initial Scoping

Table A1 sets out an initial scoping for impacts of HPMAs by sector, considering specific impact pathways/interactions for each sector. This has drawn on the draft HPMA Policy Framework developed by Marine Scotland, and scoping and socio-economic impact assessments for previous MPA designation work and offshore wind SEIAs. It also indicates if there is an existing method for assessment established in previous SEIAs, or whether methods and cost estimates need further development. Appendix B sets out more detailed assessment methods and should be read in conjunction with the initial scoping table.

**Table A1. Initial scoping for HPMAs by sector and considering specific impact pathways for each sector**

| Sector | Sector scoped in? | Impact pathway | Pathway scoped in? | Comments on whether existing method and cost assumptions available |
|---|---|---|---|---|
| Aquaculture (finfish) | Yes | Removal of sites/infrastructure | Yes | No – estimate of cost for removal/relocation to be discussed with industry. |
| | | Costs associated with relocation, including shore-based infrastructure | Yes | No – estimate of cost for removal/relocation to be discussed with industry. |
| | | Additional costs for marine licence renewals adjacent to HPMAs | Yes | Yes (distance from HPMA to be determined) |
| | | Sterilisation of potential development sites | Yes | Opportunity cost – not possible to quantify |
| | | Costs of uncertainty and delays | Yes | Opportunity cost – not possible to quantify |
| | Yes | Removal of sites/infrastructure | Yes | No – estimate of cost for removal/relocatio |

| Sector | Sector scoped in? | Impact pathway | Pathway scoped in? | Comments on whether existing method and cost assumptions available |
|---|---|---|---|---|
| Aquaculture (shellfish and seaweed) | | | | n to be discussed with industry |
| | | Costs associated with relocation, including shore-based infrastructure | Yes | No – estimate of cost for removal/relocation to be discussed with industry |
| | | Additional costs for marine licence renewals adjacent to HPMAs | Yes | Yes (distance from HPMA to be determined) |
| | | Sterilisation of potential development sites | Yes | Opportunity cost – not possible to quantify |
| | | Costs of uncertainty and delays | Yes | Opportunity cost – not possible to quantify |
| Aviation | No | No management expected to be required for this sector | | |
| Carbon Capture and Undersea Storage | Yes | Additional costs for marine licence determinations | Yes | Yes |
| | | Pipelines – obstruction/deviation of new pipeline routes | Yes | No, deviation of routes not previously assessed, have assumed new development would tie into existing pipeline network<br>Estimate of pipeline cost per km to be discussed with industry |
| | | Sterilisation of potential development sites | Yes | Opportunity cost – not possible to quantify |

| Sector | Sector scoped in? | Impact pathway | Pathway scoped in? | Comments on whether existing method and cost assumptions available |
|---|---|---|---|---|
| | | Cost of uncertainty and delays | Yes | Opportunity cost – not possible to quantify |
| Coast Protection and Flood Defence | Yes | Removal of existing defences | No | Inspection, maintenance and repairs of existing infrastructure such as coastal defences, inactive oil and gas infrastructure, or active pipelines and cables expected to be able to continue |
| | | Maintenance of existing coastal protection and flood defences | No | Inspection, maintenance and repairs of existing infrastructure such as coastal defences, inactive oil and gas infrastructure, or active pipelines and cables expected to be able to continue |
| | | Additional costs for planning and licence applications for maintenance of existing/construction of new flood protection or coastal defences within HPMAs | Yes | Yes |
| Commercial Fisheries | Yes | Exclusion of commercial fishing activity from HPMAs | Yes | Yes. Will consider whether there are price effects as well as volume effects on landings, from |

| Sector | Sector scoped in? | Impact pathway | Pathway scoped in? | Comments on whether existing method and cost assumptions available |
|---|---|---|---|---|
| | | | | ecosystem recovery in the HPMAs. |
| | | Minimum speed requirement for transiting sites | Yes | Yes |
| | | Restriction on fixed engines and net and coble fisheries | Yes | Yes |
| Energy Generation | Yes | Additional assessment costs for marine licence determinations | Yes | Yes |
| | | Deviation of new cable routes to avoid HPMAs | Yes | Yes |
| | | Cost of uncertainty and delays | Yes | Opportunity cost – not possible to quantify |
| Marine Aggregate Extraction | No | No current marine aggregate licences or licence applications in Scottish waters | | |
| Military and Defence | Yes | Revision of Marine Environment and Sustainability Assessment Tool (MESAT) (and other Ministry of Defence (MoD) environmental tools) and additions to electronic charting by the Hydrographic Office | Yes | Yes |
| | | Compliance with MESAT revisions | Yes | Yes |
| Oil and Gas | Yes | Additional assessment costs for marine licence determinations | Yes | Yes |

| Sector | Sector scoped in? | Impact pathway | Pathway scoped in? | Comments on whether existing method and cost assumptions available |
|---|---|---|---|---|
| | | (development and decommissioning) | | |
| | | Deviation of new cable/pipeline routes | Yes | Yes |
| | | Removal of existing cables/pipelines | No | Removal of existing infrastructure not anticipated |
| | | Sterilisation of potential development sites (exploration sites) | Yes | Opportunity cost – not possible to quantify |
| | | Cost of uncertainty and delays | Yes | Opportunity cost – not possible to quantify |
| Ports and Harbours | Yes | Additional assessment costs for marine licence determinations (new development proposals, maintenance dredging disposal) | Yes | Yes |
| | | Cost of uncertainty and delays | Yes | Opportunity cost – not possible to quantify |
| Power Interconnectors | Yes | Additional assessment costs for marine licence determinations | Yes | Yes |
| | | Deviation of new cable routes to avoid HPMAs | Yes | Yes |
| Recreational Fishing | Yes | Restriction on sea fishing in HPMAs (below MLWS) | Yes | Yes |
| | | Shore fishing below MLWS | Yes | No but method developed based on coastline affected and |

| Sector | Sector scoped in? | Impact pathway | Pathway scoped in? | Comments on whether existing method and cost assumptions available |
|---|---|---|---|---|
| | | | | value of shore-based recreational fishing in the relevant region |
| | | Shore fishing above MLWS | No | Recreational fishing activities in areas above MLWS will not be affected as these areas will not be included within HPMAs<br>*NB it may not be possible to differentiate shore fishing below and above MLWS for the impacts (will be specific to individuals, a single location may be used for fishing above and below MLWS)* |
| Recreational Boating | Yes | Vessel speed restrictions | Yes | Yes |
| | | Deviation of cruising routes | No | Transit expected to be allowed |
| | | Restrictions on anchoring | Yes | Difficult to quantify; qualitative assessment only |
| | | Vessel number restrictions (at 'non-damaging levels' | Yes | No, difficult to quantify. Qualitative assessment only |
| | | Additional assessment costs for marine licence | Yes | Yes |

| Sector | Sector scoped in? | Impact pathway | Pathway scoped in? | Comments on whether existing method and cost assumptions available |
|---|---|---|---|---|
| | | determinations for marinas | | |
| Seabed mining | Yes | Additional assessment costs for marine licence determinations | Yes | Yes |
| | | Sterilisation of potential development sites | Yes | Opportunity cost |
| Seaweed harvesting (wild) | No | Activity takes place above MLWS and so would be unaffected by HPMAs | | |
| Shipping | Yes | Deviation of shipping routes | No | Policy framework indicates shipping routes will not need to be altered – right of innocent passage |
| | | Restrictions on discharge of waste material and ballast water | Yes | |
| Telecom Cables | Yes | Additional assessment costs for marine licence determinations on new cables in relation to lifeline services | Yes | Yes |
| | | Deviation of cable routes to avoid HPMAs | Yes | Yes |
| Tourism (including heritage assets) | Yes | Vessel speed restrictions and restrictions on numbers/frequency/size of vessels for marine wildlife tourism (wildlife watching | Yes | Yes |

| Sector | Sector scoped in? | Impact pathway | Pathway scoped in? | Comments on whether existing method and cost assumptions available |
|---|---|---|---|---|
| | | Comply with codes of practice / best practice – tourist boats and equipment rentals (e.g. kayaks) | Yes | Additional training costs, compliance with codes<br>Communicating to customers |
| | | Impact of designation on tourism product | Yes | Covered in ES benefits assessment |
| | | Impact of ecosystem recovery on tourism – increased chance of encountering species that attract visitors | Yes | Covered in ES benefits assessment |
| Water sports | Yes | Restrictions of water sports to 'non-damaging' levels and vessel speed restrictions | Yes | |
| | | Follow existing codes of best practice | Yes | Yes |

# Appendix B Sector Considerations and Assessment Methods

This appendix provides definitions of the various marine sectors in Scotland that have been scoped into the assessment and outlines the methods to assess the impacts of potential HPMAs (pHPMAs) on each sector. The sectors are:

- Aquaculture – Finfish
- Aquaculture – Shellfish and Seaweed
- Carbon Capture and Undersea Storage
- Coast Protection and Flood Defence
- Commercial Fisheries
- Energy Generation
- Military and Defence
- Oil and Gas
- Ports and Harbours
- Power Interconnectors and Transmission Lines
- Recreational Fishing
- Recreational Boating
- Seabed Mining
- Shipping
- Telecommunication Cables
- Tourism
- Water Sports

# 1 Aquaculture – Finfish

## B.1.1 **Sector Definition**

For the purposes of this assessment, finfish aquaculture relates to the production of marine finfish species within sea-based aquaculture installations. Marine finfish species cultivated in land-based production systems or freshwater finfish species cultivated in freshwater installations have been excluded.

## B.1.2 Sectoral Considerations for HPMAs

Aquaculture of any form, will not be permitted within HPMAs, therefore consents for new aquaculture sites will not be granted within HPMAs and, in the event of overlaps, any existing sites within HPMAs will need to relocate. Activity in areas above MLWS will not be affected as these areas will not be included within HPMAs.

The following potential impacts may require assessment:

- Removal of existing sites and associated infrastructure;
- Costs associated with relocation, including shore-based infrastructure;
- Additional assessment costs to support marine licence determinations for new development proposals and renewals adjacent to HPMAs;
- Sterilisation of potential development sites;
- Cost of uncertainty and delays.

## B.1.3 Assessment Methods

**Removal of Existing Sites and Associated Infrastructure**

Removal of existing sites and associated infrastructure may incur costs associated with:

- Removal of infrastructure and materials located on the water;
- Licensing costs for removal of infrastructure;

- Business closures and loss of employment (potentially associated with local coastal and rural communities).

Lease areas from Crown Estate Scotland will be used to identify the number of lease areas within a pHPMA that may be affected. On a per lease area basis, the costs associated with the above impacts will calculated using existing available information, as well as via consultation with the finfish aquaculture sector and relevant statutory bodies. It is recognised that the costs are likely to vary between lease areas, and may be higher or lower than the estimated cost. The potential for business closures and loss of employment may only be possible to assess qualitatively. The likelihood of the risk will depend on the scale of impacts as well as site-specific factors. It is noted that the industry is set up in a way which encourages single company management areas which is better for biosecurity. The implication is that in a given area it is likely that the fish farms present might all be owned by the same company.

**Costs associated with Relocation, including shore-based infrastructure**

The costs associated with relocating a finfish aquaculture site depends on a wide range of variables, in particular, on the availability of suitable alternative locations, the size of the enterprise, and the distance between existing and new locations. Furthermore, even if relocation may be technically feasible, it may not be financially viable for aquaculture businesses. Where there is potential for sites to be relocated outside of HPMAs, there will be costs associated with this process, including:

- Availability of suitable relocation sites outside of HPMAs;
- Marine licence applications and associated impact assessments and management plans for relocation sites;
- Transportation of mobile infrastructure and materials from previous site (including set-up at relocation site);
- Construction/purchasing/leasing of new onshore infrastructure at relocation site (roads, slipways, access, shorebase).

The finfish aquaculture sector will be consulted with regarding the feasibility, viability and costs involved in relocating an aquaculture site. It is assumed that any production cycles will be allowed to finish prior to relocation, so that existing fish stocks do not need to be transported between sites.

**New Development Proposals and Marine Licence Renewals adjacent to HPMAs**

There would be a requirement for public authorities to consider whether a proposed new activity taking place outside of a HPMA is capable of affecting the ecosystem within the HPMA. Any new information would either be reported within the Environmental Impact Assessment (EIA) if required, or as a separate HPMA assessment. It is assumed that the additional assessments will fall between 2030 and 2040 and the cost to the applicant of each assessment will be £5,600[71] at 2019 prices (uprated to current prices).

**Sterilisation of Potential Development Sites**

The designation of pHPMAs may result in the sterilisation of potential development sites, precluding development of new sites. This would represent an opportunity cost for the sector, which is not readily quantified. Lease option areas are not made public by Crown Estate Scotland until a developer has decided to progress a site and obtain the necessary licences and permissions. Such potential constraints are therefore recognised qualitatively in the assessment; it is not possible to quantify these potential impacts.

**Cost of Uncertainty and Delays**

The designation of HPMAs has the potential to increase the time taken to determine planning or marine licence applications and to negatively affect investor confidence. It is not possible to quantify these potential impacts.

[71] This figure is a notional amount to reflect the likelihood that some minor additional assessment and reporting will be required. It is based on industry knowledge and experience of writing such assessments, and it is considered that the majority of information required would already be prepared to inform the EIA / Environmental Report, therefore this additional cost is relatively minor. This figure is applied across all relevant sectors (with the exception of Ports and Harbours for which a separate industry-specific value is used). It represents an average value for the purposes of assessment and in practice the actual value incurred may be higher or lower.

### B.1.4 Limitations

- The number and location of future planning applications is uncertain;
- The size of current sites (and therefore costs of removing and relocating infrastructure) is uncertain, and in some cases relocation may not be possible;
- The potential for businesses to absorb costs may differ (e.g. large multinational companies vs small family-run enterprises), and may affect whether the impact results in a cost to business, or a loss of business.

# 2 Aquaculture – Shellfish and Seaweed

## B.1.5 Sector Definition

For the purposes of this assessment, shellfish and seaweed aquaculture relates to the production of marine shellfish or marine algae within aquaculture installations excluding cultivated shellfish beds which are covered under commercial fishing. It includes long-line cultivation of mussels and seaweeds and intertidal oyster cultivation.

## B.1.6 Sectoral Considerations for HPMAs

Aquaculture of any form, will not be permitted within HPMAs, therefore consents for new aquaculture sites will not be granted within HPMAs and, in the event of overlaps, any existing sites within HPMAs will need to relocate. Activity in areas above MLWS will not be affected as these areas will not be included within HPMAs.

The following potential impacts will require assessment:

- Removal of existing sites and associated infrastructure;
- Costs associated with relocation, including shore-based infrastructure;
- Additional assessment of new development proposals and marine licence renewals adjacent to HPMAs;
- Sterilisation of potential development sites;
- Cost of uncertainty and delays.

## B.1.7 Assessment Methods

**Removal of Existing Sites and Associated Infrastructure**

Removal of existing sites and associated infrastructure may incur costs associated with:

- Removal of infrastructure and materials located on the water;

- Removal of infrastructure and materials located onshore (if in an unsuitable location);
- Licensing costs for removal of infrastructure;
- Business closures and loss of employment (potentially associated with local coastal and rural communities).

Lease areas from Crown Estate Scotland will be used to identify the number of lease areas within a pHPMA that may be affected. On a per lease area basis, the costs associated with the above impacts will calculated using existing available information, as well as via consultation with the shellfish aquaculture sector and relevant statutory bodies. It is recognised that the costs are likely to vary between lease areas, and may be higher or lower than the estimated cost. The potential for business closures and loss of employment may only be possible to assess qualitatively. The likelihood of the risk will depend on the scale of impacts as well as site-specific factors.

**Costs associated with Relocation, including shore-based infrastructure**

The costs associated with relocating a shellfish or seaweed aquaculture site depends on a wide range of variables, in particular, on the availability of suitable alternative locations, the size of the enterprise, and the distance between the existing and new locations. Furthermore, even if relocation may be technically feasible, it may not be financially viable for aquaculture businesses.

Where there is potential for sites to be relocated outside of HPMAs, there will be costs associated with this process, including:

- Availability of suitable relocation sites outside of HPMAs;
- Marine licence applications and associated impact assessments and management plans for relocation sites;
- Transportation of mobile infrastructure and materials from previous site (including set-up at relocation site);

- Construction/purchasing/leasing of new onshore infrastructure at relocation site if required (roads, slipways, access, shorebase).

The shellfish and seaweed aquaculture sectors will be consulted with regarding the feasibility, viability and costs involved in relocating an aquaculture site. It is assumed that any production cycles will be allowed to finish prior to relocation, so that existing stocks do not need to be transported between sites.

**New Development Proposals and Marine Licence Renewals adjacent to HPMAs.**

There would be a requirement for public authorities to consider whether a proposed new activity taking place outside of a HPMA is capable of affecting the ecosystem within the HPMA. Any new information would either be reported within the Environmental Impact Assessment (EIA) if required, or as a separate MPA assessment. It is assumed that the additional assessments will fall in 2030 and 2040 and the cost of each assessment will be £5,600[72] at 2019 prices.

**Sterilisation of Potential Development Sites**

The designation of pHPMAs may result in the sterilisation of potential development sites, precluding development of new sites. This would represent an opportunity cost for the sector, which is not readily quantified. Lease option areas are not made public by Crown Estate Scotland until a developer has decided to progress a site and obtain the necessary licences and permissions. Such potential constraints are therefore recognised qualitatively in the assessment; it is not possible to quantify these potential impacts.

[72] This figure is a notional amount to reflect the likelihood that some minor additional assessment and reporting will be required. It is based on industry knowledge and experience of writing such assessments, and it is considered that the majority of information required would already be prepared to inform the EIA / Environmental Report, therefore this additional cost is relatively minor. This figure is applied across all relevant sectors (with the exception of Ports and Harbours for which a separate industry-specific value is used). It represents an average value for the purposes of assessment and in practice the actual value incurred may be higher or lower.

**Cost of Uncertainty and Delays**

The designation of pHPMAs has the potential to increase the time taken to determine planning applications and to negatively affect investor confidence. It is not possible to quantify these potential impacts.

## B.1.8 Limitations

- The level and location of future planning applications is uncertain;
- The size of current sites (and therefore costs of removing and relocating infrastructure) is uncertain, and in some cases relocation may not be possible;
- The potential for businesses to absorb costs may differ (e.g. large multinational companies vs small family-run enterprises), and may affect whether the impact results in a cost to business, or a loss of business.

# 3 Carbon Capture Utilisation and Storage

## B.1.9 Sector Definition

Carbon Capture Utilisation and Storage (CCUS) is a carbon abatement technology that will enable fossil fuels to be used with substantially reduced carbon dioxide ($CO_2$) emissions. CCUS combines three distinct processes: capturing the $CO_2$ from power stations and other industrial sources, transporting it (usually via pipelines) to storage points, then injection of the $CO_2$ into deep geological formations (e.g. deep saline formations or depleted oil and gas fields) for long term storage.

## B.1.10 Sectoral Considerations for HPMAs

Construction of new infrastructure associated with carbon capture utilisation and storage will not be permitted within HPMAs.

Existing oil and gas pipelines (which may be repurposed for $CO_2$ transportation in future) will be considered as part of the HPMA selection and assessment process, to avoid unnecessarily scoping out areas which may be suitable for designation as HPMAs. In the event of any overlap with proposed HPMAs, decisions on whether to include these areas within sites will be taken on a case-by-case basis, with advice from Nature Scot and JNCC. This could include consideration of the spatial extent of infrastructure within a proposed site (particularly in relation to more sensitive elements of the marine ecosystem) and the level and environmental impact of activity required for repairs and maintenance.

The following potential impacts pHPMAs may require assessment:

- Additional assessment costs to support marine licence determinations for new development proposals and repair and maintenance to carbon-capture-associated infrastructure within HPMAs;
- Obstruction/deviation of new pipeline routes;
- Sterilisation of potential development sites;
- Cost of uncertainty and delays.

## B.1.11 Assessment Methods

### Additional Assessment to Support Marine Licence Determinations

It is assumed that additional assessment will be required to determine the environmental impact of new CCUS sites outside of HPMAs, and for existing infrastructure within HPMAs. This will be necessary to support marine licence applications, as is the case for MPAs under the Marine (Scotland) Act 2010. This information would either be reported within the EIA if required, or as a separate HPMA assessment. It is assumed that the cost of this additional assessment will be £5,600 (at 2019 prices).

### Deviation of CCUS Pipelines to Avoid HPMAs

There may be potential for new CCUS pipelines to link into existing networks, however, pipeline routes and networks may need to deviate in order to avoid HPMAs. If deviation is required, there will be costs associated with consenting and the purchase, installation, and maintenance of such pipelines. The cost will be calculated based on an average cost per km of pipeline, using input from CCUS or the NSTA.

### Sterilisation of Potential Development Sites

Further consideration will be given to the potential socio-economic impacts of sterilisation of potential development sites in consultation with the Carbon Capture & Storage Association (CCSA). For sterilisation of seabed, the development potential of the saline aquifers, based on studies such as ACT Acorn (2008)[73], depleted oil and gas reservoirs (if spatial data are available), and additional data on the spatial extent of saline aquifers, potential CCS reservoirs and planned location of development will be considered. This will take into account the HM Government and OGA initial review of

[73] ACT Acorn, 2018. ACT Acorn Feasibility Study, D05 Site Selection Report, 10196ACTC-Reo-08-01, January 2018.

offshore assets which have the potential to be reused[74] and the British Geological Society $CO_2$ Stored database[75] of potential offshore $CO_2$ storage sites around the UK.

**Cost of Uncertainty and Delays**

The designation of pHPMAs has the potential to increase the time taken to determine planning or marine licence applications and to negatively affect investor confidence. It is not possible to quantify these potential impacts.

### B.1.12 Limitations

- The number and location of CCUS pipelines and installations that may be constructed during the assessment period is unknown. BEIS (2018)[76] sets out the ambition to deploy CCUS at scale during the 2030s, subject to the costs coming down sufficiently. However, there are no commercial-scale CCUS projects in the UK and uncertainty remains regarding the economic viability and the future location and scale of CCUS activity in the UK.
- CCC (2022)[77] noted the carbon capture, (use), and storage business model is showing initial signs of delay and progress on developing CCUS in manufacturing is now a year behind the Government's deployment pathway.

[74] BEIS (2020). Carbon Capture, Usage and Storage. A Government Response on Re-use of Oil and Gas Assets for Carbon Capture and Storage Projects. Accessed 6 July 2022.

[75] CO2 Stored. Accessed 6 July 2022.

[76] BEIS (2018). Clean Growth. The UK Carbon Capture Usage and Storage deployment pathway. An Action Plan.. Accessed 6 July 2022.

[77] CCC (2022). Progress in reducing emissions. 2022 Report to Parliament. June 2022. Accessed 6 July 2022.

# 4 Coast Protection and Flood Defence

## B.1.13 Sector Definition

This sector includes coastal defence measures used to prevent or reduce flood risk and coastal erosion[78]. Examples of coastal and flood defences include groynes, sea walls and embankments (termed 'hard engineering') and beach replenishment, managed retreat and coastal realignment (termed 'soft engineering').

## B.1.14 Sectoral Considerations for HPMAs

Coastal protection and flood defences are considered critical infrastructure, therefore associated activities will be permitted within HPMAs. Such activities may include maintenance or repair of existing infrastructure, as well as construction of new flood protection and coastal defences. The following potential impacts may require assessment:

- Additional assessment costs to support planning and licence applications for maintenance of existing/construction of new flood defence or coastal protection within pHPMAs;

## B.1.15 Assessment Methods

**Additional Assessment to Support Planning and Licence Applications**

Location of existing flood defences and coastal protection are identified from the Coastal Protection and Flood Defence Database layers on NMPi[79]. These layers show point data indicating the approximate location of the works rather than their full

[78] United Kingdom Marine Monitoring and Assessment Strategy (UKMMAS), 2010. Charting Progress 2 Feeder Report Productive Seas. Department for Environment Food and Rural Affairs on behalf of UKMMAS (Eds. Saunders, J. and McKie, J.) 472pp

[79] At the time of drafting, these were available on NMPi, but at the time of submitting the first draft, these no longer appeared to be available. Only the National Coastal Change Assessment is now available. An alternative data source is Eurosion coastline classification data, which gives a broader picture but is also deficient.

extent[80]. A buffer will be applied around the pHPMAs so that coastal and flood defences that lie above MLWS but adjacent to pHPMAs are identified.

It is assumed that each asset requires maintenance or construction works once every 20 years. It is assumed that these applications will require additional assessment of the potential environmental impacts on the HPMA, as required for MPAs under the Marine (Scotland) Act 2010. This information would either be reported within the EIA if required, or as a separate HPMA assessment. The cost of undertaking the additional assessment to support each planning application is estimated at £5,600 (at 2019 prices, uprated to current prices). For the purposes of this assessment, it is assumed that these assessments are carried out in 2035.

The location of future coastal protection and flood defence schemes is not known and therefore it is not possible to estimate the additional assessment costs for future defences. Where a pHPMA is in the inshore area and adjacent to the MWLS line, this will be recognised qualitatively as a potential cost.

### B.1.16 Limitations

- Spatial data on the location of coast protection and flood defence structures is of poor quality;
- Uncertainty concerning future maintenance and new construction requirements.

[80] However, the length of some coastal protection schemes since 2000 are provided in Marine Scotland (2011) Scotland's Marine Atlas: Information for The National Marine Plan. Accessed 26 August 2022.

# 5 Commercial Fisheries

## B.1.17 Sector Definition

For the purpose of this study, commercial fisheries relate to all commercial fishing activity within Scottish waters and includes the subsequent handling and processing of catches. In this study, commercial fishing activity includes wild salmon and sea trout fisheries.

## B.1.18 Sectoral Considerations for HPMAs

Commercial fishing of any kind will not be permitted within HPMAs. This includes fishing with static gear, mobile gear and hand collection by divers.

Transit of HPMAs by fishing vessels will be permitted. Fishing gear will need to be lashed and stowed on board while the vessel is within an HPMA boundary. There may be additional requirements at the individual site level for the purposes of monitoring and enforcement, such as minimum speed requirements for transiting sites.

The following potential impacts will require assessment:

- Exclusion of commercial fishing activity from HPMAs;
- Minimum speed requirement for transiting sites;
- Restriction on fixed engines and net and coble fisheries.

## B.1.19 Assessment Methods

**Exclusion of Commercial Fishing Activity from HPMAs.**

There will be a loss of access to existing fishing grounds as a result of being unable to fish within HPMAs, which may lead to a reduction in, or loss of, landings. There will be a need to take into account any restrictions on commercial fishing activity that have already been brought forward through NCMPA and SAC management measures to avoid double counting. Assessment of the cost to the commercial fisheries sector in terms of the loss of the value of landings is as follows:

**Step 1: Estimating the costs arising from proposed management scenarios – value of landings affected**. Due to the differences in data availability, this is carried out separately for under-12 m and over-12 m vessels.

For vessels over 12 m in length, this is assessed using Vessel Monitoring System (VMS) ping data linked to landings declarations for pelagic, demersal and shellfish species groups. Recorded landings for a vessel in a day are allocated across all of the vessel's VMS fishing pings on that day, where a 'fishing ping' is defined as one where the average speed since the previous ping is greater than zero and up to and including 5 knots for all gear types. VMS ping data are extracted by Marine Scotland and are estimates of landings value by area of capture. The ping data are then intersected with the pHPMA areas to calculate the value affected for each gear type.

For vessels 12 m and under, ICES rectangle landings data are used, pro-rated based on area or another measure that reflects the proportion of activity within the HPMA area compared with the whole ICES rectangle, derived by Marine Scotland from FISH1 forms (under10m vessels not in a Producer Organisation) or paper logbooks (10-12m vessels)..

For both under-12 m and over-12 m vessels, five years of data are used (the most recent five-year period for which data are available[81], excluding 2020 to avoid the effect of the coronavirus pandemic and Brexit market disruption to fishing activity), uprated to the assessment year prices using predicted GDP deflators and an annual average value calculated. A static baseline is used, assuming the same value of landings in each year of the assessment period.

The datasets include all UK-registered vessels. Impacts are attributed to Scottish vessels and Scottish ports through the analysis of Home District and Port of landing.

For non-UK vessels, value of landings and gear type information are not available. VMS ping data can be used to identify nationalities affected, the number of vessels

[81] Alternatively, the data used could be aligned with the data for the offshore and inshore MPA fisheries management measures SEIAs, likely to be 2015-2019 for both

in each case, and the average time fishing in each pHPMA (based on VMS pings within the pHPMA).

**Step 2: Displacement test**. The assessment of the potential for displacement of fishing effort is based on the criteria in McLeod (2014)[82], which applied a step-wise process of displacement tests comparing landings affected to landings in surrounding ICES rectangles and (Clean and Safe Seas Evidence Group, CSSEG) region. Should alternative specific guidance on assessing displacement in a quantitative and proportionate manner become available this will be considered as a potential alternative.

**Step 3: Convert value of landings to direct GVA impact.** Where there is a reduction in landings value, the impact on direct gross value added (GVA) is calculated for UK vessels based on fleet segment-specific GVA as a percentage of fishing turnover from the Seafish fleet economic performance dataset[83]. These will be calculated for relevant vessel lengths and gear types based on the most recent Seafish data at the time.

**Step 4: Calculate indirect and induced GVA, and employment effects**. A reduction in landings and direct GVA in the fishing sector can have knock-on effects on the sector's supply chain (indirect GVA impacts). This effect is estimated by applying the Type I GVA multiplier for sea fishing from the Scottish Government's Input-Output Tables and Multipliers[84]. The knock-on impacts of a change in household consumption (induced GVA) is estimated by applying the Type II GVA multiplier for sea fishing from the Scottish Government's Input-Output Tables and Multipliers. Reductions in direct and indirect employment, and in direct, indirect and induced employment, ae estimated by applying the Type I and Type II employment effects, respectively, for sea fishing from the Scottish Input-Output Tables and Multipliers.

[82] McLeod, M., 2014. Scottish MPA Project – Assessing the potential levels and effect of fisheries displacement as a consequence of possible management measures for future inshore Marine Protected Areas.

[83] Seafish - Fishing data and insight.

[84] Scottish Government Input-Output Tables.

**Step 5: Calculate the present value of impacts over the assessment period.** The average annual value of landings affected is assumed to be constant throughout the 20-year period of the assessment. Costs are calculated in current prices, discounted over the assessment period at a rate of 3.5%[85].

**Step 6: Disclosure analysis.** It is not permitted, for reasons of confidentiality, to disclose data on annual landings values that represent five or fewer vessels. In these cases, the value of affected gear types are aggregated together for presentation of results.

**Step 7: Consequential impacts to seafood processors**: Any significant impacts on seafood processors would arise from a change in the availability of landings, and therefore is dependent on the outcome of the assessment of the loss of access to traditional fishing grounds. The potential impact on seafood processors is identified for individual pHPMAs based on the landings ports that affected landings are made to. In addition, the impact across all pHPMAs on individual ports will be assessed based on the reduction in the value of landings to each Scottish port, in relation to the total value of landings to each port. This enables the analysis to reflect the fact that a reduction in a certain tonnage of landings to a small island port may have a greater impact on any associated processing activities at that port compared to a loss of the same value of landings to a larger port.

**Step 8: Identify and document other non-quantified costs and benefits.** Other costs and benefits that may arise from the management scenarios, but that have not been quantified, are identified and recorded in the Site Reports, such as impacts of displacement of fishing effort leading to increased costs and conflict with other fleet segments.

**Minimum speed requirement during HPMA transit.**

Fishing activity generally takes place at speeds below 6 knots, therefore the restriction of vessel speeds only has the potential to affect steaming time. For a

[85] 3.5% rate used based on HM Treasury Green Book Guidance (2017). Discounting is the technique of applying a discount rate to convert future monetary amounts to their equivalent value in today's terms, (based on the premise that people prefer to receive benefits in the present rather than in the future).

vessel travelling at 6 knots rather than 10 knots, this implies an additional 40 minutes steaming time on a one hour traverse.

The potential impact on steaming times is assessed based on the location of pHPMAs in relation to fishing ports. Travelling at lower speeds also reduces fuel consumption and will reduce fuel costs.

**Restriction on fixed engines and net and coble fisheries**

The impact on fixed engines and net and coble fisheries will be assessed based on the recorded locations of these fisheries (from NMPi), coupled with catch data, to estimate the potential reduction in landings values from these fisheries.

### B.1.20 Limitations

- Spatial resolution of data on under-12 m vessels is not sufficient for an accurate assessment of cost impacts to this fleet segment. Where Scotmap data, which relate to under-15 m vessels activity in 2007, are used to pro-rata the ICES rectangle landings value for under-12 m vessels to the pHPMA areas, this assumes that the pattern of activity of under-12 m vessels currently is similar to that for under-15 m vessels in 2007. If the distribution of effort differs significantly between these two vessel size groups, or has changed over time, this may over- or under-estimate the value of landings affected for under-12 m vessels. The Scotmap 'All gears' value layer was used to derive the proportions, which may over- or under-estimate the value for specific gears in some sites. Additionally, Scotmap was based on a survey which had low coverage in some regions.
- VMS pings occur at least every two hours, and therefore do not provide a complete picture of fishing activity. However, by using data over a five-year period this limitation is minimised. The process of averaging landings data across pings may result in landings values being over- or under-estimated for individual pings.

- The classification of gear types relies on the information reported in logbooks. Some gears may be wrongly classified, in particular mechanical dredges (DRB) may be classified as mechanised (suction) dredges (HMD).
- The extent to which displacement of fishing activity will occur (rather than loss of the value of landings), and the nature of displacement (areas or gear types to which effort might be displaced) is uncertain. The knock-on impacts in terms of environmental impacts, impacts on vessels affected and impacts on other vessels, are also uncertain. Displacement could result in additional environmental impacts, impacts on the vessels displaced, and on other vessels.
- As the value of future landings cannot be forecast, it is assumed that the value of landings is constant over time. The average value of landings per year estimated for each pHPMA is therefore assumed to be the same in each of the 20 years covered by the quantified assessment period. In reality, it is likely that the value of landings in each site would fluctuate over time, depending on regulations, quotas, and environmental influences, and hence the estimated loss in landings may underestimate or overestimate the true future value of landings. As the GVA and employment estimates are based on the value of affected landings the same limitation applies.
- Fishing patterns may have changed compared to the period from which data are used for the assessment, due to the introduction of fisheries management measures in MPAs and SACs, and the construction of offshore wind farms in particular.
- The quantification of cost impacts to the sector is restricted to UK vessels, as data on non-UK vessels are not available to allow assessment of impacts.

# 6 Energy Generation

## B.1.21 Sector Definition

The energy generation sector includes energy generation from conventional sources (coal, gas, nuclear, etc.) as well as offshore renewables (offshore wind, wave and tidal) and potential associated hydrogen production. Note, the extraction of oil and gas is considered under ‘Oil and Gas’ sector.

## B.1.22 Sectoral Considerations for HPMAs

Existing renewable energy developments, as well as any areas with option agreements or consents already in place for future renewable developments, will be excluded from the HPMA selection process so that overlaps do not occur. New developments will not be permitted within HPMAs.

In general, the construction of new subsea cables within HPMAs will not be allowed, with the following exceptions:

- The laying of new cables in relation to lifeline services to remote and island communities, such as, for example, power distribution cables or cables related to broadband/telecommunication services;
- The laying of new cables which are permitted in accordance with international law (UNCLOS).

For the limited instances where the laying of new cables are consented, the repair and maintenance of those cables can also be allowed on a case by case basis.

Existing active cables would not be compatible with HPMAs due to the infrastructure and activities associated with maintaining and repairing them. Existing active cables are excluded from the HPMA selection process as it would not be practical to move them.

Water abstraction (for example required for power station cooling) would not be allowed in HPMAs.

The following potential impacts may require assessment:

- Additional assessment costs to support marine licence determinations (for impacts of maintenance, repair, or removal, of existing infrastructure within pHPMAs, or for new developments within a buffer of pHPMAs);
- Deviation of cable routes to avoid HPMAs;
- Cost of uncertainty and delays.

### B.1.23 Assessment Methods

**Additional Assessment to Support Marine Licence Determinations**

It is assumed that additional assessment will be required to determine the environmental impact of new renewable energy sites within a buffer of pHPMAs, and for any existing infrastructure (cables) within HPMAs. This will be necessary to support marine licence applications, as is the case for MPAs under the Marine (Scotland) Act 2010. This information would either be reported within the EIA if required, or as a separate HPMA assessment. It is assumed that the cost of this additional assessment will be £5,600 (at 2019 prices).

**Deviation of Cable Routes to Avoid HPMAs**

It will be assumed that the cost to of having to deviate future cables around HPMAs is:

- Length of deviation (km) × Average cost cable laying per km (£/km)

The average cost of cable laying is assumed to be £1.06m per km (2013 prices) (based on Annex H14 of Defra, 2012), which will be uprated to current prices for the assessment.

**Sterilisation of Potential Development Sites**

The designation of pHPMAs may result in the sterilisation of potential development sites, precluding development of new sites. Whilst Scotwind and INTOG lease areas are expected to be scoped out of the site selection process, it is not yet clear whether draft plan option areas for wave and tidal energy will also be scoped out.

Sterilisation of potential development sites would represent an opportunity cost for the sector, which is not readily quantified. Such potential constraints are therefore recognised qualitatively in the assessment; it is not possible to quantify these potential impacts.

**Cost of Uncertainty and Delays**

The designation of pHPMAs has the potential to increase the time taken to determine licence applications and to negatively affect investor confidence. It is not possible to quantify these potential impacts.

### B.1.24 Limitations

- Uncertainty concerning scale and location of future development for offshore renewables, particularly the location and scale of offshore wave and tidal development within the Option Areas.

# 7 Military and Defence

## B.1.25 Sector Definition

Military and defence activities are a reserved matter under the responsibility of Ministry of Defence (MoD). The military and defence sector makes use of the Scottish coastline for the location of bases and training and use of the sea for training, test and evaluation activities and the surveillance and monitoring of waters to detect and respond to potential threats. In this assessment, military interests comprise the use of the coast and seas by the Royal Navy (submarine bases, jetties and exercise areas), Army (training camps and firing ranges), Royal Air Force (bases, coastal Air Weapon Ranges and Danger Areas) and Ministry of Defence (MOD) (Defence Test and Evaluation Ranges to trial weapon systems)[86].

## B.1.26 Sectoral Considerations for HPMAs

HPMAs will not be designated in some areas where Ministry of Defence (MoD) activities are carried out, such as areas of MoD estate and other infrastructure, and areas where it is possible to define the type and extent of activities at a suitable scale to allow their exclusion.

MoD activities relating to national security may need to go ahead within HPMAs. Where activities do need to go ahead, operators and planners will need to follow relevant environmental protection guidelines.

The following potential impacts may require assessment:

- Revision of Marine Environment and Sustainability Assessment Tool (MESAT) (and other MoD environmental tools) and additions to electronic charting by the Hydrographic Office; and
- Subsequent compliance with MESAT revisions.

[86] Baxter, J.M., Boyd, I.L., Cox, M., Donald, A.E., Malcolm, S.J., Miles, H., Miller, B., Moffat, C.F., (Editors), 2011. Scotland's Marine Atlas: Information for the national marine plan. Marine Scotland, Edinburgh.

## B.1.27 Assessment Methods

### Revisions To MESAT And Hydrographic Electronic Charts

Revisions to MESAT and hydrographic charts may be required with respect to undertaking military activities within or in proximity to HPMAs. The costs to MoD are assessed at a national level. It is assumed that the following costs are incurred:

- Initial revision of MESAT (and other MoD environmental tools) and additions to electronic charting by the Hydrographic Office are estimated to cost £25k at 2012 prices[87] (to be uprated to current prices). This cost would be incurred in 2026; and
- Additional annual maintenance costs are estimated to be £5k at 2012 prices[88] (to be uprated to current prices). This cost would be incurred annually from 2027.

### Compliance with MESAT Revisions

As MoD is operational throughout Scottish waters and as HPMAs are likely to be extensive, it is assumed that consideration of HPMAs will be undertaken as part of planning for all MoD maritime activities. It is estimated that the costs to MoD will be £11,100 per year in the first four years of the assessment period, reducing to £5,600 p.a. from year 5 onwards (at 2019 prices, to be uprated to current prices for the assessment)[89].

## B.1.28 Limitations

- Uncertainty concerning the location and scale of current or future activity.

[87] Defra, 2012. Designation of Marine Conservation Zones in English Inshore Waters and English and Welsh Offshore Waters. Impact Assessment. IA No: Defra 1475. December 2012

[88] ibid

[89] Defra, 2012. Designation of Marine Conservation Zones in English Inshore Waters and English and Welsh Offshore Waters. Impact Assessment. IA No: Defra 1475. December 2012

# 8 Oil and Gas

## B.1.29 Sector Definition

This sector relates to the extraction of oil and gas in the sub-sea environment largely from offshore reserves. Oil reserves include both oil and the liquids and liquefied products obtained from gas fields, gas-condensate fields and from the associated gas in oil fields. Gas reserves are the quantity of gas expected to be available for sale from dry gas fields, gas-condensate fields and oil fields with associated gas. For this assessment, activity within this sector includes exploration, production, interconnectors and gas storage (i.e. the 'upstream' oil and gas sector).

## B.1.30 Sectoral Considerations for HPMAs

The regulatory regime for licensing offshore petroleum installations and pipelines for oil and gas exploration and exploitation of oil and gas in the Scottish inshore and offshore regions is a reserved matter under the Scotland Act 1998, Schedule 5, Section D2. More generally, the authorisation and operation of oil and gas installations takes place in a complex regulatory environment, involving a mix of reserved and devolved responsibilities and authorities.

Activities associated with oil and gas exploration, extraction and storage, including any exploratory activity and the construction of new infrastructure should be avoided within HPMAs. The Scottish Government will work with the UK Government to avoid, wherever possible, these activities taking place within a HPMA.

Existing active oil and gas developments will be excluded from the HPMA selection process so that overlaps do not occur. New activity will not be consented, so any exploratory activity or construction of new infrastructure will therefore be excluded from the HPMA selection process so that overlaps do not occur. However, areas where there are existing active oil and gas pipelines, inactive pipelines and other inactive infrastructure such as plugged and abandoned wells will be considered as part of the HPMA selection and assessment process to avoid unnecessarily scoping out areas. In the event of any overlap of inactive infrastructure with proposed

HPMAs, decisions on whether to include these areas within sites will be taken on a case-by-case basis, with advice from Nature Scot and JNCC.

The following potential impacts may require assessment:

- Additional assessment costs to support licensing determinations (new development proposals, repair and maintenance, and decommissioning);
- Deviation of new pipelines around HPMAs;
- Sterilisation of potential development sites (i.e. exploration sites);
- Costs of uncertainty and delays.

### B.1.31 Assessment Methods

**Additional Assessment Costs to support Licensing Determinations (new development proposals, repair and maintenance, and decommissioning)**

It will be assumed that additional assessments may be required to determine the potential environmental impact (as required under the Marine (Scotland) Act 2010 for MPAs) by new oil and gas developments, decommissioning of existing infrastructure, and maintenance and repair of existing infrastructure within HPMAs. This information would either be reported within the EIA if required, or as a separate HPMA assessment. It is assumed that the cost of this additional assessment will be £5,600 (at 2019 prices, uprated to current prices).

The guidance notes for oil and gas surveys and shallow drilling (2005) state that an EIA is required for the following activities:

- Seismic surveys in sensitive sea areas such as Cardigan Bay, the English Channel, the Moray Firth, the St George's Channel and deep-water areas to the west and north of the United Kingdom.
- High resolution seismic site surveys, in sensitive areas as in bullet 1, above.
- Any other survey using airguns, waterguns or vibroseis in sensitive areas as in bullet 1, above.
- Any survey or shallow drilling that could have an effect on the integrity of a relevant site or other sensitive area, e.g. shallow drilling operations on a shallow sandbank habitat or seabed sampling operations near a reef habitat.

BEIS (2019) states that "under the EIA Regulations an application for consent for projects for which an ES will be required includes those where consent is sought for the getting of 500 tonnes or more of oil per day or 500,000 $m^3$ or more of gas per day otherwise than as a by-product of the drilling or the testing of any well; consent is sought for the construction of a pipe-line for the conveyance of petroleum". In addition, BEIS state that "applications for EIA Directions that an ES need not be prepared will be considered on a case-by-case basis, and whether the applications are approved or rejected will depend on a number of factors including the nature, timing and location of the project, the environmental sensitivity of the area and, most importantly, whether it is considered likely that the proposals will have any significant adverse impact." Therefore, it will be assumed here that EIAs will be required for these activities as the area in question is a proposed protected area. This is corroborated by Oil&Gas UK whom suggest that "in general, projects in near shore or sensitive areas will be expected to require an ES".

Oil and gas licences specify the duration of time permitted to undertake exploration and extraction. These deadlines are used in the assessment to estimate the years in which each activity (such as geophysical surveys or drilling) are likely to occur and hence, when the EIA is required.

The "Innovate" licence comprises three terms: the Initial term (which covers exploration; Second term (which covers the appraisal and field development planning); and the Third term (which covers development and production). The lengths of the first two

terms are flexible, with a maximum duration of 9 and 6 years respectively. The Third Term is granted for 18 years with potential extensions.

There are three Phases during the Initial Term:

- Phase A: For carrying out Geotechnical Studies and Geophysical Data Purchase and Reprocessing;
- Phase B: For Shooting New Seismic and acquiring other Geophysical Data (i.e. proprietary data);
- Phase C: For Drilling Exploration and/or Appraisal wells.

**Deviation of Pipelines Around HPMAs.**

It is unlikely that any new export pipelines would be constructed; rather any new developments would be likely to tie in to existing infrastructure. However, should new pipelines be required and have to deviate around pHPMAs, the cost will be assessed based on a cost per km of pipeline (to be obtained from consultation with industry), and the length of the deviation required.

**Sterilisation of Potential Development Sites**

The designation of pHPMAs may result in the sterilisation of potential development sites, precluding the development of new sites. This would represent an opportunity cost for the sector, which is not readily quantified. Such potential constraints are therefore recognised qualitatively in the assessment; it is not possible to quantify these potential impacts.

**Cost of Uncertainty and Delays**

The designation of the HPMAs has the potential to increase the time taken to determine licence applications and to negatively affect investor confidence. It is not possible to quantify these potential impacts.

### B.1.32 **Limitations**

- Uncertainty concerning the location, scale and timing of future development activity, particularly in later years of the assessment period; and
- Uncertainty concerning the cost impact of project delays associated with additional assessment requirements.

# 9 Ports and Harbours

## B.1.33 Sector Definition

Ports provide the modal interchange points by which goods and people are transported from land to sea. Harbours are, by definition, safe havens for vessels to reside and are often commensurate with port areas. Navigation channels and approaches undergo regular maintenance dredging to ensure safe navigation, and dredge material is often disposed of at sea in defined disposal sites. In addition, anchorage areas outside port areas provide areas for vessels waiting to access berths in the port.

## B.1.34 Sectoral Considerations for HPMAs

In the event of overlaps, it would not be feasible to relocate existing ports and harbours within HPMAs. HPMAs will therefore not be designated in areas that overlap with existing ports and harbours. This will include associated infrastructure and any associated areas which are dredged for navigational purposes and associated dredge deposit sites.

Development and construction of new ports, harbours and marinas will not be permitted within HPMAs. Disposal of waste from dredging associated with ports and harbours will not be permitted within HPMAs.

The following potential impacts may require assessment:

- Additional assessment costs for marine licence determinations (new development proposals, maintenance dredging and disposal);
- Cost of uncertainty and delays.

## B.1.35 Assessment Methods

**Additional Assessment Costs for Marine Licence Determinations (New Development Proposals, Maintenance Dredging and Disposal)**

Costs are assessed on the following assumptions:

- New development proposals and maintenance dredging and disposal will require additional assessment of impacts to protect the environment, as required for MPAs under the Marine (Scotland) Act 2010. This information would either be reported within the EIA if required, or as a separate HPMA assessment;
- Additional assessment costs for a licence application are estimated to be £7,600[90] (at 2019 prices, uprated to current prices);
- Costs are incurred by all major ports within 5km of pHPMAs or all non-major ports within 1km of pHPMAs; and
- All major ports submit development applications every 5 years starting in 2028 and all other ports submit development applications every 20 years starting in 2036.

**Cost of Uncertainty and Delays**

The designation of pHPMAs has the potential to increase the time taken to determine licence applications and to negatively affect investor confidence. It is not possible to quantify these potential impacts.

### B.1.36 Limitations

- The location, nature and timing of future port development activity is uncertain.

[90] Figure uprated from Defra, 2012. Designation of Marine Conservation Zones in English Inshore Waters and English and Welsh Offshore Waters. Impact Assessment. IA No: Defra 1475. December 2012. The figure for Ports and Harbours is higher than for other sectors to reflect that licence applications can be more complex in this sector, potentially combining a variety of construction activities as well as dredging).

# 10 Power Interconnectors and Transmission Lines

## B.1.37 Sector Definition

This sector is concerned with the transmission of power through submarine cables, including international, national and inter-island links. This assessment excludes power cables to/from individual developments (e.g. power supplies to oil and gas installations, export cables from offshore wind farms).

## B.1.38 Sectoral Considerations for HPMAs

In general, the construction of new subsea cables within HPMAs will not be allowed, with the following exceptions:

- The laying of new cables in relation to lifeline services to remote and island communities, such as, for example, power distribution cables or cables related to broadband/telecommunication services;
- The laying of new cables which are permitted in accordance with international law (UNCLOS).

For the limited instances where the laying of new cables are consented, the repair and maintenance of those cables can also be allowed on a case by case basis.

Existing active cables would not be compatible with HPMAs due to the infrastructure and activities associated with maintaining and repairing them. Existing active cables are excluded from the HPMA selection process as it would not be practical to move them.

The following potential impacts may require assessment:

- Additional assessment costs to support marine licence determinations;
- Deviation of new cable routes to avoid HPMAs;
- Cost of uncertainty and delays.

## B.1.39 Assessment Methods

### Additional Assessment Costs to Support Marine Licence Determinations

It is assumed that additional assessment will be required to provide information to the regulator concerning the potential environmental impact of new interconnectors and transmission projects, as required for MPAs under the Marine (Scotland) Act 2010. This information would either be reported within the EIA if required, or as a separate HPMA assessment. It is assumed that the cost of this additional assessment will be £5,600 (at 2019 prices, uprated to current prices).

### Deviation of Cable Routes to Avoid HPMAs

If deviation of cable routes is requires, it is assumed that the cost to of having to deviate future power interconnectors and transmission lines around HPMAs is:

- Length of deviation (km) × Average cost cable laying per km (£/km)

The average cost of cable laying will be assumed to be £1.06m per km (2013 prices) (based on Annex H14 of Defra, 2012), which will be uprated to current prices for the assessment.

Planned power interconnectors and any information on known/planned routes will be used to assess potential overlap with pHPMAs.

### Cost of Uncertainty and Delays

The designation of HPMAs has the potential to increase the time taken to determine licence applications and to negatively affect investor confidence. It is not possible to quantify these potential impacts.

## B.1.40 Limitations

- The number and location of interconnectors that may be constructed up to 2040 is uncertain and beyond 2040 is unknown.

# 11 Recreational Fishing

## B.1.41 Sector Definition

Recreational fishing is undertaken for the purposes of pleasure, tourism or sport, and it is illegal to sell any catch from this activity[91]. It takes place throughout Scottish waters and can be considered a year-round sport. It includes fishing from the shore and by boat (both private and charter). Scotland does not require licences for recreational fishing[92]; however, there may be restrictions on certain target species (e.g. sea bass).

## B.1.42 Sectoral Considerations for HPMAs

It is intended that recreational fishing of any kind will not be allowed within HPMAs. This will include all fixed engine fisheries, net and coble fisheries, creel fisheries, rod and line fisheries (including catch and release) and hand gathering operating in areas below MLWS.

Recreational fishing in areas above MLWS will not be affected as these areas will not be included within HPMAs.

The following potential impacts may require assessment:

- Restriction on sea fishing in HPMAs (below MLWS), including restriction on catch and release;
- Restriction on shore fishing below MLWS, including restriction on catch and release.

[91] UK Government, 2022. Guidance on Commercial and recreational fishing

[92] Scottish Government. Salmon and recreational fisheries

## B.1.43 Assessment Methods

**Restriction on sea fishing in HPMAs (below MLWS)**

The potential economic cost of the loss of marine space for recreational sea fishing can be estimated based on the total reduction in expenditure/loss of income. This can be roughly calculated by multiplying the percentage loss of area within 6 NM, by the estimated value of boat-based sea fishing in the relevant region (derived from Radford et al., 2009[93], and uprated to current prices). If more specific information about sea fishing locations within HPMAs are known, then more accurate analysis may be possible of the scale of activity within the site and, based on the availability of alternative locations, the potential for it to relocate.

Potential impacts on other types of recreational fishing which can occur around Scotland's coast, including fixed engine fisheries, net and coble fisheries, and creel fisheries, will also be considered.

**Restriction on shore fishing below MLWS**

The potential economic cost of the loss of shoreline space for recreational sea fishing can be estimated based on the total reduction in expenditure/loss of income. However, the nature of restrictions on shore fishing into waters above or below MLWS is unclear, as only the latter would be restricted by an HPMA. This could be roughly calculated by multiplying the percentage loss of mainland shoreline by the value of shore-based fishing in the relevant region (derived from Hyder et al., 2021[94]). If more specific information about shoreline sea fishing locations within HPMAs are known, then more accurate analysis may be possible of the scale of activity within the site and, based on the availability of alternative locations, the potential for it to relocate.

[93] Radford, A., Riddington, G. and Gibson, H., 2009. Economic Impact of Recreational Sea Angling in Scotland. Prepared for the Scottish Government. July 2009. ISBN: 978-0-7559-8130-4.

[94] Hyder K, Brown A, Armstrong M, Bell B, Alison Hook S, Kroese J, & Radford Z, 2021. Participation, effort, and catches of sea anglers resident in the UK in 2018 & 2019. CEFAS.

### B.1.44 Limitations

- In general, data on the distribution and intensity of marine water sport activities (including recreational fishing) is limited. In the Scottish Marine Recreation and Tourism Survey[95], it was noted that the survey was not a random survey of the whole population, and therefore, the survey results may be biased and should be treated with caution. Furthermore, the smaller number of responses covering remoter parts of Scotland means that spatial information for areas such as the Western Isles and Shetland is likely to be partial.
- If recreational fishing is not permitted in an area, there may be implications for health and wellbeing which will be taken into account in the ecosystem services assessment.

[95] Land Use Consultants (LUC), 2016. Scottish marine recreation and tourism survey 2015. Final report prepared by LUC, March 2016.

# 12 Recreational Boating

## B.1.45 Sector Definition

For the purpose of this study, recreational boating is considered to include recreational activities undertaken in medium and large sailing vessels, yachts, powerboats and motorboats. Information on small sailing boat activity such as dinghies (usually taken out of water at end of use) and other types of water sports are covered under water sports. It is possible that general tourism values may overlap with values specifically associated with recreational activities. General tourism is described separately in Appendix B.16. There is some possibility of a degree of double counting using this approach but not to the extent that it materially affects the results of the study.

## B.1.46 Sectoral Considerations for HPMAs

Recreational motor and sail vessels (excluding those partaking in recreational fishing), personal watercrafts and windsurfing will be permitted within HPMAs at 'non-damaging levels', therefore, there may be restrictions to minimise impact on HPMAs. HPMAs may also impact future marina developments. The following potential impacts may require assessment:

- Restrictions on anchoring (spatial, at 'non-damaging' levels, or anchor size/type);
- Vessel number restrictions (at 'non-damaging' levels);
- Additional assessment costs for marine licence determinations for marinas.

## B.1.47 Assessment Methods

**Vessel Speed Restrictions**

It is assumed that RYA (Scotland) is required to disseminate information regarding any speed restrictions at a cost of £1,000 per site. It is assumed that compliance

with speed restrictions does not impose any significant cost on recreational boaters or the supply chain.

**Restrictions on Anchoring**

Restrictions on anchoring may be spatial, restrictions on numbers of vessels allowed to anchor in an area, or restrictions on the size/type of anchor allowed in an area. If vessels have to change to a different anchor type, the cost to individual operators could be assessed based on the cost per anchor and an estimate of the number of vessels potentially affected. If anchoring is not permitted in an area (and assuming that other alternatives such as eco-moorings are not permitted to be installed), it is not possible to quantify the impact of this, although the implications for health and wellbeing will be taken into account in the ecosystem services assessment.

**Vessel (and/or People) Number Restrictions**

Restrictions on the numbers of vessels that can use an area will be noted qualitatively; it is not possible to quantify this impact.

**Additional Assessment Costs to Inform Marine Licence Determinations for Marinas**

It will be assumed that additional assessment will be required to provide information to the regulator concerning the potential environmental impact of new marinas, as required for MPAs under the Marine (Scotland) Act 2010. This information would either be reported within the EIA if required, or as a separate HPMA assessment. It is assumed that the cost of this additional assessment will be £5,600 (at 2019 prices, uprated to current prices). The location of existing marinas in relation to pHPMA sites and a 1 km buffer will be assessed using spatial data, and assumptions on the number of licence applications during the assessment period will be developed.

## B.1.48 Limitations

- Future trends in recreational boating activity are uncertain.

# 13 Seabed Mining

## B.1.49 Sector definition

This sector relates to the extraction of minerals from the seabed and novel chemicals derived from the genetic diversity of marine life[96]. This can include seabed mining in the deep sea, which is defined as oceans that are more than 500m deep. Valuable minerals can be found at or near the surface of the seabed with a potential to yield economic benefits

## B.1.50 Sectoral Considerations for HPMAs

Seabed mining is a reserved matter, so cannot be regulated by the Scottish Parliament. The Scottish Government intends to work with the UK Government to avoid these activities taking place in HPMAs.

The timing and location of any future mining developments is unknown. However, the Government Office for Science recently suggested that commercial exploitation in the UK EEZ is uncertain. For the purposes of this assessment, it is assumed that seabed mining is unlikely to occur in the short-term, but exploration activities may occur towards the end of the assessment period. The following potential impacts may require assessment:

- Additional assessment costs for marine licence determinations;
- Sterilisation of potential development sites.

## B.1.51 Assessment Methods

**Additional Assessment Costs for Marine Licence Determinations for New Seabed Mining Activities Outside of HPMAs**

[96] Taormina, B., et al. 2018. Ibid.

It will be assumed that additional assessment will be required to provide information to the regulator for any licence applications concerning the potential environmental impact of seabed mining, as required for MPAs under the Marine (Scotland) Act 2010. This information would either be reported within the EIA if required, or as a separate HPMA assessment. It is assumed that the cost of this additional assessment is £5,600 (at 2019 prices, uprated to current prices).

Mining within UK waters is considered unlikely, given the exploration costs. However, given that there are potential opportunities in UK waters, it is assumed that one exploration licence application will be made at the end of the assessment period. This location of the application is considered based on the location of potential mineral deposits found.

**Sterilisation of Potential Development Sites**

The designation of pHPMAs may result in the sterilisation of potential development sites, precluding the development of new sites. This would represent an opportunity cost for the sector, which is not readily quantified. Such potential constraints are therefore recognised qualitatively in the assessment; it is not possible to quantify these potential impacts.

### B.1.52 Limitations

- The potential for domestic UK EEZ seabed exploration and mining activities is unknown;
- The timing and location of any exploration activities is unknown.

# 14 Shipping

## B.1.53 Sector Definition

Shipping provides for the transport of freight and passengers both within Scottish waters and internationally. Commercial shipping routes can be split into two distinct types; transiting vessels passing through Scottish waters and vessels with either their origin or destination port within Scotland. Anchorages are covered under Ports and Harbours.

## B.1.54 Sectoral Considerations for HPMAs

Shipping and ferries will not be impacted by HPMAs. Right of innocent passage and freedom of navigation is enshrined in international law (UNCLOS). Therefore, there will not be a need for deviation of shipping routes. The following potential impacts may require assessment:

- Restrictions on discharge of waste material and ballast water

# 15 Telecommunication Cables

## B.1.55 Sector Definition

This sector relates to fibre optic submarine telecommunication cables, which carry telephone calls, internet connections and data as part of national and international data transfer networks utilised for the majority of international communication transmissions.

## B.1.56 Sectoral Considerations for HPMAs

Wherever possible activities associated with subsea cables (including telecommunication cables) should be avoided within HPMAs. In general, the construction of new subsea cables within HPMAs will not be allowed, with the following exceptions:

- The laying of new cables in relation to lifeline services to remote and island communities, such as, for example, power distribution cables or cables related to broadband/telecommunication services;
- The laying of new cables which are permitted in accordance with international law (UNCLOS).

For the limited instances where the laying of new cables are consented, the repair and maintenance of those cables can also be allowed on a case by case basis.

Existing active cables would not be compatible with HPMAs due to the infrastructure and activities associated with maintaining and repairing them. Existing active cables are excluded from the HPMA selection process as it would not be practical to move them.

The following potential impacts may require assessment:

- Additional assessment costs to support marine licence determinations for laying new telecommunication cables (to provide critical infrastructure or lifeline services) within HPMAs;

- Deviation of telecommunication cable routes to avoid HPMAs.

## B.1.57 Assessment Methods

The timing and location of telecom cable replacements is uncertain. For the purposes of this assessment, it is assumed that 50% of existing cables will require replacement at some point in the assessment period. For reasons of simplicity, it is assumed that all replacements will be initiated in 2030 and that the costs for replacement at each site (comprising additional assessment costs for marine licence determinations, and deviation of cable routes to avoid pHPMAs) will be halved (to account for not all telecom cables requiring replacement during the assessment period). While this approach ensures that the national total cost is consistent with the assumptions, for individual sites the costs will be over or underestimated depending on whether cable replacement or repair and maintenance takes place at those specific sites.

**Additional Assessment to Support Marine Licence Determinations**

It is assumed that additional assessment will be required to provide information to the regulator concerning the potential environmental impacts of telecom cable activities, as required for MPAs under the Marine (Scotland) Act 2010. This information would either be reported within the EIA if required, or as a separate HPMA assessment. It is assumed that the cost of this additional assessment will be £5,600 (at 2019 prices, uprated to current prices). It is assumed that these assessments are carried out in 2030.

**Deviation of Telecommunication Cable Routes to Avoid HPMAs**

Where telecommunication cables require replacement, it is assumed that the new cable will need to deviate around the HPMA. The average cost of cable laying is assumed to be $90,000 per km (2014 prices) (based on IBT, 2014), which will be uprated to current prices and converted to GBP for the assessment. For any pHPMA scoped into the assessment, the cost to the sector of having to ‘detour’ a future telecom cable around a site is assessed as:

Length of deviation (km) × Average cost cable laying per km (£/km)

It is assumed that half of cables will require replacement; consistent with assumptions above, the cost for each site will be halved. While this approach ensures that the national total cost is consistent with the assumptions, for individual sites the costs will be over or underestimated depending on whether cable replacement takes place at those specific sites.

### B.1.58 Limitations

- The number and location of new telecom cables is uncertain; and
- The timing and location of cable replacements is uncertain.

# 16 Tourism and Leisure

## B.1.59 Sector Definition

Tourism can be defined as ‘a stay of one or more nights away from home for holidays, visits to friends or relatives, business/conference trips or any other purposes excluding activities such as boarding education or semi-permanent employment’ (VisitScotland). Tourism and leisure is defined to also include day trips of more than 3 hours (door to door), in line with definitions used in work for ONS[97]. They cover any recreational activity that makes use of the marine environment and intertidal coastal zones[98].

Both non-motorised (walking/picnicking) and motorised (boat-based tourism e.g. wildlife viewing) activities can be included in marine and coastal tourism. Recreational boating and water sports activities are considered as separate sectors (see B.12 and B.16). For this assessment, tourism is defined as relevant activities not already included within recreational boating and water sports, to avoid double counting.

Local water-based recreation activity is included under water sports. Local land-based coastal recreation, which can include a range of activities such as walking along the sea-front to sea-side based horse riding, are assumed to be excluded from this analysis as they would either take place above MLWS, and/or be captured under recreational boating or water sports.

## B.1.60 Sectoral Considerations for HPMAs

Many marine tourism activities are low impact and will be able to continue within HPMAs, with management measures potentially needed to ensure this is at ‘non-damaging’ levels. The following potential impacts may require assessment:

[97] eftec, CEH, SQW and ABPmer (2019) The Ecosystem Contribution to Tourism and Outdoor Leisure. Report to Defra.

[98] Benfield, S and McConnell, S, 2007. Marine and Coastal Visitor Management, Public Engagement and Interpretation in Argyll and the Islands: the way forward. Marine and Coastal Development Unit, Argyll & Bute Council, 2007, pp1-145.

- Vessel speed restrictions, restrictions on numbers/frequency/size of vessels for Marine wildlife watching;
- Comply with codes of practice/best practice.

### B.1.61 Assessment Methods

**Vessel Speed Restrictions, Restrictions on Numbers/Frequency/Size of Marine Wildlife Watching Vessels Within HPMAs**

Given that vessels related to tourism activities are often intending to seek out and view wildlife, it is expected that speeds are unlikely to be considerably more than 6 knots, and that the distances travelled will not usually be large, therefore vessel speed restrictions will have minimal impact. Therefore, there is assumed to be little or no additional cost to tourism activities associated with this vessel speed restrictions.

Restrictions on numbers of vessels, or frequency of visits may affect the level of wildlife watching activity. If this has the effect of reducing current levels, the cost impacts will be assessed in consultation with operators. If restrictions are above the current level, this will reflect a potential future opportunity cost that is not possible to quantify.

If vessel size restrictions are introduced that would have the effect of excluding existing operators' vessels, the potential cost impacts will be assessed in consultation with operators.

There could also be a positive impact that HPMAs allow recovery of marine ecosystems and increase the opportunities for visitors to observe marine species, thereby expanding the locations/ marine capacity for wildlife-watching activity. This will be assessed through the ecosystem services assessment.

**Comply with Codes of Practice/Best Practice**

This relates principally to wildlife tour operators who it is assumed are already following Codes of Practice/Best Practice

### B.1.62 Limitations

- Uncertainty surrounding impact of reducing speeds, and limitations on numbers/frequency/size of vessels to wildlife tour operators.

# 17 Water Sports

## B.1.63 Sector Definition

Water sports are recreational activities undertaken on or immersed in a body of water. The main marine water sports undertaken in Scotland are surfing, windsurfing, sea kayaking, small sail boat activities (such as dinghy sailing) and scuba diving[99]. Recreational boating activity by larger vessels such as yachts is covered separately in Appendix B.12, recreational fishing is covered in Appendix B.11, and tourism is covered in Appendix B.16).

## B.1.64 Sectoral Considerations for HPMAs

The majority of water sports will be permitted within HPMAs at 'non-damaging' levels. Potential impacts may require assessment and introduction of restrictions of water sports to 'non-damaging' levels. For example through:

- Restrictions to 'non-damaging' levels and vessel speed restrictions;
- Follow existing codes of practice/best practice.

There could also be a positive impact that HPMAs allow recovery of marine ecosystems and increase the opportunities for recreational enjoyment of marine species, thereby increasing benefits from marine recreation. This will be assessed through the ecosystem services assessment.

## B.1.65 Assessment Methods

**Restrictions of Water Sports to 'Non-Damaging' Levels and Vessel Speed Restrictions in HPMAs**

Where spatial restrictions are implemented on activities, or restrictions on numbers of vessels/people participating in activities within HPMAs, this may result in reduced water sports activity. If this has the effect of reducing current levels, the cost impacts

[99] LUC (2016). Scottish Marine Recreation and Tourism Survey, 2015. Prepared for Marine Scotland, March 2016.

will be assessed based on assumptions about how much the activity might reduce by, and estimates of the value of recreational activities. Where this affects individuals' voluntary participation in activities, the implications for reduced recreational enjoyment, health and wellbeing will be taken into account in the ecosystem services assessment. If restrictions are above the current level, this will reflect a potential future opportunity cost that is not possible to quantify.

Vessel speed and/or noise restrictions may be required in some areas. For some water sports vessels it is expected that noise or speeds are unlikely to be considerably more than 6 knots, and therefore this will have minimal impact. For vessels that travel faster (e.g. boats taking scuba divers to dive sites), the speed restriction will increase the transit time, but travelling at lower speeds also reduces fuel consumption and will reduce fuel costs. It is therefore assumed that there is little or no additional cost to these water sports activities associated with this restriction. For water sports that rely on higher vessel speeds (e.g. waterskiing, jetskis), they may not be allowed to continue, and will be assessed on a case-by-case basis.

**Follow Existing Codes of Practice/Best Practice including Scottish Marine Wildlife Watching Code (SMWWC) and Wildlife Safe (WiSe) Scheme**

This relates principally to commercial operators who are already assumed to be following best practice, therefore there is no additional cost associated with this.

### B.1.66 Limitations

- In general, data on the distribution and intensity of marine water sports activities is limited. In the Scottish Marine Recreation and Tourism Survey[100], low response rates to the survey for a minority of activities mean that some spatial information is incomplete. Furthermore, the smaller number of responses covering remoter parts of Scotland means that spatial information for areas such as the Western Isles and Shetland is also likely to be partial.
- Participation rates and location of future water sports activities are uncertain.

[100] Land Use Consultants (LUC), 2016. Scottish marine recreation and tourism survey 2015. Final report prepared by LUC, March 2016.

# Appendix C Site Assessment Tables Template

## C.2 Site name

### C.2.1 Summary of Proposed HPMA (pHPMA)

**Site (marine) Extent (km$^2$): XXX**

| **Table 1. Summary of Proposed HPMA** | **Site code: XXX** |
|---|---|
| **Justification for site selection** | |
| | |
| References: | |

## C.2.2 **Summary of Costs and Benefits**

| **Table 2. Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an HMPA (Over 20 years inclusive at present values)** | | | **XXX** |
|---|---|---|---|
| **Human Activity** | **Cost Impact on Activity** | | |
| | **Lower Estimate (£k)** | **Intermediate Estimate (£k)** | **Upper Estimate (£k)** |
| **Quantified Economic Costs (Discounted)** | | | |
| Aquaculture (Finfish) | | | |
| Aquaculture (Shellfish and Seaweed) | | | |
| Carbon Capture and Undersea Storage | | | |
| Coastal Protection and Flood Defence | | | |
| Commercial Fisheries (GVA) | | | |
| Energy Generation | | | |
| Military and Defence | | | |
| Oil and Gas | | | |
| Ports and Harbours | | | |
| Power Interconnectors and Transmission Lines | | | |
| Recreational Fishing | | | |
| Recreational Boating | | | |
| Seabed Mining | | | |
| Shipping | | | |
| Telecommunication Cables | | | |
| Tourism | | | |
| Water Sports | | | |
| **Total Quantified Economic Costs** | | | |
| **Total Quantified Economic Costs (GVA)** | | | |

| **Non-Quantified Economic Costs** | | | |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| **Note:** For detailed information on economic cost impacts on activities, see Table X. | | | |

## C.2.3 **Human Activity Summaries**

**Site-Specific Economic Costs on Human Activities arising from the Designation and Management of the Site as an HPMA (over 20 years inclusive)**

| **Table 3x (a, b, d…): Human Activity (repeated for each human activity/sector affected)** | | | | **xxx** |
|---|---|---|---|---|
| Summary of human activity | | | | |
| **Economic Impacts Arising from the Designation and Management of the Site (Over 20 years inclusive)** | | | | |
| | | **Lower Estimate** | **Intermediate Estimate** | **Upper Estimate** |
| Assumptions for impacts | | | | |
| One-off impacts (on-site) | | | | |
| Recurring impacts (on-site) | | | | |
| Description of non-quantified impacts | On-site | | | |
| | Off-site | | | |
| **Quantified Impacts arising from the Management Scenarios for the Site (over 20 years inclusive) (deriving from on-site impacts)** | | | | |
| **Cost Impacts (£000s)** | | | | |
| Total costs (20 years) | | | | |
| Average annual costs | | | | |
| Present value of total costs (20 years) | | | | |
| **Economic Impacts (where relevant)** | | | | |
| **Direct GVA (£000s)** | | | | |
| Total change in GVA (20 years) | | | | |
| Average annual change in GVA | | | | |

| | | | |
|---|---|---|---|
| Present value of total change in GVA (20 years) | | | |
| **Direct + Indirect GVA (£000s)** | | | |
| Total change in GVA (20 years) | | | |
| Average annual change in GVA | | | |
| Present value of total change in GVA (20 years) | | | |
| **Direct, Indirect + Induced GVA (£000s)** | | | |
| Total change in GVA (20 years) | | | |
| Average annual change in GVA | | | |
| Present value of total change in GVA (20 years) | | | |
| **Employment (FTEs)** | | | |
| Direct and indirect reduction in employment | | | |
| Direct, indirect and induced reduction in employment | | | |

Definitions of cost and economic impacts:

Total costs = Sum of one-off costs and recurring costs for the site summed over the 20 year period.

Average annual costs = Total costs divided by the total number of years under analysis (i.e. 20).

Present value of total costs = Total costs discounted to their current value, using a discount rate of 3.5%.

Total change in GVA (20 years) = The change in GVA (direct/indirect/induced as appropriate) for commercial fisheries summed over the 20 year period.

Average annual change to GVA = Total change in GVA (direct/indirect/induced as appropriate) for commercial fisheries divided by the total number of years under analysis (i.e. 20).

Present value of total change in GVA (20 years) = Total change in GVA (direct/indirect/induced as appropriate) for commercial fisheries discounted to current value, using a discount rate of 3.5%.

Direct, indirect reduction in employment = The average (mean) reduction in direct employment in the sector in full-time equivalents (FTEs), and indirect reduction in employment on the sector's suppliers.

Direct, indirect and induced reduction in employment = The average (mean) reduction in employment in the sector, the sector's suppliers and across the economy as a whole as a result of reduced expenditure by employees and suppliers.

**Human activities that would benefit from designation and management of the site as an HPMA**

| Table 4. Human Activities that would Benefit from Designation and Management of the Site as an MPA | | | | XXX |
|---|---|---|---|---|
| **Activity** | **Description** | **Lower Estimate** | **Intermediate Estimate** | **Upper Estimate** |
| | | | | |
| | | | | |

**Human activities that would be unaffected by designation and management of the site as an HPMA**

| Table 5. Human Activities that would be Unaffected by Designation and Management of the Site as an HPMA | XXX |
|---|---|
| **Activity** | **Description** |
| | |
| | |
| | |

## C.2.4 Social and Distributional Analysis of Impacts arising from the Designation and Management of the Site as an HPMA (over 20 years inclusive)

| Table 6a. Social Impacts Associated with Quantified and Non-Quantified Economic Impacts | | | XXX |
|---|---|---|---|
| **Potential Economic Impacts** | **Area of Social Impact Affected** | **Mitigation** | **Significance of Social Impact** |
| | | | |
| | | | |
| | | | |
| Impacts: xxx – significant negative effect; xx – possible negative effects; x – minimal negative effect, if any; 0 – no noticeable effect expected. | | | |

| Table 6b. Distribution of Social Impacts (Location, Age and Gender) | | | | | | | | | XXX |
|---|---|---|---|---|---|---|---|---|---|
| **Sector/Impact** | **Scale of Impact by location** | | | **Age** | | | **Gender** | | |
| | **Region** | **Ports*** | **Rural, Urban, Mainland or Island** | **Childrden** | **Working age** | **Pensionable Age** | **Male** | **Female** | |
| | | | | | | | | | |
| | | | | | | | | | |
| Impacts: xxx/+++ – significant negative/positive effect; xx/++ – possible negative/positive effects; x/+ – minimal negative/positive effect, if any; 0 – no noticeable effect expected.<br>* Based on value of landings by home or landing port affected under intermediate estimate (upper estimate in brackets) | | | | | | | | | |

| Table 6c. | Distribution of Social Impacts (Fishing Groups, Income Groups and Social Groups) | | | | | | | XXX |
|---|---|---|---|---|---|---|---|---|
| Sector / Impact | Fishing Groups | | Income Groups | | | Vulnerable Social Groups | | |
| | Vessel Category <12 m >12 m | Gear Types/ Sector | 10% most deprived | Middle 80% | 10% most affluent | Crofters | Ethnic minorities | With disability or long-term sick |
| | | | | | | | | |
| | | | | | | | | |
| Impacts: xxx/+++ – significant negative/positive effect; xx/++ – possible negative/positive effects; x/+ – minimal negative/positive effect, if any; 0 – no noticeable effect expected. | | | | | | | | |

## C.2.5 **Public Sector Costs**

| **Table 7. Site-Specific Public Sector Costs arising from the Designation and Management of the Site as an HPMA (over 20 years inclusive)** | | | **XXX** |
|---|---|---|---|
| **Description** | **Public Sector Costs** | | |
| | **Lower Estimate (£k)** | **Intermediate Estimate (£k)** | **Upper Estimate (£k)** |
| **Quantified Public Sector Costs (Total, not discounted unless otherwise specified)** | | | |
| | | | |
| | | | |
| | | | |
| **Total Quantified Public Sector Costs (20 years)** | | | |
| **Average annual costs** | | | |
| **Present value of total costs (20 years)** | | | |

## C.2.6 Potential contribution of the site to an ecologically-coherent network

| Table 8. | Overview of HPMA contribution to an ecologically coherent network | X<br>X<br>X |
|---|---|---|
| | | |
| Detail of table to be developed based on Network Level Assessment when available, but may include:<br>- Ecological representation<br>- Spatial coverage<br>- Degraded vs more natural areas<br>- Complementary to existing MPA network<br>Ecological resilience and adaptation to climate change (including connectivity and biogeographical differences) | | |
| References: | | |

## C.2.7 **Anticipated Impacts on Ecosystem Services**

| **Table 9a. Summary of Ecosystem Services Benefits arising from the Designation and Management of the Site as an HPMA (Over 60 years inclusive)** | | | | | | | | | **XXX** |
|---|---|---|---|---|---|---|---|---|---|
| **Ecosystem Service** | **Relevance to Site** | **On-site / Off-site** | **Baseline Level** | **Estimated Impacts of Management** | | | **Value Weighting** | **Scale of Benefits** | **Confidence** |
| | | | | **Lower** | **Intermediate** | **Upper** | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| **Total value of changes in ecosystem services** | | | | | | | | | |

| **Table 9b. Summary of Ecosystem Services Costs arising from the Designation and Management of the Site as an MPA (Over 60 years inclusive)** | | | | | | | | | **XXX** |
|---|---|---|---|---|---|---|---|---|---|
| **Ecosystem Service** | **Relevance to Site** | **On-site / Off-site** | **Baseline Level** | **Estimated Impacts of Management** | | | **Value Weighting** | **Scale of Costs** | **Confidence** |
| | | | | **Lower** | **Intermediate** | **Upper** | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| **Total value of changes in ecosystem services** | | | | | | | | | |

# Appendix D Abbreviations

| | |
|---|---|
| AIS | Automatic Identification System |
| BEIS | Department for Business, Energy and Industrial Strategy |
| BRIA | Business and Regulatory Impact Assessment |
| CCC | Climate Change Committee |
| CCSA | Carbon Capture and Storage Association |
| CCUS | Carbon Capture Utilisation and Storage |
| CSSEG | Clean and Safe Seas Evidence Group |
| DRB | Boat Dredge |
| EEZ | Exclusive Economic Zone |
| EIA | Environmental Impact Assessment |
| GDP | Gross Domestic Product |
| GVA | Gross Value Added |
| HMD | Mechanised Dredge |
| HPMA | Highly Protected Marine Area |
| INTOG | Innovation and Targeted Oil and Gas |
| IUCN | International Union for the Conservation of Nature |
| ICES | International Council for the Exploration of the Sea |
| JNCC | Joint Nature Conservation Committee |
| MESAT | Marine Environment and Sustainability Assessment Tool |
| MLWS | Mean Low Water Springs |
| MoD | Ministry of Defence |
| MPA | Marine Protected Area |
| NCMPA | Nature Conservation Marine Protected Area |
| NEA | National Ecosystem Assessment |
| NMPi | National Marine Plan interactive |
| NSTA | North Sea Transition Authority |
| OABM | Other Area Based Management |
| OGA | Oil and Gas Authority |
| ONS | Office for National Statistics |
| PEXA | Practice and Exercise Areas |
| pHPMA | Proposed Highly Protected Marine Area |
| RYA | Royal Yachting Association |

| | |
|---|---|
| SA | Sustainability Appraisal |
| SAC | Special Area of Conservation |
| SEA | Strategic Environmental Assessment |
| SEIA | Social and Economic Impact Assessment |
| SMWWC | Scottish Marine Wildlife Watching Code |
| SPA | Special Protection Area |
| SSSI | Site of Special Scientific Interest |
| UKHO | UK Hydrographic Office |
| UNCLOS | UN Convention on the Law of the Sea |
| VMS | Vessel Monitoring System |
| WiSe | Wildlife Safe |

Cardinal points/directions are used unless otherwise stated.

SI units are used unless otherwise stated.

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