Department
for Environment
Food & Rural Affairs

Crab and Lobster Fisheries Management Plan

Strategic Environmental Assessment: Environmental Report

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Contents

Non-technical summary

The crab and lobster fisheries management plan (FMP) has been prepared to meet the requirements of the Fisheries Act 2020. It sets out the policies and proposed measures Defra will use to manage crab and lobster fishing activity, so stocks are harvested within sustainable levels. Alongside these measures, the crab and lobster FMP also sets out management approaches to help support wider social, economic and environmental aspects of the fisheries.

This environmental report (ER) has been produced in accordance with the Environmental Assessment of Plans and Programmes Regulations 2004 (SEA Regulations 2004). The following issues (from Schedule 2, paragraph 6 of the SEA Regulations 2004) were scoped into the assessment:

- biodiversity
- fauna
- flora
- geology and sediments (soil)
- water
- climatic factors
- cultural heritage

This assessment focuses on how the policies and actions in the crab and lobster FMP could give rise to both significant positive and negative environmental effects. The findings of this assessment have been used to inform the development of the FMP.

The assessment was conducted against a baseline that primarily used existing evidence on the state of the marine environment set out in the updated UK Marine Strategy (UKMS) Part 1, published in 2019. Additional sources of evidence were used to establish the current status of the environment in relation to issues not covered by the UKMS, such as climatic factors. The historical impact of fishing activity on the marine environment has been considered part of the baseline. The assessment used the best available evidence to reach a judgement on the environmental effects of the crab and lobster FMP.

This report sets out those plans, programmes and environmental protection objectives, both international and domestic, that Defra considers relevant to the crab and lobster FMP.

The report considers and acknowledges the existing environmental effects of crab and lobster fishing using pots and traps on those issues scoped into this assessment, in relation to Marine Protected Areas (MPAs), the UKMS descriptors, and the wider environment. The potential positive and negative environmental effects of the crab and lobster FMP's policies and proposed measures alone and in-combination have also been assessed.

The strategic environmental assessment (SEA) concluded that the current evidence shows the crab and lobster fisheries have some impact on the wider marine environment.

Bycatch of mobile species that are designated features of MPAs was identified as a potential issue. Beyond MPAs, the contribution of fishing-related litter and potential bycatch of non-target species were identified as the principal potential impacts associated with crab and lobster fishing. The contribution of crab and lobster fishing to climate change related issues and its interactions with cultural heritage, through entanglement of pot ropes, for example, were also identified as potential impacts.

The crab and lobster FMP has considered these impacts and sets out proposals to monitor and, where required, introduce mitigation to address these impacts.

The assessment of the policies, measures and actions did not identify any negative effects that posed a significant risk to the environment. The policies, measures and actions will, where appropriate, be developed to avoid any potential negative effects identified by the assessment process. The environmental effects of implementing the crab and lobster FMP's policies and measures will also be monitored to identify unforeseen adverse effects at an early stage, so appropriate remedial action can be undertaken.

This assessment recommends that the crab and lobster FMP should consider the following additional points.

1. Future iterations of the crab and lobster FMP should consider how to develop the cultural heritage of each fishery, and how fisheries management can contribute to reducing potential negative interactions with marine heritage assets.
2. The FMP would benefit from providing more specific detail on how it will interact with Marine Plans. Describing how the FMP could positively or negatively interact with this programme would improve the in-combination assessment (a component of the SEA which evaluates the potential impacts of the plan in combination with other plans or projects).

1. Introduction

Fisheries Management Plans – context and background

Marine fish stocks are a public resource, a valuable natural asset, and important components of marine ecosystems. Managing fishing activity so that we harvest our stocks within sustainable limits will ensure our fishing communities, the seafood supply chain and wider society continue to benefit from our natural assets, now and into the future.

The Fisheries Act 2020 requires the fisheries policy authorities[1] in the UK to publish Fisheries Management Plans (FMPs) as set out in the Joint Fisheries Statement (JFS), to manage fishing activity so the harvesting of fish stocks remains within sustainable levels.

Sustainable fisheries protect stocks and the wider environment whilst delivering social and economic benefits for present and future generations. Delivering sustainable fisheries will involve balancing the environmental, social and economic aspects of fisheries. Both the short-term and the long-term impacts of decisions to manage fishing activity to protect stocks, the marine environment and on the fishing industry will be considered. Any short-term decisions to favour social or economic benefit should not significantly compromise the long-term health of the stocks and marine environment that underpin these societal and cultural benefits of fishing. These decisions should recognise the cultural importance of fishing through maintaining and, where possible, strengthening coastal communities and livelihoods, alongside the requirement for fish stocks to reach and maintain sustainable levels.

UK fisheries policy authorities identified 43 FMPs in the JFS. A timetable for the preparation and publication of the FMPs can be found in Annex A of the JFS and summarised on Gov.UK: see the List of FMPs.

All FMPs must contain the information set out in Section 6 of the Fisheries Act 2020. In summary, a FMP must specify the relevant authority; stock or stocks, type of fishing and geographical area to which the plan relates; the status of the stocks; policies and actions to harvest within sustainable limits; and the indicators to be used to monitor the effectiveness of the plan.

FMPs must specify whether there is sufficient evidence to assess a stock's Maximum Sustainable Yield (MSY). Where there is insufficient evidence, the FMP must specify policies for maintaining or increasing levels of the stock, and the steps (if any) that the relevant authority or authorities propose to take to obtain the scientific evidence necessary to enable an assessment of a stock's MSY. If no steps are proposed, the FMP will explain

1 **Fisheries policy authorities:** As defined by section 52 of the Fisheries Act 2020, "fisheries policy authorities" means (a) the Secretary of State, (b) the Scottish Ministers, (c) the Welsh Ministers, and (d) the Northern Ireland department.

the reasons for that, and how the precautionary approach to fisheries management will be applied so fish are harvested within sustainable limits.

Through managing fishing activity within sustainable limits, FMPs will contribute to the fisheries objectives set out in section 1 of the Fisheries Act 2020. The scope of a FMP may be extended to consider wider fisheries management issues related to environmental, social, or economic matters. How FMPs consider wider fisheries management issues will be determined at the individual FMP level, appropriate to the stock(s), fishery and geographic area within the remit of the FMP.

The Fisheries Act 2020 requires FMPs to report their effectiveness every three years and be reviewed at least every six years. FMPs will evolve as our understanding and evidence base develops through their implementation. Some FMPs will progressively address a wider range of fisheries management issues as they evolve through an iterative approach over time.

FMPs will contain a range of policies and fisheries management measures/interventions whose detail will vary depending on the evidence available to support their implementation. Some policies and measures may only indicate future action and will develop over time as the plan's evidence progresses through each iteration.

FMPs will adopt an ecosystem-based approach to fisheries management to help deliver environmental, social, and economic benefits beyond those accrued from just achieving the sustainable harvesting of stocks.

The policies and actions proposed by a FMP will apply to all vessels (UK and non-UK vessels) fishing in the area covered by the plan.

Delivering Sustainable Management of Fisheries and FMPs

Fisheries rely on the ecosystems in which they operate to support healthy stocks. These ecosystems can be compromised by human-induced pressures including pollution, marine litter, and unsustainable exploitation of marine resources. This pressure includes the impact of fish population levels on the processes and functioning of the wider ecosystem - for example, the removal of prey species impacts the status of top predators.

Long-term sustainable and profitable fisheries require active management to avoid, reduce or mitigate any adverse impacts of fishing activity on ecosystem functioning, ecosystem resilience, or environmental threats such as climate change.

Available fishery data and advice will help determine the targets and catch limits applied to each stock. Where possible, these limits would include the MSY for data-rich stocks where biomass fluctuations can be tracked. Alternative proxies for harvest limits, the precautionary approach, or a combination of both are required for more data-limited stocks, where it is only possible to detect biomass fluctuations.

Not all stocks currently have sufficient evidence to establish MSY or proxy reference points and limits. It is not scientifically feasible or economically viable to collect such evidence for some species. In these cases, FMPs must include the steps, or reasons for not taking steps, national fisheries authorities will take to ensure stocks are harvested within sustainable limits.

FMPs will recognise the importance of the sustainable use and conservation of our marine natural assets and the ecosystem services they provide when setting out policies to manage fishing activity. FMPs will make use of the best available scientific advice, be subject to scientific evaluation, and consider the environmental risks associated with the fishing activity. The plans will use a risk-based approach to identifying appropriate and proportionate mitigation for its environmental impact.

FMPs will contribute to achieving Good Environmental Status (GES) under the UK Marine Strategy (UK MS). In addition to improving or maintaining the status of commercial stocks, plans can include actions focused on reducing the risks and/or pressures from fishing activity to other ecosystem components that may prevent achieving GES.

Managing fishing activity within sustainable limits through FMPs will directly contribute to securing the continued availability of seafood products as an important food source within the UK food supply chain.

Scope of the FMP

The Crab and Lobster FMP relates to all brown crab (*Cancer pagurus*) and European lobster (*Homarus gammarus*) fishing activity in English waters, including activity from other UK, EU and other coastal State vessels. Additionally, there are several data-deficient species also included in this FMP. These are crawfish (*Palinurus elephas*), velvet swimmer crab (*Necora puber*), common spider crab (*Maja brachydactyla*), and common prawn (*Palaemon serratus*).

The main landing sites for crab in England are located on the east, northeast and southwest coasts. English ports of particular significance are:

- Grimsby
- Bridlington
- Newlyn
- Salcombe
- Scarborough

The main landing ports in England for lobster are:

- Bridlington
- Scarborough
- Whitby
- Newlyn
- Hornsea

The main landing ports in England for crawfish are:

- Newlyn
- Isles of Scilly

The main landing ports in England for spider crab are:

- Cadgwith
- Hayle
- Helston
- Salcombe
- Newlyn
- Newquay

The main landing ports in England for velvet crab are:

- Holy Island
- Amble
- Bridlington
- Seahouses
- Mylor

The main landing ports in England for the common prawn are:

- Exmouth
- River Dart
- Paignton
- Lyme Regis

Crab and Lobster FMP Objectives

The overarching vision for the Crab and Lobster FMP for English waters is that crab and lobster fisheries are managed to ensure the long-term sustainability of the stocks, to deliver social benefits to coastal communities from an economically profitable fishery, while maintaining public confidence in the management of this important resource. Table 1 sets outs the Crab and Lobster FMP objectives.

Table 1. The Brown Crab objectives.

#	Objective	Rationale	Actions
1	Develop and pilot an improved data collection programme for crab fisheries, which supports a data rich future and results in the establishment of a reliable time series that facilitates robust, sustainable management.	Scientific evidence provisioning is fundamental for facilitating the development and enforcement of an appropriate, evidence-based fisheries management regime.	Evaluate current data gathering protocols to identify means of improving data provision, consistency, compatibility between data assets, and identifying critical data and knowledge gaps. Improve the current data collection programme at a national level, to address critical data requirements and build a long-term time series of data to support evidence-based fisheries management. The data collection programme should consider both fishery-dependent and independent data and make best use of fisher knowledge and expertise. Create an ongoing time series and develop a process for reviewing stock status at the end of the first 5 years of the plan. Build partnerships between stakeholders and UK Research and Innovation (UKRI) institutes to ensure that: • research is targeted at answering management questions. • research is peer reviewed. • industry is consulted. • data is made available to support evidence-based fishery management- The scientific evidence objective.

#	Objective	Rationale	Actions
2	Establish methods better to assess stock status that reflect the life history of the target species and fishery exploitation patterns.	Accurate information regarding stock status is essential for informing management decisions and protecting against over-exploitation.	Critique current stock assessment approach and explore alternative assessment options. Determine appropriateness of current stock boundaries and alignment between management and stock areas, accounting for migration patterns, where relevant. Undertake research to begin addressing uncertainties in current modelling approaches, including: • growth and natural mortality • representativeness of landings data • non-fishing impacts on crustacean stocks • methods of gathering useful fishing effort data from static gear fisheries Establish a suitable assessment and management cycle for crab whereby stock assessments inform timely and effective fishery management approaches to respond to changes in stock status.

#	Objective	Rationale	Actions
3	Assess the impact of crab fishing activity on the wider marine environment.	It is essential to understand how crab potting activity impacts the marine environment to identify and minimise any negative interactions. This will help protect marine ecosystem structure and functioning, achievement of good environmental status (GES), and improve industry reputation.	Undertake desk-based review of wider environmental impacts of crab fisheries on benthic habitats and endangered, threatened and protected (ETP) species, considering factors such as regional variations in fishing methods, gear types, and species present. Assess the efficacy of existing avoidance and mitigation measures relating to impacts of crab fisheries on benthic habitats. If necessary, make recommendations on changes (considering both regulatory and voluntary measures) that the sector could make to improve its environmental credentials. Assess the efficacy of existing bycatch avoidance and mitigation measures, and of reporting requirements relating to impacts of crab fisheries on ETP species. If necessary, make recommendations on changes (considering both regulatory and voluntary measures) that the sector could make to improve its environmental credentials. Explore the frequency, scale, drivers and likely impacts of fishing gear losses in the static gear sector. Consider the introduction of biodegradable materials to mitigate the impacts of lost gear.

#	Objective	Rationale	Actions
4	Improve understanding of interactions between the crab fishery and other fisheries.	Understanding interactions with other fisheries is key to developing a management regime which accounts for the operations of other fisheries, and appropriately addresses any issues or conflicts identified.	1. Review interactions between crab fisheries and other fisheries to improve understanding of: • Direct impacts (for example incidental capture of non-target species in the crab fishery) and • Indirect impacts (for example bait sourcing for crab fisheries and provisioning bait for whelk fisheries). Review issues surrounding interactions between fisheries operating in shared marine space - both between different metiers of static gear fisheries and between static and mobile gear fisheries - and explore ways of minimising the social, economic, and environmental impacts of conflicts between fishers at present and in the future. Review the impact of other fisheries on crab stocks, for example by-catch and mortality of crabs in other fisheries.

#	Objective	Rationale	Actions
5	Devise and implement a short- to medium-term management approach proposal that considers the external regulatory environment.	Under a changing political landscape post EU exit, it will be important to implement interim management measures based on best-available scientific evidence in order to protect crab stocks against over-exploitation, whilst an increased time series of data required for responsive, evidence-based management is assembled (as per objectives 1 and 2).	Explore options around managing fishing effort to protect stocks in the absence of a full time series of effort data. Ensuring that management remains flexible and responsive to changes in stock status or availability of scientific information as the evidence base improves. Develop an interim management approach which takes into account the wider political landscape post EU exit and: • Enables managers and industry to respond to changes in stock status in the absence of comprehensive stock status information. • Ensures management approach for English crab fisheries is aligned with the requirements set out under the UK-EU Trade and Cooperation Agreement • Informs and responds to changes to the Western Waters effort regime. Review the ways in which different metiers are grouped for management purposes, in consideration of differences in fishing capacity between vessels of different constructions.

#	Objective	Rationale	Actions
6	Establish a long-term management approach for crab fisheries in line with improvements in data collection and stock assessment.	A harvest strategy with appropriate harvest control rules (HCRs), which are based on an increased time series of data (as per objectives 1 and 2) will facilitate agile fisheries management which is responsive to changes in fishing activity and stock status, thus protecting against unsustainable exploitation. HCRs are the operational component of a harvest strategy and set a pre-agreed response to changes in the fishery - for example, a pre-determined reduction in fishing effort triggered by changes to an indicator of stock status.	Collaboratively develop a harvest strategy, with appropriate harvest control rules, for English crab fisheries with input from industry, researchers, and regulators. This work should consider the following principles. 1. HCRs should ensure that: • exploitation is aligned with actual or likely stock status according to the best available scientific evidence. • management measures are adjusted in response to changes in the assessed state of the stock. 2. Development of HCRs should include evaluation of available management tools in the crab fishery context to determine the most appropriate management tools to limit fishing mortality. 3. Development of a harvest strategy and HCRs is predicated on provision of better data on English crab fisheries, as outlined in objectives 1 and 2. Consider fishery management measures designed to rebuild stocks rather than preserve them, as required, in line with the best available scientific evidence.

#	Objective	Rationale	Actions
7	Explore trade-offs between access arrangements for crab fisheries that will ensure both long-term environmental sustainability and economic profitability.	Appropriate access arrangements will support thriving crab fisheries in terms of both economic and environmental sustainability.	Explore options for: • Fair and equitable access to the resource and equitable fishing opportunities • Community access arrangements • consideration of cultural heritage • addressing issues around capacity (including latent capacity) • newcomers to the fishery

#	Objective	Rationale	Actions
8	Maintain other key commercial crustacean species	Monitoring of other key commercial crustacean fisheries facilitates timely management interventions to prevent unsustainable fishing practices (if required). These species are not currently captured under any other English FMP. However, they make up a significant proportion of fishers' catches in some parts of the country. Incorporating these species in the FMP will ensure that patterns of fishing activity and any biological indicators of stock sustainability, are monitored and that potential issues can be identified and addressed.	Within the broader Crab & Lobster Fisheries Management Plan, acknowledge and address issues specific to the following fisheries: • Crawfish (*Palinurus elephas*), • Common prawn (*Palaemon serratus*), • Spider crab (*Maja brachydactyla*). • Velvet crab (*Necora puber*), and; • Emerging crustacean fisheries. Undertake annual monitoring of patterns of fishing activity, fleet performance, management, and indicators of stock status. Consideration of these species in other objectives Consideration species-specific management requirements, for example, harmonisation of the crawfish minimum conservation reference size (MCRS) nationally.

#	Objective	Rationale	Actions
9	Government and shellfish industry to work together to take collective responsibility to: • Mitigate or reduce emissions from the shellfish supply chain • Adapt to and reduce the environmental impacts of climate change	Improved understanding of the carbon footprint of shellfish fisheries in scope of the FMP will help identify carbon hotspots and identify opportunities for decarbonization or mitigation. Reducing emissions from the shellfish supply chain will help the industry contribute to national and global goals to combat the climate crisis and to meeting net-zero commitments. Improved understanding of likely impacts of climate change on English shellfish fisheries will help the commercial fishing sector adapt to changes, building greater business resilience.	1. Work collectively to: • Assess the carbon footprint of English shellfish fisheries using a reliable metric which takes into account specifics of the shellfish industry (e.g., different fleet métiers, carbon sequestration in shell material, etc.) • Identify opportunities for reducing or mitigating carbon emissions in the shellfish sector and encourage improvements. • Support seafood businesses to explore alternative uses for shellfish co-products and by-products (for example, shell waste), to minimise emissions in the shellfish supply chain. • monitor climate change-related issues of relevance to the shellfish sector and use the SIAG as a forum through which to raise awareness, stimulate collaborative working, and support communication of positive environmental credentials. 2. Review relevant research to outline likely impacts of changing climatic conditions on English shellfish fisheries, in order to: • Assess the likely impact on population dynamics of target species, • Assess economic viability of commercial fisheries, and likely impact(s) on coastal communities and wider society (e.g., loss of employment) • communicate options for English shellfish fisheries to adapt and to operate under changing climatic conditions.

Table 2. The European Lobster objectives.

#	Objective	Rationale	Actions
1	Develop and pilot an improved data collection programme for lobster fisheries, which supports a data rich future and results in the establishment of a reliable time series that facilitates robust, sustainable management.	Scientific evidence provisioning is fundamental for facilitating the development and enforcement of an appropriate evidence-based fisheries management regime.	1. Evaluate current data gathering protocols to identify means of improving data provision, consistency, and compatibility between data assets, and identifying critical data and knowledge gaps. 2. Improve the current data collection programme at a national level, to address critical data requirements and build a long-term time series of data to support evidence-based fisheries management. The data collection programme should consider both fishery- dependent and independent data and make best use of fisher knowledge and expertise. 3. Develop a mechanism of gathering accurate fishing effort data from lobster fisheries, as a means of monitoring fleet performance and likely stock status (for example by increasing usage of the government's Record your catch app). 4. Build partnerships between stakeholders and UKRI institutes to ensure that: • research is targeted at answering management questions. • research is peer reviewed, and industry is consulted. • data is made available to support evidence-based fishery management. 5. Create an on-going time series and develop a process by which stock status may be reviewed at the end of the first five years of the plan.

#	Objective	Rationale	Actions
2	Establish methods to better assess stock status that reflect the life history of the target species and fishery exploitation patterns.	Accurate information regarding stock status is essential for informing management decisions and protecting against over-exploitation.	1. Assess the current stock assessment approach and explore alternative assessment options. 1. Determine appropriateness of current stock boundaries and alignment between management and stock areas. 2. Undertake research to begin addressing uncertainties in current modelling approaches, including growth and natural mortality, representativeness of landings data, non-fishing impacts on lobster stocks, and methods of gathering useful fishing effort data from static gear fisheries. 3. Establish a suitable assessment and management cycle for lobster whereby stock assessments inform timely and effective fishery management approaches to respond to changes in stock status.

#	Objective	Rationale	Actions
3	Assess the impact of lobster fishing activity on the wider marine environment.	It is essential to understand how lobster potting activity impacts the marine environment to identify and minimise any negative interactions. This will help to protect marine ecosystem structure and functioning, achievement of GES, and improve industry reputation.	1. Undertake desk-based review of wider environmental impacts of lobster fisheries on benthic habitats and ETP species, considering factors such as regional variations in fishing methods, gear types and species present. 2. Assess the efficacy of existing avoidance and mitigation measures relating to impacts of lobster fisheries on benthic habitats, if necessary, make recommendations on changes (considering both regulatory and voluntary measures) the sector could make to improve its environmental credentials. 3. Assess the efficacy of existing bycatch avoidance and mitigation measures and reporting requirements relating to impacts of lobster fisheries on ETP species, if necessary, make recommendations on changes (considering both regulatory and voluntary measures) the sector could make to improve its environmental credentials. 4. Explore the frequency, scale, drivers and likely impacts of fishing gear losses in the static gear sector. Consider the introduction of biodegradable materials to mitigate the impacts of lost gear.

#	Objective	Rationale	Actions
4	Improve understanding of interactions between the English lobster fishery and other fisheries.	Understanding interactions with other fisheries is key to developing a management regime which accounts for the operations of other fisheries, and appropriately addresses any issues or conflicts identified.	1. Review interactions between lobster fisheries and other fisheries to improve understanding of: • Direct impacts (for example incidental capture of non-target species in the lobster fishery) and • Indirect impacts (for example sourcing bait for lobster fisheries). 2. Review issues surrounding interactions between fisheries operating in shared marine space - both between different metiers of static gear fisheries and between static and mobile gear fisheries. Also explore ways of minimising the social, economic, and environmental impacts of conflicts between fishers at present and in the future. 3. Review the impact of other fisheries on lobster stocks, for example, by-catch and mortality of lobsters in other fisheries.

#	Objective	Rationale	Actions
5	Devise and implement a short- to medium-term management approach proposal that takes into account the external regulatory environment.	Under a changing landscape post-EU exit, it will be important to implement interim management measures based on best-available scientific evidence in order to protect lobster stocks against over-exploitation, while an increased time series of data required for responsive, evidence-based management is assembled (as per objectives 1 and 2).	1. Explore options around managing fishing effort to protect stocks in the absence of a full time series of effort data. Ensuring that management remains flexible and responsive to changes in stock status or availability of scientific information as the evidence base improves. 2. Develop an interim management approach which considers the wider post EU landscape and: • Enables managers and industry to respond to changes in stock status in the absence of comprehensive stock status information. • Ensures management approach for English lobster fisheries is aligned with the requirements set out under the TCA. 3. Determine how to protect stocks from overexploitation in the absence of suitable evidence: • incorporate a flexible approach, so that responsive fishery management can be implemented in the absence of perfect information. 4. Provide a structure for the development of agile management regimes which are responsive to changes in stock status or patterns of fishing activity.

#	Objective	Rationale	Actions
6	Establish a long-term management approach for lobster fisheries in line with improvements in data collection and stock assessment.	A harvest strategy with appropriate HCRs, which are based on an increased time series of data (as per objectives 1 and 2) will facilitate agile fisheries management that is responsive to changes in fishing activity and stock status, thus protecting against unsustainable exploitation. HCRs are the operational component of a harvest strategy and set a pre-agreed response to changes in the fishery – for example, a pre-determined reduction in fishing effort triggered by changes to an indicator of stock status. A harvest strategy and HCRs should balance stock health and socio-economic factors to ensure that stocks are protected, and the fisheries remain economically viable.	Co-develop a harvest strategy with appropriate HCRs for English lobster fisheries, with input from industry, researchers, and regulators. This work should consider the following principles. 1. HCRs should ensure that: • exploitation is aligned with actual or likely stock status, according to the best available scientific evidence. • management measures are adjusted in response to changes. 2. Development of HCRs should include exploration of appropriate management tools, including input controls (for example, pot limitations, seasonal closures, restrictive permitting schemes, or caps on effort) and output controls (for example, catch limits or size restrictions) to determine the most appropriate management tools to limit fishing mortality. 3. Development of a harvest strategy and HCRs is based on provision of better data on English lobster fisheries, as outlined in objectives 1 and 2. Implement management measures that are designed to enhance stocks, rather than preserving them.
7	Explore trade-offs between access arrangements for lobster fisheries that will ensure both long-term environmental sustainability and economic profitability.	Appropriate access arrangements will support thriving lobster fisheries in terms of both economic and environmental sustainability.	1. Explore options for: • fair and equitable access to the resource, and equitable fishing opportunities • community access arrangements • consideration of cultural heritage • addressing issues around capacity (including latent capacity) • newcomers to the fishery

#	Objective	Rationale	Actions
8	Government and shellfish industry to work together to take collective responsibility to: • Mitigate or reduce emissions from the shellfish supply chain • Adapt to and reduce the environmental impacts of climate change	Improved understanding of the carbon footprint of shellfish fisheries in scope of the FMP will help identify carbon hotspots and identify opportunities for decarbonization or mitigation. Reducing emissions from the shellfish supply chain will help the industry contribute to national and global goals for combatting climate change and meeting net-zero commitments. Improved understanding of likely impacts of climate change on English shellfish fisheries will help the commercial fishing sector adapt to changes, building greater business resilience.	Work collectively to: • assess the carbon footprint of English shellfish fisheries using a reliable metric that takes into account specifics of the shellfish industry (for example, different fleet métiers and carbon sequestration in shell material) • Identify opportunities for reducing or mitigating carbon emissions in the shellfish sector and encourage improvements. • Support seafood businesses to explore alternative uses for shellfish co- / by-products, e.g., shell waste, to minimise emissions in the shellfish supply chain. • Monitor climate change-related issues of relevance to the shellfish sector and use the SIAG as a forum through which to raise awareness, stimulate collaborative working, and support communication of positive environmental credentials. Review relevant research to outline likely impacts of changing climatic conditions on English shellfish fisheries, to assess: • assess the likely impact on population dynamics of target species. • assess economic viability of commercial fisheries, and likely impacts on coastal communities and wider society (for example, loss of employment) • communicate options for English shellfish fisheries to adapt to and operate under changing climatic conditions

Crab and Lobster FMP Measures

Table 3. Crab and Lobster FMP Fishery Management Measures

Measure	Likely current feasibility/ timings	Justification and additional information
MCRS variations (lobster and crawfish)	Short-term: no apparent evidence barriers to implementation	Opportunities exist for harmonisation or increase of national MCRSs for lobster and crawfish, which could be explored as a short-term approach to increasing stock protection. MCRSs are easily enforced (shoreside) and easy for fishers to abide by. Analysis of the level of catch decreases and the likely impact on industry, compared to the potential long-term benefits to the stock, would need to be carried out. This should include exploring whether phased MCRS increases over a set number of years could reduce impacts on the industry. We will also consider landing size measures more broadly, which could include a maximum landing size for lobster in certain areas. Research and data gaps set out in the evidence plan will need to be completed before considering the appropriateness of this measure.
MCRS variations (brown crab)	Medium term: some research required to understand stock level variability.	The crab MCRS landscape is currently fragmented and based on local or regional requirements. Finer scale management could be piloted in certain areas (at CFU level, see proposed initial management interventions to help determine whether changes to existing MCRS would provide increased protection to stocks). Effectiveness of MCRS would be maximised, with better understanding of regional or local spawning cycles, to align MCRS with the likelihood of allowing crabs to spawn multiple times before capture. MCRS increases are likely to result in a short-term decrease in catch per unit effort (CPUE), but long-term improvements. This could be mitigated by phasing MCRS increases over a set number of years.

Measure	Likely current feasibility/ timings	Justification and additional information
Ban on landing soft ('white') crab	Short-term: no apparent evidence barriers to implementation, and research is underway to address knowledge gaps.	Landing of soft brown crab is prohibited under the Sea Fisheries (Shellfish) Act 1967 **unless** it is being used as bait. This loophole has led to the development of a market for soft brown crab to be used as whelk bait. Once prohibited, any soft-shelled crab caught in traps, instead of being landed as bait, would be immediately returned to the sea and therefore protected at this more vulnerable stage of their life cycle and allow them to reproduce within that moult period. Stakeholders are largely in favour of banning the landing of soft brown crab (Seafish FMP stakeholder engagement activities and Project UK South-West crab management workshops, 2022). Recently moulted, soft-shelled brown crab are primarily used as whelk bait as they are not considered suitable for processing and human consumption. Stakeholders acknowledged that some operators participate in, and benefit from, the market for soft crab and there would be an immediate economic impact for some operators who have historically landed soft brown crab for bait. In February 2022 legislation was introduced to ban the landing of soft brown crab in Northern Ireland. The management proposal was in response to concerns from industry stakeholders and received unanimous support at public consultation. There is currently no accepted definition of soft brown crab, beyond subjective inspection of individuals. This has the potential to complicate effective enforcement. A FISP-funded research project is under way to develop durometer-based methods to define soft crab. This would assist with better monitoring and enforcement of measures to restrict landing of soft-shelled crab for bait.

Measure	Likely current feasibility/ timings	Justification and additional information
Restricting landings based on sex	Longer-term: some research required to understand efficacy and application.	Measures to protect female crabs or lobsters have the potential to increase spawning biomass. However, uncertainties exist around sex ratios due to assumption that sampled catches are representative of population structure. These assumptions make no allowance for possible behavioural differences or catchability between sexes. Berried female crabs are thought to rarely enter baited pots, meaning their biology confers a degree of protection from capture and as such management interventions based on crab sex may not deliver sufficient protection to stocks. There is a perception amongst fishers that management measures based on discrimination between sexes can lead to imbalance between males and females in the population (Seafish FMP stakeholder engagement activities, 2022). V-notching schemes already exist in some regions. This scheme requires that berried lobsters have a V-shaped notch cut into their tails; V-notched lobsters cannot be landed. This means that spawning-sized females are afforded a degree of protection (sometimes for several years) until they have moulted several times and the V-notch has grown out. A ban on landing egg-bearing (berried) lobsters is already in place in English waters through The Lobsters and Crawfish (Prohibition of Fishing and Landing) (Amendment) (England) Order 2017. The Order was introduced to improve stock health through increasing protection for spawning stock and juveniles and, in the long term, to increase the volume of catch that could be landed by fishers. Bans are largely supported by stakeholders (Seafish FMP stakeholder engagement activities and Project UK SW crab management workshops, 2022). We will consider how new measures and future management regimes can work with and strengthen existing legislation, such as the berried lobster ban.

Measure	Likely current feasibility/ timings	Justification and additional information
Seasonal closures	Longer term: some research required to understand efficacy and application.	FMP development engagement activities in 2022 found disagreement between stakeholders on when seasonal closures would be most effective – summer or winter – due to different patterns of fishing activity between large and small vessel operators. Spatial closures require consideration of what happens to static gears during closures – they may not be able to be brought ashore and stored. In addition to developing a clear rationale and criteria behind any such closures, for example, to protect spawning or based on evidence of stock status, the likely impacts on industry and other stocks or species would need to be explored.
Assess the impact of latent capacity within the fleet	Longer term: some research required to understand efficacy and application.	Assessing the impact of fishing effort can help to inform the use of longer-term management measures, such as pot limits, days at sea limits, and other effort limitation intervention. There is a need to understand the risks that increased effort within these fisheries pose to the long-term sustainability of crab and lobster stocks. The scale of these risks will vary between fisheries, meaning a range of measures will need to be applied to be effective. Assessing fishing effort is also important for understanding the expected impacts of applying various management measures. This includes the likelihood of effort being displaced into other fisheries if action is taken to remove effort (for example, days at sea, pot limitations) from the crab and lobster fleets. Latent capacity will also be considered when assessing fishing effort within the fleet and subsequent potential management proposals.

Measure	Likely current feasibility/ timings	Justification and additional information
Managing recreational fishing effort	Longer term: some research required to understand efficacy and application	Effective fisheries management and stock assessment should account for all removals from the stock. There are currently some small-scale and recreational fisheries that are exempt from catch reporting requirements, meaning that total fishing mortality is under-reported. Although some IFCAs apply permits, pot limits and bag limits, and reporting requirements to recreational shellfish fisheries, there is no data on the total number of recreational pots in use or on the impact recreational fishing has on shellfish stocks. Recreational shellfish fishing was not considered a high priority by attendees of Project UK SW crab management workshops. Cefas considers recreational catches of shellfish to be minor and a low priority for management intervention.

Measure	Likely current feasibility/ timings	Justification and additional information
Pot limits	Medium term: Lessons learned from the finer scale pilot proposals will inform development of this measure. Research is required to address gaps to inform evidence-based management action and enforcement considerations.	I Initial considerations are under way around the benefits, impacts and application of pot limits, which includes exploring examples of where such limits currently apply, such as Northumberland and Sussex IFCA districts. Pot limits could be determined relative to vessel size, capacity or number of crew on board. Further stakeholder consultation and analysis would be required to evaluate the appropriateness of different approaches. Different approaches may also be evaluated and trialled with stakeholder input through the regional management pilots. Pot limit measures would need to consider the following issues. 1. There is a need to improve availability of data on current fishing effort (total numbers of pots in use, pot design, pot hauls, soak times, crab and lobster catchability due to different baits, seasons, and individual animal behaviour) and distinguish between pot types in current data series. 2. The diversity of different vessels and fishing practices involved in the fishery could limit applicability. 3. Implementation of iVMS may provide a proxy of pot numbers hauled in the future, as will improving the fishery-dependent data collection. 4. Any limit on the number of pots could be accompanied by additional restrictions on pot design or capacity to prevent circumvention, as certain pot sizes or designs may have higher fishing efficiency. Without this, there is a risk that pot limits could fail to directly limit effort or fishing mortality. 5. There should be requirements for the recovery of pots that are currently in the water. It is not clear how this could be achieved or how excess pots could be disposed of. 6. Effective enforcement of pot limits may require additional gear-marking regulations and at-sea inspection, which would be resource intensive and expensive.

Measure	Likely current feasibility/ timings	Justification and additional information
Catch limits	Longer term: significant research required to address gaps to inform evidence-based management action and enforcement considerations.	Catch limits could be an effective measure for crab and lobster fisheries, given the high survivability of animals returned to the sea. However, constraints with existing stock assessments mean it would not currently be possible to provide an analytical basis for catch forecasts and to provide annual scientific catch limit advice. Initial catch limits could be set on a precautionary basis (for example, based on track record of historical catches) and adjusted according to stock assessment outputs (stock status trends). There is, however, a recognised risk that this approach could lead to fishing effort being limited unnecessarily or create scenarios such as a 'race to fish' which can impact markets. The potential impacts on industry across sectors and fisheries would therefore need to be explored. While developing a thorough analysis of how and whether catch limits should be developed for English crab and lobster fisheries, the following issues would need to be considered. 1. Lack of support from stakeholders, who believe that catch limits are not a suitable management option for crab fisheries in English waters, at this time. This was voiced at both the crab and lobster FMP stakeholder engagement events (Seafish, 2022) and Project UK SW crab management workshops. 2. Catch limits are widely seen by stakeholders as creating a risk of consolidation of fishing opportunities in the hands of fewer larger operators. 3. Catch limits would likely incentivise better sorting or grading of catches and reduce landings of poor-quality crab, as fishers aim to maximise economic value of catches. 4. Further consideration would be required on how to equitably allocate future catch limits and to ensure fleets and communities remain economically profitable. 5. Identify relevant data required, including appropriate time series of data, to underpin catch limits, and understand if this is being collected already or if new methods for data collection are needed.

Measure	Likely current feasibility/ timings	Justification and additional information
Effort limits (days at sea)	Longer term: significant research required to address gaps to inform evidence-based management action and enforcement considerations.	Effort limits are already in place for vessels of 15 metres and over targeting brown and spider crab in ICES areas 5, 6 and 7, under the retained EU Western Waters Effort Regime (WWER). Management of the regime is 'desk based', meaning enforcement is straightforward. While the WWER days at sea effort limits theoretically provide some level of protection to stocks, they are not based on scientific information relating to stock health but rather on historic track record. Any such effort-based limits developed in the future would be based on the best available scientific evidence and likely apply to all areas and all sized vessels. Work has already been carried out to begin to explore potential future approaches as set out in the Cefas report 'Management options for UK crab and scallop fisheries in Western Waters, 2020'. It is recognised that days at sea-based effort restrictions are not always appropriate for the management of static gear fisheries, as limits do not necessarily restrict the number of pots being used, nor is it a method commonly used for other static fisheries around the world. Despite this, however, there have been mixed views from stakeholders around the appropriateness of days at sea effort as a management approach. Stakeholders at Project UK SW crab management workshops felt that days at sea limits are appropriate for larger vessels fishing offshore, whilst there is a perception amongst smaller vessel owners that the amount of time they can go to sea is already restricted by bad weather, meaning that further restrictions on days at sea would disproportionately impact smaller vessels.

2. Approach to Strategic Environmental Assessment

Screening

SEA Regulations 2004 requires that qualifying public plans, programmes, and strategies undergo screening for SEA during their preparation and prior to adoption. Fisheries Management Plans are plans that fall within the definition in regulation 2.

Defra consider that regulation 3(2)(a) of the SEA Regulations 2004 applies to the Crab and Lobster FMP as the plan relates to England only.

In accordance with the SEA Regulations 2004 Defra carried out a screening exercise which determined that the proposed policies in the Crab and Lobster FMP may have likely significant effect (either positive or negative) on a European site or a European offshore marine site and they are not directly connected with or necessary to the management of such sites.

The screening exercise used Defra's Magic Map Application to identify whether the geographical scope of the FMP overlaps with any European sites or European offshore marine sites. Table 3, page 35 of The updated UK Marine Strategy Part 1 sets out the pressures on the marine environment resulting from anthropogenic activity, which includes fishing. This information was used to identify whether fishing activity for crab and lobster has the potential to impact these sites and interest features. For example, shellfish harvesting has the potential to result in the extraction of, or mortality/injury to, wild species and cause physical disturbance of benthic habitats.

The screening also judged that the proposed polices in the arising from the Crab and Lobster FMP have the potential to affect multiple European marine sites and the wider marine environment.

Based on the outcome of the screening, Defra concluded the FMP, falls within the description of a plan in regulation 5(3) of the SEA Regulations 2004, and so as a result of regulation 5(1) must be subject to SEA in accordance with Part 3 of the SEA Regulations 2004 during its preparation and prior to its adoption (publication).

Completing this SEA does not remove any other statutory obligation on competent authorities to assess the possible environment impact of a policy or measure ahead of its implementation.

Scoping

Defra carried out a scoping exercise to identify the scope and level of detail of the assessment that will be documented in the Environmental Report. Regulation 12(5) requires that when deciding on the scope and level of detail of the information in the

Environmental Report, the responsible authority must seek the views of the Consultation Bodies.

A Scoping Report identifying the scope and level of detail of the assessment of the Crab and Lobster FMP was provided to the following Consultation Bodies;

- Historic England
- Natural England
- Environment Agency
- Joint Nature Conservation Committee (JNCC)

See Appendix F for Consultation Body responses on the Scoping Report and how consideration was given to the points raised in each response.

Regulation 12(3) of the SEA Regulations 2004 requires that the Environmental Report shall include the information referred to in Schedule 2, in so far as it is reasonably required. Table 4 sets out which section of this report corresponds to the relevant paragraphs of Schedule 2.

Table 4. Section of this report and the corresponding paragraph of Schedule 2 of the SEA Regulations 2004.

Section(s) of this Report	Corresponding Paragraph in Schedule 2
Sections: 1 and 4	Paragraph 1: An outline of the contents and main objectives of the plan or programme, and of its relationship with other relevant plans and programmes.
Sections: 3 and 7	Paragraph 2: The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme.
Section: 3	Paragraph 3: The environmental characteristics of areas likely to be significantly affected.
Section: 3	Paragraph 4: Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, [such as a European site (within the meaning of regulation 8 of the Conservation of Habitats and Species Regulations 2017)].

Section(s) of this Report	Corresponding Paragraph in Schedule 2
Section: 4	Paragraph 5: The environmental protection objectives, established at international, [European Union] or national level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation.
Section: 5	Paragraph 6: The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, cumulative and synergistic effects, on issues such as (a) biodiversity; (b) population; (c) human health; (d) fauna; (e) flora; (f) soil; (g) water; (h) air; (i) climatic factors; (j) material assets; (k) cultural heritage, including architectural and archaeological heritage; (l) landscape; and (m) the inter-relationship between the issues referred to in sub-paragraphs (a) to (l).
Section: 6	Paragraph 7: The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme.
Section: 7	Paragraph 8: An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information.
Section: 8	Paragraph 9: A description of the measures envisaged concerning monitoring in accordance with regulation 17.
Non-technical summary	Paragraph 10: A non-technical summary of the information provided under paragraphs 1 to 9.

Scope of the Assessment

Schedule 2 paragraph 6 to the SEA Regulations 2004 lists the issues that must be considered for an assessment of likely significant effect in relation to the FMP. Based on its initial evaluation of likely significant effects and taking into account the results of the scoping consultation carried out (see Scoping above and Appendix F), the following conclusions were reached regarding the content of the Environmental Report.

Defra propose that the Environmental Report will address the effects on the following issues:

- Biodiversity, fauna and flora
  - Including the following sub-sections: cetaceans, seals, birds, fish, benthic habitats, commercially exploited fish and shellfish, food webs.
- Geology and sediments (soil)
  - Including the following sub-section: benthic habitats.
- Water
  - Including the following sub-sections: marine litter and underwater noise.
- Climatic factors
  - Including the following sub-sections: vessel emission, blue carbon.
- Cultural Heritage
  - Including the following sub-section: interactions between fishing gear and marine heritage assets.

Defra scoped the following issues out of the assessment, and therefore they will not be covered in the Environmental Report:

- Population (Human)
- Human health
- Air
- Material assets
- Landscape / seascape

Fishing activity being managed through the FMP has the potential to have some level of interaction with all the issues from Schedule 2 paragraph 6, however the scoping exercise considered and scoped in those environmental issues that would be significantly affected by the Crab and Lobster FMP. Landscape/seascape was screened out as it was considered that this issue would not be significantly affected by the Crab and Lobster FMP. This decision is based on evidence (from the Lyme Bay Experimental Potting Project)[2] that indicates potting has a low impact on the local seabed and is therefore unlikely to have an impact at a broader landscape/seascape scale. Issues such as Population, Human Health, Air and Material Assets were also scoped out of this assessment as it was considered that they would not be significantly affected by the Crab and Lobster FMP. Table 5 provides the justification behind this decision.

Additional rationale behind why sub-sections were considered is included below:

- To link the issues (from Schedule 2 paragraph 6) that will be addressed by this Environmental Report with the environmental baseline (see section 3), we have attributed a UK Marine Strategy (UK MS) descriptor of Good Environmental

2 Kopp, D., Coupeau, Y., Vincent, B., Morandeau, F., Méhault, S. and Simon, J., 2020. The low impact of fish traps on the seabed makes it an eco-friendly fishing technique. Plos one, 15(8), p.e0237819.

Status (GES) to the appropriate corresponding issue(s); see Appendix A for the list of the 11 UK MS descriptors. Achieving GES is about protecting the natural marine environment, preventing its deterioration and restoring it where practical, while allowing sustainable use of marine resources.

- Assessing the status of these descriptors identifies where improvements are required to achieve GES. Knowing the current status will help direct efforts to reduce the impacts of certain human activities. The UK Marine Strategy assessment tool provides further information.
- Under the UK MS, Descriptor 1 – Biodiversity has been split into the following sub-sections cetaceans, seals, birds, fish, benthic habitats. These sub-sections are all relevant to the biodiversity issue from Schedule 2 paragraph 6 and therefore have been included in this assessment.
- Marine Litter and Underwater Noise have been included as the most relevant sub-sections assessed by UK MS under the Water issue heading. Fishing activity was considered not to contribute on Eutrophication, Changes in Hydrographical Conditions and Contaminants; therefore, these sub-sections have not been included.
- Climatic factors are not considered under the UK MS assessment process; therefore, no predetermined sub-sections are available. Vessel emissions and blue carbon were identified as the two most relevant issues related to fishing activity that are associated with climate change.
- Cultural heritage is also not considered under the UK MS assessment process; therefore, no predetermined sub-sections are available. The interaction between fishing gear and marine heritage assets was identified as the most relevant impact related to fishing activity that is associated this issue heading.

Table 5 shows the results of the scoping exercise on the Crab and Lobster FMP.

Table 5. Results of the scoping exercise to determine those environmental issues likely to be significantly affected by the Crab and Lobster FMP and thus scoped into the SEA. Where relevant, the relationship between the issue and the UK MS descriptor of GES is shown as 'D#' where # represents the number of the descriptor, as shown in Appendix A.

Issue	Potential to cause impacts	Justification
Biodiversity, fauna and flora (UK MS descriptors D1, D3, D4, D6)	Yes	Fishing activity for Crab and Lobster has the potential to result in the extraction of, or mortality/injury to/ disturbance to, both target and non-target wild species and cause physical disturbance of benthic habitats. These issues are within the scope of this SEA.

Issue	Potential to cause impacts	Justification
Population (Human)	No	The FMP is not likely to result in significant increases or decreases in human population numbers, or changes to in-migration or out-migration. This issue is beyond the scope of this SEA.
Human health	No	The FMP would not result in any significant human health issues. Whilst fishing remains a dangerous vocation and the FMP will promote safe operations, the regulation of the safety of fishing operations falls elsewhere. This issue is beyond the scope of this SEA.
Geology and sediments (soil) (UK MS descriptor D6)	Yes	Fishing activity for crab and lobster has the potential to result in physical disturbance to the seabed and substrates. This issue is within the scope of this SEA.
Water (UK MS descriptors D10, D11)	Yes	The FMP aims to make fishing practices more environmentally sustainable so there is scope to reduce the impact of fisheries on water quality. This issue is within the scope of this SEA.
Air	No	The FMP is unlikely to result in significant additional vessel emissions and associated air pollution. Reducing vessel emissions from a carbon footprint perspective will be considered by the Climatic factors issue. This issue is beyond the scope of this SEA.
Climatic factors	Yes	The FMP will make an appropriate contribution to the climate change objective of the Fisheries Act 2020, seeking to ensure it develops relevant policies to both mitigate impact on and adapt to climate change. This issue is within the scope of this SEA.

Issue	Potential to cause impacts	Justification
Material assets	No	The FMP will not impact material assets related to; ports and shipping; fisheries and aquaculture; leisure or recreation; tourism; marine manufacturing; defence; aggregate extraction; energy generation and infrastructure development; seabed assets. This issue is beyond the scope of this SEA.
Cultural heritage	Yes	Fishing activity for crab and lobster has the potential to interact with marine heritage assets. While the FMP is not intended to focus on mitigating the impacts of fishing on the marine historic environment, there is potential for fisheries management to have a positive effect on safeguarding cultural heritage features. This issue is within the scope of this SEA.
Landscape Seascape	No	The FMP is unlikely to significantly alter the current effects of fishing practices on the landscape and or seascape in the UK. This issue is beyond the scope of this SEA.

Assessment Methodology

This SEA reflects the geographical scope (section 1) and type of fishing covered by the FMP. It considers the objectives of the Crab and Lobster FMP and the measures (section 1) it sets out to achieve these objectives. It is the Crab and Lobster FMP, as a plan of management that has been assessed, rather than crab and lobster fishing activity.

The assessment reviewed existing evidence on the current state of the marine environment, which included the impact of fishing within the baseline state (section 3).

It assessed the nature and extent of likely effects of the Crab and Lobster FMP (including its policies and measures) on those environmental issues scoped into the assessment and where applicable their associated UK MS descriptors identified in Table 5.

As the FMP is a strategic programme of work, the SEA will consider the potential positive and negative environmental effects of management options in the context of the UK MS descriptors.

More detailed fisheries assessments which consider current activity are already in progress or have been completed. These assessments may be used to inform the FMP actions as they are delivered, and include:

- Defra's completed Revised Approach to fisheries management programme (inside six nautical miles).
- The Marine Management Organisation's (MMO) ongoing Fishery Assessment programme (outside six nautical miles) in England.

Future delivery of the goals and objectives specified in the FMP programme may give rise to management changes such as new legislation to regulate crab and lobster fishing. Such changes may have the potential to impact MPAs and their features and will be subject to more detailed assessment before being implemented.

Nevertheless, this ER acknowledges the likely significant effects associated with fishing activity being managed through the Crab and Lobster FMP and sets out in broad terms how the FMP will seek to avoid, reduce, or at least mitigate significant negative effects.

During the development of the Crab and Lobster FMP, advice from Statutory Nature Conservation Bodies (SNCBs) (Natural England and JNCC) on the impacts of fishing activity in relation to MPAs and UK MS descriptors was considered. This ER reviews how this advice has been reflected in the FMP, and how the proposed policies and actions could change the baseline.

It is important to note the Crab and Lobster FMP contains a range of policies and fisheries management measures that vary in their stage of development depending upon the evidence available to support their implementation. The level of detail possible for our environmental assessment depends upon the stage of development of the policies and measures of the FMP at the present time.

This assessment acknowledges that the Crab and Lobster FMP focuses on two principal species (Brown Crab and Lobster) but also makes reference to four data deficient species. The FMP sets out one objective that is specific to these data deficient species, which focuses on monitoring commercial fisheries to collect further evidence on these species. This Environmental Report will focus the assessment on the two principal species.

This assessment acknowledges the Crab and Lobster FMP sets out objectives to develop the evidence base for the brown crab and lobster fisheries. Our assessment used the best available evidence at the present time to reach a judgement on the environmental effects of the Crab and Lobster FMP. We acknowledge that more evidence is required before an assessment is possible for the data-deficient species and any conclusion on potential environmental effects.

The detail of the environmental assessment is covered in section 5.

3. Environmental Baseline

Summary of the Current State of the UK Marine Environment

Section 3 provides a summary of the current state of the UK marine environment for each of the environmental issues screened into this SEA, and where applicable their associated UK MS descriptors (Table 4). The SEA has been conducted against the environmental baseline set out in these sources of existing information. We acknowledge that there are some uncertainties and evidence gaps in the environmental baseline. However, we consider that this environmental baseline provides a comprehensive level of information to undertake an effective assessment and provide informed evidence-based recommendations. Where required, further detailed assessments using additional evidence will be completed ahead of the implementation of FMP measures.

It is likely that without the FMP, those issues which are contributing to the current state of the marine environment will likely continue to have an influence. The FMP seeks to promote the management of crab and lobster fisheries in a more coherent and coordinated manner that considers wider environmental issues. The FMP has the potential to improve the current state of the environment set out below, both where no improvement has been observed, and where positive trends have been identified. Section 6 and 7 considers how the implementation of the FMP's proposed policies and actions could change the baseline.

Biodiversity, Flora, Fauna and Geodiversity[3] (Geology and sediments)[4]

The primary source of information on the current state of the UK marine environment came from the UK MS descriptor status assessments: The updated UK Marine Strategy Part 1, published in 2019. The impact of fishing has been considered as part of the assessment on the UK MS descriptors, therefore information on the impact of fishing activity on the marine environment has been included in the sections below as part of the baseline. For further information on the baseline related to UK MS descriptors see Appendix B.

D1 and D4 – Cetaceans

Cetaceans (whales and dolphins) are an important marine ecosystem component that contributes to overall levels of biodiversity (D1). In addition, as top predators, the abundance of cetaceans can also provide some understanding on how the food web is functioning (D4).

3 Geodiversity is defined as the natural range of rocks, minerals, fossils, landforms, topography, sediments and soils together with the natural processes which form and alter them.

4 Geodiversity (Geology and sediments) issue has been combined with the Biodiversity, Flora, and Fauna section as benthic habitats is relevant to these issues.

The current status of cetaceans for both the North Sea and Celtic Sea is mixed. While there are some aspects that are in line with the achievement of GES, much of the picture is unclear. The impact of various net fisheries is leading to bycatch that, in places, might be impacting long term population viability of harbour porpoise.

Other than for a limited number of coastal bottlenose dolphin populations, it is unclear whether the abundance and range of most cetacean species can be considered in line with GES. Fisheries and the removal of prey species is one of several activities/ pressures that have the potential to result in changes in cetacean abundance and distribution.

D1 and D4 – Seals

Seals are an important marine ecosystem component that contributes to overall levels of biodiversity (D1). In addition, as top predators, seal productivity can also provide some understanding and insight as to how the food web is functioning (D4).

Grey seals populations and productivity continues to increase, and targets are being met. Bycatch (largely in tangle/trammel nets) is occurring but not at levels that threaten population viability. For harbour seals, the status is not in line with GES where population declines have occurred in some areas. The cause is unknown. It is not thought to be linked to bycatch as occurrences are rare and there is no indication that it is linked to other pressures associated with fishing.

D1 and D4 – Birds

Seabirds are well-monitored species that are an important marine ecosystem component that contributes to overall biodiversity (D1). In addition, as top predators, the abundance of birds can also provide some understanding and insight as to how the wider food web is functioning (D4).

Seabird populations are currently below the level that is considered to meet GES and the situation is deteriorating. Some declines in breeding success have been linked to prey availability caused by climate change and/or past and present fisheries. Invasive predatory mammals are also known to impact breeding success on island colonies. The impact of bycatch will be included in future assessments and current evidence suggests that some longline and static net fisheries could be having possible population level impacts on certain species.

D1 and D4 – Fish and D3 – Commercially exploited fish and shellfish

Fish are an important ecosystem component that contributes to overall levels of biodiversity (D1). In addition, fish of different species have a significant role in marine food webs (D4), acting as both predators and prey. Some fish species are commercially exploited, and only a proportion of these have managed quotas. Over exploitation can lead to a decline in stocks (D3) which can reduce both future commercial opportunities and have wider ecological impacts.

The current status of fish communities in the UK is primarily shaped by historical over-exploitation by fisheries, while ongoing over-exploitation continues to be a notable contributing factor. Improved fisheries management since the 1990s has resulted in more stocks being fished at or below MSY levels so, although the target is not yet met, there is a positive trend. Improved fisheries management has also resulted in some positive trends in fish communities beyond the targeted stocks.

D1 & D6 – Benthic Habitats

Benthic habitats are an important ecosystem component that contributes to overall levels of biodiversity (D1). It is also important to ensure the structure and function of the benthic ecosystems is adequately safeguarded by considering seafloor integrity (D6).

There is widespread disturbance of seabed habitats by demersal towed gear and other marine activities, and this is preventing the achievement of GES. Other impacts from non-fisheries activities may also be having an influence, but to a much lesser degree.

D4 – Food webs

Food webs (D4) are the network of predator-prey relationships that occur in the marine environment, from phytoplankton to top predators such as birds or seals. Fish communities are a key component of food webs. Knowledge of food webs allow understanding of how changes at one trophic level can impact those above and below it.

Historic fishing activity which has contributed to the current environmental baseline, has had a large impact on fish community structure which is a key component of marine food webs. With improved fisheries management focusing on stocks, some recovery is occurring. However, the management of fish stocks solely to safeguard future fisheries will not necessarily lead to all food web targets being met. Changes in plankton are likely driven by prevailing environmental conditions, but other impacts cannot be ruled out.

Water Quality

D10 – Marine Litter

Marine litter, including from fishing activities, is a significant pressure on marine ecosystems and water quality. The UK has not yet achieved its aim of GES for litter. Beach litter levels in the Celtic Seas have remained largely stable since the assessment in 2012, whilst beach litter levels in the Greater North Sea have slightly increased. Waste fishing material is a component of beach litter. Both floating litter and seafloor litter remain an issue, with plastic the predominant material. Achieving GES for marine litter requires improved waste management practices, the reduction of lost or discarded fishing gear, and increased awareness and monitoring of the issue.

D11 – Underwater noise

Underwater noise from fisheries, while not the primary source, can still contribute to the overall noise pollution in the marine environment. Fishing vessels will contribute to

underwater noise through sonar, engine noise, gear interacting with seabed and deploying and retrieving gear.

The achievement of GES for underwater noise in the UK is uncertain. Research and monitoring programmes established since 2012 have provided an improved understanding of the impacts of sound on marine ecosystems. However, achieving GES for underwater noise will require better understanding and monitoring of the issue, as well as the development and implementation of strategies to manage noise pollution from various sources.

Climatic Factors

Climate change impacts are not part of the UK MS, therefore evidence from other sources were used to provide baseline information in relation to this issue. Statistics from the Department for Business, Energy & Industrial Strategy (BEIS), Department for Transport (DFT) and Engelhard *et al* (2022) report on Carbon emissions in UK fisheries, were used to identify the contribution UK fishing fleets have to the total carbon emissions at sea each year.

Vessel Emissions

For 2019, estimated emissions by the UK fishing fleet (802 kt CO_2e) would have represented 0.18% of the UK's total territorial emissions (455 Mt CO_2e)[5], or 0.66% of the UK's domestic transport emissions (122 Mt CO_2e)[6]. To put this into context, estimated emissions by the UK fishing fleet would have been equivalent to 1.7% of total agricultural emissions in 2019 (46.3 Mt CO_2e). Recent analysis has shown that the total UK pot and trap fishing fleet segment (which comprises of 1,542 vessels) produced 12.5% (101kt CO_2e) of the total at sea carbon emissions annually across the UK's fishing fleets.[7] This indicates the low carbon footprint of pot fisheries, when compared to other industries.

Blue Carbon

Certain marine habitats including seagrass, kelp and muddy sediments, are able to capture and store carbon and therefore these are known as blue carbon habitats. Currently there is no comprehensive assessment of the impact of potting on organic carbon stocks. A new cross-Administration UK Blue Carbon Evidence Partnership has

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5 BEIS (Department for Business, Energy & Industrial Strategy) (2021b) 2019 UK Greenhouse Gas Emissions: Final Figures – Statistical Summary.https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2019

6 DfT (Department for Transport) (2021) Statistical Release: Transport and Environment Statistics 2021 Annual Report, 11 May 2021. https://www.gov.uk/government/statistics/transport-and-environment-statistics-2021

7 Engelhard, G.H., Harrod, O.L., Pinnegar, J.K. (2022) Carbon emissions in UK fisheries: recent trends, current levels, and pathways to Net Zero Final report for Defra project C8118. Centre for Environment, Fisheries & Aquaculture Science (Cefas), Lowestoft, UK.

been formed to improve the evidence base on blue carbon habitats in UK waters, advancing our commitment to protecting and restoring blue carbon habitats as a nature-based solution. Through the partnership, announced at Conference of the Parties 26 (COP26), UK Administrations will work together to address key research questions related to blue carbon.

Climate change impacts on crab and lobster stocks and fisheries

Climate change and warming oceans are changing the distribution of commercially important shellfish species[8]. Crustaceans (such as crabs and lobsters) are considered to be more tolerant to the changes in ocean acidification than molluscs (such as scallops) and gastropods (such as whelks)[9]. However, there is variation in the tolerance between crab species, with recent studies highlighting the vulnerability of the brown crab to conditions expected by 2100[10], which could have significant economic implications to the UK crab fisheries.

Cultural Heritage

The definition of the 'marine and aquatic environment' in the Fisheries Act 2020 (section 52) includes features of 'archaeological or historic interest in marine or coastal areas. These features should be regarded as part of the wider marine environment.

Cultural heritage impacts are not part of the UK MS, therefore evidence from other sources were used to provide baseline information in relation to this issue.

The Fishing and the Historic Environment report produced by Historic England was used as the primary source of information on the interactions between commercial fishing and the marine historic environment in English waters.

The report identifies that positive and negative interactions can arise when archaeological material present on the foreshore and seabed, is encountered during commercial fishing.

The following interactions between fishing gear and marine heritage assets can occur[11]:

- Interactions with pots and traps may have a low-to-moderate significance resulting from flattening, snagging, and anchoring impacts.

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8 Mieszkowska, N., Burrows, M. and Sugden, H. (2020) Impacts of climate change on intertidal habitats relevant to the coastal and marine environment around the UK. MCCIP Science Review 2020, 256–271. doi: 10.14465/2020.arc12.ith

9 Kroeker, KL., Kordas, RL., Crim, RN., Singh, GG. (2010). Meta-analysis reveals negative yet variable effects of ocean acidification on marine organisms. Ecology letters 13:1419-1434

[10]Whiteley, N. M., Suckling, C. C., Ciotti, B. J., Brown, J., McCarthy, I. D., Gimenez, L., & Hauton, C. (2018). Sensitivity to near-future CO2 conditions in marine crabs depends on their compensatory capacities for salinity change. Scientific Reports, 8(1), 1-13.

[11] Information derived from Fishing and the Historic Environment, page 44.

The report identifies several potential and evidenced interactions between commercial fishing and marine heritage assets. However, given the anecdotal nature of many of these interactions, a comprehensive assessment of the extent of interactions and their impacts is currently not available for English waters.

Existing Environmental Effects of Crab and Lobster Fishing

Fishing for crab and lobster or potting activity in general is not mentioned in section 3 or in the additional baseline information in Appendix B. Crab and lobster fishing is therefore not considered to be having a significant influence on the current baseline. Nevertheless, we recognise that fishing for crab and lobster is not without its risks to the environment.

The Crab and Lobster FMP focuses on achieving the sustainable harvesting of crab and lobster stocks. This focus seeks to reduce the environmental risks linked to over-fishing these stocks, thereby giving net positive benefit to environmental status over the long term.

As described in Section 2, this Environmental Report focuses on assessing how the policies, measures and actions in the Crab and Lobster FMP are likely to give rise to both significant positive and negative environmental effects. This assessment does not consider all the risks and impacts of fishing activity per se. Such assessments have already been conducted as part of the UK's obligations under legislation relating to a) MPAs, which includes Defra's Revised Approach to fisheries management programme (inside 6nm) and the MMO's ongoing Fishery Assessment programme (outside 6nm); and b) the wider marine environment (UK MS). It is the policies, measures and actions of the Crab and Lobster FMP, as a plan of management that has been assessed, rather than the fishing activities themselves.

Nevertheless, fishing within sustainable limits for the target stocks (MSY or appropriate proxies) may reduce but will not eliminate all of the negative impacts of that fishing activity on the wider marine environment. These impacts are identified in the sections below.

We acknowledge the FMP focuses on two principal species but also makes reference to four data deficient species. The type of fishing for the data deficient species will be similar to the activity targeting brown crab and European lobster. We anticipate the effects of these fisheries on the data-deficient species will likely be similar to those for the brown crab and European lobster fisheries. We are unable to make a complete assessment at this stage due to the lack of available data for these species. Further assessment will be required as the evidence-base develops to fully understand the environmental effects of fishing for these species.

Biodiversity, Flora, Fauna and Geodiversity, Water quality

Environmental Effects Associated with MPAs

Advice provided to Defra by our SNCBs gives more detail on the pressures[12] crab and lobster fishing could have on the marine environment in relation to MPAs.

The following pressures were identified to occur within MPA boundaries:

- Crab and lobster are predominantly caught in static pots, therefore the potential pressures of potting for crab and lobster on MPA features include the removal of target and non-target species and abrasion/disturbance of the substrate on the surface of the seabed.

The assessments of the impact of crab and lobster fishing activities inside MPAs are undertaken by the IFCAs within 6nm and the MMO outside 6nm. Figure 1 shows the distribution of MPAs relevant to the Crab and Lobster FMP. Stakeholders have worked closely with regulators to help develop measures to mitigate impacts within inshore and offshore MPAs. Appropriate management is in place to ensure any fishing within MPAs is compatible with the MPA's conservation objectives. Current management measures already in place related to potting activities are detailed on the MMO and Association of IFCAs websites.

12 A pressure is the mechanism through which an activity has an effect on any part of the ecosystem. The nature of the pressure is determined by activity type, intensity and duration. For more information, see MarLIN - The Marine Life Information Network - Marine Evidence based Sensitivity Assessment (MarESA)

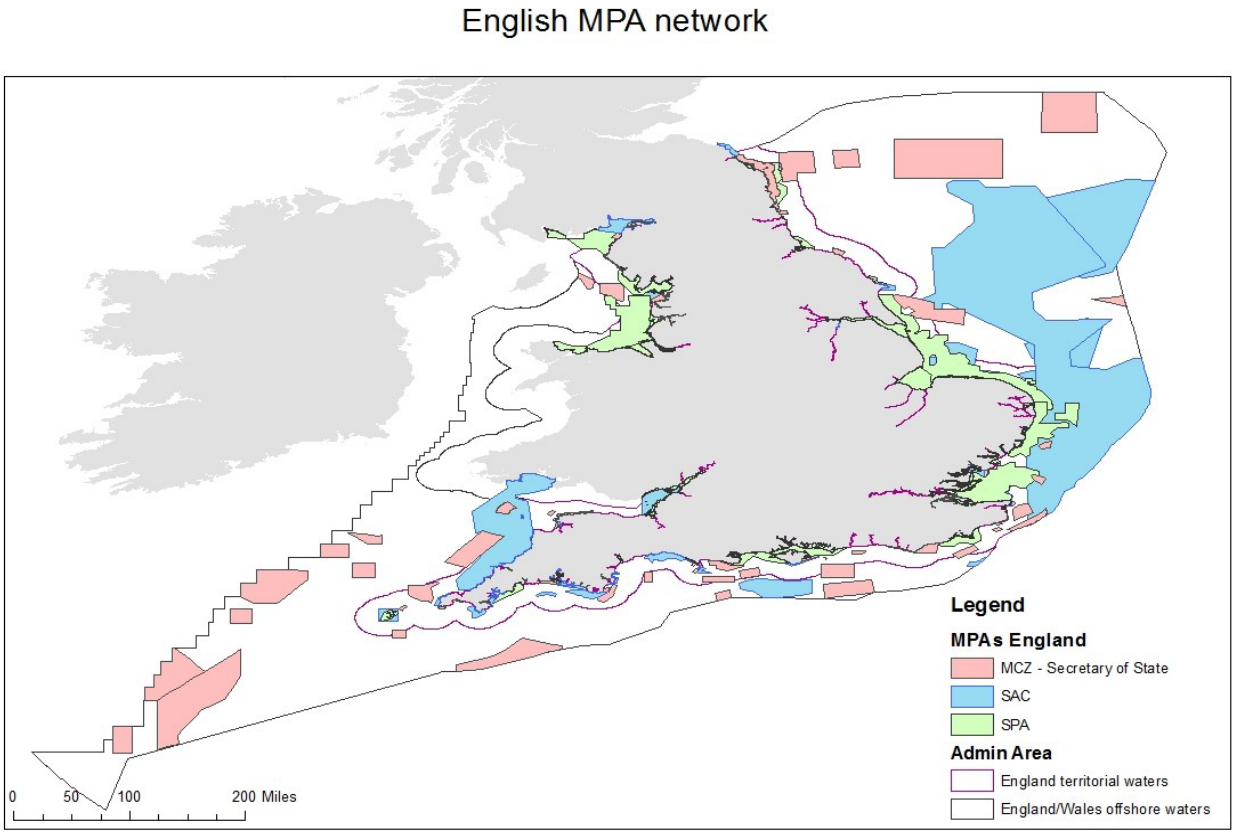

Figure 1. England's MPA network

Figure 1 description: a map showing the location of marine protected areas within English waters. The map includes marine conservation zones, special areas of conservation and special protection areas.

Whilst existing MPA site management considers fishing activity that occurs within the site's boundaries, there remains the potential for fishing activity outside MPAs to have impacts on the features protected within the MPA. These impacts can occur when either the pressure exerted by the fishery impacts protected features beyond the spatial footprint of a particular fishing activity (e.g. noise) or when the feature of an MPA is mobile and travels outside the site.

Advice provided to Defra by the SNCBs on outside MPA boundary impacts of crab and lobster fishing activities concluded that the crab and lobster fisheries pose a moderate risk of bycatch of mobile species that are designated features of MPAs. Spiny lobster (protected within some MCZs in the Southwest) may be caught and retained outside of the site boundary. In addition, there is some risk to otters (protected in some SACs) being caught in pots set in shallow coastal areas, although this is a very localised issue limited to a very small proportion of area fished.

Environmental Effects Associated with UK MS Descriptors

Advice provided to Defra by Statutory Nature Conservation Bodies (SNCBs) gives more detail on how the key issues[13] identified by The updated UK Marine Strategy Part 1, apply to crab and lobster fishing and their likely impact on achieving GES (Appendix A).

The following potential issues and their associated risk level[14] have been identified for crab and lobster fishing on UK MS descriptors:

- **The contribution to fishing related litter (D10):** The loss of pots, ropes and buoys will add to overall levels of fishing related litter within the sea. Consideration of how best to avoid or minimise loss and achieve sustainable end of life disposal is important. As rates of loss of potting gear is likely to be low compared to other fishing practices, this is considered a low risk. Better evidence on the contribution of crab and lobster fishing related litter would be beneficial for understanding the scale of this issue. Some strategic mitigation would help reduce the input of crab and lobster fishing related litter within the sea.
- **The impact of bycatch of species on D1 biodiversity and its relation to D4 food webs:** While it is likely that most non-target species caught within pots will be able to be successfully returned alive, there is a known risk posed to large cetaceans which can become entangled in pot ropes. Risk will vary geographically. Where there is overlap between large cetaceans and potting activity, entanglement related deaths which are low in English waters, are probably unlikely to have population level effects and therefore impact GES indicators[15]. It is therefore considered a low risk. However, incidental catches of sensitive species should still be minimised and, where possible, eliminated to meet part b of the ecosystem objective of the Fisheries Act. Better evidence of bycatch events would be beneficial for understanding the scale of this issue.
- Developing and implementing measures to achieve sustainable harvesting of crab and lobster stocks reduces the risks associated with achieving targets for D3 Commercial fish.
- The SNCBs' advice on nature conservation risks to UK MS descriptors noted that potting was not considered to have an impact on D4 Food webs beyond those

[13] Key issues: impact of the removal of targeted species on the status of fish stocks; benthic disturbance related pressures associated with towed demersal gear; impact of the removal of targeted fish stocks on other species / wider environment; impact of bycatch (bird / mammal / fish) on biodiversity, food webs or stocks; fishing related sources contributing to marine litter; noise from pingers / acoustic deterrents contributing to marine noise.

[14] Draft GES rapid risk assessment categories: Low risk means some risk does exist, but the impact may not be of a scale to impact upon GES descriptors. Moderate risk means there is clear link between the fishing activity and the GES indicator, but other activities also significantly contribute to the current indicator status, r where high-risk activity only makes up a small proportion of the fishery. High risk means the link between fishing activity within the FMP and the failure to meet the GES indicator is recognised. 'Risk unclear' is used where the situation is complex, and more work is required to understand the true nature of risk.

[15]See https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/cetaceans/

issues already considered through bycatch. The impact of potting on D1 and D6 Seafloor integrity is not considered significant enough for action to be required.

Climatic Factors

Vessels fishing for crab and lobster contribute to the total carbon emissions at sea each year by the UK's fishing fleets. While the estimated emissions by the UK fishing fleet represents a small proportion of the overall emissions in the UK, decarbonising the fleet and moving towards net zero will help reduce the contribution of fisheries activities to climate change.

No conclusive evidence is currently available on the impact of fishing activity for crab and lobster on organic carbon stocks. However, the impact of potting activities on blue carbon is of less concern when compared to some other types of fishing activity. Improved recording of the intensity of crab and lobster fishing on the seabed more broadly will help any future assessment of any effects on organic carbon stocks when the evidence base on blue carbon habitats in UK waters improves.

Climate influenced changes to a species range, and its physical and biological characteristics can influence how sensitive a stock is to fishing pressure. These changes can also impact where and how fishing vessels operate.

Cultural Heritage

Fishing activity can have both positive and negative effects on marine heritage assets. The positive effects relate to the discovery of marine heritage assets during fishing activity, with both past and future discoveries or findspots often reliant on fishing gear interactions. Negative effects can be caused by physical disturbance to cultural heritage on and within the seabed. Specific effects include: impeded access and interpretation of assets by fishing gear (for example, nets, lines and ropes) collecting around physical structures; direct damage of assets by gear, usually towed gear, causing irreparable alteration to physical structures; burial of archaeological material by sediment during fishing practices; removal of the archaeological material from the seabed during fishing practices; and transferal of archaeological material from its original place on the seabed during fishing practices. Avoiding negative interactions with marine heritage assets will help conserve them for their enjoyment by future generations.

The marine historic environment also plays an important role in providing ecosystem services in relation to nature conservation, sea angling, recreational diving and commercial fishing. Marine heritage assets, particularly ship and plane wrecks can provide habitats for marine life, with fish often aggregating around them for refuge or to feed. Avoiding negative interactions with marine heritage assets that act as habitats can positively contribute to the conservation of the wider marine environment.

4. Relevant Plans, Programmes and Environmental Protection Objectives

The Crab and Lobster FMP has broad application since it covers an activity that occurs across English waters. Consequently, the plan will interact with a range of established national legislation, plans and programmes, and international agreements and declarations signed by the UK.

The Crab and Lobster FMP applies to English waters, therefore, when preparing FMPs, the relevant fisheries policy authorities are required to have regard to this existing regulatory structure.

The sections below set out those plans, programmes and environmental protection objectives that Defra consider relevant to the implementation of the Crab and Lobster FMP. The Crab and Lobster FMP could interact with other relevant plans and projects. Any cumulative impacts will also be considered in any future assessments ahead of implementing measures.

International

The Crab and Lobster FMP has had regard to the commitments the UK has made under the following international agreements and declarations during its preparation:

- Trade and Cooperation Agreement (TCA) between the EU and the UK
- UN Convention on the Law of the Sea (UNCLOS)
- UN Sustainable Development Goals
- UN Convention on Biological Diversity (CBD)
- Convention on the Conservation of Migratory Species of Wild Animals (CMS)
- RAMSAR Convention
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- Convention for the Protection of the Marine Environment of the Northeast Atlantic (OSPAR)
    - The OSPAR Quality Status Report is a key resource when looking at the environmental impact of fisheries in the Northeast Atlantic.
- Regional Fisheries Management Organisations (RFMOs): The UK is an independent Contracting Party to the following RFMOs relevant to stocks being managed through the FMP: NEAFC – Northeast Atlantic Fisheries Commission
- Convention for the Protection of the Archaeological Heritage of Europe

Domestic

The Crab and Lobster FMP has had regard to the following national legislation, plans and programmes during its preparation:

Marine Protected Areas

FMPs are required by law to consider the implications of the fishing activity they manage for designated sites, primarily Marine Protected Areas (MPAs). Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are protected under the Conservation of Habitats and Species Regulations 2017, known as the Habitats Regulations. Marine Conservation Zones (MCZs) are protected by the Marine and Coastal Access Act 2009. The MPA network covers 38% of UK waters. Relevant or public authorities (including fisheries regulators) assess human activities that could interact with the designated features of MPAs, seek the advice of the Statutory Nature Conservation Bodies (SNCBs) and introduce management where required. The Crab and Lobster FMP will support the management of fishing activity in MPAs. When implementing any actions arising from the FMP that overlap with European Marine Sites and MCZs or their designated features, an assessment will be undertaken prior to implementation, to assess the likely effects of the action on the conservation objectives of the site.

Marine regulators also have responsibilities relating to Sites of Special Scientific Interest (SSSIs) under the Wildlife & Countryside Act 1981 and Natural Environment & Rural Communities Act 2006. Ramsar sites (wetlands of international importance), designated under the Ramsar Convention, are often underpinned by SSSIs but are afforded the same protection at a policy level as Special Areas of Conservation and Special Protection Areas. Appendix C lists the different types of MPA and relevant designations in the UK.

Highly Protected Marine Areas

Highly Protected Marine Areas (HPMAs) are areas of the sea (including the shoreline) that allow the protection and full recovery of marine ecosystems. By setting aside some areas of sea with high levels of protection, HPMAs will allow nature to fully recover to a more natural state, allowing the ecosystem to thrive.

HPMAs will protect all species and habitats and associated ecosystem processes within the site boundary, including the seabed and water column. For large HPMAs, resultant displacement may lead to the intensification of fisheries pressure that will require assessing and potentially addressing if unduly exacerbating existing pressures.

The first three HPMA designations in English waters came into force on 5 July 2023.

The three sites are:

- Allonby Bay
- Northeast of Farnes Deep
- Dolphin Head

Any actions arising from the FMP that overlap with HPMAs will comply with the conservation objectives for designated features.

Conservation of Habitats and Species Regulations 2017

The Conservation of Habitats and Species Regulations 2017 include provisions for: protecting sites that are internationally important for threatened habitats and species (European marine sites) and provide a legal framework for species requiring protection (European protected species). The Crab and Lobster FMP will support the protection of protected sites and species.

The Conservation of Offshore Marine Habitats and Species Regulations 2017

The Conservation of Offshore Marine Habitats and Species Regulations 2017 include provisions for the designation and protection of areas that host important habitats and species in the offshore marine area. The Crab and Lobster FMP will support the protection of offshore marine habitats and species.

Marine Strategy Regulations 2010 – UK wide

The Marine Strategy Regulations 2010 requires Administrations in the UK to take action to achieve or maintain Good Environmental Status (GES) in UK waters. The UK Marine Strategy (UK MS) is a key pillar of marine policy in the UK. There is a clear link between the UK MS and the 'ecosystem objective' of the Fisheries Act 2020 – sections 1(4) and 1(10).

The UK Marine Strategy Part Three: Programme of Measures identifies FMPs as a tool to support the delivery of GES for commercial fisheries (Descriptor 3). It also recognises FMPs could, where appropriate include 'measures to mitigate the impact of fishing activity on the wider environment, including the seabed' to support the delivery of GES for other descriptors.

Marine Plans – UK wide

The Marine and Coastal Access Act 2009 (MCAA) makes provision for the UK Marine Policy Statement (MPS), published 2011, and requires (together with the Marine Act (Northern Ireland) 2013) the production of marine plans where the MPS is in place. The MPS provides the framework for marine plans around the UK and sets the high-level policy context for marine planning, including setting high-level marine objectives. Under MCAA s.58, decisions relating to the marine area should be taken in line with the Marine Plan. The Crab and Lobster FMP considers the relationship between marine spatial planning and fishing activity being managed through FMPs, and how these policies can work in a joined-up way to ensure more effective use of the marine space and resources. Further information on the marine plans in England is provided in Appendix D.

The Environment Act (2021) – UK wide

The Environment Act 2021 sets out England's commitment to protect and enhance our environment for future generations. The act seeks to improve air and water quality, protect wildlife, increase recycling and reduce plastic waste. A central pillar is an obligation for policy makers to have due regard to five environmental principles (integration principle, prevention principle, rectification at source principle, polluter pays principle, precautionary principle) during the development of policy. Policies developed through the Crab and Lobster FMP will have due regard to these principles. Further details of the environmental principles can be found at Environmental Principles Gov.uk page.

The Environment Act 2021 also requires the government to publish an Environmental Improvement Plan (EIP) for England. The EIP published in 2023 builds on the 25 Year Environment Plan by setting out how the government in England will work with landowners, communities and businesses to deliver goals for improving the environment. FMP policy supports the EIP by enabling the development of fisheries management tools that will contribute to securing clean, healthy, productive and biologically diverse oceans and seas. Through implementing a sustainable domestic fisheries policy, the Crab and Lobster FMP will deliver measures to secure healthy stocks that will be fished in an environmentally sustainable manner.

The Environment Act 2021 also makes provision for legally binding targets of which the targets for biodiversity and Marine Protected Areas will relate to FMPs. In addition, public authorities who operate in England must consider what actions they can take to conserve and enhance biodiversity in England. This obligation is the strengthened 'biodiversity duty' that the Environment Act 2021 introduced. The Crab and Lobster FMP will comply with the biodiversity duty.

The Environmental Targets (Biodiversity) (England) Regulations 2023

These Regulations set long-term targets in respect of three matters within the priority area of biodiversity under section 1 of the Environment Act 2021 (c. 30). These Regulations also set a target in relation to the abundance of species in accordance with section 3 of the Environment Act 2021. The Regulations specify the standard to be achieved in respect of each target and the date by which it must be achieved. The Crab and Lobster FMP will support achieving the targets set out in the Regulations as appropriate.

The Environmental Targets (Marine Protected Areas) Regulations 2022 – England

These Regulations set a long-term environmental target under section 1 of the Environment Act 2021 (c. 30). The target set by Regulation 3 is in respect of the condition of protected features in MPAs. These Regulations specify the standard to be achieved in respect of the target and the date by which it must be achieved. The Crab and Lobster FMP will support achieving the targets set out in the Regulations.

Climate Change Act 2008

The Climate Change Act 2008 is the basis for the UK's approach to tackling and responding to climate change. It requires that emissions of carbon dioxide and other greenhouse gases are reduced and that climate change risks are adapted to. The Act also establishes the framework to deliver on these requirements. The Crab and Lobster FMP will support policies to meet targets to achieve net zero by 2050 as set out in the legislation.

Marine Wildlife Bycatch Mitigation Initiative

The Marine wildlife bycatch mitigation initiative outlines how the UK will achieve its ambitions to minimise and, where possible, eliminate the bycatch of sensitive marine species. This initiative brings together, and builds on, existing work such as the UK Bycatch Monitoring Programme and Clean Catch UK, recognising that further actions need to be taken if we are to achieve our objectives. The Crab and Lobster FMP will support this initiative by contributing to mitigating the negative impacts of fishing activity as appropriate.

Water Environment Regulations (Water Framework Directive)

The Water Environment (Water Framework Directive) (England & Wales) Regulations 2017 (referred to as the WFD Regulations) provide a framework for assessing and managing the water environment, which includes estuaries and coastal waters in England. The Crab and Lobster FMP will support achieving the targets for water quality set out in the regulations.

River Basin Management Plans (RBMPs) produced under the Water Environment Regulations provide the overarching framework for to help protect and improve our water environment. RBMPs extend out to 1 nautical mile from the baseline into the marine environment and seek to maintain or restore Good Ecological Status[16]. The Crab and Lobster FMP will support the objectives in the relevant RBMPs to meet Good Ecological Status.

Other FMPs

There are no other FMPs published at the present time so we are unable to make any formal assessment of how the Crab and Lobster FMP will interact with other plans. Defra and our delivery partners considered the interaction between the current tranche of plans whilst drafting the FMP. We will review interactions again as the final versions are prepared and adjust the FMP as appropriate. The interaction between FMPs will be

[16] Good ecological status (GES) is a metric for assessing the health of the water environment. It is assigned using various water flow, habitat and biological quality tests. Failure to meet any one individual test means that the whole water body fails to achieve good ecological status. Source: Department for Environment, Food and Rural Affairs (DEFRA) (WQR0028)

considered when monitoring the effectiveness of plans. Any necessary adaptations would be built into the plan's ongoing implementation and adjusted in future revisions of the FMP.

Other Localised Plans

Explore Marine Plans (EMP) is an online interactive tool developed by the Marine Management Organisation (MMO) to allow a user find and view spatial marine activity data for the English marine area, information on marine planning licences relating to a specific area, and marine plan policy information.

The Crab and Lobster FMP will use this tool to identify where the plan could interact with other relevant marine activities, plans or projects. Any necessary adaptations would be built into the plan's ongoing implementation and contribute to future revisions of the FMP.

5. Assessment of Environmental Effects

The environmental baseline information (section 3) shows that the marine environment is subject to a range of pressures from human activities. Fishing-related activities form only part of the contribution of these pressures to the current state of our marine environment.

The present assessment acknowledges the evidence that shows those pressures that are largely derived from fishing activity and can impact the marine environment directly. Fishing can also contribute to other environmental effects when considered in-combination with other processes and activities.

Section 5 assesses the environmental effects of the policies and actions of the Crab and Lobster FMP in relation to the environmental issues screened into this SEA, and where applicable their associated UK MS descriptors (Table 4).

Overview of the Potential Positive and Negative Environmental Effects of the Objectives and Measures of the Crab and Lobster FMP

The potential positive and negative environmental effects of implementing the objectives (section 1) and management measures of the Crab and Lobster FMP have been identified in Tables 6, 7 and 8 below. The assessment focuses on the two principal species (brown crab and European lobster) consider by the FMP. Data deficient species are considered at this stage through brown crab objective 9. Objectives and measures are related to the two principal species unless otherwise stated. Further assessment of the environmental effects relating to data deficient species will be done once specific objectives and measures are set out in future revisions of the FMP.

Table 6. High-level assessment of the positive and negative environmental effects of the Brown Crab objectives

#	Objective	Positive Effects	Negative Effects
1	Develop and pilot a comprehensive data collection programme for crab fisheries, which supports a data rich future and results in the establishment of a reliable time series that facilitates well-informed, sustainable management.	This objective will contribute to improvements in evidence to assess the status of crab stocks. These improvements will enable better evaluations of the impact of fishing on those stocks and improve the collection of biological and environmental data. This will support monitoring and evaluation of any impacts of the fishery on the wider environment. The policies and actions arising from this objective may contribute to brown crab stocks being sustainably harvested. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Geology/sediments (UK MS - D6) • Water (UK MS D10, D11) • Climatic factors • Cultural Heritage	Any dedicated field surveys (for monitoring and data collection) could result in unwanted effects on the marine environment. This objective is seen as low risk as the environmental impacts will be considered during the development of any data collection programme. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Water (UK MS descriptors D10, D11) • Climatic factors

#	Objective	Positive Effects	Negative Effects
2	Establish methods to better assess stock status that reflect the life history of the target species and fishery exploitation patterns.	This objective will develop ways to accurately assess stocks or the exploitation status of stocks. The policies and actions arising from this objective may contribute to crab stocks being sustainably harvested and reduce the risk of overexploitation. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Geology/sediments (UK MS - D6) • Water (UK MS D10, D11) • Climatic factors	No negative effects are anticipated, therefore this objective is considered to pose a low risk.

#	Objective	Positive Effects	Negative Effects
3	Assess the impact of crab fishing activity on the wider marine environment.	This objective will assess the impact of crab fishing activity on the wider marine environment, including impacts on benthic habitats, non-target species and Endangered, Threatened and Protected Species (ETP) species, and fishing related litter. Actions under this objective will allow any impacts to be identified and mitigation to be built into future fisheries management, which may help protect the marine environment. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Geology/sediments (UK MS - D6) • Water (UK MS D10, D11) • Climatic factors • Cultural Heritage	No negative effects are anticipated, therefore this objective is considered to pose a low risk.

#	Objective	Positive Effects	Negative Effects
4	Improve understanding of interactions between the crab fishery and other fisheries.	This objective will develop a better understanding of the interactions between the English crab fishery and other fisheries. This will be particularly relevant to understanding the interaction between the Crab and Lobster FMP, to ensure common issues such as bait use, diversification and displacement are considered together. The policies and actions arising from this objective may contribute to crab stocks being sustainably harvested and reduce the combined effect of fisheries on the marine environment. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Geology/sediments (UK MS - D6) • Water (UK MS D10, D11) • Climatic factors	No negative effects are anticipated, therefore this objective is considered to pose a low risk.

#	Objective	Positive Effects	Negative Effects
5	Devise and implement a short- to medium-term management approach proposal that considers the external regulatory environment.	This objective will seek to develop an interim crab harvest strategy based on current evidence. The policies and actions arising from this objective may contribute to the protection of crab stocks from over-exploitation as the evidence base is improved. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6)	Stock assessments could indicate a higher level of fishing is possible which could lead to increased impacts on the environment. This objective could lead to changes in fishing effort, spatial changes in effort and or displacement to currently unfished areas or to other species. Any increase in fishing activity could put pressure on marine systems resulting in increased bycatch, seabed disturbance and fishing related litter as well as potentially increasing carbon dioxide emissions. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Geology/sediments (UK MS - D6) • Water (UK MS D10, D11) • Climatic factors

#	Objective	Positive Effects	Negative Effects
6	Establish a long-term management approach for crab fisheries in line with improvements in data collection and stock assessment.	This objective will seek to develop a crab harvest strategy with appropriate harvest control rules. The policies and actions arising from this objective may contribute to crab stocks being sustainably harvested. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6)	Stock assessments could indicate a higher level of fishing is possible which could lead increased impacts on the environment. This objective could lead to changes in fishing effort, spatial changes in effort and or displacement to currently unfished areas. Any increase in fishing activity could put pressure on marine systems resulting in increased bycatch, seabed disturbance and fishing related litter as well as potentially increasing carbon dioxide emissions. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Geology/sediments (UK MS - D6) • Water (UK MS D10, D11) • Climatic factors

#	Objective	Positive Effects	Negative Effects
7	Explore trade-offs between access arrangements for crab fisheries that will ensure both long-term environmental sustainability and economic profitability.	This objective will explore appropriate access arrangements to crab fisheries. Actions and policies arising from this objective may contribute to the environmental and economic sustainability of the fishery as fair and equitable access to the resource is determined. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Water (UK MS D10, D11) • Climatic factors	No negative effects are anticipated, therefore this objective is considered to pose a low risk.

#	Objective	Positive Effects	Negative Effects
8	Monitor other key commercial crustacean species.	This objective will monitor and develop understanding of emerging crustacean fisheries. Actions and policies arising from this objective may develop management strategies for emergent crustacean fisheries where evidence has demonstrated a need. The policies and actions arising from this objective may contribute to crab stocks being sustainably harvested and reduce the combined effect of fisheries on the marine environment. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6)	Improvements in stock information could result in higher levels of fishing which could lead increased impacts on the environment. Emerging fisheries could be at risk of over exploitation (due to market demand/ prices) before management has been considered/ applied. This could impact the target stock, other stocks and the environment. This objective could lead to changes in fishing effort, spatial changes in effort and/or displacement to currently unfished areas or to other species. Any increase in fishing activity could put pressure on marine systems resulting in increased bycatch, seabed disturbance and fishing related litter as well as potentially increasing carbon dioxide emissions. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Geology/sediments (UK MS - D6) • Water (UK MS D10, D11) • Climatic factors

#	Objective	Positive Effects	Negative Effects
9	The shellfish industry to work together to take collective responsibility to: • Mitigate or reduce emissions from the shellfish supply chain • Adapt to and reduce the environmental impacts of climate change	This objective will seek to improve our understanding of the carbon footprint of shellfish fisheries in scope of the FMP, will help identify carbon hotspots and opportunities for decarbonisation to inform future environmental adaptations to the commercial fishing sector building a greater business resilience. Reducing emissions from the shellfish supply chain will help the industry contribute to national and global goals to combat the climate crisis and meet net-zero commitments. Adapting to and reducing the environmental impacts of climate change will make the fishery more resilient to changes associated with climate, leading to a more sustainable fishery. Relevant SEA Issues: • Climatic factors	No negative effects are anticipated.

Table 7. High-level assessment of the positive and negative environmental effects of the European Lobster objectives

#	Objective	Positive Effects	Negative Effects
1	Develop and pilot a comprehensive data collection programme for lobster fisheries, which supports a data rich future and results in the establishment of a reliable time series that facilitates well-informed, sustainable management.	This objective will contribute to improvements in evidence to assess the status of lobster stocks. These improvements will enable better evaluations of the impact of fishing on those stocks and improve the collection of biological and environmental data. This will support monitoring and evaluation of any impacts of the fishery on the wider environment. The policies and actions arising from this objective may contribute to lobster stocks being sustainably harvested. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Geology/sediments (UK MS - D6) • Water (UK MS D10, D11) • Climatic factors • Cultural Heritage	Any dedicated field surveys (for monitoring and data collection) could result in unwanted effects on the marine environment. This objective is seen as low risk as the environmental impacts will be considered during the development of any data collection programme. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Water (UK MS descriptors D10, D11) • Climatic factors

#	Objective	Positive Effects	Negative Effects
2	Establish methods to better assess stock status that reflect the life history of the target species and fishery exploitation patterns.	This objective will develop ways to accurately assess stocks or the exploitation status of stocks. The policies and actions arising from this objective may contribute to lobster stocks being sustainably harvested and reduce the risk of overexploitation. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Geology/sediments (UK MS - D6) • Water (UK MS D10, D11) • Climatic factors	No negative effects are anticipated, therefore this objective is considered to pose a low risk.

#	Objective	Positive Effects	Negative Effects
3	Assess the impact of lobster fishing activity on the wider marine environment.	This objective will assess the impact of lobster fishing activity on the wider marine environment, including impacts on benthic habitats, non-target species and Endangered, Threatened and Protected (ETP) species, and fishing related litter. Actions under this objective will allow any impacts to be identified and mitigation to be built into future fisheries management, which may help protect the marine environment. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Geology/sediments (UK MS - D6) • Water (UK MS D10, D11) • Climatic factors • Cultural Heritage	No negative effects are anticipated, therefore this objective is considered to pose a low risk.

#	Objective	Positive Effects	Negative Effects
4	Improve understanding of interactions between the English lobster fishery and other fisheries.	This objective will develop a better understanding of the interactions between the English lobster fishery and other fisheries. This will be particularly relevant to understanding the interaction between the Crab and Lobster FMP, to ensure common issues such as bait use, diversification and displacement are considered together. The policies and actions arising from this objective may contribute to lobster stocks being sustainably harvested and reduce the combined effect of fisheries on the marine environment. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Geology/sediments (UK MS - D6) • Water (UK MS D10, D11) • Climatic factors	No negative effects are anticipated, therefore this objective is considered to pose a low risk.

#	Objective	Positive Effects	Negative Effects
5	Devise and implement a short- to medium-term management approach proposal that considers the external regulatory environment.	This objective will seek to develop an interim lobster harvest strategy based on current evidence. The policies and actions arising from this objective may contribute to the protection of lobster stocks from over-exploitation as the evidence base is improved. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6)	Stock assessments could indicate a higher level of fishing is sustainable for stocks which, without effective controls in place, could lead increased impacts on the environment. This objective could lead to changes in fishing effort, spatial changes in effort and or displacement to currently unfished areas or to other species. Any increase in fishing activity could put pressure on marine systems resulting in increased bycatch, seabed disturbance and fishing related litter as well as potentially increasing carbon dioxide emissions. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Geology/sediments (UK MS - D6) • Water (UK MS D10, D11) • Climatic factors

#	Objective	Positive Effects	Negative Effects
6	Establish a long-term management approach for lobster fisheries in line with improvements in data collection and stock assessment.	This objective will seek to develop a lobster harvest strategy with appropriate harvest control rules. The policies and actions arising from this objective may contribute to lobster stocks being sustainably harvested. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6)	Stock assessments could indicate a higher level of fishing is sustainable for stocks which, without effective controls in place, could lead to increased impacts on the environment. This objective could lead to changes in fishing effort, spatial changes in effort and or displacement to currently unfished areas. Any increase in fishing activity could put pressure on marine systems resulting in increased bycatch, seabed disturbance and fishing related litter as well as potentially increasing carbon dioxide emissions. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Geology/sediments (UK MS - D6) • Water (UK MS D10, D11) • Climatic factors

#	Objective	Positive Effects	Negative Effects
7	Explore trade-offs between access arrangements for crab fisheries that will ensure both long-term environmental sustainability and economic profitability.	This objective will explore appropriate access arrangements to crab fisheries. Actions and policies arising from this objective may contribute to the environmental and economic sustainability of the fishery as fair and equitable access to the resource is determined. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Water (UK MS D10, D11) • Climatic factors	No negative effects are anticipated, therefore this objective is considered to pose a low risk.

#	Objective	Positive Effects	Negative Effects
8	Government and shellfish industry to work together to take collective responsibility to: • mitigate or reduce emissions from the shellfish supply chain Government and shellfish industry to work together to take collective responsibility to: • to and reduce the environmental impacts of climate change	This objective will seek to improve our understanding of the carbon footprint of shellfish fisheries in scope of the FMP, will help identify carbon hotspots and opportunities for decarbonisation to inform future environmental adaptations to the commercial fishing sector building a greater business resilience. Reducing emissions from the shellfish supply chain will help the industry contribute to national and global goals to combat the climate crisis and meet net-zero commitments. Adapting to and reducing the environmental impacts of climate change will make the fishery more resilient to changes associated with climate, leading to a more sustainable fishery. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6)	No negative effects are anticipated, therefore this objective is considered to pose a low risk.

Table 8. High-level assessment of the positive and negative environmental effects of the possible Crab and Lobster Fishery Management Measures

Measure	Positive Effects	Negative Effects
MCRS variations (lobster and crawfish)	Establishing a standardised MLS may provide additional protection for spawning stocks, enhancing reproductive capacity. Ensuring healthy population of crab and lobster at or above size at maturity may help crab and lobster populations become more resilient to environmental change and could positively benefit marine ecosystem function and biodiversity. This would also serve to simplify the management landscape and make effective enforcement more straightforward. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6)	Increasing MLS/MCRS could result in more animals (undersize) being thrown back. Whilst these species have high survivability rates, capture and poor handling can negatively impact the individual animals and potentially the stock. There may also be wider impacts (to other stocks, the environment) if they are returned to the sea at a different location to where they were caught and if significant numbers are put back together, therefore increasing the carrying capacity of a certain area. MCRS harmonisation across regional boundaries may have localised stock or ecosystem impacts if set too low. Relevant SEA issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Water (UK MS D10, D11) • Climatic factors

Measure	Positive Effects	Negative Effects
MCRS variations (brown crab)	Establishing a standardised MLS may provide additional protection for spawning stocks, enhancing reproductive capacity. Ensuring healthy populations of crab and lobster at or above size at maturity may help crab and lobster populations become more resilient to environmental change and could positively benefit marine ecosystem function and biodiversity. This would also serve to simplify the management landscape and make effective enforcement more straightforward. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6)	Increasing MLS/MCRS could result in more animals (undersize) being thrown back. Whilst these species have high survivability rates, capture and poor handling can negatively impact the individual animals and potentially the stock. MCRS harmonisation across regional boundaries may have localised stock or ecosystem impacts if set too low. There may also be wider impacts (to other stocks, the environment) if they are returned to the sea at a different location to where they were caught and if significant numbers are put back together, therefore increasing the carrying capacity of a certain area. Relevant SEA issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Water (UK MS D10, D11) • Climatic factors

Measure	Positive Effects	Negative Effects
Ban on landing soft ('white') crab	Ensuring that all soft-shelled brown crab caught in pots are immediately returned to the sea will provide additional protection for spawning stocks, as moulting occurs before spawning. More mature individual crabs would be likely to be retained within the population due to this management measure, supporting stock recovery. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6)	These measures could impact the whelk fishery, as soft-shell crab is used for bait in that fishery. Other species could be targeted for use as bait which could have wider implications (on other stocks and the environment). Relevant SEA issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Water (UK MS D10, D11) • Climatic factors
Restricting landings based on sex	Restrictions on landing female lobsters has the potential to increase spawning biomass and prevent the practice of 'scrubbing' egg-bearing lobsters to remove the eggs and allow the animal to be landed. These measures could improve stock health by increasing protection for spawning stocks and juveniles. Ensuring healthy populations of crab and lobster may help make their populations more resilient to environmental change and could positively benefit marine ecosystem function and biodiversity. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6)	More males may be removed causing an imbalance in the sex ration of populations. This could impact population structure and reduce their reproductive capabilities. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6)

Measure	Positive Effects	Negative Effects
Seasonal closures	Seasonal closures may be used to reduce fishing pressure on stocks when females are laying eggs and could improve likelihood of reproductive success of crab and lobster populations. Protecting the spawning stock may help crab and lobster populations become more resilient to environmental change and could positively benefit marine ecosystem function and biodiversity. This measure will also benefit data deficient species, until the evidence-base for these species improves. Relevant SEA Issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6)	Spatial closures could result in spatial changes in effort, including displacement of activity that could increase fishing pressure on habitats not currently fished or fished infrequently. Spatial squeeze could result in increased activity of fishing activity (and other marine activities) in a smaller area, putting further pressure on marine habitats. Any increase in fishing activity could put pressure on marine systems resulting in increased bycatch, seabed disturbance and fishing related litter as well as potentially increasing carbon dioxide emissions. Relevant SEA issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Water (UK MS D10, D11) • Climatic factors

Measure	Positive Effects	Negative Effects
Assess the impact of latent capacity within the fleet	Managing latent licences could prevent an increase in fishing pressure to unsustainable levels in the future if licences are brought back into use. The policies and actions arising from this objective may contribute to crab stocks being sustainably harvested and reduce the risk of overexploitation. Relevant SEA Issues: Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6)	This objective could restrict fishing, which could lead to changes in fishing effort, spatial changes in effort and or displacement to currently unfished areas. Any increase in fishing activity could put pressure on marine systems resulting in increased bycatch, seabed disturbance and fishing related litter as well as potentially increasing carbon dioxide emissions. Relevant SEA issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Water (UK MS D10, D11) • Climatic factors
Managing recreational fishing effort	Managing recreational effort would account for all removals from the stock and lead to more accurate reporting of total fishing mortality. This may contribute to crab stocks being sustainably harvested and reduce the risk of overexploitation. Relevant SEA issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6)	Misreporting of recreational fishing effort could give an inaccurate picture of crab stocks and lead to increased fishing effort. Relevant SEA issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6)

Measure	Positive Effects	Negative Effects
Pot limits	Managing effort in the crab and lobster fishery, through pot limits should give better control over how the resource is exploited. Such control should contribute to crab and lobster stocks being sustainably harvested, reduce the risk of overexploitation, and improve resilience of the stock to environmental change. Regulating the number of pots may also help control the footprint of pots on the seabed, avoiding significant disturbance to the seabed particularly when combined with potting activity for other species. This measure will also benefit data deficient species, until the evidence base for these species improves. Relevant SEA issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Geology/Sediments (UK MS D6)	This measure could lead to changes in footprint of potting activity. Increased numbers of pots could put pressure on stocks, marine systems resulting in increased bycatch, seabed disturbance and fishing related litter. This measure could lead to changes in the frequency of impacts associated with potting, as fishers compensate for a reduction in pots with multiple fishing trips and increased number of hauls. Relevant SEA issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Geology/Sediments (UK MS D6) • Water (UK MS D10, D11) • Climatic factors

Measure	Positive Effects	Negative Effects
Catch limits	A catch limit would determine safe biological limits for fishing mortality, protecting the stock from over-exploitation and may help crab and lobster populations become more resilient to environmental change, and could positively benefit marine ecosystem function and biodiversity. Relevant SEA issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6)	This measure could lead to changes in fishing effort, spatial changes in effort and or displacement to currently unfished areas. Any increase in fishing activity could put pressure on marine systems resulting in increased bycatch, seabed disturbance and fishing related litter as well as potentially increasing carbon dioxide emissions. Relevant SEA issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Geology/Sediments (UK MS D6) • Water (UK MS D10, D11) • Climatic factors

Measure	Positive Effects	Negative Effects
Effort limits (days at sea)	Managing effort in the crab and lobster fishery may give better control over how the resource is exploited. Such control should contribute to crab and lobster stocks being sustainably harvested, reduce the risk of over exploitation and help crab and lobster populations become more resilient to environmental change. Healthy crab and lobster populations would add benefit to marine ecosystem function and biodiversity. This measure will also benefit data deficient species, until the evidence-base for these species improves. Relevant SEA issues: Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6)	This objective could lead to changes in fishing effort, spatial changes in effort and or displacement to currently unfished areas. Any increase in fishing activity could put pressure on marine systems resulting in increased bycatch, seabed disturbance and fishing related litter as well as potentially increasing carbon dioxide emissions. Relevant SEA issues: • Biodiversity, fauna, flora (UK MS - D1, D3, D4, D6) • Geology/Sediments (UK MS D6) • Water (UK MS D10, D11) • Climatic factors

Potential Positive Environmental Effects of the FMP in General

Biodiversity, Flora, Fauna, Geology and Sediments (Soil), Water Quality

The overarching aim of the Crab and Lobster FMP is to effectively manage the harvesting of crab and lobster stocks within sustainable limits while focusing on improving the sustainability of the fisheries over the long-term.

Securing the long-term sustainable harvesting of crab and lobster stocks across English waters, with the long-term aim of fishing within sustainable limits (MSY or appropriate proxies) could:

- help reduce the risk of crab and lobster stocks being over-exploited.
- reduce fishing-related mortality which may help crab and lobster populations become more resilient to environmental change which could benefit marine ecosystem function and biodiversity; and,
- help control species removal from food webs.

The Crab and Lobster FMP includes policies seeking to better assess bycatch associated with the fisheries, which should allow the introduction of measures to reduce bycatch of non-target and sensitive species over the long-term if required.

The Crab and Lobster FMP includes policies to better assess the contribution of crab and lobster fishing to marine litter and identifies strategic actions to help reduce fishing related marine litter.

Contribution of measures to manage harvesting of crab and lobster within sustainable limits in England (set out on in section 1 and assessed in section 5), will help contribute to the achievement of GES for Commercial fish (D3) for the UK MS by seeking to ensure that target stocks are harvested sustainably. The Crab and Lobster FMP's proposed interventions to develop better evidence on bycatch and the contribution of crab and lobster fishing related litter should positively contribute to achieving GES for descriptors D1, D4, D6 and D10.

The authors of the Crab and Lobster FMP considered advice from SNCBs on the risks posed by fishing for crab and lobster when developing and implementing the management measures set out in the FMP. Considering the wider impacts on the marine environment at the FMP preparation stage should lead to more informed management interventions that could have a positive effect on the environment.

The Crab and Lobster FMP adopts an ecosystem-based approach to fisheries management to help deliver environmental, social and economic benefits beyond those accrued from just achieving the sustainable harvesting of stocks.

Climatic Factors

The Crab and Lobster FMP supports policy development to reduce the contribution of fisheries activities to climate change, contributing to achieving the climate change objective in Fisheries Act 2020. Such policies will help identify opportunities to decarbonise the fleet and move towards net zero, making vessels more fuel efficient and generally less polluting.

The Crab and Lobster FMP will contribute to building an improved understanding of the potential impacts that crab and lobster fishing can have on blue carbon habitats.

The Crab and Lobster FMP will contribute to building an improved understanding of how climate change is influencing crab and lobster stock range and the physical and biological characteristics of crab and lobster species. This will help the crab and lobster fisheries adapt to climate driven changes in the distribution of stocks, contributing to the climate objective in the Fisheries Act 2020.

Cultural Heritage

While the FMP is not intended to focus on mitigating the impacts of fishing on marine heritage assets, fisheries management could contribute to safeguarding these assets and their locations.

Fisheries management that reduces adverse effects on habitats and seabed features, for example through gear design and pot limits, could indirectly help to conserve both known and unknown marine heritage assets.

Managing stocks so they are harvested in a sustainable way can have environmental, social and economic benefits. Ensuring a fishery is environmentally, socially and economically sustainable over the long term could help promote the cultural importance of fishing and preserve the cultural heritage of fishing itself including wrecks of fishing vessels, historic harbours and infrastructure, and fishing communities.

The SEA process will highlight to fisheries policy authorities how crab and lobster fisheries management policies and measures could support measures that protect the historic marine environment and improve early reporting of previously unknown sites.

Overview of Potential Negative Environmental Effects of the FMP

Biodiversity, Flora, Fauna, Geology and Sediments, Water quality, Climatic factors, Cultural heritage

It is difficult at this stage to be certain whether the Crab and Lobster FMP will result in any significant negative effects on the marine environment, as the proposed policies and fisheries management measures vary in their stage of development. Therefore, we do not

yet know the potential environmental effects of implementing the combination of policies and fisheries management measures set out in the Crab and Lobster FMP. However, the fisheries objectives which will guide our actions should deliver improved environmental protection, so although it is difficult at this stage to anticipate significant negative effects on the environment in the short term, the overall ambition is to have a positive effect on the environment over the long term through the implementation of the ecosystem-based approach to fisheries management. From an MPA perspective, any changes in management will be subject to MPA assessments which will ensure MPA features are protected inside and outside sites.

We acknowledge the FMP focuses on two principal species but also refers to four data deficient species. This assessment focuses on those policies and measures related to the principal species considered by the FMP. We note that the fisheries for the data deficient species will be monitored and that potential issues will be identified and addressed. However, continuing commercial exploitation of marine species without clear data on the status of their populations is a risk. We recommend that monitoring of the FMP's effectiveness considers the potential environmental effects of fisheries for these data deficient species when developing future policies and measures.

There is the potential for factors such as the spatial footprint, intensity, type of gear and fishing methods of the crab and lobster fisheries to alter through implementing the policies and actions of the FMP. We recognise that management interventions may solve one issue, but unintended and unpredictable issues could arise. For example, some of the proposed precautionary management measures and actions intended to have a positive effect to support the FMP objectives may lead to displacement of fishing activity to other locations or into fisheries. This change may result in negative environmental effects that fall outside the scope (geographic area or species) of this FMP. Where an FMP cannot solve an issue, it may be appropriate for other FMPs to consider this issue. Or, if areas beyond English waters are affected, it may be appropriate for this issue to be considered through wider UK or international fisheries management fora.

Section 5 has identified potential negative effects that could arise from the implementation of the FMP's policies, actions and measures. Due to the policies, actions and measures being at an early stage of development it is difficult to systematically set out their magnitude and significance. Changes to fishing activity resulting from the implementation of the FMP objectives and measures will be monitored as part of the process of evaluating the effectiveness of FMPs. Such monitoring will help identify any unintended consequences on the environment and indicate whether the implementation of these measures could lead to any significant environmental effects if unmanaged. Mitigating action could then be considered where any significant negative effects are identified, that are related to those issues scoped into this assessment.

In-combination Effects

The Crab and Lobster FMP could potentially have positive (or negative) in-combination effects with other programmes to deliver sustainable fisheries (see section 4). Whilst these

other programmes focus on different topics, there are common themes that positively link them together. For example, FMPs and the Marine Plans share the common principles of managing marine resources sustainably and reducing the impact of anthropogenic pressure on the marine environment. Having due regard to the Environmental Principles during the development of policy will further ensure that the environment will be appropriately considered throughout the FMP process. More broadly, we anticipate the cumulative positive effect of these programmes will result in helping to meet sustainability objectives and achieving long-term improvements to the marine environment.

Undertaking the in-combination assessment at this stage in the production cycle of the FMP proved difficult due to the policies and measures being at an early stage of development. From the analysis of the potential environmental effects (section 5) of the policies and measures set out in the Crab and Lobster FMP, the potential negative effects are not considered significant enough at this stage to require the policies and measures to be amended. When considering other potential policies, we are not aware at this stage that any other regimes/activities are going to change that position. The FMP could facilitate the in-combination assessment with Marine Plans by providing more specific detail on how the FMP could positively or negatively interact with them.

Before there are any changes to fisheries management as a result of the Crab and Lobster FMP, where necessary, all new measures will be subject to Habitats Regulations Assessments and Marine Conservation Zone assessments. Such assessments will consider the potential in-combination effects with other plans and projects that are occurring or will occur within in an MPA. These assessments will also identify where any specific interactions exist.

The combined effect of implementing the polices and measures of all FMPs will be considered through the mandatory FMP monitoring process once the plan is published and could form part of the longer-term JFS or FMP review cycles (section 8).

Conclusions

Crab and lobster fishing is an ongoing activity that poses some risks to the quality status of the marine environment. The Crab and Lobster FMP focuses on achieving the sustainable harvesting of crab and lobster stocks and therefore will reduce the risks to the future status of crab and lobster stocks in the long-term giving positive benefits to the environment.

Nevertheless, we acknowledge that fishing for crab and lobster within sustainable limits may not remove all the associated negative effects of that fishing on the wider marine environment.

The Fisheries Objectives (in the Fisheries Act) require FMPs to integrate environmental, social and economic aspects of a fishery when introducing interventions to control fishing activity within sustainable levels. Achieving the balance between these three elements will be a central component of making a contribution to the sustainability objective.

The Crab and Lobster FMP takes a precautionary approach to fisheries management and adopts a balanced and proportionate approach towards delivering the fisheries objectives.

The Crab and Lobster FMP may result in positive and negative effects on the environment in the short term, with the overall ambition to have a positive effect on the environment over the long term through the implementation of the ecosystem-based approach to fisheries management.

The Crab and Lobster FMP sets out how the issues of litter and bycatch with will be addressed through the future management.

The Crab and Lobster FMP does not specifically consider the impacts of fishing on marine heritage assets. However, fisheries management aimed at reducing wider environmental effects could indirectly help to conserve both known and unknown marine heritage assets. This iteration of the FMP focuses on setting out measures to achieve sustainable harvesting of crab and lobster stocks but there is scope for future iterations of the FMP to address this wider issue.

6. Proposed Measures to Reduce Significant Negative Effects

Existing Negative Effects of Crab and Lobster Fishing

This ER has acknowledged the existing negative environmental effects associated with the fishing activity which will be managed through the FMP. The actions proposed by the FMP to reduce negative effects are set out below.

The known impacts of crab and lobster fishing include bycatch of sensitive and/or non-target species, rope entanglement on sensitive species, litter/ghost gear affecting habitats and species, vessel emissions on climate, and the impact on cultural heritage sites.

Biodiversity, Flora, Fauna, Geology and Sediments (Soil), Water Quality

Management of crab and lobster fisheries within English waters largely consists of some technical measures, alongside restrictions on the number of days at sea that 15m and over vessels can fish for crab in certain areas (under the Western Waters effort regime). National legislation restricts the number of shellfish licences available (in England and Wales) and prohibits landing of berried crab and lobster, soft-shelled crabs (unless for bait), and lobsters with a v-notch in their tail fin. Minimum Conservation Reference Sizes (MCRS) are applicable to both brown crab and lobster. Landing of crab claws is also prohibited if the weight exceeds 1% of the total landings (pots) or 75kg (nets). Regional measures are enforced by the 10 IFCAs within England, whose jurisdictions extend from the coast out to 6nm. These measures will be part of the overall management strategy and will make a contribution to the conservation of stocks and the wider environment.

There are five Crab Fishery Units (CFU) that have been defined for England. These units are based upon the understanding of larval distributions and development, hydrographic conditions, and distribution of the fisheries. Each CFU encompasses waters covered by international, national, and local legislation which may be different within each region.

The five Crab Fishery Units (CFU) that have been defined within English waters are:

- Central North Sea
- Southern North Sea
- Eastern English Channel
- Western English Channel
- Celtic Sea

Stock assessments are carried out across most of these areas with the exception of the Irish Sea, due to low levels of fishing effort and landings from here. Stock boundaries for brown crab remain poorly understood and both sexes move quite widely at times; females in particular have been shown to travel large distances in relation to spawning activity.

As of 2019, the exploitation rate was categorised as ‘High’ in the Southern North Sea CFU, where exploitation was above the maximum reference point limit for both sexes. A further three CFUs – Central North Sea, Western English Channel, and Celtic Sea – were recorded at ‘Moderate’ rates. In the Eastern English Channel, the exploitation rate was unknown.

There are six Lobster Fishery Units (LFU) that have been defined for England (Figure 30). These units have been based upon the distribution of the fisheries, hydrographic conditions and what is known of larval distributions and development. Each LFU encompasses waters covered by international, national, and local legislation which may be different within each region.

The six Lobster Fishery Units (LFU) that have been defined within English waters are:

- Northwest
- Northumberland and Durham
- Yorkshire Humber
- East Anglia
- Southeast South Coast
- Southwest

These are based on geographically defined areas where lobster fisheries occur. Assessments are not carried out for the Northwest LFU, due to low level of fishing effort and landings from this region.

As of 2019, three LFUs – Northumberland and Durham, Yorkshire Humber, and East Anglia – were categorised as ‘High’ due to exploitation rates being at or above maximum reference points for both sexes. The Southeast South Coast and Southwest were both categorised as ‘Moderate’.

The FMP does not set out measures specifically to reduce the environmental effects of the fishing activity that targets the data deficient species. Further evidence is required to understand any environmental effects to develop appropriate measures. More broadly the measures that are used to manage the effects of potting in general on the environment will likely also reduce the environmental effects of potting activity for the data deficient species.

The Crab and Lobster FMP has considered advice from SNCBs with respect to the impacts from crab and lobster fishing activity on MPA features and the wider marine environment in relation to UK MS descriptors. The FMP has set out the following proposed measures to reduce those known negative effects.

Impacts within MPAs

The MPA network (Appendix C) is protected through the existing MPA management process by managing human activities such as fishing, to avoid likely significant effects on the environment. These activities are mainly controlled through the powers vested in the IFCAs and the MMO to make bylaws.

IFCAs and the MMO were involved in the development of the FMP to ensure measures proposed through the FMP are compatible with existing MPA management.

Before Defra implement any new management interventions proposed in the Crab and Lobster FMP, those interventions will be screened for likely significant effects on any European sites or European offshore marine sites that overlap with the geographical scope of the measure and, where necessary, a further appropriate assessment completed in accordance with the Conservation of Habitats and Species Regulations 2017 or the Conservation of Offshore Habitats and Species Regulations 2017. In accordance with the Marine and Coastal Access Act 2009, a Marine Conservation Zone (MCZ) Assessment will also be completed before any new management measure is implemented that may significantly hinder the conservation objectives of an MCZ.

These actions will make sure the impacts of crab and lobster fishing activity and the FMP's policies, actions and measures do not prevent our ability to meet the conservation objectives for MPA features, thereby enabling us to achieve the legally binding target for MPA condition set out in the Environmental Targets (Marine Protected Areas) Regulations 2022.

Impacts outside MPAs

The crab and lobster fisheries pose a moderate risk of bycatch of mobile species that are designated features of MPAs, and bycatch in relation to UK MS descriptors. Potential impacts will be considered via a bycatch monitoring plan to be set out in future iterations of the FMP. See below for further details.

UK MS Descriptors Impacts

Litter: Acknowledging that the loss of pots, ropes and buoys from crab and lobster fishing activity will add to overall levels of fishing related litter within the sea, the FMP proposes the following measures:

- The Crab and Lobster Management Group will work with the UK Gear Forum to:
  (1) improve our understanding of the scale of ecosystem impacts from abandoned lost and discarded potting gear;
  (2) identify opportunities to collect and reuse end of life potting gear;
  (3) assess how to better record and assess the scale of abandoned and lost fishing gear; and,
  (4) review the effectiveness of existing technical measures to minimise ghost fishing from pots and rope entanglement.
- These activities will take a whole-life cycle approach to prevent and divert material from becoming a source of marine litter. It will feed into Defra's existing end-of-life fishing gear initiatives that support a circular economy to reduce the impacts generated from fishing waste.

These measures should help the Crab and Lobster FMP support the achievement of GES for UKMS Descriptor 11 – Litter, and thereby have a positive effect on the current baseline status.

Bycatch: Despite anticipated low risk of bycatch of sensitive and/or non-target species associated with the crab and lobster fisheries, the Crab and Lobster FMP proposes to improve reporting of any bycatch via a monitoring plan. The plan will encourage fishers to report accidental bycatches along with the geographical location and re-enforce the existing requirement to report any marine mammals caught in fishing gear within 48 hours of returning to port. Information gathered will be used to better assess risk, potential hotspot areas, and determine if management measures are required. These measures could include reducing pot limits and soak times – reducing the time ropes (which are the key cause of entanglement) spend in the water is likely to be a key mitigation.

The Crab and Lobster FMP will collaborate with other existing initiatives that are working to mitigate negative impacts of fishing action, such as the Bycatch Mitigation Initiative, Clean Catch UK.

Collectively, these proposed measures will help the Crab and Lobster FMP support the achievement of GES for UKMS D1 – Biological diversity and D4 Food webs and therefore have a positive effect on the current baseline.

The FMP could set out how the objectives of the FMP will contribute to achieving GES for the relevant UKMS descriptors.

Climate Change

Vessel Emissions: The UK shellfish sector collectively will need to consider how it will reduce emissions to contribute to meeting the Net Zero target. Mitigating actions could include technological, regulatory, managerial, and behavioural changes to increase efficiency or transition to alternative fuels and energy sources, and reducing the direct impact that fisheries' have on marine carbon stores. Work is occurring at a national level to understand the current evidence gaps and latest innovations to support the development of pathways towards Net Zero for the UK fishing fleet.

FMP aspirations will be progressed through the Seafood Emissions Profiling Tool in the first instance, to help establish a more detailed emissions profile (and emissions' hotspots) for crab and lobster products. This information will then help establish the mitigation actions needed to further reduce the emissions profile.

Seafish has recently established the Vessels of the Future forum which brings together the fishing industry, researchers, boat builders and regulators to explore opportunities to assist the UK fishing sector to make the transition to a low emissions fleet. This forum will work with the SIAG to explore the opportunity for change in the potting sector.

Blue Carbon: Due to the lack of information available on crab and lobster specific impacts on blue carbon habitats, the Crab and Lobster FMP in the first instance will collate research findings to build an improved understanding of the potential impacts of crab and lobster fishing. Implementing such actions has the potential for the FMP to have a positive contribution to the current baseline in the future.

Climate change impacts on crab and lobster stocks and fisheries: Over the duration of this plan the focus will be on contributing to the evidence base and monitoring trends to assess likely impacts to shellfish species generally, and crab and lobster specifically.

Cultural Heritage

The Crab and Lobster FMP does not explicitly consider the potential impacts of crab and lobster fishing activity on marine cultural heritage.

Historic England have developed a range of options designed to manage negative interactions between commercial fishing and the historic marine environment. Defra should work with agencies such as Historic England to consider how measures that could protect the marine historic environment could be incorporated into fisheries management for future iterations. Considering appropriate measures to reduce negative interactions with marine heritage assets could strengthen the positive interactions between FMPs and cultural heritage and has the potential for the FMP to contribute to having a positive effect on the current baseline.

Effects identified by this assessment

The assessment of the likely negative effects of the policies, measures and actions in section 5 did not identify any negative effects that posed a significant risk to the environment. Therefore, no changes to the proposed objectives, policies and measures are needed ahead of publishing the FMP. Where appropriate, the policies, measures and actions will be developed and implemented to mitigate any potential negative effects identified by the current assessment.

The likely negative effects will also be considered when developing monitoring activities as part of the implementation process (see section 8), to ensure that any negative effects of the of the FMP's policies, measures and actions can be further reduced. Monitoring changes to fishing activity resulting from the implementation of the FMP will help identify

any unintended consequences on the environment that could lead to significant negative environmental effects. Where likely unintended environmental consequences are identified, appropriate changes to management or mitigation can be implemented to reduce to any negative environmental effects developing.

General

The UK is committed to using marine resources sustainably and reducing the impacts of fishing on the marine environment to comply with its international and domestic obligations. The Crab and Lobster FMP seeks to support these commitments by providing the tools (FMP policies and measures) to deliver the sustainable harvesting of crab and lobster stocks.

The range of environmental issues identified through this assessment have been largely considered by the Crab and Lobster FMP. The FMP acknowledges that the evidence base is not sufficiently comprehensive at present to fully address many of the issues and therefore proposes a multi-step, iterative approach to deliver long-term sustainability through improving the evidence base. The FMP should remain flexible to adapt its policies and measures as new evidence on potential impacts of crab and lobster fishing emerge, particularly in relation to climate change.

This ER considers that the FMP has proposed all necessary actions to address existing issues and has appropriately considered how it will address potential issues arising from the implementation of the FMP's policies, measures and actions. This ER has therefore not proposed any mitigations in addition to those already set out in the FMP.

7. Reasonable Alternatives

Regulation 12(2)(b) of the SEA Regulations 2004 requires the fisheries policy authorities to consider reasonable alternatives to the Crab and Lobster FMP. A reasonable alternative has been defined as 'an activity that could feasibly attain or approximate the FMP's objectives at a lower environmental cost or decreased level of environmental degradation'[17].

Section 2 of the Fisheries Act 2020 requires the fisheries policy authorities to publish a JFS setting out how they will use FMPs to achieve, or contribute to achieving, the fisheries objectives. The JFS lists the planned FMPs, including the Crab and Lobster FMP. This listing creates a legal requirement to prepare and publish the Crab and Lobster FMP and does not allow for a reasonable alternative to producing an FMP unless a 'relevant change of circumstances', as set out in section 7 (7)[18] of the Fisheries Act, applies; we are not aware of any information that would invoke these circumstances.

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[17] Reasonable alternative definition.

[18] Fisheries Act 2020 (legislation.gov.uk)

The Crab and Lobster FMP, alongside the other 42 FMPs, was agreed by the fisheries policy authorities through the JFS publication process. Engagement across administrations took place via the processes outlined in the Fisheries Framework. Regular scrutiny of the emerging list of FMPs was built into every step of the JFS policy formation, and through this process credible alternatives to managing stocks without a FMP were considered. The list of FMPs, which included a FMP for Crab and Lobster, was part of the public consultation on the Joint Fisheries Statement in early 2022. There were no comments on the inclusion of a FMP for Crab and Lobster.

The brown crab and lobster fisheries are an ongoing activity with some existing management in place. Continuing with the current approach without strengthened or new management alongside further evidence collection was judged to increase the likelihood of stocks being over-exploited with insufficient protection for the wider marine environment. Therefore, additional and/or amended management was required. The Crab and Lobster FMP seeks to promote the management of the fisheries in a more coherent and coordinated manner that considers wider environmental issues. The FMP will likely deliver greater environmental gain and will have a more significant positive impact on improving the current environmental baseline, compared to a 'business as usual' approach that only continues with existing fisheries management.

The Crab and Lobster FMP policies and measures were developed to specifically address those fisheries management issues identified within the crab and lobster fisheries.

The interventions adopt a precautionary approach as required by the Fisheries Act 2020 and are intended to safeguard stocks and the fisheries in the short term whilst more information is gathered to inform evidence-based adaptive management in the future.

A range of environmental issues (for example, through SNCB advice, evidence relating to climatic change impacts) have been considered during the development of the current proposed policies and measures to ensure they have minimal negative environmental effects and where applicable maximum positive environmental gain. Stakeholder input, including that from the environmental sector has been considered during the development of polices and measures. These processes have been employed to ensure the most appropriate actions have been proposed for this stage in the life cycle of the FMP.

An assessment of the potential alternatives is provided in Tables 9, 10 and 11.

Table 9. Assessment of Alternatives to Proposed Crab Objectives.

#	Objective	Alternative to proposed objective
1	Develop and pilot a comprehensive data collection programme for crab fisheries, which supports a data rich future and results in the establishment of a reliable time series that facilitates well-informed, sustainable management.	Better data are required to make evidence-based management decisions. Possible alternatives: • Rather than 'pilot' a data collection programme, introduce it fully and evolve as necessary. Not currently in a position to roll out a full programme. • Continue to base management decisions on data collected from existing programmes, for example, national/ local stock assessments, which would likely inform more precautionary type measures (given more evidence required). Management would be unlikely to be as effective. • Increased use of existing data gathered by fishers. Management would improve but unlikely to be as effective as coverage is not comprehensive.

#	Objective	Alternative to proposed objective
2	Establish methods to better assess stock status that reflect the life history of the target species and fishery exploitation patterns.	Accurate information on stock status is required to make evidence-based management decisions to protect against over-exploitation. Possible alternatives: • Continue to base management decisions on data collected from existing programmes, for example, national/ local stock assessments, which would likely inform more precautionary type measures (given more evidence required). Management would be unlikely to be as effective. • Increased use of existing data gathered by fishers. Management would improve but would be unlikely to be as effective as coverage is not comprehensive.
3	Assess the impact of crab fishing activity on the wider marine environment.	Better understanding of how crab potting activity impacts the marine environment is required to minimise negative interactions and ensure the fishery is sustainable. No reasonable alternative is available.
4	Improve understanding of interactions between the crab fishery and other fisheries.	Understanding interactions with other fisheries is required to develop management that accounts for other fisheries, and appropriately addresses any issues or conflicts identified, ensuring the fishery is sustainable. No reasonable alternative is available.

#	Objective	Alternative to proposed objective
5	Devise and implement a short- to medium-term management approach proposal that considers the external regulatory environment.	Implementing management measures based on best-available scientific evidence that take account of the external regulatory environment is required for responsive management to protect crab stocks against over-exploitation. No reasonable alternative is available.
6	Establish a long-term management approach for crab fisheries in line with improvements in data collection and stock assessment.	A long-term management approach for crab fisheries using improved data collection and stock assessments is required to manage fishing activity sustainably to protect stocks. No reasonable alternative is available.
7	Explore trade-offs between arrangements for providing access to crab fisheries that will ensure both: • long-term environmental sustainability; and • economic profitability	Appropriate access arrangements can support thriving crab fisheries in terms of both economic and environmental sustainability. This objective will also help meet the equal access objective in the Fisheries Act 2020. No reasonable alternative is available.
8	Monitor other key commercial crustacean species	The alternative would be to set out specific objectives and measures to manage fishing of other crustacean species. Due to the deficiency of data this objective was the most effective action at this stage. Future iterations of the FMP will consider management as required when the evidence base if more developed.

#	Objective	Alternative to proposed objective
9	Government and shellfish industry to work together to take collective responsibility to: • mitigate or reduce emissions from the shellfish supply chain • adapt to and reduce the environmental impacts of climate change	Considering climate change issues is required to ensure the industry contributes to reducing its impact on the environment and is ready to adapt to the environmental impacts of climate change. No reasonable alternative is available.

Table 10. Assessment of Alternatives to Proposed Lobster Objectives.

#	Objective	Alternative to proposed objective
1	Develop and pilot a comprehensive data collection programme for lobster fisheries, which supports a data rich future and results in the establishment of a reliable time series that facilitates well-informed, sustainable management.	Better data are required to make evidence-based management decisions. Possible alternatives: • Rather than 'pilot' a data collection programme, introduce it fully and evolve as necessary. Not currently in a position to roll out a full programme. • Continue to base management decisions on data collected from existing programmes e.g., national/ local stock assessments, which would likely inform more precautionary type measures (given more evidence required). Management would be unlikely be as effective. • Increased use of existing data gathered by fishers. Management would improve but unlikely to be as effective as coverage is not comprehensive.

#	Objective	Alternative to proposed objective
2	Establish methods to better assess stock status that reflect the life history of the target species and fishery exploitation patterns.	Accurate information on stock status is required to make evidence-based management decisions to protect against over-exploitation. Possible alternatives: • Continue to base management decisions on data collected from existing programmes, for example, national/ local stock assessments, which would likely inform more precautionary type measures (given more evidence required). Management would be unlikely be as effective. • Increased use of existing data gathered by fishers. Management would improve but unlikely to be as effective as coverage is not comprehensive.
3	Assess the impact of lobster fishing activity on the wider marine environment.	Better understanding of how lobster potting activity impacts the marine environment is required to minimise negative interactions and ensure the fishery is sustainable. No reasonable alternative is available.
4	Improve understanding of interactions between the English lobster fishery and other fisheries.	Understanding interactions with other fisheries is required to develop management that accounts for other fisheries, and appropriately addresses any issues or conflicts identified, ensuring the fishery is sustainable. No reasonable alternative is available.
5	Devise and implement a short- to medium-term management approach proposal that takes into account the external regulatory environment.	Implementing management measures based on best-available scientific evidence that take account of the external regulatory environment is required for responsive management to protect lobster stocks against over-exploitation. No reasonable alternative is available.

#	Objective	Alternative to proposed objective
6	Establish a long-term management approach for lobster fisheries in line with improvements in data collection and stock assessment.	A long-term management approach for lobster fisheries using improved data collection and stock assessments is required manage fishing activity sustainably to protect stocks. No reasonable alternative is available.
7	Explore trade-offs between access arrangements for lobster fisheries that will ensure both long-term environmental sustainability and economic profitability.	Appropriate access arrangements can support thriving crab fisheries in terms of both economic and environmental sustainability. This objective will also help meet the equal access objective in the Fisheries Act 2020. No reasonable alternative is available.
8	Enable the shellfish industry to: 1: Mitigate emissions from the shellfish supply chain, and; 2: Adapt to the environmental impacts of climate change	Considering climate change issues is required to ensure the industry contributes to reducing its impact on the environment and is ready to adapt to the environmental impacts of climate change. No reasonable alternative is available.

Table 11. Assessment of alternatives to proposed management measures.

Measure	Alternative to proposed measure
MCRS variations (lobster and crawfish) MCRS variations (brown crab Ban on landing soft ('white') crab) Restricting landings based on sex Seasonal closures	These measures have been proposed to increase stock protection. Alternative sizes (e.g., increase or decrease on those proposed) would not follow the evidence currently available. They are part of a suite of different measures to protect stocks, improve stock sustainability and reduce the effects on the wider environment. Possible alternatives which could be considered in the future include: • Technical specification for gears e.g., increased application of escape hatches in pots (to allow undersized/ juvenile animals to escape) • Explore incentives around promoting v-notching of egg bearing females • Increase effectiveness of berried ban enforcement • Banning the use of soft-shell crab for bait
Assess the impact of latent capacity within the fleet Managing recreational fishing effort Pot limits Catch limits Effort limits (days at sea)	These measures have been proposed to manage fishing pressure within sustainable limits. They are part of a suite of different measures to protect stocks, improve stock sustainability and reduce the effects on the wider environment. Other alternatives will be considered in future iterations of the FMP as the evidence base develops.

The proposed policies and measures set out in the FMP are therefore considered to be the most appropriate for this stage in the FMP's development.

The Crab and Lobster FMP will develop through future iterations as the evidence base improves. Policies and actions will be monitored and adapted to ensure the most appropriate and effective management interventions are used to address contemporary issues. Where appropriate, additional measures will be developed as options for more

targeted management become available to tackle a wider range of fisheries management issues over the longer term.

The public will be consulted on the Crab and Lobster FMP, alongside the consultation of this ER. These consultations will provide stakeholders with the opportunity to review proposed measures and present alternatives if available.

8. Monitoring and Review

Monitoring

Regulation 17 of the SEA Regulations 2004 requires Defra to monitor any significant environmental effects arising through the implementation of the Crab and Lobster FMP. Monitoring should identify unforeseen adverse effects at an early stage, ensuring appropriate remedial action can be undertaken. Paragraph 9 of Schedule 2 to the 2004 Regulations requires the Environmental Report to include a description of the measures envisaged concerning monitoring in accordance with regulation 17.

The types of relevant monitoring already undertaken or proposed by the FMP fall into two types:

- Monitoring the effectiveness of FMP
- Monitoring environmental impacts

Monitoring effectiveness of the FMP

This is the first version of the crab and lobster FMP. It sets out the first steps and longer-term vision necessary for sustainable management of this fishery. These plans are intended to allow an adaptive approach and will be reviewed and improved over time, as we collect more evidence and collaborate with the fishing sector and wider interests on the sustainable management of these fisheries.

Delivery of the actions and measures for this crab and lobster FMP will be monitored.

For some stocks, or elements of stocks (male crabs in the Western Channel and Celtic Sea CFUs), there is insufficient evidence to determine MSY or a proxy for MSY. This FMP sets out the proposed steps to build the evidence base for these data-limited stocks to support progress towards defining and measuring stock status and reporting on stock sustainability. An increase in the available evidence to define and measure stock status will be an indicator of the effectiveness of this plan for these stocks.

For some stocks with insufficient data to carry out a stock assessment, there are currently no plans set out in this FMP to increase data collection, due to limited fishing effort and landings. Plans to increase data collection for these stocks will be reviewed over time.

For some stocks, there is sufficient evidence to determine a proxy for MSY and to assess the sustainability of the stock, with most stocks below sustainable limits. An increase

and/or maintenance of the number of stocks fished at sustainable levels will indicate the effectiveness of this plan for these stocks.

This FMP sets out the proposed steps to build the evidence base to improve stock assessment calculations for all stocks. An increase in the available evidence with improved stock assessments will be an indicator of the effectiveness of this plan for these stocks.

Other indicators to measure the effectiveness of the policies for restoring these stocks to, or maintaining them at, sustainable levels, are:

- the introduction of increased, and where possible harmonised, MCRS for lobster and crawfish to more accurately reflect the available evidence on size of maturity and improve the reproductive capacity of the stocks, in order to help maintain or increase their stock levels.
- the development and introduction of effort management measures for crab and lobster, including considering the introduction of both input controls (for example, pot limits or days at sea limits) and output controls (catch limits, for example) to increase protection for stocks, in order to help maintain or increase their levels.

In addition to the monitoring set out in the FMP, monitoring of the environmental effects of implementing the FMP's policies, actions and measures will be undertaken by fisheries managers (Defra, MMO, and IFCAs) These actions may include;

- Monitoring changes in fishing activity e.g. changes in effort or the spatial and/or temporal patterns of fishing, resulting from the implementation of the FMP.

If any negative impacts are identified, fisheries managers should consider adjusting crab and lobster fishery management.

Environmental Impacts

There are existing monitoring programmes that consider the potential impact of fishing activity on the environment. The following programmes may identify adverse impacts from crab and lobster fishing that could be addressed through amending the FMP or its implementation.

MPAs: The conservation status of conservation sites, including SACs, SPAs, and MCZs is monitored by the SNCBs, and is reported under the Habitats Regulations and Marine and Coastal Access Act. Findings from these monitoring activities could be used to help indicate where potential risks or impacts associated with fishing activity being managed through the FMP are occurring. FMPs could act on this evidence to amend its policies and measures to reduce or avoid these risks or impacts. Findings from these monitoring activities could also be used to indicate where FMP policies and measures are having a positive effect.

UK MS: The UK MS monitors and assesses the state of the marine environment against 11 descriptors. See section above for details on how monitoring the FMP will link into future assessments under the UK MS.

Atmospheric emissions: The Climate Change Committee (CCC) was set up under the Climate Change Act 2008 to support the strategic aims of the UK administrations and to independently assess how the UK can optimally achieve its emissions reductions goals. The Committee advises on the level of carbon budgets and submits annual reports to Parliament on the UK's progress towards targets and budgets. Evidence on the contribution of the UK pot and trap fishing fleet has been considered in this SEA and would continue to be reviewed against the FMP objectives as part of monitoring.

Review

The Fisheries Act 2020 requires the Crab and Lobster FMP to be reviewed at least every six years; the Act requires a report on the FMP's progress to be included in the report on the JFS every three years. The formal review will assess how the FMP has contributed to the crab and lobster fisheries harvesting within sustainable limits and the Fisheries Act objectives.

The results of monitoring the effectiveness of the Crab and Lobster FMP will also contribute to the legally required process to review the JFS. The JFS report will set out the extent to which each FMP has been implemented and has affected stock levels in the UK.

Additional reviews can be conducted at any point within these time scales if relevant evidence, international obligations, or wider events require a change in the policies set out in the FMP.

The findings of these reviews will inform the development of subsequent iterations of the Crab and Lobster FMP. As part of the reporting and wider review processes, alternatives to management can be identified to ensure the Crab and Lobster FMP delivers on its objectives and wider environmental obligations.

The SEA Environmental Report will be periodically updated to reflect how the implementation of FMP policies and actions affect the environment. Such updating will ensure that the SEA remains up to date throughout the ongoing FMP process into the future.

Appendix A: Eleven Descriptors of the UK MS

D1 – Biological diversity (cetaceans, seals, birds, fish, and benthic habitats)

D2 – Non-indigenous species

D3 – Commercially exploited fish and shellfish

D4 – Food webs (cetaceans, seals, birds, and fish)

D5 – Eutrophication

D6 – Sea-floor integrity (benthic habitats)

D7 – Hydrographical conditions

D8 – Contaminants

D9 – Contaminants in fish and other seafood for human consumption

D10 – Litter

D11 – Introduction of energy, including underwater noise

Appendix B: Additional Baseline Information

D1 and D4 – Cetaceans

Cetaceans (whales and dolphins) are an important marine ecosystem component that contributes to overall levels of biodiversity (D1). In addition, as top predators, the abundance of cetaceans can also provide some understanding on how the food web is functioning (D4).

To meet Good Environmental Status, the high-level objective is that 'the population abundance of cetaceans indicates health populations that are not significantly affected by human activities'. However, according to the 2019 UKMS updated part 1 assessment (available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/921262/marine-strategy-part1-october19.pdf), the overall status of cetaceans in the North Sea and Celtic Seas is currently uncertain. The baseline environmental condition with respect to cetaceans is therefore one where some degree of recovery is potentially required to meet GES. For more information, see https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/cetaceans/.

A summary of the status is shown in Table A1. When considering the detailed targets and indicators used to make the assessment, the data suggests some are in line with GES in some geographic areas. But for many others, the results are either unclear or insufficient data is available to make an assessment. It should be noted that the indicators used do not always cover the entire breadth of what is set out in the target. For instance, the bycatch assessment is currently primarily driven by looking at harbour porpoise. The indicators can be developed in the future as more evidence is available.

Table A1. Detail from the 2019 UKMS assessment on descriptor D1; D4: Cetaceans. Taken from Marine Strategy Part One: UK updated assessment and Good Environmental Status (available at https://www.gov.uk/government/publications/marine-strategy-part-one-uk-updated-assessment-and-good-environmental-status) and the UKMS Marine Online Assessment Tool (available at https://moat.cefas.co.uk/).

Target	Indicator	North Sea	Celtic Seas
The long-term viability of cetacean populations is not threatened by incidental bycatch	Harbour porpoise bycatch	GES achieved	GES status uncertain

Target	Indicator	North Sea	Celtic Seas
There should be no significant decrease in abundance caused by human activities	Abundance and distribution of coastal bottlenose dolphins	GES achieved	GES status uncertain
There should be no significant decrease in abundance caused by human activities	Abundance and distribution of cetaceans other than coastal bottlenose dolphins	GES partially achieved	GES status uncertain
Population range is not significantly lower than the favourable reference value for the species	Abundance and distribution of coastal bottlenose dolphins	GES achieved	GES status uncertain
Population range is not significantly lower than the favourable reference value for the species	Abundance and distribution of cetaceans other than coastal bottlenose dolphins	GES partially achieved	GES status uncertain

Current impact of fisheries on the baseline condition

Fishing is one of several anthropogenic activities that are considered relevant to this ecosystem component. Other pressures include noise impacts from offshore infrastructure such as renewable energy and pollution from a range of sources. More information on relevant pressures is provided in section 2.6.1 of the Marine Strategy Part One: UK updated assessment and Good Environmental Status (available at https://www.gov.uk/government/publications/marine-strategy-part-one-uk-updated-assessment-and-good-environmental-status).

Cetacean bycatch

There is a specific target associated with the impact of bycatch from fisheries on the viability of cetacean populations. In the 2019 UKMS assessment, only data on the bycatch of Harbour Porpoise was used. This estimated that bycatch in the North Sea was below the precautionary threshold of 1% of the population estimate (and therefore meeting the indicator target), but above this threshold for the Celtic Seas. It was, however, below the less precautionary 1.7% of population estimate. Whether the target was being met in the

Celtic Seas was therefore uncertain. For more detail on the assessment, see https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/cetaceans/harbour-porpoise-bycatch/.

More recent analysis for the 2023 OSPAR quality status report (which uses the same indicator as the UKMS) shows that bycatch of harbour porpoise in the Greater North Sea and Irish & Celtic seas are exceeding the threshold. Bycatch of common dolphin is also exceeding the threshold. For more details, see https://oap.ospar.org/en/ospar-assessments/quality-status-reports/qsr-2023/indicator-assessments/marine-mammal-bycatch/. As this is a common indicator for both OSPAR and UKMS, that suggests that an updated UKMS assessment would no longer be seen as meeting this target.

Using the latest evidence from the UK Bycatch Monitoring Programme by Kingston et al (2021)[19], it is specifically net fisheries (for example, gill nets, tangle nets etc) that are largely responsible for both harbour porpoise and common dolphin bycatch.

Cetacean abundance and range targets

For coastal bottlenose dolphins, the indicator target of 'no statistically significant decrease in abundance' was met in the Greater North Sea and for the largest group in the Celtic Seas (in the Coastal Wales assessment unit). No assessment has been possible for the other two smaller Celtic Seas Groups (in the West Coast assessment unit and Coastal Southwest assessment unit). For more information, see https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/cetaceans/abundance-and-distribution-of-coastal-bottlenose-dolphins/

For species other than coastal bottlenose dolphins, the indicator target of 'no significant decline' was met for some species in some areas (minke whale in the Greater North Sea), but for most species and all of the Celtic Seas, there was insufficient evidence to make an assessment. For more information, see https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/cetaceans/abundance-and-distribution-of-cetaceans-other-than-coastal-bottlenose-dolphins/

Without this information, it is difficult to understand the potential impact fisheries could currently be having (alongside impacts from other industries or factors such as pollution) and if fisheries impacts are a scale of concern. Aside from bycatch (which is considered separately), the mechanism by which certain fisheries could theoretically be impacting on abundance and distribution would be through the removal of prey species important to cetacean species. At high levels, this could potentially lead to population-level impacts.

19 Kingston, A., Thomas, I. and Northridge, S. (2021) UK Bycatch Monitoring Programme Report for 2019. Sea Mammal Research Unit. Available at Science Search (defra.gov.uk)

Cetacean summary

The status of cetaceans with both the North Sea and Celtic Sea is mixed. While there are some aspects that are in line with the achievement of GES, much of the picture is unclear. The impact of various net fisheries is leading to bycatch that, in places, might be impacting long term population viability of harbour porpoise.

Other than for a limited number of coastal bottlenose dolphin populations, it is unclear whether the abundance and range of most cetacean species can be considered in line with GES. Fisheries and the removal of prey species is one of several activities / pressures that have the potential to result in changes in cetacean abundance and distribution.

D1 and D4 – Seals

The UK has achieved its aim of GES for grey seals in the Greater North Sea and Celtic Seas. There was a significant increase in the abundance of harbour seals in West Scotland where most harbour seals are located, but their status in other parts of the Celtic Seas is uncertain. Harbour seals in the Greater North Sea have not yet achieved GES.

Seals are an important marine ecosystem component that contributes to overall levels of biodiversity (D1). In addition, as top predators, seal productivity can also provide some understanding and insight as to how the food web is functioning (D4).

To meet Good Environmental Status, the high-level objective is that 'the population abundance and demography of seals indicate healthy populations that are not significantly affected by human activities'. According to the 2019 UKMS updated part 1 assessment (available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/921262/marine-strategy-part1-october19.pdf), the UK has achieved its aim for GES for grey seals in the Greater North Sea and Celtic Seas. For harbour seals, there has been a significant increase in abundance in West Scotland where most harbour seals are located but their status is uncertain in other parts of the Celtic Seas and below what is required for GES in the Greater North Seas. For more information, see https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/seals/.

A summary of the current status is shown in Table A2. It should be noted that the current indicators used do not always cover the entire breadth of what is set out in the targets. For instance, there was no indicator developed or used as part of the 2019 assessment for bycatch.

Table A2. Detail from the 2019 UKMS assessment on descriptor D1; D4: Seals. Taken from Marine Strategy Part One: UK updated assessment and Good Environmental Status (available at https://www.gov.uk/government/publications/marine-strategy-part-one-uk-updated-assessment-and-good-environmental-status) and the UKMS Marine Online Assessment Tool (available at https://moat.cefas.co.uk/). *For this indicator, an assessment of seal bycatch be found on the OSPAR 2023 quality status report website at

https://oap.ospar.org/en/ospar-assessments/quality-status-reports/qsr-2023/indicator-assessments/marine-mammal-bycatch/.

Target	Indicator	North Sea	Celtic Seas
The long-term viability of seal populations is not threatened by incidental bycatch.	Marine mammal bycatch (OSPAR)*	-	-
Population abundance and distribution are consistent with favourable conservation status.	Grey seal abundance and distribution	GES achieved	GES achieved
	Harbour seal abundance and distribution	GES not achieved	GES status uncertain
Grey seal pup production does not decline substantially in the short or long-term.	Grey seal pup production (OSPAR)	GES achieved	GES achieved

Current impact of fisheries on the baseline condition

Fishing is one of several anthropogenic activities that are considered relevant to marine mammals. Other pressures include noise impacts from offshore infrastructure such as renewable energy and pollution from a range of sources. More information on relevant pressures is provided in section 2.6.1 of the Marine Strategy Part One: UK updated assessment and Good Environmental Status (available at https://www.gov.uk/government/publications/marine-strategy-part-one-uk-updated-assessment-and-good-environmental-status).

Seal bycatch

The 2019 UKMS assessment suggests a new target on bycatch mortality will be used in the future. Seal bycatch was not considered within the 2019 assessment. Grey seals are one of the three marine mammal species regularly recorded during the UK Bycatch Monitoring programme. Figures for seals (grey and harbour) are combined but the majority are thought to be greys. In the 2018 report[20] the authors were fairly confident that all seals observed in gillnets were greys. Harbour seals (referred to as common seals in the report)

20 7 Northridge, S., Kingston, A. and Thomas, l. (2019) Annual report on the implementation of Council Regulation (EC) No 812/2004 during 2018. Sea Mammal Research Unit. Available at Science Search (defra.gov.uk)

are rarely caught and numbers are too low to generate a useful bycatch estimate separately. The gears that pose the most risk to grey seals appears to be tangle and trammel nets, which was estimated to account for over 90% of seal bycatch in 2019[21].

The most recent OSPAR quality status reports assessment on marine mammal bycatch[22] (which is likely to feed into the next round of UKMS assessments), concludes that although grey seal bycatch is high, bycatch in 2020 was below the threshold value set and therefore not thought to be demographically significant. This suggests that in an updated UKMS assessment, seal bycatch is not likely to be threatening the long-term viability of the population and the bycatch target will be met.

Seal abundance and production

The 2019 UKMS assessment reports that grey seal numbers have continued to increase. Increases in grey seal pup production has slowed since the rapid increase following the end of culling in the 1970s, but still shows a positive trend. This is line with GES. Harbour seal abundance has increased over both the short and long term in the English Channel and along the East Coast of England. But there have been short-term and long-term declines in parts of Scotland. The cause of the declines is not currently known. For more information, see https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/seals/.

Seals summary

Grey seals populations and productivity continues to increase, and targets are being met. Bycatch (largely in tangle and trammel nets) is occurring but not at levels that threaten population viability. For harbour seals, the status is not in line with GES where population declines have occurred in some areas. The cause is unknown. It is not thought to be linked to bycatch as occurrences are rare and there is no indication that it is linked to other pressures associated with fishing.

D1 and D4 – Birds

The UK has achieved its aim of GES for non-breeding waterbirds in the Greater North Sea but not in the Celtic Seas. Breeding seabirds have not achieved GES.

Seabirds are well monitored species that are an important marine ecosystem component that contributes to overall biodiversity (D1). In addition, as top predators, the abundance of

21 Kingston, A., Thomas, I. and Northridge, S. (2021) UK Bycatch Monitoring Programme Report for 2019. Sea Mammal Research Unit. Available at Science Search (defra.gov.uk)

22 https://oap.ospar.org/en/ospar-assessments/quality-status-reports/qsr-2023/indicator-assessments/marine-mammal-bycatch/

birds can also provide some understanding and insight as to how the wider food web is functioning (D4).

To meet Good Environmental Status, the high-level objective is that 'the abundance and demography of marine bird species indicate healthy populations that are not significantly affected by human activities. According to the 2019 UKMS updated part 1 assessment (available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/921262/marine-strategy-part1-october19.pdf), GES has not been achieved for seabirds in the Greater North Sea and the Celtic Seas and the situation is declining, evidenced by increasing breeding failure rates. The baseline environmental condition with respect to birds is therefore one where some recovery is required to meet GES. For more information, see https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/birds/

A summary of the current status is shown in Table A3. It should be noted that the current indicators used do not always cover the entire breadth of what is set out in the targets. For instance, although there are plans for target about bycatch, there was no indicator developed or used as part of the 2019 assessment.

Table A3. Detail from the 2019 UKMS assessment on descriptor D1; D4: Birds. Taken from Marine Strategy Part One: UK updated assessment and Good Environmental Status (available at https://www.gov.uk/government/publications/marine-strategy-part-one-uk-updated-assessment-and-good-environmental-status) and the UKMS Marine Online Assessment Tool (available at https://moat.cefas.co.uk/). *For this indicator, detail of a pilot assessment can be found on the OSPAR 2023 quality status report website at https://oap.ospar.org/en/ospar-assessments/quality-status-reports/qsr-2023/indicator-assessments/marine-bird-bycatch-pilot/

Target	Indicator	North Sea	Celtic Seas
The long-term viability of marine bird populations is not threatened by deaths caused by incidental bycatch catch in mobile and static fishing gear.	Under development*	-	-
The population size of species has not declined substantially since 1992 as a result of human activities.	Marine bird abundance	GES not achieved	GES not achieved

Target	Indicator	North Sea	Celtic Seas
Widespread lack of breeding success in marine birds caused by human activities should occur in no more than three years in six.	Marine bird breeding success/failure	GES not achieved	GES partially achieved
	Kittiwake breeding success	GES achieved	Not assessed
There is no significant change or reduction in population distribution caused by human activities.	Distribution of breeding and non-breeding marine birds	Not assessed	Not assessed
There is no significant change or reduction in population distribution caused by human activities.	Invasive mammal presence on island seabird colonies	Not assessed	Not assessed

Current impact of fisheries on the baseline condition

Fishing is one of several anthropogenic activities that are considered relevant to this ecosystem component, including incidental bycatch and competition for resources (for example, sandeel fishing). Other pressures include mortality due to renewables, disturbance from a range of activities, oil pollution, and transfer of non-indigenous species to islands from ships. More information on relevant pressures is provided in section 2.6.1 of the Marine Strategy Part One: UK updated assessment and Good Environmental Status (available at https://www.gov.uk/government/publications/marine-strategy-part-one-uk-updated-assessment-and-good-environmental-status).

Bird populations size and breeding success

In the 2019 UKMS assessment, population targets were met for non-breeding water birds in the Greater North Sea but not in the Celtic Seas. Population targets for breeding seabirds were not met for breeding seabirds in either sub-region. In both sub-regions, a quarter or more species showed frequent and widespread breeding failures. Surface-feeding species that predominantly prey on small fish are often subject to greater ecological pressures compared to others. This would suggest that the surface feeding availability of small forage fish species including lesser sandeel and sprat is limiting the breeding success of surface-feeding species such as black-legged kittiwake. Reductions in food availability could be a result of climate change or due to past and present fisheries, or a combination of both. For more information, see https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/birds/.

The recent avian influenza outbreak Is likely to have had a strong negative effect on seabird population sizes for some species. It is not yet clear what the extent of the impact is, but it has the potential to move the baseline further away from meeting GES targets.

Bird bycatch

The 2019 UKMS assessment suggests a new target on bycatch mortality that will be used in the future. It is well recognised that certain fishing gears can pose a high bycatch risk to seabirds. Anderson et al[23] (2022) identifies the UK offshore demersal longline fishery and the <10m static net fishery as the fleets that pose the highest risk to birds.

Mortality estimates are not produced routinely for birds using data available from the UK Bycatch Monitoring Programme. Preliminary estimates using the available data suggests that UK vessels in longline, gillnet and midwater trawls may account for thousands of seabird mortalities each year covering several species, with fulmar and cormorant being the most affected species in terms of possible population impacts with a further five species (great northern diver, gannet, shag, guillemot and razorbill) having an estimated bycatch mortality that exceeded 1% of total adult mortality (Northridge et al 2020[24] and Miles et al 2020[25]). However, these estimates have high uncertainty in part because sample sizes are low and possibly unrepresentative of the fleet.

Bird summary

Seabird populations are currently below the level that is considered to meet GES and the situation is deteriorating. Some declines in breeding success have been linked to prey availability caused by climate change and / or past and present fisheries. Invasive predatory mammals are also known to impact breeding success on island colonies. The impact of bycatch will be included in future assessments and current evidence suggests that some longline and static net fisheries could be having possible population level impacts on certain species.

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23 Anderson, O.R.J., Thompson, D. & Parsons, M. (2022). Seabird bycatch mitigation: evidence base for possible UK application and research. JNCC Report No. 717, JNCC, Peterborough. ISSN 0963-8091. https://hub.jncc.gov.uk/assets/dbed3ea2-1c2a-40cf-b0f8-437372f1a036

24 Northridge. S., Kinston. A. and Coram. A. (2020). Preliminary estimates of seabird bycatch by UK vessels in UK and adjacent waters. Scottish Ocean Institute, University of St Andrews. Final report to JNCC

25 Miles, J., Parsons, M. and O'Brien, S. (2020). Preliminary assessment of seabird population response to potential bycatch mitigation in the UK-registered fishing fleet. Report prepared for the Department for Environment Food and Rural Affairs (Project Code ME6024).

D1 and D4 – Fish and D3 – Commercially exploited fish and shellfish

Demersal fish biodiversity is recovering from a history of over-exploitation, but GES has not yet been achieved in either the Greater North Sea or the Celtic Seas. A partial assessment of pelagic shelf fish status did not provide a clear result.
The UK has achieved its aim of GES for some commercially exploited fish. Most national shellfish stocks have either not yet achieved GES or their status is uncertain. The percentage of quota stocks fished below MSY and the proportion of marine fish spawning stock biomasses capable of producing MSY have increased significantly since 1990.

Fish are an important ecosystem component that contributes to overall levels of biodiversity (D1). In addition, fish of different species have a significant role in marine food webs (D4), acting as both predators and prey. Some fish species are commercially exploited, and only a proportion of these have managed quotas. Over exploitation can lead to a decline in stocks (D3) which can reduce both future commercial opportunities and have wider ecological impacts.

In order to meet Good Environmental Status, the high-level objective for fish is that 'the abundance and demography of fish indicate healthy populations that are not significantly affected by human activities. For stocks of commercial fish, the high-level objective is that 'Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock'.

According to the 2019 UKMS updated part 1 assessment (available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/921262/marine-strategy-part1-october19.pdf), neither of these objectives are currently being met, although there are signs of improvement. The baseline environmental condition with respect to fish is therefore one where recovery is required to meet GES. For more information, see https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/fish/ and https://moat.cefas.co.uk/pressures-from-human-activities/commercial-fish-and-shellfish/.

The 2019 assessment used a limited number of indicators. More indictors are being included in future assessments. A summary of the current status and indicators is shown in Table A4a and A4b.

Table A4a. Detail from the 2019 UKMS assessment on fish D1; D4: Fish. Taken from Marine Strategy Part One: UK updated assessment and Good Environmental Status (available at https://www.gov.uk/government/publications/marine-strategy-part-one-uk-updated-assessment-and-good-environmental-status) and the UKMS Marine Online Assessment Tool (available at https://moat.cefas.co.uk/).

Target	Indicator	North Sea	Celtic Seas
The size structure of fish communities is indicative of a healthy marine food web.	Size composition in fish communities.	GES not achieved	GES not achieved
The size structure of fish communities is indicative of a healthy marine food web.	Proportion of large fish (Large Fish Index).	GES not achieved	GES partially achieved
The size structure of fish communities is indicative of a healthy marine food web.	Mean maximum length of fish.	GES not achieved	GES not achieved
Incidental bycatch is below levels which threaten long-term viability and recovery of fish populations.	Under development.	Not assessed	Not assessed
The population abundance of sensitive species is not decreasing due to anthropogenic activities and long-term viability is ensured.	Recovery in the population abundance of sensitive fish species.	GES not achieved	GES achieved
For fish species in the Habitats and Birds Directive population abundance and geographic distribution meets established favourable reference values.	UK assessments of listed fish species.	Not assessed	Not assessed
For listed fish species, the area and the quality of the habitat is sufficient.	UK assessments of listed fish species.	Not assessed	Not assessed

Table A4b. Detail from the 2019 UKMS assessment D3: commercial fish and shellfish. Taken from Marine Strategy Part One: UK updated assessment and Good Environmental Status (available at https://www.gov.uk/government/publications/marine-strategy-part-one-uk-updated-assessment-and-good-environmental-status) and the UKMS Marine Online Assessment Tool (available at https://moat.cefas.co.uk/).

Target	Indicator	North Sea	Celtic Seas
The Fishing mortality rate of populations of commercially exploited species is at or below levels which can produce the maximum sustainable yield.	Commercial fishing pressure for stocks of UK interest.	GES partially achieved	GES partially achieved
The Spawning Stock Biomass of populations of commercially exploited species are above biomass levels capable of producing the maximum sustainable yield.	Reproductive capacity of commercially exploited stocks of UK interest.	GES partially achieved	GES partially achieved

Current impact of fisheries on the baseline condition

The status of commercial fish stocks (D3) primarily relates to exploitation rates so is predominantly influenced by fishing activities. For commercial fish some (53% of quota stocks) were being exploited at or below MSY in 2015, but this was not the case for all stocks. Out of a suite of 79 TACs which can be reported across multiple years, 32 of the 79 baseline TACs were consistent with ICES' advice (40%) in 2023 compared to 27 TACs (34%) in 2022 (Bell et al.2023[26]). Most non-quota stocks are unassessed, and do not have MSY or a suitable proxy in place despite being a significant proportion of UK landings. Most shellfish stocks have either not met the requirement or their status is uncertain. For more information, see https://moat.cefas.co.uk/pressures-from-human-activities/commercial-fish-and-shellfish/

Fish as part of the ecosystem (D1 and D4) encompasses a much wider range of species, including those not commercially targeted. Both the removal of targeted species and bycatch of non-targeted / non-commercial fish species is relevant. While fishing is considered the main anthropogenic activity that is relevant to this ecosystem component,

26 Bell ED, Nash RMD, Garnacho E, De Oliveira J, Hanin M, Gilmour F, O'Brien CM 2023. Assessing the sustainability of negotiated fisheries catch limits by the UK for 2023. Cefas project report for Defra.

other pressures such as noise from renewable infrastructure and hydrodynamic changes brought about from coastal defence are also relevant in some instances. More information on relevant pressures is provided in section 2.6.1 of the Marine Strategy Part One: UK updated assessment and Good Environmental Status (available at https://www.gov.uk/government/publications/marine-strategy-part-one-uk-updated-assessment-and-good-environmental-status).

Recovery from past over-exploitation by fisheries does appear to be occurring in some areas. Demersal fish biodiversity is recovering from a history of over-exploitation, but GES has not been achieved in either the Greater North Sea or the Celtic Sea. A partial assessment of pelagic shelf fish status did not provide a clear result. For more information, see https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/fish/

Fish summary

The current status of fish communities in the UK is primarily shaped by historical over-exploitation by fisheries, while ongoing over-exploitation continues to be a notable contributing factor. Improved fisheries management since the 1990s has resulted in more stocks being fished at or below MSY levels so, although the target is not yet met, there is a positive trend. Improved fisheries management has also resulted in some positive trend in fish communities beyond the targeted stocks.

D1 & D6 – Benthic Habitats

The levels of physical damage to soft sediment habitats are consistent with the achievement of GES in UK waters to the west of the Celtic Seas, but not in the Celtic Seas or in the Greater North Sea. For sublittoral rock and biogenic habitats GES has not yet been achieved. Descriptor also relevant to Geodiversity (geology and sediments).

Benthic habitats are an important ecosystem component that contributes to overall levels of biodiversity (D1). It is also important to ensure the structure and function of the benthic ecosystems is adequately safeguarded by considering seafloor integrity (D6).

To meet Good Environmental Status, the high-level objective is that 'the health of seabed habitats is not significantly adversely affected by human activities'. However, according to the 2019 UKMS updated part 1 assessment (available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/921262/marine-strategy-part1-october19.pdf), GES has not been achieved. This states that the main problem is caused by physical disruption of the seabed from fishing gear (demersal towed gear). The baseline environmental condition with respect to benthic habitats is therefore one which is required to meet GES. For more information, see https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/benthic-habitats/

A summary of the current status is shown in Table A5. Most indicators focussing on intertidal benthic habitat are consistent with GES (except for saltmarsh in the North Sea), but subtidal habitats are not consistent with GES.

Table A5. Detail from the 2019 UKMS assessment on D1; D6: Benthic habitats. Taken from Marine Strategy Part One: UK updated assessment and Good Environmental Status (available at https://www.gov.uk/government/publications/marine-strategy-part-one-uk-updated-assessment-and-good-environmental-status) and the UKMS Marine Online Assessment Tool (available at https://moat.cefas.co.uk/). *The benthic communities' indicator (OSPAR BH2) is currently in the pilot stage of development.

Target	Indicator	North Sea	Celtic Seas
The physical loss of each seabed habitat type caused by human activities is minimised and where possible reversed.	Physical loss of predicted habitats	GES not achieved	GES not achieved
The extent of habitat types adversely affected by physical disturbance caused by human activity should be minimised.	Extent of Physical damage indicator to predominant and special habitats	GES not achieved	GES not achieved
The extent of habitat types adversely affected by physical disturbance caused by human activity should be minimised.	Benthic communities' indicator*	Not assessed	Not assessed
Habitat loss of sensitive, fragile, or important habitats caused by human activities is prevented, and where feasible reversed.	Physical loss of predicted habitats indicator	GES not achieved	GES not achieved
The extent of adverse effects caused by human activities on the condition, function and ecosystem processes of habitats is minimised.	Benthic communities' indicator	Not assessed	Not assessed
The extent of adverse effects caused by human activities on the condition, function and ecosystem processes of habitats is minimised.	Aggregated Infaunal Quality Index	GES not achieved	GES partially achieved

Target	Indicator	North Sea	Celtic Seas
The extent of adverse effects caused by human activities on the condition, function and ecosystem processes of habitats is minimised.	Aggregated Saltmarsh Tool	GES not achieved	GES achieved
The extent of adverse effects caused by human activities on the condition, function and ecosystem processes of habitats is minimised.	Aggregated Rocky Shore Macroalgal Index	GES achieved	GES achieved
The extent of adverse effects caused by human activities on the condition, function and ecosystem processes of habitats is minimised.	Aggregated Intertidal Seagrass Tool	GES achieved	GES achieved
The extent of adverse effects caused by human activities on the condition, function and ecosystem processes of habitats is minimised.	Intertidal rock community change indicator (MarClim)	GES status uncertain	GES status uncertain

Current impact of fisheries on the baseline condition

Fishing is one of several anthropogenic activities that are considered relevant to this ecosystem component. Other pressures include physical loss from renewable energy generation and oil extraction, coastal defence and the input and spread on invasive non-native species. But the main barrier to the achievement of GES is caused by physical disruption of the seabed from fishing. More information on relevant pressures is provided in section 2.6.1 of the Marine Strategy Part One: UK updated assessment and Good Environmental Status (available at https://www.gov.uk/government/publications/marine-strategy-part-one-uk-updated-assessment-and-good-environmental-status).

Physical disturbance of seabed

Fishing is considered to be the main driver of physical disturbance and occurs when gear is towed across the seafloor. The degree of disturbance depends on factors such as the size of the gear, the activity level (for example, number of tows per year) how fragile the benthic species present are and how quickly they can recover. The use of demersal towed gears is widely distributed. Using available VMS data and benthic habitat data available, the 2019 UKMS assessment concluded that seabed disturbance targets were not being met within the Greater North Sea and Celtic Seas. As the analysis combined the VMS of all towed gear metiers together, it is not yet possible to determine the relative contribution

of different gear types to the current levels of seabed disturbance. Other activities, such as aggregate extraction, have yet to be included within the analysis, but the spatial extents of these are considerably smaller than fishing activity. For more information and detail of the analysis, see https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/benthic-habitats/physical-damage/ and https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/biodiversity-status/habitats/extent-physical-damage-predominant-and-special-habitats/

Habitat loss

UKMS assessments on a limited range of highly sensitive habitats (seagrass beds and horse mussel reefs), suggest that a loss of areas of potential habitat has occurred up to 2016. This was based on modelled data. The main causes were not thought to be due to fishing as these impacts are generally considered reversable. Irreversible loss has been predicted to have come about from aquaculture, navigational dredging / dredge spoil disposal, recreational activity, and coastal development. For more information, see https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/benthic-habitats/physical-loss/. There are instances where fishing can result in permanent habitat loss (for instance, heavy bottom towed gear over softer, rocky reef habitats), but fishing is generally considered to lead to habitat disturbance / degradation rather than loss.

Benthic habitat summary

There is widespread disturbance of seabed habitats by demersal towed gear that is contributing to the failure to achieve GES. Other impacts from non-fisheries activities may also be having an influence, but to a much lesser degree.

D4 – Food webs

Food webs (D4) are the network of predator-prey relationships that occur in the marine environment, from phytoplankton to top predators such as birds or seals. Fish communities are a key component of food webs. Knowledge of food webs allow understanding of how changes at one trophic level can impact those above and below it.

To meet Good Environmental Status, the high-level objective for food webs is that 'the health of the marine food web is not significantly affected by human activities'. According to the 2019 UKMS updated part 1 assessment (available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/921262/marine-strategy-part1-october19.pdf), the extent to which good environmental status has been achieved is uncertain. Plankton communities are changing, some fish communities are recovering from past overexploitation, but others are not, breeding seabirds are in decline, and grey seal numbers are increasing. It is known that the components of the marine food webs are changing but it is not always clear how they are affecting each other. For more information, see https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/food-webs/

A summary of the current status is shown in Table A6.

Table A6. Detail from the 2019 UKMS assessment on D4: food webs. Taken from Marine Strategy Part One: UK updated assessment and Good Environmental Status (available at https://www.gov.uk/government/publications/marine-strategy-part-one-uk-updated-assessment-and-good-environmental-status) and the UKMS Marine Online Assessment Tool (available at https://moat.cefas.co.uk/).

Target	Indicator	North Sea	Celtic Seas
The species composition and relative abundance of representative feeding guilds are indicative of a healthy marine food web.	Mean maximum length of fish.	GES not achieved	GES not achieved
The species composition and relative abundance of representative feeding guilds are indicative of a healthy marine food web.	Selected plankton lifeforms pairs (for example, large vs small zooplankton).	GES status uncertain	GES status uncertain
The species composition and relative abundance of representative feeding guilds are indicative of a healthy marine food web.	Abundance and distribution of coastal bottlenose dolphins.	GES achieved	GES status uncertain
The species composition and relative abundance of representative feeding guilds are indicative of a healthy marine food web.	Abundance and distribution of cetaceans other than coastal bottlenose dolphins.	GES partially achieved	GES status uncertain
The species composition and relative abundance of representative feeding guilds are indicative of a healthy marine food web.	Marine bird abundance.	GES not achieved	GES not achieved

Target	Indicator	North Sea	Celtic Seas
The balance of abundance between representative feeding guilds is indicative of a healthy marine food web.	TBC	Not assessed	Not assessed
The size structure of fish communities is indicative of a healthy marine food web.	Size composition in fish communities.	GES not achieved	GES partially achieved
Productivity of the representative feeding guilds, characterised by key species, is indicative of a healthy marine food web.	Grey seal pup production.	GES achieved	GES achieved
Productivity of the representative feeding guilds, characterised by key species, is indicative of a healthy marine food web.	Marine bird breeding success/failure.	GES not achieved	GES partially achieved
Productivity of the representative feeding guilds, characterised by key species, is indicative of a healthy marine food web.	Kittiwake breeding success.	GES achieved	Not assessed

Current impact of fisheries on the baseline condition

Anthropogenic impacts on the marine food web are multiple and complex. As fish communities are a key component of food webs, pressure from fisheries can have a significant impact. The removal of forage fish (i.e., species at a low trophic level that contribute significantly to the diets of other fish, marine mammals, or seabirds) has the potential to impact higher tropic levels. For instance, reduction in the availability of small forage fish is likely to be contributing to the breeding success of some marine birds. Climatically driven changes in plankton will also have a strong influence on the rest of the food web. More detail is given under the individual faunal group sections. For more information, see https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/food-webs/.

Food webs summary

Historic fishing activity has had a large impact on fish community structure which is a key component of marine food webs. With improved fisheries management focusing on stocks, some recovery is occurring. However, the management of fish stocks solely to safeguard future fisheries will not necessarily lead to all food web targets being met. Changes in plankton are likely driven by prevailing environmental conditions, but other impacts cannot be ruled out.

D10 – Marine Litter

To achieve Good Environmental Status for marine litter, the high-level objective is that 'the amount of litter and its degradation products on coastlines and in the marine environment is reducing and levels do not pose a significant risk to the environment and marine life.' According to the 2019 UKMS updated part 1 assessment (available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/921262/marine-strategy-part1-october19.pdf), GES has not been achieved for marine litter, and it remains a significant pressure on marine ecosystems. The baseline environmental condition with respect to marine litter is therefore one where improvement is required to meet GES. For more information, see https://moat.cefas.co.uk/pressures-from-human-activities/marine-litter/.A summary of the current status is shown in Table A7.

Table A7. Detail from the 2019 UKMS assessment on D10 Marine Litter. Taken from Marine Strategy Part One: UK updated assessment and Good Environmental Status (available at https://www.gov.uk/government/publications/marine-strategy-part-one-uk-updated-assessment-and-good-environmental-status) and the UKMS Marine Online Assessment Tool (available at https://moat.cefas.co.uk/).

Target	Indicator	North Sea	Celtic Seas
A decrease in the total amount of the most common categories of litter found on surveyed beaches.	Presence of litter (beaches).	GES not achieved	GES not achieved
A decrease in the number of items of litter on the seabed.	Presence of litter (seabed).	GES status uncertain	GES status uncertain
A downward trend in the number of northern fulmars with more than 0.1g of plastic particles in their stomach.	Presence of floating litter.	GES status uncertain	GES status uncertain
Develop an appropriate indicator to measure micro-litter in the marine environment.	In development.	Not assessed	Not assessed

Current impact of fisheries on the baseline condition

Fishing activities can contribute to marine litter through discarded or lost fishing gear, including nets, lines, and traps. This type of litter, also known as "ghost gear", can persist in the environment, entangling marine life, smothering benthic habitats, and introducing microplastics into the marine food chain. In addition, waste generated onboard fishing vessels, such as packaging materials and food waste, can also contribute to marine litter when not disposed of properly.

Marine litter summary

Marine litter, including from fishing activities, is a significant pressure on marine ecosystems and water quality. The UK has not yet achieved its aim of GES for litter. Beach litter levels in the Celtic Seas have remained largely stable since the assessment in 2012, whilst beach litter levels in the Greater North Sea have slightly increased. Waste fishing material is a component of beach litter. Both floating litter and seafloor litter remain an issue, with plastic the predominant material. Achieving GES for marine litter requires improved waste management practices, the reduction of lost or discarded fishing gear, and increased awareness and monitoring of the issue.

D11 – Underwater noise

To achieve Good Environmental Status for underwater noise, the high-level objective is that ‘loud, low and mid frequency impulsive sounds and continuous low frequency sounds introduced into the marine environment through human activities are managed to the extent that they do not have adverse effects on marine ecosystems and animals at the population level.’ The 2019 UKMS updated part 1 assessment (available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/921262/marine-strategy-part1-october19.pdf), indicates that data on underwater noise is limited, making it difficult to determine whether GES has been achieved. However, increasing awareness of the issue has led to further research and monitoring efforts. For more information, see https://moat.cefas.co.uk/pressures-from-human-activities/underwater-noise/. A summary of the current status is shown in Table A8.

Table A8. Detail from the 2019 UKMS assessment on D11 Underwater noise. Taken from Marine Strategy Part One: UK updated assessment and Good Environmental Status (available at https://www.gov.uk/government/publications/marine-strategy-part-one-uk-updated-assessment-and-good-environmental-status) and the UKMS Marine Online Assessment Tool (available at https://moat.cefas.co.uk/).

Target 2019	Indicator	North Sea	Celtic Seas
Levels of anthropogenic impulsive sound sources do not exceed levels that adversely affect populations of marine animals.		GES status uncertain	GES status uncertain
Levels of anthropogenic continuous low-frequency sound do not exceed the levels that adversely affect populations of marine animals	Safe levels of low anthropogenic continuous low frequency sound.	GES status uncertain	GES status uncertain

Current impact of fisheries on the baseline condition

Fishing activities can generate underwater noise through the use of engines, sonar, and other equipment. Although fisheries are not the primary source of anthropogenic underwater noise (shipping, construction, and energy production are major contributors), they can still contribute to the overall noise pollution in the marine environment. This noise can impact marine species that rely on sound for communication, navigation, and foraging, leading to changes in behaviour, stress, and potential displacement from preferred habitats.

Summary

Underwater noise from fisheries, while not the primary source, can still contribute to the overall noise pollution in the marine environment. Fishing vessels will contribute to underwater noise through sonar, engine noise, gear interacting with seabed and deploying and retrieving gear. The achievement of GES for underwater noise in the UK is uncertain. Research and monitoring programmes established since 2012 have provided an improved understanding of the impacts of sound on marine ecosystems. However, achieving GES for underwater noise will require better understanding and monitoring of the issue, as well as the development and implementation of strategies to manage noise pollution from various sources.

Appendix C: UK MPA designations

- Conservation of Habitats and Species Regulations 2017 and The Conservation of Offshore Marine Habitats and Species Regulations 2017
    - Special Protection Areas (SPAs)–- England, Scotland, Wales
    - Special Areas of Conservation (SACs)–- England, Scotland, Wales
- Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (as amended)
    - Special Protection Areas (SPAs) – Northern Ireland
    - Special Areas of Conservation (SACs) – Northern Ireland
- Marine and Coastal Access Act 2009
    - Marine Conservation Zones (MCZs) – England, Wales
    - Nature Conservation Marine Protected Areas (NCMPAs), offshore waters – Scotland
- Marine (Scotland) Act 2010
    - Nature Conservation Marine Protected Areas (NCMPAs), inshore waters – Scotland
- Marine Act (Northern Ireland) 2013
    - Marine Conservation Zones (MCZs) – Northern Ireland
- Natural Environment and Rural Communities Act 2006 (Part 4)
    - Sites of Special Scientific Interest (SSSI) – England, Scotland, Wales
- The Environment (Northern Ireland) Order 2002
    - Coastal Areas of Special Scientific Interest (ASSIs)–- Northern Ireland
- Convention on Wetlands of International Importance
    - Ramsar Sites (Wetland of International Importance under the Convention on Wetlands of International Importance Especially as Waterfowl Habitat)

Appendix D: Marine Plans – Specific detail within the UK

England

Marine plans put into practice the objectives for the marine environment that are identified in the MPS alongside the National Planning Policy Framework (NPPF) and the Localism Act 2011. The Marine Management Organisation (MMO) is responsible for preparing marine plans in England, and published the North East, North West, South West, South East marine plans by 2021. The marine plans include policies to support a sustainable fishing industry and a healthy marine environment.

Appendix E: Glossary

Biodiversity: The variety of all life on earth, including the diversity within and between all plant and animal species and the diversity of ecosystems.

Blue carbon: Carbon captured by the world's oceans and coastal ecosystems. Blue carbon habitats are the habitats where it is stored.

Bycatch: Defined in section 52 of the Fisheries Act 2020 means (a) fish that are caught while fishing for fish of a different description, or (b) animals other than fish that are caught in the course of fishing.

Climate change: Referring to human-induced climate change driven by greenhouse gas emissions. It includes global warming, warming oceans, greater risks of flooding, droughts, and heat waves.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): CITES is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten the survival of the species.

Convention on the Conservation of Migratory Species of Wild Animals (CMS): The Convention on the Conservation of Migratory Species of Wild Animals, also known as the Convention on Migratory Species (CMS) is an international agreement that aims to conserve migratory species throughout their ranges. The agreement was signed under the auspices of the United Nations Environment Programme and is concerned with conservation of wildlife and habitats on a global scale.

Descriptors (UK Marine Strategy): Descriptors are elements within the environment that provide the means to assess general status or condition of that environment. This can be done through the establishment of indicators or targets for each descriptor.

Ecosystem: A biological community which consists of all the organisms and the physical environment with which they interact.

Ecosystem-based approach: Defined in section 1(10) of the Fisheries Act 2020 as an approach which (a) ensures that the collective pressure of human activities is kept within levels compatible with the achievement of good environmental status (within the meaning of the Marine Strategy Regulations 2010 (S.I. 2010/1627)), and (b) does not compromise the capacity of marine ecosystems to respond to human-induced changes.

Findspots: The place where one or more artefacts have been found. May prove to be associated with a site, other finds, natural features etc., or isolated (no apparent relationship).

Fish: Marine and estuarine finfish and shellfish, including migratory species such as European eel and salmon.

Fisheries: The commercial or recreational capture of wild marine organisms (fish and shellfish); commercial fishing can use a variety of mobile and static gear, vessels and locations.

Fisheries Framework (Fisheries Management and Support Framework): outlines the legislation and policies for the sustainable management of fisheries and the wider seafood sector. It covers the catching, processing and supply industries, including access to fishing opportunities, licensing, stock recovery, enforcement, data collection, aquaculture, recreational sea angling, and areas of collaboration and common principles. It includes governance structures and ways of working.

Fisheries Management Plan (FMP): A document, prepared and published under the Fisheries Act 2020, that sets out policies designed to restore one or more stocks of sea fish to, or maintain them at, sustainable levels.

Fisheries policy authorities: As defined by section 52 of the Fisheries Act 2020, "fisheries policy authorities" means (a) the Secretary of State, (b) the Scottish Ministers, (c) the Welsh Ministers, and (d) the Northern Ireland department.

Fishermen's fasteners: Places where fishermen have snagged their fishing gear.

Food webs: The natural interconnection of food chains and a graphical representation of what-eats what in an ecological community.

Good Environmental Status (GES): A qualitative description of the state of the seas that the Marine Strategy Regulations 2010 requires authorities to achieve or maintain by the year 2020. Achieving GES is about protecting the marine environment, preventing its deterioration, and restoring it where practical, while allowing sustainable use of marine resources.

Inshore: 0 to 12 nautical miles from the UK's territorial sea baselines.

Inshore Fisheries and Conservation Authorities (IFCAs): IFCAs are responsible for the management of fishing activities in English coastal waters out to six nautical miles from territorial sea baselines. The 10 IFCAs have a shared "vision" to lead, champion and manage a sustainable marine environment and inshore fisheries.

International Council for the Exploration of the Sea (ICES): Coordinates and promotes marine research on oceanography, the marine environment, the marine ecosystem, and on living marine resources in the North Atlantic.

Joint Fisheries Statement (JFS): As defined by section 2(1) of the Fisheries Act 2020, a document which sets out the policies of the fisheries policy authorities for achieving, or contributing to the achievement of, the fisheries objectives in the Fisheries Act 2020.

Marine environment: Includes (a) the natural beauty or amenity of marine or coastal areas, or of inland waters or waterside areas, (b) features of archaeological or historic

interest in those areas, and c) flora and fauna which are dependent on, or associated with, a marine or coastal, or aquatic or waterside, environment.

Marine litter: Any solid material which has been deliberately discarded or unintentionally lost on beaches, on shores or at sea. It includes any persistent, manufactured or processed solid material.

Marine Management Organisation (MMO): An executive non-departmental public body in the United Kingdom established under the Marine and Coastal Access Act 2009, with responsibility for planning and licensing of activities in English waters from 0-200nm, save fisheries activities within 0-6nm which are the responsibility of the IFCAs. The MMO also has some UK responsibilities.

Marine Protected Areas (MPA): Areas of the sea protected by law for nature conservation purposes.

Marine Plans: A marine plan is a document which has been prepared and adopted for a marine plan area by the appropriate marine plan authority in accordance with Schedule 6 of the Marine and Coastal Access Act 2009, and which states the authority's policies for and in connection with the sustainable development of the area.

Maximum Sustainable Yield (MSY): Defined in the Fisheries Act 2020 as the highest theoretical equilibrium yield that can be continuously taken on average from a marine stock under existing environmental conditions without significantly affecting recruitment.

National fisheries authorities: As defined by section 25(4) of the Fisheries Act 2020, these are (a) the Secretary of State, (b) the Marine Management Organisation, (c) the Scottish Ministers, (d) the Welsh Ministers, and (e) the Northern Ireland department. The term ‘national fisheries authorities’ differs from ‘fisheries policies authorities’ in including the MMO.

Non-quota stocks (NQS): Species that are not managed through TACs (quota limits). They include some finfish, most commercial shellfish species, and various other species.

Offshore: 12 to 200 nautical miles from the UK’s territorial sea baselines.

Precautionary approach to fisheries management: Defined in section 1(10) of the Fisheries Act 2020 as an approach in which the absence of sufficient scientific information is not used to justify postponing or failing to take management measures to conserve target species, associated or dependent species, non-target species or their environment.

Processing: As defined by section 52 of the Fisheries Act 2020: in relation to fish or any other aquatic organism, includes preserving or preparing the organism, or producing any substance or article from it, by any method for human or animal consumption.

RAMSAR Convention: The convention emphasises the special value of wetland, particularly as a key habitat for waterfowl. The Convention resulted in the designation of sites known as Ramsar Sites for management and conservation at an international level.

Recreational sea fishing: An umbrella term for a variety of recreational activities including recreational sea angling, recreational netters and charter boats.

Regional Fisheries Management Organisation (RFMO): A multilateral international body or agreement set up to manage and conserve fish stocks in a particular region.

Remote Electronic Monitoring (REM): Integrated on-board systems that may include cameras, gear sensors, video storage, and Global Positioning System units, which capture comprehensive videos and are used to monitor fishing activity with associated sensor and positional information.

Resilience: The ability of an ecosystem, species, habitat, or industry to respond, recover or adapt to either changes or disturbances within a reasonable timeframe without permanent loss or damage.

Sensitive species: As defined in section 52 of the Fisheries Act 2020, sensitive species means: (a) any species of animal or plant listed in Annex II or IV of Directive 92/43/EEC of the Council of the European Communities on the conservation of natural habitats and of wild flora and fauna (as amended from time to time), (b) any other species of animal or plant, other than a species of fish, whose habitat, distribution, population size or population condition is adversely affected by pressures arising from fishing or other human activities, or (c) any species of bird.

Shellfish: As defined in section 52 of the Fisheries Act 2020, shellfish includes molluscs and crustaceans of any kind found in the sea or inland waters.

Statutory Nature Conservation Bodies (SNCBs): The Statutory Nature Conservation Bodies' (SNCBs) are Natural England, Natural Resources Wales, NatureScot, the Northern Ireland Environment Agency, the Joint Nature Conservation Committee, and DAERA's statutory advisory body, the Council for Nature Conservation and the Countryside.

Sustainable Development: As defined by the Brundtland report (1987), sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainable fishing: Sustainable fisheries protect their stocks and the wider environment whilst delivering social and economic prosperity. Fisheries management decisions should balance environmental, economic and social considerations to create sustainable fisheries that benefit present and future generations. It means ensuring that fish stocks can be fished commercially and recreationally, both now and in the future. Both the short-term and the long-term impacts of decisions managing fishing activity to protect stocks and on the fishing industry should be considered, while any short-term decisions to give social or economic benefit should not significantly compromise the long-term health of the marine environment. These decisions should recognise the cultural importance of fishing through maintaining and, where possible, strengthening coastal communities and livelihoods alongside the requirement for fish stocks to reach and maintain sustainable levels.

Territorial sea: The waters under the jurisdiction of a state, defined by UNCLOS as up to 12 nautical miles from the baseline or low-water line along the coast.

The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR): An international agreement for cooperation for the protection of the marine environment of the North-East Atlantic. Work under the Convention is managed by the OSPAR Commission, made up of representatives of the Governments of 15 Contracting Parties and the European Commission, representing the European Union. Work to implement the OSPAR Convention is taken forward through the adoption of decisions, which are legally binding on the Contracting Parties, recommendations, and other agreements.

Total Allowable Catch (TAC): The total allowable catch (TAC) is a catch limit set for a particular fishery or stock, generally for a year or a fishing season. TACs are usually expressed in tonnes of live weight equivalent but are sometimes set in terms of numbers of fish.

Trade and Cooperation Agreement (TCA): The Trade and Cooperation Agreement between the United Kingdom of Great Britain and Northern Ireland, of the one part, and the European Union and the European Atomic Energy Community of the other part. This agreement governs the relationship between the UK and the EU. It was signed in December 2020, applied from 1 January 2021 and was ratified (in a slightly amended form) in April 2021.

UK Marine Policy Statement (UKMPS): The UK policy framework for preparing marine plans and taking decisions that affect the marine environment in the UK.

UK Marine Strategy (UK MS): The UK Marine Strategy provides the framework for delivering marine policy at the UK level and sets out how we will achieve the vision of clean, healthy, safe, productive, and biologically diverse oceans and seas.

UN Convention on Biological Diversity (CBD): The international legal instrument for the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.

UN Convention on the Law of the Sea (UNCLOS): A multilateral international agreement that lays down a comprehensive regime of law and order in the world's oceans and seas, establishing rules governing all uses of the oceans and their resources. It was signed in 1982 and came into force in 1994.

UN Sustainable Development Goals: 17 United Nations goals ‘to transform our world’ and promote prosperity whilst protecting the planet. Goal 14 is to conserve and sustainably use the oceans, seas and marine resources for sustainable development.

Water quality: A measure of the condition of water and its suitability to sustain a range of uses for both biotic and human benefits.

Appendix F: Statutory Consultee Consultation Responses

As required by the 2004 Act, we have sought the views of our statutory consultees on this SEA and associated ER and their responses are detailed below.

Natural England Response

31/03/23

Our refs: 426388, 426389,426390

By email only

Re: Strategic Environmental Assessments – Scallop Fisheries Management Plan, Whelk Fisheries Management Plan, Crab and Lobster Fisheries Management Plan

Thank you for your consultation email dated the 17th of March seeking our views on whether the proposed scope and level detail of your Strategic Environmental Assessments are appropriate.

We have reviewed the reports provided. In all three documents, the proposed scope includes the main high-level topics we would want to see covered within the SEAs (section 5.36). While we largely agree with what has been scoped out (section 5.37), some of the issues are beyond the remit of Natural England and advice should be sought from appropriate bodies such as Historic England.

In terms of whether the level of detail of the proposed assessment is appropriate, that is more difficult to say with certainty at this stage as the scoping document is relatively high-level. However, the approach set out in section 5.3.8. that suggests linking to UK Marine Strategy descriptors (and presumably drafting the Environmental Report accordingly) does appear to be sensible and should make the assessment both logical and contain a suitable level of detail. We can provide ongoing advice and support on what we consider to be an appropriate level of detail as you progress the drafting of the Environmental Reports.

Natural England agree that the SEA should focus on the positive and negative effects of FMP rather than the fishing activity *per se*, as set out in 5.3.2. However, we also see value in the SEA acknowledging the pressures resulting from current fishing activity. For this purpose it isn't clear from section 5.3.3 exactly what you propose to include; for instance, will pressures from current activity that are not being managed be

acknowledged, or only those where management exists? We would welcome further discussion on this important point.

We have several other comments that we wish to raise at this stage. These can be found in a table appended to this letter below. We would welcome further discussion on these issues.

Ref	Document / section	Comment
1	All documents, section 1.2.3	It is good see more or less verbatim reference to the definition of sustainable fishing in this section (from old EAF work). Would you want to maybe include the sentence on trade-offs?
2	All documents, Section 1.3.	In each of the scoping reports, the draft FMP objectives have been included. We have been asked to provide comment on these through other channels. We will not be providing further comment here.
3	All documents, section 3.1.1.	Linking to the work done in the UK Marine Strategy to describe the baseline seems sensible as it avoids unnecessary repetition of work. The link provided gives the link original 11 descriptors as set out in the Marine Strategy Framework Directive. Presumably this work will follow the UK approach to date that has separated certain descriptors into their faunal groups? This approach would make the Environmental Report easier to follow.
4	All documents, section 3.2.3	This is a standard line across all documents. It appears to be a high-level statement about all fisheries rather than the individual fisheries that are the subject of each SEA. That is fine for scoping as long as the relative risks are considered within the Environmental Report in more detail. For instance, physical disturbance will be much more relevant to the Scallop FMP than the two potting FMPs.
5	All documents, section 3.2.3	In this high-level statement, we suggest including disturbance to species. E.g. *'Fishing activity that targets […] has the potential to cause physical disturbance to the seabed and the mortality of/injury to/**disturbance to**, wild species, both target and non-target species'*. While this may well turn out not be an issue of concern, it should be scoped in at this stage.
6	Crab & Lobster / Whelk, section 3.2.4	This appears to be a standard line that is across all documents. While that is fine for scoping, the impact of static gear on blue carbon habitats is much less of a concern than the impact of mobile benthic gear. This needs to be clear within the Environmental Report i.e., that differentiation.

Ref	Document / section	Comment
7	All documents, section 3.3.2	This states that '*the draft […] FMP objectives set out in section 1.3. above, indicate how the plan will consider wider fisheries management issues including those relating to the environment, to reduce negative impacts from the fishery.'* This does not seem to be correct – the FMP objectives presented say **what** they will do rather than explain **how**. For the Crab & Lobster and Whelk FMPs, the objective only goes as far as '*Assess the impact of* *[…] fishing activity on the wider environment.*'
8	All documents, section 4	More detail is needed in areas where there are linked plans / programmes. For instance, Defra's Bycatch Mitigation Initiative is a highly relevant programme of work with related objectives. In addition, the proposed working group on managing the effects of fishing on seafloor integrity, a measure proposed within the 2021 UK programme of measures consultation document should also be included. As the Environmental Report looks like it will be built around UKMS descriptors, the detail contained within the programme of measures are highly relevant. It is our understanding that the updated report will be published soon, so this should be used.
9	All documents, section 4.3	As stated in our email on 24th March, the following new legislation will need to be included: The Environmental Targets (Biodiversity) (England) Regulations 2023 and The Environmental Targets (Marine Protected Areas) Regulations 2023.
10	All documents, section 5.3.3	We also see value in the SEA acknowledging the pressures resulting from current fishing activity, but it isn't clear from section 5.3.3 exactly what you propose to include. It states '*.. the SEA will acknowledge these pressures resulting from current fishing activity **already being managed** and explain how the FMP will support existing mitigation. The plan will also propose new interventions to further mitigate negative environmental effects where necessary.*' If only the pressures resulting from current fishing activity already being managed will be acknowledged, what about those pressures that are not being managed? For instance, outside MPAs, the impact on seabed integrity is not managed (other than by accident rather than by design). It is important to also acknowledge these pressures, even if there is a gap in management that the FMP will not fill.

Ref	Document / section	Comment
11	All documents, sections 5.3.7 / 5.3.10	The justification for the issues scoped out of the assessment largely seem justified. However, cultural heritage may need further consideration. As the risk from fisheries on cultural heritage is outside the scope of Natural England's remit, we suggest seeking advice from Historic England.
12	All documents, section 5.3.8	We agree with structuring the Environment Report around UKMS descriptors. The text mentions the 11 descriptors. Following the UK approach of splitting some descriptors into their faunal groups will make the Environmental report easier to follow (this is similar to comment 3)
13	All documents, section 5.3.9	This provides a link to the Marine Strategy assessment tool. Some of the information within this may now be out of date. For instance, there have been new outputs from the BH3 model which assesses seabed disturbance from bottom towed gears. Where possible, using the most up to date information available would be preferred. Where this is not possible, the Environmental Report should note when updates are expected if it is relevant.

How the consultation response was considered

Point #	How point was considered
1	Sentence referring to balancing environmental, economic, and social considerations included.
2	No amendment required
3	Sub-sections added
4	Point acknowledged Environmental Report will consider in more detail
5	Suggested text added

Point #	How point was considered
6	Point acknowledged Environmental Report will consider in more detail
7	Text amended to reflect to point,
8	Further detail on linked plans/programmes added to ER. Link to Marine strategy part three: UK programme of measures added to scoping report.
9	Regulations added
10	Text amended to make clear FMP will acknowledge/consider activity being managed, and activity not being managed.
11	Further explanation of why issues have been scoped in/out has been included in scoping report and ER.
12	Text added, splitting descriptors into faunal groups.
13	Point acknowledged most up to date information will be used where possible.

JNCC Response

Joint Nature Conservation Committee
Inverdee House
Baxter Street,
Aberdeen,
AB11 9QA
https://jncc.gov.uk/

14th April 2023

Strategic Environmental Assessments – Scallop Fisheries Management Plan, Whelk Fisheries Management Plan, Crab and Lobster Fisheries Management Plan

Thank you for your consultation email regarding the above scoping reports which JNCC received on 17th March 2023. JNCC are pleased to provide advice on whether the proposed scope and level of detail of the assessment is appropriate. The advice presented below is provided by JNCC as part of our statutory advisory role to the UK Government and devolved administrations on issues relating to nature conservation in UK offshore waters.

We have reviewed all three Strategic Environmental Assessment (SEA) Scoping Reports and given the similarities between them, we have decided to provide a single response to cover all 3 scoping reports as, for the most part, our comments relate to them all. We note where any comment refers to a specific scoping report.

JNCC agree that the SEAs will assess the environmental effects of the specific fisheries management plan, rather than the existing fishing activities. For this purpose, the proposed scope of the SEAs described in sections 5.3 demonstrates a suitable breadth and covers the environmental receptors that JNCC would expect to be included in such an assessment. The approach of framing the assessment around UK MS descriptors is sensible, covering the range of environmental pressures associated with both the FMPs and existing fishing activity, and can establish an appropriate environmental baseline.

Regarding the report for the Scallop FMP SEA, we note that there is a requirement under the Environment (Wales) Act 2016 to consider ecosystem services and ecosystem resilience and therefore this consideration should be reflected in the scoping report. Welsh Government and statutory advisors can provide more detail on these requirements.

Considering the level of detail presented in the Scoping Reports, as noted in 5.3.4, the evolving nature of the fisheries management plans make it difficult to assess the precise level of detail that will be required in the Environmental Report during this scoping stage.

Nevertheless, our review has identified several areas where the inclusion of greater detail would strengthen the assessment. A summary of our primary observations and comments can be found in Table 1 below. We welcome any further discussion on these matters and are keen to provide further support where appropriate.

Table 1: JNCC comments on FMP SEA scoping reports

Comment ref	Relevant section	Comment
JNCC 1	General Particularly for sections 5.3.6., 5.3.1.0 (Table 2), 6. and 7.	Enhancing the level of detail during the initial scoping phase would allow for a more comprehensive understanding of various aspects, enabling the identification and resolution of potential concerns early on. By providing stakeholders and consultees with the opportunity to comment on specific elements, such as thoroughly exploring all available alternatives and mitigation options, potential issues can be addressed to avoid them being raised during the later stages of the environmental report drafting process.
JNCC 2	3.1.1 Environmental baseline	Using the framework of UK Marine Strategy descriptors to establish an environmental baseline for the FMPs is a sensible approach that makes effective use of existing programmes.
JNCC 2	3.2.3. Fishing activity that targets [fishery] has the potential to cause physical disturbance to the seabed and the mortality of/injury to, wild species, both target and non-target species.	To improve this paragraph, it is recommended to include more detailed information on the different pressures tailored to each fishery, which will provide a more in-depth understanding of their distinct characteristics and factors to be considered. The SNCB advice provided as part of the FMP drafting process provides a suitable basis for this description.
JNCC 3	4.3 Relevant plans, programmes and environmental protection objectives - Domestic	This section should be expanded to include a much wider range of relevant plans, programmes and environmental objectives, including those at local level. It would be helpful to identify the specific components of the related plans/programmes that are relevant to the SEA. The UK Marine Strategy Programme of Measures can help identifying linkages.

Comment ref	Relevant section	Comment
		It may also be appropriate to include reference to other FMPs.
JNCC 4	5.3 Scope of the assessment	This section would benefit from a definition of the levels of significance used when considering the scope of the assessment
	5.3.2. The SEA will not assess all the risks and impacts of fishing activity per se. Such assessments have already been conducted as part of the UK's obligations under legislation relating to Marine Protected Areas (MPAs) and the wider marine environment (UK MS).	It is important to recognise that the assessment is of the effects of the FMP and not of the existing fishing activity *per se*. Whilst the text refers to assessments of fishing activity already conducted as part of the UK's obligations relating to MPAs and the UK Marine Strategy, it is important to note that these are based on broad fishing gear types rather than being fishery specific. We consider these assessments adequate for the purposes of SEA.
JNCC 5	5.3.4. The level of detail possible for the environmental assessment will depend upon the stage of development of the polices and measures of the FMP, noting these will evolve over time.	Given the evolving nature of the FMPs and possible further amendments (currently version two draft FMP awaiting public consultation and update), the SEA is likely to require periodic reviews. It would be good practise for the Environmental Report to identify what these triggers might be to ensure that the assessment remains up to date throughout the FMP process.
JNCC 6	5.3.6. Environmental issues	It would be beneficial to include sub-sections for the receptors scoped-in to the assessment detailing which elements will be covered to ensure adequate coverage.

Comment ref	Relevant section	Comment
JNCC 7	5.3.10. Table 2	It would be advantageous to enhance the justification column by providing specific details, presenting a more comprehensive description of the unique aspects and environmental effects associated with each fishery. It would be helpful if this description detailed the range of anticipated effects (short, medium, long-term; temporary, permanent; positive and negative; and secondary, cumulative and synergistic). We would also expect to see a more detailed consideration supporting those receptors that have been scoped out.
JNCC 8	6. Reasonable Alternatives	This section lacks the inclusion of specific alternatives. We recommend the consideration of a “business as usual” approach of continuing existing fisheries management i.e. no change to baseline.
JNCC 9	7. Mitigation and Monitoring	It is recommended to list the potential mitigation options in this section, enabling consultees to share their input at the scoping phase.

How the consultation response was considered

Point #	How point was considered
JNCC 1	Further explanation of why issues have been scoped in/out has been included in scoping report and ER.
JNCC 2	No amendment required.
JNCC 2	Further detail from SNCB advice to include in scoping reports. This will be covered in greater details in the ERs.

Point #	How point was considered
JNCC 3	More relevant plans, programmes, and environmental objectives to be added in scoping report. Further detail on linked plans/programmes added to ER. Reference to other FMPs to be included.
JNCC 4	Further explanation of why issues have been scoped in/out has been included in scoping report and ER.
	No amendment required.
JNCC 5	Text added to ER to make clear how the SEA will be kept up to date.
JNCC 6	Sub-sections added.
JNCC 7	Further explanation of why issues have been scoped in/out has been included in scoping report and ER.
JNCC 8	Business as usual approach references in text in ER. Further text that considers reasonable alternatives added to ER.
JNCC 9	List/description of mitigation measures will be included in ER as assessment of effects is required first.

Point #	How point was considered
10. From letter: Regarding the report for the Scallop FMP SEA, we note that there is a requirement under the Environment (Wales) Act 2016 to consider ecosystem services and ecosystem resilience and therefore this consideration should be reflected in the scoping report. Welsh Government and statutory advisors can provide more detail on these requirements.	The Environment (Wales) Act 2016 will be considered from an ecosystem services and ecosystem resilience perspective for joint FMPs with Wales.

Historic England Response

Email only

Dear Sir/Madam

Historic England is pleased to offer its comments in response to Defra seeking views on the scope and level of detail of Strategic Environmental Assessment (SEA) of three Fisheries Management Plans (FMPs) for scallop, whelk, and crab and lobster fisheries.

Noting that the scallop FMP is joint with Welsh Government, it would be helpful to know if Defra has also sought views from Cadw and the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW)?

Historic England (HE) is the Government's advisor on all aspects of the historic environment in England. HE's general powers under section 33 of the National Heritage Act 1983 were extended via the National Heritage Act 2002 to modify our functions to include securing the preservation of monuments in, on, or under the seabed within the seaward limits of the UK Territorial Sea adjacent to England. HE also provides advice in relation to English marine plan areas (inshore and offshore) as defined by the Marine and Coastal Access Act (MCAA) 2009.

HE's principal comment in respect of the scoping reports is that we do not agree that cultural heritage should be regarded as beyond the scope of the SEAs. If the SEAs do not cover cultural heritage, then they may be challenged on the basis that they have not identified, described and evaluated likely significant effects of an issue – cultural heritage, including architectural and archaeological heritage – set out in Schedule 2 of the Regulations.

Each of the scoping reports acknowledges that fishing activity for the three fisheries has the potential to cause physical disturbance to the seabed. Accordingly, fishing activity for the three fisheries also has the potential to cause physical disturbance to cultural heritage on and within the seabed. Physical disturbance is often detrimental to the conservation of cultural heritage, harms its significance, and compromises its enjoyment by future generations.

The impact on heritage assets of fishing activity – including the use of towed gear and traps – has been repeatedly observed. This includes damage to heritage assets whose significance is recognised through their statutory protection. HE continues to deal with active cases of damage to designated heritage assets attributable to fishing activity causing physical disturbance to the seabed.

Evidence relating to two recent instances of damage from fishing activity to designated heritage assets – the Klein Hollandia (aka Eastbourne Wreck, LEN 1464317) and the Rooswijk (LEN 1000085) – is attached. In the case of the Klein Hollandia, photographic evidence suggests that the damage is from scallop dredges or similar gear. Both instances are being investigated as heritage crimes. Further examples of impacts from fishing on

heritage assets is set out in the following report: Fishing and the Historic Environment | Historic England.

Whilst HE acknowledges that FMPs are not intended to focus on mitigating all impacts of fishing on cultural heritage, implementation of FMP objectives is likely to alter factors such as the spatial distribution, intensity, gear, and methods of each fishery. Consequently, the FMPs are likely to change patterns of physical disturbance and therefore the potential for significant effects of these fisheries on cultural heritage. Moreover, FMP objectives on potential damaging impacts and the reduction of environmental impacts are directly relevant to cultural heritage. As such, HE regards cultural heritage as an issue that clearly lies within the scope of the three SEAs.

HE notes that landscape and seascape are also regarded as beyond the scope of the three SEAs. Again, we believe this could invite challenges. HE would like to underline the potential for the physical disturbance of the seabed by these fishing activities to impact deposits associated with prehistoric landscapes that are now submerged by sea-level rise. These former landscapes are extensive and are often represented by peaty horizons and other fine-grained deposits. Impacts from fishing to these peaty and other deposits are well attested: historically, such deposits were referred to by fishers as moorlog. As well as impacting landscape deposits, fishing is known to disturb prehistoric artefacts associated with these landscape features, disrupting their distributions, causing damage to the artefacts themselves, and causing artefacts to be removed. Evidence of fishing impacts on submerged prehistoric landscapes is demonstrated by widespread examples of artefacts in museum and other collections: the impact of shellfish dredging in particular is attested by material from the Solent (see Catalogue of the Michael White Collection). As above, HE regards submerged prehistoric landscapes as an issue that should be in scope of the three SEAs.

The potentially significant impact of fisheries – especially those using towed gear such as scallop dredgers – on prehistoric landscapes has a further effect pertaining to FMP objectives, namely climate change mitigation and adaptation. As is increasingly recognised on land, peat deposits represent an important carbon store. The role as a carbon store of submerged peats and other prehistoric organic-rich deposits warrants attention also, as do activities such as certain fisheries that degrade these carbon stores and remobilise the carbon within them. FMP objectives on climate change are, therefore, of direct relevance to cultural heritage; and cultural heritage is a potential source of data and understanding of the extent of these important deposits, how they are changing, and how their conservation might contribute to climate change mitigation and adaptation.

HE is clear that the FMPs are likely to influence fishing activities that have significant negative impacts on cultural heritage. However, HE would like to underline that there are also positive interactions between fishing and cultural heritage. For example, many fishers have been conscientious in reporting impacts to cultural heritage and artefacts caught by their gear, and these reports have been a source of important discoveries leading – in some cases – to statutory designation of historic shipwrecks. Heritage specialists have collaborated very positively with the fishing sector on numerous occasions, both through IFCAs and with individual fishers. This does not diminish the seriousness of impacts to

cultural heritage from fishing activity, but HE recognises that the overall picture includes positive as well as negative aspects.

Among the positive interactions between fishing and cultural heritage are the cultural heritage of fishing itself, ranging from the wrecks of fishing vessels to historic harbours and infrastructure, their associated settlements and communities, and the wide range of tangible and intangible cultural heritage associated with fishing. As the opening sentence of the Joint Fisheries Statement (JFS) notes, 'The UK's seafood sector is an important part of the economy of coastal communities and has a rich cultural heritage from which many of those communities draw a sense of place and identity' (emphasis added). The JFS also notes at numerous points that fisheries and fishing have cultural importance, value and benefits. FMP objectives set out in the scoping reports on social and economic sustainability, and on promotion of opportunities could benefit from positive engagement with the cultural heritage of fisheries – especially where these are as long-established historically as the three fisheries addressed in the scoping reports. The potential positive interactions between FMPs and cultural heritage are a further source of (beneficial) impacts and add yet more weight to the need for cultural heritage to be within the scope of the SEAs. HE would go further to suggest that each FMP be given a specific objective on developing the cultural heritage of each fishery: otherwise, the importance of cultural heritage acknowledged in the JFS will be unsupported by FMPs and their objectives.

HE would like to draw attention to a PhD that it has initiated and is co-supervising on 'Mobilising Cultural Heritage in UK Marine Fisheries' through the Centre for Doctoral Training in Sustainable Management of UK Marine Resources (CDT SuMMeR). The PhD is due to commence in September 2023 based at Heriot-Watt and Exeter Penrhyn. HE would be pleased to serve as a conduit between this important research and Defra.

HE would like to note that for the purposes of the Fisheries Act 2020, the 'marine and aquatic environment' includes features of archaeological or historic interest in marine or coastal areas (s. 52). The Act provides that financial assistance, regulatory provisions and sea fish licensing can be applied for the purposes of conserving or enhancing the marine and aquatic environment, including features of archaeological or historic interest. The capacity to apply measures in the Act to features of archaeological or historic interest was confirmed by the Minister during the Committee Stage of the Bill in September 2020.

In contrast, it should be noted that cultural heritage / features of archaeological or historic interest are not among the descriptors used by the UK Marine Strategy to provide a framework to assess Good Environmental Status (GES). Consequently, GES does not cover all the issues encompassed by SEA or by the marine and aquatic environment for the purpose of the Fishing Act and other fisheries legislation. Too closely linking the FMPs and SEAs to GES and the UK Marine Strategy is flawed in this respect. HE would ask Defra to address this flaw expressly in the SEAs, including in proposals for monitoring the effects of FMPs set out in the Environmental Reports.

HE would also like to note that the UK has other international commitments not referenced in the scoping reports that relate to cultural heritage and are relevant to FMPs, namely:

- Convention for the Protection of the Archaeological Heritage of Europe (revised) (Valletta, 1992)
- Council of Europe Landscape Convention (Florence, 2000)

Thank you again for seeking HE's views on the FMP SEAs. HE would be very pleased to discuss further with Defra how cultural heritage can be satisfactorily addressed by the SEAs, and how this can best strengthen the effectiveness of the FMPs in contributing to sustainable and well managed UK fisheries. Any queries regarding this response or further dialogue can be addressed to me via the contact details below.

Historic England

How the consultation response was considered

Point #	How point was considered
1. Noting that the scallop FMP is joint with Welsh Government, it would be helpful to know if Defra has also sought views from Cadw and the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW)?	The Welsh Government have consulted their statutory consultees which includes Cadw.
2. HE's principal comment in respect of the scoping reports is that we do not agree that cultural heritage should be regarded as beyond the scope of the SEAs. If the SEAs do not cover cultural heritage, then they may be challenged on the basis that they have not identified, described, and evaluated likely significant effects of an issue – cultural heritage, including architectural and archaeological heritage – set out in Schedule 2 of the Regulations.	Cultural heritage has been scoped into the King Scallop FMP ER.
3. Whilst HE acknowledges that FMPs are not intended to focus on mitigating all impacts of fishing on cultural heritage, implementation of FMP objectives is likely to alter factors such as the spatial distribution, intensity, gear, and methods of each fishery. Consequently, the FMPs	Point acknowledged, Environmental Report (ER) will consider how the FMPs are likely to change patterns of physical disturbance and therefore the potential for significant effects of

Point #	How point was considered
are likely to change patterns of physical disturbance and therefore the potential for significant effects of these fisheries on cultural heritage.	these fisheries on cultural heritage.
4. HE notes that landscape and seascape are also regarded as beyond the scope of the three SEAs. Again, we believe this could invite challenges.	The impact fishing activity being managed through FMPs will be considered at the scoping stage. Where it is considered there is a significant effect, this issue will be scoped in.
5. The role as a carbon store of submerged peats and other prehistoric organic-rich deposits warrants attention also, as do activities such as certain fisheries that degrade these carbon stores and remobilise the carbon within them.	Point acknowledged; Environmental Reports (ER) will consider this issue.
6. HE is clear that the FMPs are likely to influence fishing activities that have significant negative impacts on cultural heritage. However, HE would like to underline that there are also positive interactions between fishing and cultural heritage.	Point acknowledged, Environmental Reports (ER) will consider positive interactions between fishing and cultural heritage.
7. HE would go further to suggest that each FMP be given a specific objective on developing the cultural heritage of each fishery: otherwise, the importance of cultural heritage acknowledged in the JFS will be unsupported by FMPs and their objectives.	Point acknowledged, Environmental Reports (ER) will provide recommendations on how FMPs could consider fishing and cultural heritage.
8. HE would like to draw attention to a PhD that it has initiated and is co-supervising on ‘Mobilising Cultural Heritage in UK	Defra would welcome further discussions with HE to consider this offer.

Point #	How point was considered
Marine Fisheries' through the Centre for Doctoral Training in Sustainable Management of UK Marine Resources (CDT SuMMeR). The PhD is due to commence in September 2023 based at Heriot-Watt and Exeter Penrhyn. HE would be pleased to serve as a conduit between this important research and Defra.	
9. HE would like to note that for the purposes of the Fisheries Act 2020, the 'marine and aquatic environment' includes features of archaeological or historic interest in marine or coastal areas (s. 52).	This definition has been reflected in the relevant sections of the ERs.
10. In contrast, it should be noted that cultural heritage / features of archaeological or historic interest are not among the descriptors used by the UK Marine Strategy to provide a framework to assess Good Environmental Status (GES). Consequently, GES does not cover all the issues encompassed by SEA or by the marine and aquatic environment for the purpose of the Fishing Act and other fisheries legislation. Too closely linking the FMPs and SEAs to GES and the UK Marine Strategy is flawed in this respect. HE would ask Defra to address this flaw expressly in the SEAs, including in proposals for monitoring the effects of FMPs set out in the Environmental Reports.	Point acknowledged. Issues such as climatic factors and cultural heritage that are not part of UK MS will be considered outside of this framework.
11. HE would also like to note that the UK has other international commitments not referenced in the scoping reports that relate to cultural heritage and are relevant to FMPs, namely:	These international commitments will be reflected as appropriate in the ERs.

Point #	How point was considered
12. Convention for the Protection of the Archaeological Heritage of Europe (revised) (Valletta, 1992) 13. Council of Europe Landscape Convention (Florence, 2000)	
14. HE would be very pleased to discuss further with Defra how cultural heritage can be satisfactorily addressed by the SEAs, and how this can best strengthen the effectiveness of the FMPs in contributing to sustainable and well managed UK fisheries.	Defra will instigate further discussions with HE to consider this point.

Environment Agency Response

Thank you for giving us an opportunity to review a selection of the 43 Fisheries Management Plans that are being put into action.

The main aim of the plans is to promote the sustainable management of the fisheries in question, including one that delivers ecosystem functionality, yet there appears to be no reference to the Water Environment Regulations (Water Framework Directive) or UK Marine Strategy indicators and the potential impact the fisheries will have on achieving Good Ecological/Environmental Status (GES/GEnS). This is particularly important for fisheries, such as scallop dredging, that may impact on the seabed and therefore benthic invertebrate communities.

We recommend having a clear objective within each of the plans that links to assessing the impact of the fishery on GES and GEnS to ensure the plans fully promote ecosystem functionality.

Environment Agency

How the consultation response was considered

Point #	How point was considered
1. The main aim of the plans is to promote the sustainable management of the fisheries in question, including one that delivers ecosystem functionality, yet there appears to be no reference to the Water Environment Regulations (Water Framework Directive) or UK Marine Strategy indicators and the potential impact the fisheries will have on achieving Good Ecological / Environmental Status (GES/GEnS).	Water Environment Regulations (Water Framework Directive) has now been added to the list of relevant plans, programmes, and environmental objectives. Further reference to UK MS descriptors and the potential impact the fisheries will have on achieving GES has been included in the scoping reports. The ERs will consider this in more detail.
2. We recommend having a clear objective within each of the plans that links to assessing the impact of the fishery on GES and GEnS to ensure the plans fully promote ecosystem functionality.	The ER will assess how the FMPs have considered the potential impacts of the fishery on UK MS descriptors and how proposed measures to mitigate them, set out in the FMP, could contribute to achieving GES.