



Department
for Environment
Food & Rural Affairs

Proposed Fisheries Management Plan for Crab and Lobster in English Waters

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Executive Summary

Context

Our sea fish and shellfish stocks are an important natural resource. We aim to work with the fishing sector and wider stakeholders to ensure these stocks are harvested sustainably and supported by a healthy marine environment, so they continue to provide benefits into the future.

Fisheries Management Plans (FMPs) are a requirement of the Fisheries Act 2020 (the Act), the UK Joint Fisheries Statement and a commitment in the England Environmental Improvement Plan 2023. FMPs assess the status of stocks and must set out policies to restore stocks to, or maintain them at, sustainable levels.

This draft FMP has been prepared for the purpose of meeting the requirements set out in the Act. It has been prepared in partnership with the Sea Fish Industry Authority (Seafish) in collaboration with the Crab Management Group (CMG) that brings together industry, government, and scientists. Feedback from the CMG and from the wider sector, during stakeholder engagement events, has shown that there is a need for better management of crab and lobster fisheries in England.

What is an FMP?

An FMP is an evidence-based action plan that charts a course to sustainable fisheries for current and future generations. Once published, the FMP will last for six years. It will set out both a longer-term vision and goals for the fishery (or fisheries), together with the policies and management interventions necessary to achieve these goals in the shorter term. As well as focussing on sustainable stocks, Defra intends to use FMPs to help tackle environmental, social, and economic issues associated with our fisheries, significantly enhancing our ecosystem-based approach to fisheries management and securing the economic and cultural benefits we gain from fish and from fishing. Plans will be regularly reviewed and updated to ensure they respond to new evidence and practical experience to remain effective.

Why an FMP for crabs and lobsters?

The crab and lobster industry recognised in 2019 that action was needed to better manage the stocks. With support from Seafish and Defra, the CMG was formed in 2020 to consider specific actions. This early work and engagement allowed the decision to be taken to channel the work into an FMP. Crab and lobster have been prioritised for an FMP due to the stocks' vulnerability to over-exploitation, the economic value of these fisheries, and a lack of evidence to properly assess and monitor the state of the stocks. Crab and lobster fisheries contribute socially and

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economically to coastal communities through employment and recreational fishing interests. Improved management action is therefore needed to protect crab and lobster and secure their future and the future of the industry that depend on them. Feedback from the CMG and the wider sector has confirmed the-need for better management of crab and lobster fisheries in England.

Summary of the state of stocks

There are existing stock assessments for crab and lobster providing a reasonable understanding of their biological parameters and, at a broad level, exploitation rates. Available evidence suggests that crab and lobster stocks are experiencing high exploitation rates which exceed those required to maintain stocks at Maximum Sustainable Yield (MSY). However, there are still significant gaps in our understanding of these important fisheries. Whilst work is underway to improve the quantity and quality of data, there are still significant uncertainties and assumptions in current stock assessment methodologies meaning outputs may be less certain. Accurately assessing the impact of current fishing effort on long-term stock viability is currently a challenge.

This FMP combines a long-term vision to achieve MSY with clear measures to reach and maintain this goal. This plan brings together the complete portfolio of existing management measures for crab and lobster along with all available science and evidence, and highlights where gaps exist and what is required to fill those gaps to enable the necessary protection for stocks now and in the long term. This FMP presents an opportunity to take a precautionary and adaptive approach to long-term management to create sustainable crab and lobster fisheries.

Current management

The management landscape for crab and lobster in England is highly fragmented, with a range of national and regional management measures. These measures, variously applied across differing jurisdictions, include licences to fish for shellfish, days at sea effort limits, minimum landing sizes (MLS), pot limitations, vessel length restrictions, and specific conservation regulations such as de-clawing bans or mandatory escape gaps. Most of the species included in this FMP are caught in targeted pot and trap fisheries with some, such as crawfish and spider crab, caught using nets.

The existing management regimes are largely based on administrative boundaries, such as Inshore Fisheries and Conservation Authorities (IFCA) jurisdictions or administrative boundaries between devolved administrations, and do not necessarily reflect biological boundaries between stocks. This means that fisheries exploiting the same biological stocks may be subject to different management restrictions depending on where fishing activity occurs.

Key goals and proposed actions

Stakeholders noted that a 'one size fits all' approach to management is not appropriate for a fishery characterised by local stocks and fleet variation. So regional or local based management is needed together with better species and fisheries data to ensure the long-term sustainability of these fisheries. The FMP sets out Crab and lobster specific objectives that address specific requirements for the crab and lobster fisheries in English waters.

Specifically, the FMP sets out the following actions:

Improving the evidence base: Significant gaps remain in our understanding of English crab and lobster, both in terms of fishing activity and its level of impact on stocks. The crab and lobster research plan (Annex 2) details available science and evidence; it highlights where knowledge and evidence gaps exist and what is required to fill those gaps to provide the necessary protection for stocks now and in the long-term. These evidence gaps include the development of data collection programmes, defining stock boundaries, and improving stock assessments. The aim of the research plan is to build on existing research and data for crabs and lobsters so that management is driven by a comprehensive harvest strategy, reliable stock assessments and a consistent ongoing data collection and research programme.

Initial management measures: These are designed to contribute to objectives set out in the FMP in the short-term and increase protection for stocks in line with the precautionary objective. The key proposals are exploring opportunities for harmonising lobster and crawfish minimum landing sizes with existing IFCA measures in English waters, prohibiting the landing of soft brown crab for bait, and piloting finer scale management of brown crab and European lobster in certain areas based on spatial scale rather than administrative boundaries.

Longer term measures: Over time, as both the evidence base and monitoring of management effectiveness improves, the process of implementing more targeted measures will be developed through the lifetime and future iterations of this FMP. The FMP proposes an adaptive, iterative management approach in which management decisions are implemented, reviewed, and refined with new data, to deliver long-term sustainability. Future measures will focus on ensuring stocks are not targeted excessively. Seasonal closures, effort limits, and pot and catch limits are some of the interventions under consideration which will be developed in collaboration with the CMG and relevant partners.

Wider issues and environmental impacts

All FMPs are subject to legal obligations for environmental protection arising from the Habitats Regulations, Marine and Coastal Access Act 2009, Marine Strategy

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Regulations 2010 and the Environment Act 2021. These requirements are in addition to the FMP contributing to the environmental objectives of the Fisheries Act 2020.

This FMP will contribute to commitments to improve our marine ecosystem set out in the England Environmental Improvement Plan 2023 and the UK Marine Strategy.

The crab and lobster FMP includes objectives that will ensure that the environmental impacts associated with crab and lobster fishing are understood. The crab and lobster pot fisheries potentially pose two environmental risks of bycatch of Endangered, Threatened and Protected (ETP) species and unwanted marine species and marine litter from abandoned, lost, and discarded fishing gear. Based on current evidence, both risks are considered low in these fisheries. Where crab and lobster pot fisheries are considered to have an adverse impact on the marine environment, the FMP sets out commitments to taking action to avoid, remedy or mitigate such impact.

Implementation and monitoring

The actions and measures contained within the crab and lobster FMP will undergo an implementation phase where appropriate mechanisms will be required to deliver them. Such mechanisms could include voluntary measures, license conditions, national and regional byelaws, and statutory instruments.

The Act requires the crab and lobster FMP to be reviewed when appropriate and at least every six years. This formal review will assess how the FMP has performed in terms of delivering against the objectives of the Act.

To conclude

The Crab and Lobster FMP has been prepared for the purpose of meeting the requirements set out in the Act. This statement and the contents of the plan meets the obligation set out in section 6 of the Act.

This FMP has collated existing management measures and available science and evidence to assess the status of crab and lobster stocks around England and determine a sustainable level of exploitation. It is currently difficult to accurately assess the impact that fishing effort is having on long-term stock viability or how to effectively limit effort. The Crab and Lobster FMP seeks to address this to ensure that Maximum Sustainable Yield (MSY) can be more accurately assessed, and action taken to maintain stock status at or above this level. The FMP highlights where knowledge and evidence gaps exist to establish sustainable crab and lobster fisheries. The management objectives and associated evidence and research plan guide those seeking to fill those gaps over time. The proposed management interventions seek to apply a precautionary approach to managing harvesting whilst

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evidence improves. This FMP aims to deliver a step change in moving towards the long-term sustainable management of crab and lobster fisheries in English waters.

Foreword

The Crab and Lobster FMP sets out the road map to achieve long-term sustainable management of brown crab and European lobster stocks in English waters, in line with the objectives in the Fisheries Act 2020. The FMP has been prepared in partnership with Seafish in collaboration with the Crab Management Group (a collaborative forum that brings together industry, researchers, and government regulators and policy makers, and is part of the overarching Shellfish Industry Advisory Group (SIAG)). Seafish, on behalf of Defra and the CMG, has also engaged more widely with coastal communities, supply chain businesses, environmental NGOs, and other government agencies on the development of the management objectives detailed in this FMP.

While the primary focus of this plan is crab and lobster it also includes within its scope select data-limited shellfish species for which there is currently no formal stock assessment applied. These are spider crab, crawfish, common prawn, and velvet swimmer crabs. Collectively this plan is focused on managing shellfish fisheries that contributed £122 million to the UK economy and accounted for 31,000 tonnes of landings in 2021.

While both crab and lobster fisheries have fishery independent timeseries of core biological data, and there has been some success in establishing biological reference points, there are still significant gaps in our understanding of these important fisheries that is hampering attempts to manage them effectively. Specifically, there is a lack of accurate fishing effort data and there are still significant uncertainties and assumptions in current stock assessment methodologies (such as a lack of a clear understanding of crab migration) meaning outputs may be less certain. This creates a clear challenge in trying to accurately assess the impact that current fishing effort is having on long-term stock viability.

This FMP sets out to build on existing research and management in place for crab and lobster fisheries to the point where management is driven by a comprehensive harvest strategy underpinned by a reliable stock assessment methodology, which in turn is supported by a consistent data collection and research programme. The management objectives detailed in this FMP describe the key stages on that journey and set out the shared commitment that industry and government have for these important fisheries, over the next six years. A core principle driving the implementation of the FMP objectives will be adaptive management to reflect that as the evidence base improves, management interventions will be more responsive.

The FMP's shared shellfish principles and crab and lobster fishery objectives are presented in two parts:

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1. **Shared Shellfish Principles:** These are high-level principles to guide management common to all shellfish fisheries. SIAG will have oversight and responsibility of the shared shellfish principles which will apply to all shellfish fisheries. These principles include climate change adaptation/mitigation and economic principles relating to market access, trade, and promoting increased consumption. They go beyond the statutory requirements of section 6 of the Act and are intended to drive industry behaviours and actions as well as those of government and regulators. They are included to demonstrate a more holistic picture of the challenges for the fisheries and the intention to better manage them. The SIAG will maintain responsibility for the principles and the actions set out to deliver them.
2. **Crab and Lobster Specific Objectives:** These are the objectives that relate specifically to the management of crab and lobster fisheries in English waters and are focused on the data collection, assessment and in turn management requirements of these fisheries. They are also focused on climate change adaptation/mitigation and ensuring that the environmental impacts associated with crab and lobster fishing are understood. Where these pot fisheries are considered to have an adverse impact on the marine, objectives are identified to avoid, remedy, or mitigate such impact. Again, some of these objectives and the potential actions suggested to deliver them go beyond the statutory requirements of section 6 of the Act but are included for completeness. Responsibility for delivery of these objective, once actions are agreed, will sit across industry groups, fisheries authorities, and government.

In terms of navigating this FMP:

- Context (Section 2) details how the Crab and Lobster FMP meets the requirements the Act and wider legislation and policy initiatives.
- Scope of the Crab and Lobster FMP and status of the fisheries (Section 3) includes details on current fishing methods, fleet characteristics and stock status.
- Shared shellfish principles (Section 4) outlines the high level principles developed by the Shellfish Industry Advisory Group (SIAG) for the management of all shellfisheries.
- Future fishery management strategy (Section 5) describes the fishery management strategy for these fisheries in English waters, including how the Harvest Standard Specification (HSS) will be applied and the adaptive approach to ensure appropriate management of fishing effort. This section also details the priority management interventions for this fishery; some of these will be regulatory but where appropriate non-regulatory measures will also apply.
- Meeting environmental considerations (Section 6) details how environmental considerations will be addressed.

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- Implementing the FMP and monitoring performance (Section 7) details the approach that will be followed to implement the plan and how we will measure performance in terms of delivering the plan but also in terms of how the state of the fishery has improved due to the activities undertaken.

There are six accompanying documents that support this plan:

- **Annex 1: Crab and Lobster Evidence Statement** details the current available information on these fisheries in English waters
- **Annex 2: Crab and Lobster Research Plan** details the approach to secure the evidence required to support the plan and deliver on the FMP objectives.
- **Annex 3: Crab and Lobster FMP Stakeholder Engagement Report** presents a summary of the stakeholder feedback on the proposed high-level principles and FMP objectives which was collected during a series of engagement events, held in late 2022.
- **Annex 4: Shared Shellfish Principles** developed by the SIAG: These are high-level principles and objectives to guide management common to all shellfish fisheries
- **Annex 5: Legislative Context and Governance** describes the legislative context that applies to the development and implementation of the Crab and Lobster FMP and gives details about the roles and responsibilities of the Crab and Lobster Management Group in relation to the FMP.
- **Annex 6: Environmental considerations** details the government's environmental obligations covering FMPs.

The Crab and Lobster FMP has been prepared for the purpose of meeting the requirements set out in the Act. This statement and the contents of the plan meets the obligation set out in section 6 of the Act.

Introduction

The overarching vision for the Crab and Lobster FMP for English waters is that brown crab, European lobster, and select data-limited shellfish species, for which there are currently no formal stock assessments applied, are managed to ensure their long-term sustainability and economic profitability, while maintaining public confidence in the management of this important resource.

The Crab and Lobster FMP collates all known and available information on the biological, socio-economic, and environmental status of crab and lobster fisheries in English waters. It establishes the approach that will be taken to ensure that both fisheries are being managed in line with the requirements of the Act and specifically the steps that will be taken to address evidence gaps, improve assessment methodologies, and to ensure fishing effort is aligned with the health of individual fish stocks. Alongside this the FMP seeks to ensure that these fisheries are economically viable over the long-term, and that both wider community and national benefits are realised from this important resource.

Achieving sustainable crab and lobster stocks, profitable fisheries and a healthy marine environment will mean changes to how and where crab and lobster fishing occurs (input controls¹), and the amount of crab and lobster that can be caught from one year to the next (output controls²). The purpose of this FMP is to ensure that the most appropriate management measures, based on the best available science and evidence are developed, in collaboration with the CMG, and implemented in consultation with wider stakeholders.

Context

In addition to meeting the requirements of the Act, the FMP also supports the implementation of wider commitments on protecting the marine environment, restoring biodiversity, and addressing climate change. In particular the England Environment Improvement Plan 2023 highlighted the requirement to deliver FMPs. Each FMP also supports commitments under the UK Marine Policy Statement, the UK Marine Strategy, the Marine Wildlife Bycatch Mitigation Initiative, and the Climate Change Act 2008.

1 Input controls are fisheries management measures that restrict the number and size of fishing vessels (fishing capacity controls), the amount of time fishing vessels are allowed to fish (vessel usage controls) or the product of capacity and usage (fishing effort controls). "A Fishery Managers Guidebook - Management Measures and their Application." FAO Fisheries Technical Paper 424

2 Output controls are direct limits on the volume of fish coming out of a fishery and can include the tonnage of fish/shellfish or the number of fish/shellfish that may be caught from a fishery in a period of time such as total allowable catches. FAO *ibid*.

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Further details on the requirements of the Fisheries Act and wider commitments and how these are met in this plan are set out in **Annex 6**.

The Crab and Lobster FMP was developed by Seafish, on behalf of Defra, in collaboration with the Crab and Lobster Management Group (CMG). The CMG brings together industry stakeholders, from across the crab and lobster supply chains, scientific researchers, government and fishery regulators to work collaboratively to address issues facing UK crab and lobster fisheries. The CMG oversaw the development of the FMP and established a dedicated FMP working group to work on the crab and lobster-specific management objectives and the future management requirements for crab and lobster fisheries. Further details on roles and responsibilities and the process for developing the plan are set out in **Annex 5**.

As part of the FMP development process, Seafish, on behalf of Defra, delivered a series of informal stakeholder engagement events during late 2022. A full summary of these events – including format of sessions and key themes emerging – is presented in the Stakeholder Engagement Report in **Annex 3**. Feedback from these events was used by Seafish and the CMG to refine draft content and to develop the proposed initial management interventions presented in this plan.

Scope of the Crab and Lobster FMP and Status of the English Crab and Lobster Fisheries

Species

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. Any measures adopted in accordance with this plan must be consistent with the requirements of the UK-EU Trade and Cooperation Agreement (the TCA) including Article 496³ and any relevant decisions made via the Specialised Committee for Fisheries (SCF) such as the adoption of any multi-year strategies (MYSts) for shared non-quota stocks.

Additionally, there are several data-limited species also included in this FMP for which there is currently no formal stock assessment applied. These are crawfish (*Palinurus elephas*), velvet swimmer crab (*Necora puber*), common spider crab (*Maja brachydactyla*), and common prawn (*Palaemon serratus*).

³ Article 496 of the TCA requires that fisheries management interventions are evidenced based, are proportionate and are non-discriminatory to either party.

Fleet characteristics

Inshore crab and lobster fisheries are located across the UK. Most vessels fishing for crab and lobster (over 80% in 2021) are 10 metres or under in length and tend to operate as day boats in inshore waters. There is also a larger offshore fishery located in the east, northeast, and southwest England targeted by larger potting vessels capable of fishing multi-day trips (also referred to as vivier vessels).

Ports in east and northeast England are especially reliant on crab and lobster fisheries, with a high proportion of the total value of landings occurring in this area. Ports in the southwest, particularly larger ports, receive more mixed seafood landings and a lower proportion of total landings (in terms of value) are made up of crab and lobster. In the northeast of England, landings are primarily from pots, while in southwest there is a higher (but still small) proportion of landings made using nets. The most productive area for crab and lobster fishing in English waters is to the east of England, adjacent to the Humber estuary.

Fishery and fishing methods

Most of the species included in the Crab and Lobster FMP are caught in targeted pot and trap fisheries predominantly by the 10 metre or under vessel fleet. Crawfish and spider crab are also caught in tangle net fisheries. Crab and lobster fisheries can be highly selective in utilising variations in pot size and shape, mesh size, and the design of entries and escape panels.

Two main shapes of trap are used to target brown crabs: the inkwell-shaped trap (Figure 1), favoured by larger vessels, and a standard D-shaped trap with entrances on either side or on top (Figure 2). D-shaped traps (also called creels) with parlour sections (separate sections designed to retain catch) is also popular with larger vessels, particularly on the east coast of England. However, different traps are favoured by individual fishers across different areas of the UK.

The D-shaped trap with two entrances (Figure 2) is favoured by lobster fishers, however lobsters may also be caught as a bycatch in the inkwell-style pots (Figure 1) used in crab fisheries. Crab and lobster are generally targeted, with velvet and spider crabs and crawfish mostly caught and landed as bycatch species.

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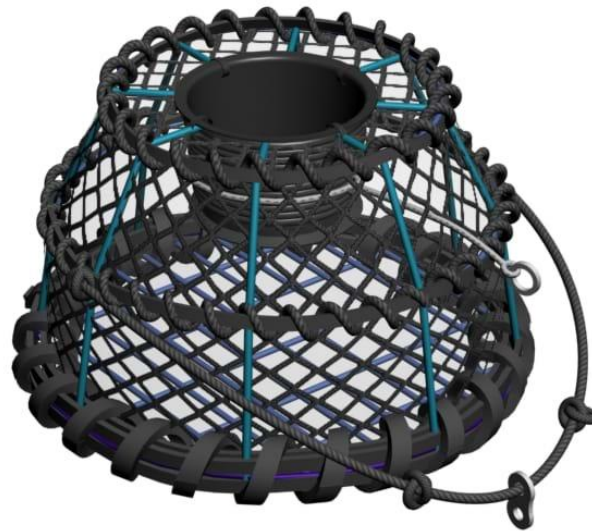


Figure 1: An inkwell-shaped trap with an open top entrance (Seafish, 2023)

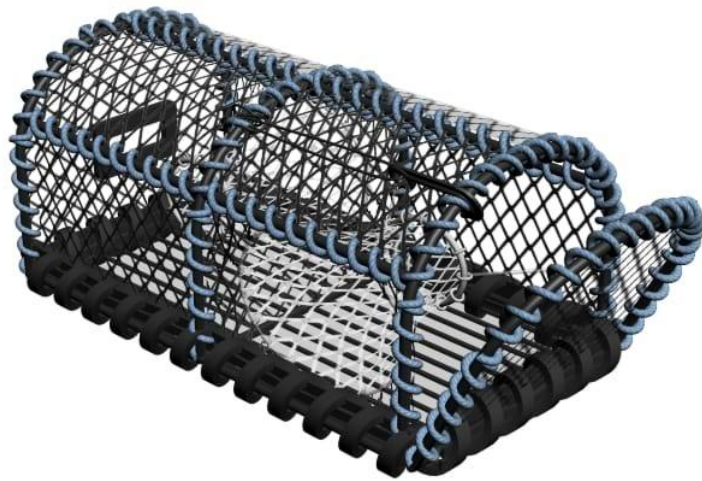


Figure 2: D-shaped creel with two entrances on either side (Seafish, 2023)

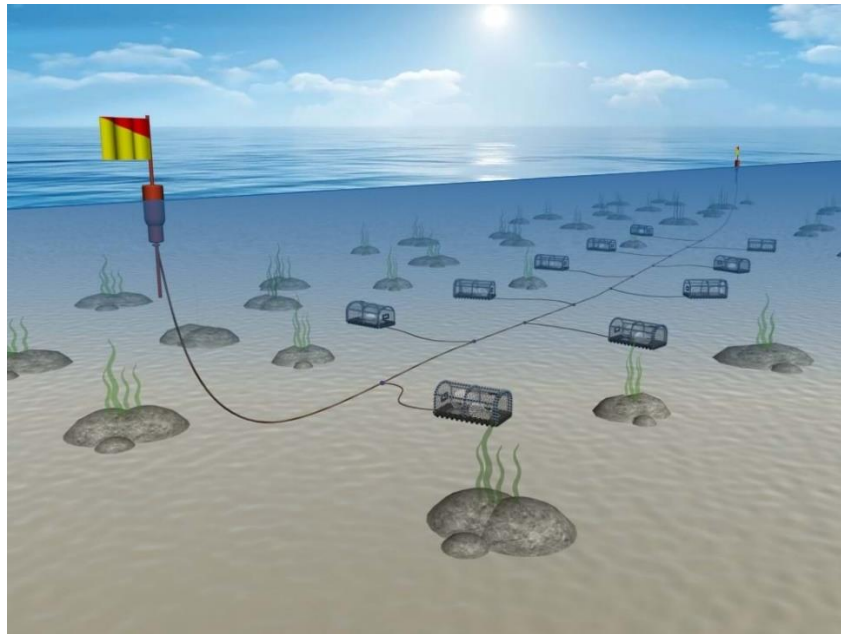


Figure 3: A fleet of creels deployed on the seabed (Seafish, 2023)

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, and Scarborough. Collectively these five ports accounted for 61% of all brown crab landings from English waters in 2021. The main landing ports in England for lobster are Bridlington, Scarborough, Whitby, Newlyn, and Hornsea. Collectively these accounted of 50% of lobster landings from English waters in 2021. More information on crab and lobster landings by port and fleet metier are presented in section 5 of Annex 1.

Data-limited shellfish species

Roughly 40% of crawfish landings are made using pots and traps, with the remaining landings predominantly caught using tangle nets. Landings by vessels over and under 10m in length are relatively similar. The main ports where crawfish are landed are in Cornwall, notably Newlyn where 22 tonnes of crawfish were landed in 2021 representing 59% of total landings in England. The second highest volume of crawfish landings in 2021 were made in the Isles of Scilly with 5.7 tonnes representing 15% of total landings.

Spider crab is both a target fishery (in tangle nets) and a bycatch from mobile and static gear vessels. All significant fishing activity takes place in the southwest of England, where the main landing sites are Cadgwith, Hayle, Helford River, Salcombe, Newlyn and Newquay. The fishery is seasonal, largely occurring between April and August. In 2020, Salcombe was the primary landing site with 44.8 tonnes (20% of total spider crab landings from English waters).

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Velvet crabs are caught in the inshore creel fishery alongside crab and lobster – they are seldom targeted in English waters, although there are more significant velvet crab fisheries in Scotland and Northern Ireland. The main landing sites in England for velvet swimmer crabs in 2021 were Holy Island (31.9 tonnes) and Amble (13.2 tonnes), representing 48% and 20% of total landings respectively. Other important ports for velvet crabs, even though volumes are small, are Bridlington, Seahouses, and Mylor.

Common prawn is generally a seasonal fishery targeted largely by vessels under 10m in length. They are fished most intensely from November to February using pots baited largely with herring. The largest landing sites are Exmouth and along the River Dart, with significant landings also at Paignton and Lyme Regis.

Current status

Crab and lobster

The landings profile for crab and lobster can be summarised as:

Crab: Overall landings for brown crab from English waters were stable between 2016 and 2019 - ranging between 13,641 and 14,877 tonnes. However, in 2020 landings dropped by -19% to 11,575 tonnes, probably impacted by the Covid 19 pandemic. Landings remained similarly low in 2021, totalling 11,683 tonnes. In 2021, the highest tonnages were landed from ICES rectangles off the northeast coast of England – specifically 36F0 off the coast of Bridlington which accounted for 26% (3,022 tonnes) of total landings. Other significant ICES rectangles in terms of crab landings are located off the southwest coast of England, specifically 29E4 and 29E6 which saw landings of 952 and 891 tonnes respectively in 2021.

Lobster: Overall landings for lobster from English waters were steady between 2016 and 2021. Within this period, lobster landings ranged between around 1,500 and 2,000 tonnes, with a peak of 1,919 tonnes in 2017 and a low of 1,492 tonnes in 2020 (again, probably impacted by the Covid 19 pandemic). Moderate annual fluctuations were observed, whereby lower landings were recorded following a year of higher landings, and vice versa. Some fluctuations may be explained by extreme cold weather events such as in 2018 which resulted in mass mortalities in the North Sea. In 2021, recorded landings were 1,772 tonnes. The highest tonnages were landed from ICES rectangles off the northeast coast of England – specifically 36F0 off the coast of Bridlington where 30% (523 tonnes) of landings originated in 2021.

Both crab and lobster fisheries benefit from a reasonable understanding of the biological parameters of each species and, at a broad level, current exploitation rates. However, challenges remain in providing reliable assessments of stock status. While there are management measures in place, primarily relating to managing

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species by size and protecting females, these are fragmented and lack sufficient coherency to deliver effective management at a fishery level.

In contrast there is limited available data on the data-limited shellfish species and, outside selected IFCA's, there are few management measures.

Both crab and lobster fisheries have a time series of scientific biological data around stock status and there has been some success in establishing biological reference points for MSY. The following reference points apply to crab and lobster:

- The proposed target reference point is defined as the exploitation rate that would produce 35% of virgin Spawner per Recruit (SpR), which is a proxy for the fishing rate that will tend to produce MSY. Crab and lobster fisheries should be managed such that the stock biomass fluctuates around this point.
- An initial limit reference point has been suggested by Cefas at 15% of virgin SpR; fisheries operating beyond this level are less likely to be sustainable. Having fisheries operating below this threshold increases the risk of impaired reproduction, compromises long-term stock sustainability, and reduces yield to the fishery. In some management jurisdictions, if a stock moves below the biomass-based limit reference point the stock is assessed as to be at risk of collapse and the fishery is closed, or at least severely restricted, and a rebuilding plan implemented.

There is an agreed stock assessment methodology in use for brown crab and European lobster fisheries but there are specific uncertainties which limit the level of certainty of the assessment results and mean that Cefas does not currently present precise estimates of fishing mortality or stock size. These include:

- Lack of understanding of growth and natural mortality rates.
- Lack of appropriate fishing effort data. Pot hauls or total pot numbers are not recorded meaning that fishing effort must be estimated from sales notes (supplemented by Monthly Shellfish Activity Return (MSAR) forms). Estimates of fishing effort are given as number of days at sea which is considered an imperfect metric for static gear fisheries as this gives no indication of total catches.
- Representativeness of landings used to collect length samples. Scientific officers visit individual ports to measure individuals from catches for length cohort analysis and to determine ratios of landings by sex. The assumption is that these catches are representative of population structure, however this makes no allowance for behavioural differences or catchability of different size / sex crabs or lobsters in pot fisheries. If catches are not representative of the wider population, then stock size assessments based on these samples will be inherently biased.

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- There is some uncertainty around the base assumptions (such as constant spatial coverage of population, equal availability of different animal size ranges) which can lead to inaccuracies in the assessment results.
- Exemptions from reporting requirements for recreational fisheries means that estimates of fishing mortality used in assessments are likely to be lower than actual fishing mortality levels as not all removals can be accounted for.

Despite this, models are considered reliable enough to give indicative figures for stock size against reference points and indicate whether exploitation rates are low, medium, or high.

Overall stock health is determined based on an assessment of exploitation rates – level of fishing pressure on the stock – and the assessment of stock status across each crab and lobster fishery unit (CFU and LFU respectively). CFU and LFU are stock units defined based on understandings of larval distribution, hydrographic conditions, and distributions. CFU and LFU are assessed by Cefas as part of the Cefas stock assessment programme. See Table 1 below and maps of CFU and LFU are shown in Figures 4 and 5 respectively.

Exploitation rates: Based on the 2019 stock status reports current exploitation rates have been assessed as follows:

Crab: Exploitation rates for crab have remained constant between 2017 and 2019. They are considered high in the Southern North Sea crab fishery unit (CFU), and moderate in three other CFUs. There is no status available for the crab fishery in the English Channel. These results suggest that all but one CFU requires management intervention to ensure the stock rebuilds to meet the MSY target.

Lobster: Exploitation rates are considered high in three lobster fishery units - Northumberland and Durham, Yorkshire Humber, East Anglia and moderate in the remaining two LFUs. While exploitation rates are at a level that could compromise the long-term sustainability of lobster stocks there has been some minor improvements recorded since the 2017 assessment where exploitation levels were very high in Northumberland and Durham and Yorkshire Humber which are now assessed as high. Similarly, exploitation rate in the Southeast South Coast LFU decreased from High to Moderate between 2017 and 2019. This suggests that exploitation rates in some LFUs is reducing.

Available effort data for crab and lobster fisheries is based on EU logbooks and MSAR forms which record days fished rather than numbers of pots fished. This means available effort information lacks sufficient granularity. Anecdotal information from some fisheries suggests that there have been significant increases in both pot numbers and spatial distribution of fishing effort in recent years, but the lack of fine scale effort data mean these increases in effort are not necessarily reflected in the

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landing data. Because fishing effort is estimated using days at sea, large increases in landings can be misinterpreted by current modelling approaches as increases in spawning stock because there is no consideration of total numbers of pots fished in a given time at sea.⁴

Assessment of stock status: Based on the 2019 assessment results the stock status of crab and lobster stocks have been assessed as follows:

Crab: Crab stock status in three of the five CFUs is assessed as below MSY; stock status in the Western Channel CFU is near MSY. Both stock status and exploitation rates were unknown in the Eastern English Channel in the 2017 and 2019 assessments.

Lobster: Stock status in two of the five LFU are below the minimum reference point and two are near the minimum reference point. Only the Southwest LFU is assessed as being below MSY.

No CFU or LFU have stock status' above MSY. There has also been little change in CFU and LFU stock size between the 2017 and 2019 assessments.

Although CFUs are assessed separately, there is recognised connectivity between units because of migration and larval dispersal although this is not fully understood. There is evidence of a westward migration of adult crabs in the English Channel and a southward drift of larval crabs along the east coast of England in the southern North Sea. This means that stock health in one CFU can have implications for stock status in another.

In summary the current stock status information indicates that fishing pressure is likely too high across all crab and lobster fisheries based on the best available evidence. Most fishery units are at or below the MSY target, and some are at or only slightly above the minimum reference point, which is the point at which long-term sustainability of the fishery could be compromised. The inherent uncertainties in the assessment process also suggest that these estimates may underestimate the extent of fishing pressure such that stock status could be worse than expected. This shows a clear need for robust management intervention and formalised rebuilding plan to bring exploitation rates down to sustainable levels and to allow stocks to recover towards the MSY target.

⁴ [Edible crab \(*Cancer pagurus*\) stock status report](#). Cefas, October 2020

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Table 1: Stock size and exploitation rates for English crab and lobster fishery units in 2019 and 2017 from Cefas' stock status reports. Cefas, October 2020 and Cefas, 2017

Region	Stock size 2017	Stock size 2019	Exploitation rate 2017	Exploitation rate 2019
Crab Fishery Units				
Central North Sea	Below MSY. Around minimum reference point limit for males, approaching target for females.	Below MSY. Approaching target for males and above the target for females.	Moderate. Below maximum reference point limit for females, males close to limit.	Moderate. Below maximum reference point limit for females, males are at the limit
Southern North Sea	Below MSY. Around minimum reference point limit for males, approaching target for females.	Below MSY. Between minimum reference point limit and target for males and females.	High. Around the maximum reference point limit for both males and females.	High. Above the maximum reference point limit for males and females.
Eastern English Channel	Unknown	Unknown	Unknown	Unknown
Western English Channel	Near MSY. High, around the level required to achieve MSY for both males and females.	Near MSY. High, around the target level required to achieve MSY for females	Moderate. At a level required to achieve MSY for both males and females.	Moderate. Around target level required to achieve MSY for females.

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Region	Stock size 2017	Stock size 2019	Exploitation rate 2017	Exploitation rate 2019
Celtic Sea	Below MSY. Below Maximum Sustainable Yield level but above minimum reference point limit for females. Unknown for males.	Below MSY. Below Maximum Sustainable Yield level but above minimum reference point limit for females. Unknown for males.	Moderate. Around level generating Maximum Sustainable Yield for females. Unknown for males.	Moderate. Close to target level generating Maximum Sustainable Yield for females. Unknown for males.
Northumberland and Durham	Below minimum ref. Below minimum reference point limit but stable for males and females.	Below minimum ref. Below the minimum reference point limit for females, just above for males	Very high. Beyond maximum reference point limit for both males and females.	High. Around maximum reference point limit for males, above for females.
Yorkshire Humber	Near minimum ref. Around minimum reference point for males and females.	Near minimum ref. Near minimum reference point for males and females.	Very high. Beyond maximum reference point limit for males and females.	High. Above the maximum reference point limit for both males and females.
East Anglia	Unknown, catch rates are fairly stable.	Below minimum ref. Low, below minimum reference point for males and females	Unknown	High. Above minimum reference point for males and female.

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Region	Stock size 2017	Stock size 2019	Exploitation rate 2017	Exploitation rate 2019
Southeast South Coast	Near minimum ref. Around the minimum reference point limit for males and females.	Near minimum ref. Around the minimum reference point limit for males, between limit and target for females.	High. Above rates consistent with MSY but below maximum reference point limit for males and females.	Moderate. Above rates consistent with MSY but below maximum reference point limit for males and females.
Southwest	Below MSY Above minimum reference point limit but below MSY target for males and females.	Below MSY Above minimum reference point limit but below MSY target for males and females	Moderate. Above rates consistent with MSY but below maximum reference point limit. Stable or decreasing over the past 3 years for males and females.	Moderate. Above rates consistent with MSY but below maximum reference point limit for males and females.

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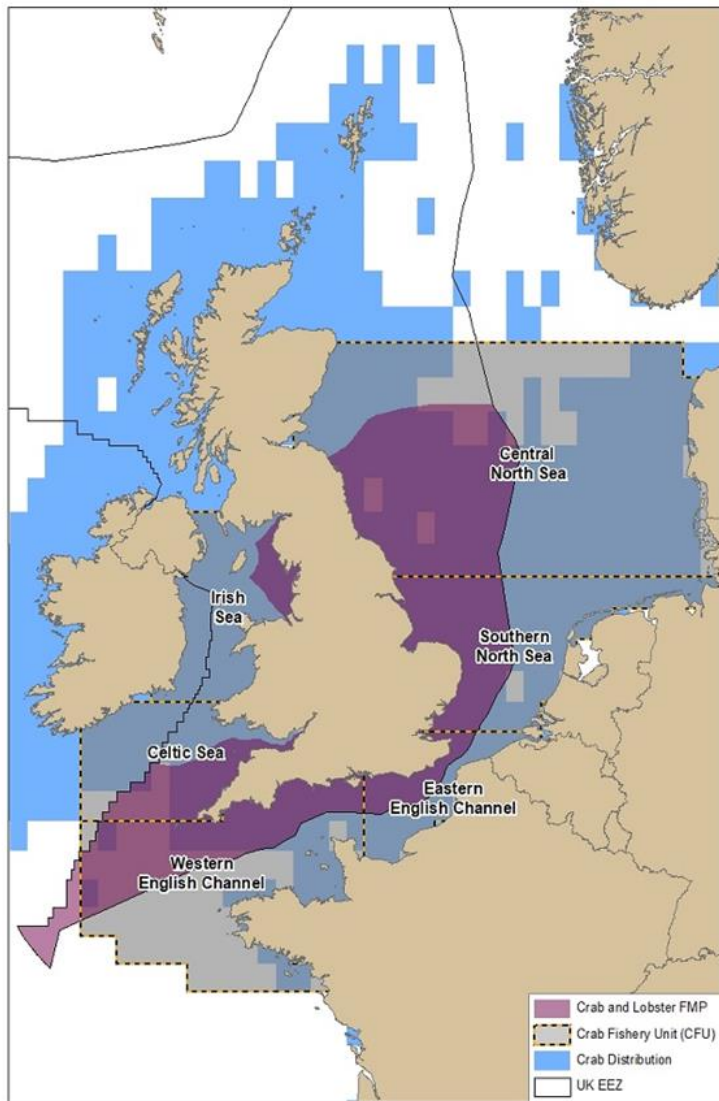


Figure 4: Crab fishery units (LFU) in England as assessed by Cefas. The FMP area is shown in purple. Source: Cefas, FMP evidence, 2022.

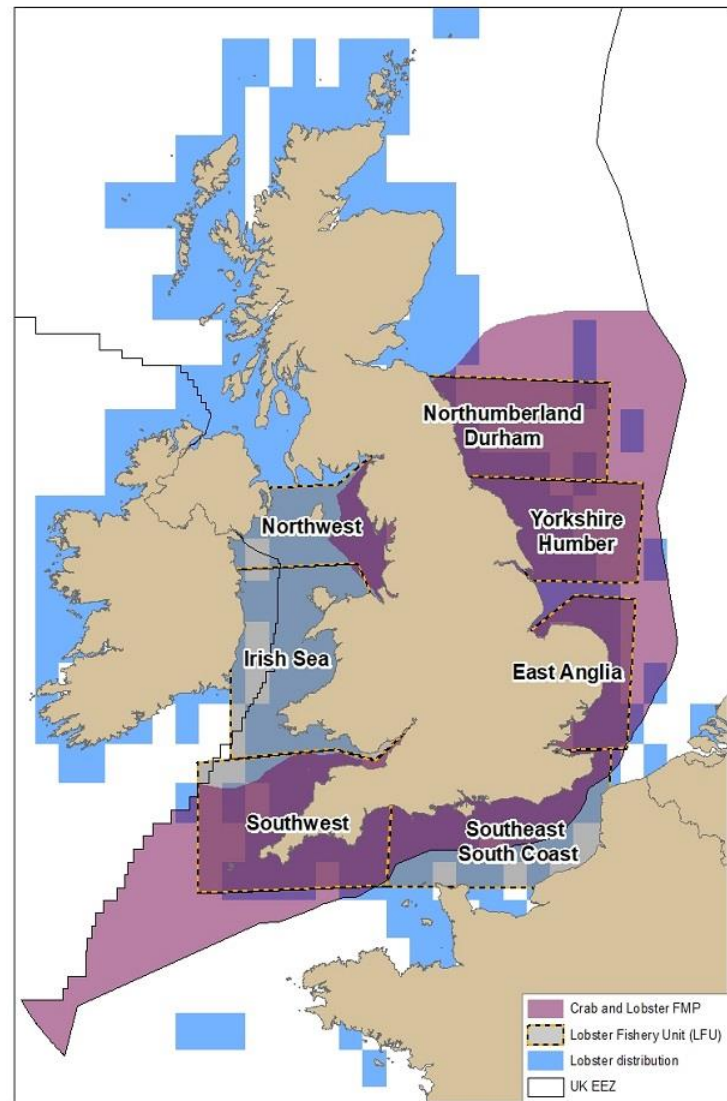


Figure 5: Lobster fishery units (LFU) in England as assessed by Cefas. The FMP area is shown in purple. Source: Cefas, FMP evidence, 2022.

Data-limited species

Crawfish, spider crab, common prawn, and velvet swimmer crab have received little focus in terms of data gathering and management and therefore are data-limited species. Information on the volume and value of landings of these species is presented in section 5 of Annex 1.

It is timely that these species are included in the scope of this FMP as growing markets for crawfish and spider crabs means that these fisheries could be subject to increased fishing pressure in the future. A summary of trends for secondary species, where information is available, is presented as follows:

- Crawfish landings remained stable at around 12.5 tonnes between 2016 and 2019, however between 2019 and 2022 there was a 282% increase in crawfish landings. This is thought to have been driven in part by the Covid-19 pandemic and closure of export markets, meaning more fishers targeted shellfish during this period. In 2022 the total value of annual crawfish landings exceeded £1 million for the first time, at £1.3 million, a 248% increase on 2019 figures.
- Velvet swimmer crabs are the most significant data-limited species in terms of both volume and value of landings; in 2019 over 2,000 tonnes of velvet swimmer crabs were landed for a total value of £5 million.
- Spider crab landings have been steadily increasing, from 344 tonnes in 2016 to 643 tonnes in 2019, in recent years there has been a decrease in volume of landings to 425 tonnes in 2020.
- Common prawn landings have fluctuated over the past years, the landings peaked in 2021 with 6.7 tonnes (worth £0.14m) before declining to 4.3 tonnes in 2022 (£0.08m). Price per landed weight has increased during this time.

Shared Shellfish Principles and Crab and Lobster Fishery Management Objectives

Shared principles

Set out below are nine overarching shared shellfish principles designed to address key management, social, and economic issues that face all shellfish fisheries in English waters.

The SIAG have developed these principles. This group brings together government, regulators, researchers, and industry stakeholders to discuss national-level strategic management of shellfish fisheries. Many issues facing the sector are not specific to

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individual shellfish species. These principles recognise common challenges and issues and have been reflected in each of the shellfish FMPs.

While these principles, and the associated actions, go beyond the legal obligations for FMPs in section 6 of the Act, Defra welcomes these industry commitments to complement and support the delivery of the FMPs and objectives in the Act.

The SIAG will maintain responsibility for the principles and the actions set out to deliver them.

The shared principles are:

1. Formalise the structure and operation of the SIAG, and associated sub-groups and ensure effective representation, so that it becomes a focal point of engagement on shellfish fisheries management in England.
2. Assess fishing effort (including latent capacity) on stock sustainability and if necessary, recommend appropriate measures to manage effort.
3. Establish a mechanism that enables regulators to effectively engage with and draw on shellfish industry knowledge in relation to discussions relating to NQS management through the TCA
4. Enable better involvement of the shellfish industry in matters regarding marine spatial planning and changes in marine spatial use by facilitating better collaboration between regulators, planners, and industry stakeholders.
5. Improve understanding of the impacts of non-fishing activities (for example capital dredging, undersea cables) on English shellfish stocks.
6. Progress initiatives to increase and promote consumption of sustainable UK shellfish.
7. Facilitate and promote trade opportunities for shellfish in overseas markets (EU and non-EU).
8. Develop advice and guidance on shellfish welfare issues to help the industry to further develop and implement best practice handling measures.
9. Industry to take collective responsibility to comply with welfare and good working conditions legislation and guidance to ensure the highest possible levels of standards across the shellfish sector supply chain.

Further detail on these objectives is set out in **Annex 4**.

Crab and lobster specific management objectives

The crab and lobster-specific objectives are management objectives for crab and lobster fisheries in English waters which are described in Table 1 below. The table sets out the rationale for each objective, the activities that will help deliver it, and how it links to objectives in the Act. Some crab and lobster FMP objectives go beyond the Act but are included here for completeness.

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These species-specific objectives are designed to address key fisheries management issues facing specific fisheries in English waters. Species-specific objectives for English brown crab and lobster fisheries were collaboratively developed by the CMG FMP working group and reflect feedback received during the stakeholder engagement events. Species-specific objectives were also reviewed by the CMG Science Sub-group and a Research and Evidence plan has been prepared which sets out how the evidence requirements to support delivery of these objectives will be met. The Research and Evidence Plan can be found in Annex 2.

The description of the objectives in the tables below includes the rationale for its inclusion, the activities that will help deliver the objective, and how it links to objectives in the Act. These objectives also reflect industry priorities and the desire to deliver environmentally sustainable shellfish fisheries which continue to deliver socio-economic benefits to communities and the wider supply chain.

Brown crab (*Cancer pagurus*) fisheries management objectives

As set out above, these objectives relate specifically to the management of crab fisheries in English waters. While most objectives identified are necessary to meet the requirements of section 6 of the Act, some objectives and the actions suggested to deliver them go beyond these requirements but are included for completeness. Responsibility for delivery of these objectives, once actions are agreed, will sit across industry groups, and fisheries authorities and will need to be prioritised to support the phased approach of FMPs progress towards meeting the Act objectives.

#	Objective	Rationale	Potential Actions	Fisheries Act 2020 objectives
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.	<p>Evaluate current data gathering protocols to identify means of improving data provision, consistency, compatibility between data assets, and identifying critical data and knowledge gaps.</p> <p>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 makes best use of fisher knowledge and expertise.</p> <p>Create an on-going time-series and develop a process by which stock status may be</p>	The scientific evidence objective

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#	Objective	Rationale	Potential Actions	Fisheries Act 2020 objectives
			<p>reviewed at the end of the first 5-years of the plan.</p> <p>Build partnerships between stakeholders and UK Research and Innovation (UKRI) institutes to ensure that research is targeted at answering management questions, peer reviewed, industry is consulted, and data is made available to support evidence-based fishery management.</p>	
2	<p>Establish methods to better assess stock status that reflect the life history of the target species and fishery exploitation patterns.</p>	<p>Accurate information regarding stock status is essential for informing management decisions and protecting against over-exploitation.</p>	<p>Critique current stock assessment approach and explore alternative assessment options.</p> <p>Determine appropriateness of current stock boundaries and alignment between management and stock areas, accounting for migration patterns where relevant.</p> <p>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, and methods of gathering useful fishing effort data from static gear fisheries.</p>	<p>The scientific evidence objective</p>

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#	Objective	Rationale	Potential Actions	Fisheries Act 2020 objectives
			<p>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.</p>	
3	<p>Assess the impact of crab fishing activity on the wider marine environment.</p>	<p>It is essential to understand how crab potting activity impacts the marine environment to identify and minimise any negative interactions.</p> <p>This will help protect marine ecosystem structure and functioning, achievement of GES, as well as improve industry reputation.</p>	<p>Undertake desk-based review of wider environmental impacts of crab fisheries on benthic habitats and Endangered, Threatened and Protected (ETP) species, considering regional variations in fishing methods, gear types, species present etc.</p> <p>Assess the efficacy of existing avoidance/mitigation measures relating to impacts of crab 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.</p> <p>Assess the efficacy of existing bycatch avoidance/ mitigation measures and reporting requirements relating to impacts of crab fisheries on ETP species, if necessary, make recommendations on changes (considering</p>	<p>The ecosystem objective</p>

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#	Objective	Rationale	Potential Actions	Fisheries Act 2020 objectives
			<p>both regulatory and voluntary measures) the sector could make to improve its environmental credentials.</p> <p>Explore the frequency, scale, drivers, and likely impacts of fishing gear losses in the static gear sector.</p>	
4	<p>Improve understanding of interactions between the crab fishery and other fisheries.</p>	<p>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.</p>	<p>Review interactions between crab fisheries and other fisheries to improve understanding of:</p> <ul style="list-style-type: none"> • 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). <p>Review issues surrounding interactions between fisheries operating in shared marine space - both between different métiers of static gear fisheries and between static and mobile gear fisheries - and explore ways of minimising the social, economic, and</p>	<p>The bycatch objective</p> <p>The ecosystem objective</p>

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#	Objective	Rationale	Potential Actions	Fisheries Act 2020 objectives
			<p>environmental impacts of conflicts between fishers at present and in the future.</p> <p>Review the impact of other fisheries on crab stocks e.g. by-catch and mortality of crabs in other fisheries.</p>	
5	<p>Devise and implement a short- to medium-term management approach proposal that takes into account the external regulatory environment.</p>	<p>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 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).</p>	<p>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.</p> <p>Develop an interim management approach which takes into account the wider landscape post EU exit and:</p> <ul style="list-style-type: none"> • 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 	<p>The sustainability objective:</p> <p>The scientific evidence objective</p>

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#	Objective	Rationale	Potential Actions	Fisheries Act 2020 objectives
			<p>the requirements set out under the TCA</p> <ul style="list-style-type: none"> • Informs and respond to changes to the Western Waters effort regime <p>Review the way in which different métiers are grouped for management purposes, in consideration of differences in fishing capacity between vessels of different constructions.</p>	
6	<p>Establish a long-term management approach for crab fisheries in line with improvements in data collection and stock assessment.</p>	<p>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.</p>	<p>Collaboratively develop a harvest strategy, with appropriate harvest control rules, for English crab fisheries with input from industry, researchers, and regulators.</p> <ul style="list-style-type: none"> • HCRs should ensure that exploitation is aligned with actual or likely stock status according to the best available scientific evidence and that management measures are adjusted in response to changes in the assessed state of the stock. • Development of HCRs should include evaluation of available management tools in the crab fishery context to determine the most appropriate 	<p>The scientific evidence objective</p> <p>The precautionary objective</p>

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#	Objective	Rationale	Potential Actions	Fisheries Act 2020 objectives
		<p>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.</p>	<p>management tools to limit fishing mortality.</p> <ul style="list-style-type: none"> • 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. <p>Consider fishery management measures designed to rebuild stocks, rather than preserve them, as required in line with the best available scientific evidence.</p>	
7	<p>Explore trade-offs between arrangements for providing access to crab fisheries that will ensure both:</p> <p>long-term environmental sustainability; and economic profitability</p>	<p>Appropriate access arrangements will support thriving crab fisheries in terms of both economic and environmental sustainability.</p>	<p>Explore options for:</p> <ul style="list-style-type: none"> • Fair and equitable access to the resource and equitable fishing opportunities. • Community access regimes. • Addressing issues around capacity (including latent capacity) • Newcomers 	<p>The equal access objective</p>

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#	Objective	Rationale	Potential Actions	Fisheries Act 2020 objectives
8	Maintain a watching brief on other key commercial crustacean species	<p>Monitoring of other key commercial crustacean fisheries facilitates timely management interventions to prevent unsustainable fishing practices (if required).</p> <p>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.</p>	<p>Within the broader Crab and Lobster Fisheries Management Plan, acknowledge and address issues specific to the following fisheries:</p> <ul style="list-style-type: none"> • Crawfish (<i>Palinurus elephas</i>), • Common prawn (<i>Palaemon serratus</i>), • Spider crab (<i>Maja brachydactyla</i>); • Velvet crab (<i>Necora puber</i>), and; • Emerging crustacean fisheries. <p>Undertake annual monitoring of patterns of fishing activity, fleet performance, management, and indicators of stock status.</p> <p>Consider these species in other objectives.</p> <p>Consider species-specific management requirements, for example:</p> <ul style="list-style-type: none"> • Harmonisation of the crawfish MLS nationally. 	<p>The sustainability objective</p> <p>The scientific evidence</p> <p>The precautionary objective</p>

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#	Objective	Rationale	Potential Actions	Fisheries Act 2020 objectives
9	<p>Government and shellfish industry to work together to take collective responsibility to:</p> <ul style="list-style-type: none"> • Mitigate or reduce emissions from the shellfish supply chain • Adapt to and reduce the environmental impacts of climate change 	<p>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.</p> <p>Reducing emissions from the shellfish supply chain will help the industry contribute to national and global goals to combat climate change and to meeting net-zero commitments.</p> <p>Improved understanding of likely impacts of climate change on English shellfish fisheries will help the commercial fishing sector adapt to</p>	<p>Work collectively to:</p> <ul style="list-style-type: none"> • Assess the carbon footprint of English shellfish fisheries using a reliable metric which takes into account specifics of the shellfish industry (for example, 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- / by-products, e.g. shell waste, to minimise emissions in the shellfish supply chain. • Maintain a watching brief on 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. 	<p>The climate change objective</p>

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#	Objective	Rationale	Potential Actions	Fisheries Act 2020 objectives
		changes, building greater business resilience.	<p>2. Review relevant research to outline likely impacts of changing climatic conditions on English shellfish fisheries, to assess:</p> <ul style="list-style-type: none"> • the likely impact on population dynamics of target species, • economic viability of commercial fisheries, and likely impact(s) on coastal communities and wider society (for example, loss of employment) and; • communicate options for English shellfish fisheries to adapt and to operate under changing climatic conditions, with the aim of safeguarding long-term environmental and socio-economic sustainability. 	

European lobster (*Homarus gammarus*) fisheries management objectives

Fisheries management objectives for lobster align closely with objectives for brown crab due to the similar nature of these pot fisheries. Lobster objectives are presented separately from crab objectives to account for differences in management requirements and the evidence base, and to enable progress against FMP objectives to be independently tracked for each species.

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As set out above, these objectives relate specifically to the management of lobster fisheries in English waters. While most objectives identified are necessary to meet the requirements of section 6 of the Act, some objectives and the actions suggested to deliver them go beyond these requirements but are included for completeness. Responsibility for delivery of these objectives, once actions are agreed, will sit across industry groups, fisheries authorities and government and will need to be prioritised to support the phased approach of FMPs progress towards meeting the Act objectives.

#	Objective	Rationale	Actions	Fisheries Act 2020 objectives
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.	<p>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.</p> <p>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.</p> <p>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, via improving usage of the MMO Catch App).</p>	The scientific evidence objective

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#	Objective	Rationale	Actions	Fisheries Act 2020 objectives
			<p>Build partnerships between stakeholders and UKRI institutes to ensure that research is targeted at answering management questions, peer reviewed, and industry are consulted, and data are made available to support evidence-based fishery management.</p> <p>Create an on-going time series and develop a process by which stock status may be reviewed at the end of the first 5-years of the plan.</p>	
2	<p>Establish methods to better assess stock status that reflect the life history of the target species and fishery exploitation patterns.</p>	<p>Accurate information regarding stock status is essential for informing management decisions and protecting against over-exploitation.</p>	<p>Critique current stock assessment approach and explore alternative assessment options.</p> <p>Determine appropriateness of current stock boundaries and alignment between management and stock areas.</p> <p>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.</p>	<p>The scientific evidence objective</p>

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#	Objective	Rationale	Actions	Fisheries Act 2020 objectives
			<p>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.</p>	
3	<p>Assess the impact of lobster fishing activity on the wider marine environment.</p>	<p>It is essential to understand how lobster potting activity impacts the marine environment in order to identify and minimise any negative interactions.</p> <p>This will help to protect marine ecosystem structure and functioning, achievement of GES, as well as improve industry reputation.</p>	<p>Undertake desk-based review of wider environmental impacts of lobster fisheries on benthic habitats and ETP species, taking into account regional variations in fishing methods, gear types, species present etc.</p> <p>Assess the efficacy of existing avoidance/ 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.</p> <p>Assess the efficacy of existing bycatch avoidance/ 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</p>	<p>The ecosystem objective</p>

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#	Objective	Rationale	Actions	Fisheries Act 2020 objectives
			<p>sector could make to improve its environmental credentials.</p> <p>Explore the frequency, scale, drivers, and likely impacts of fishing gear losses in the static gear sector.</p>	
4	<p>Improve understanding of interactions between the English lobster fishery and other fisheries.</p>	<p>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.</p>	<p>Review interactions between lobster fisheries and other fisheries to improve understanding of:</p> <ul style="list-style-type: none"> • Direct impacts (for example, incidental capture of non-target species in the lobster fishery) and • Indirect impacts (for example, sourcing bait for lobster fisheries). <p>Review issues surrounding interactions between fisheries operating in shared marine space - both between different métiers 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.</p>	<p>The bycatch objective</p> <p>The ecosystem objective</p>

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#	Objective	Rationale	Actions	Fisheries Act 2020 objectives
			<p>Review the impact of other fisheries on lobster stocks e.g. by-catch and mortality of lobsters in other fisheries.</p>	
5	<p>Devise and implement a short- to medium-term management approach proposal that takes into account the external regulatory environment.</p>	<p>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, whilst an increased time-series of data required for responsive, evidence-based management is assembled (as per Objectives 1 and 2).</p>	<p>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.</p> <p>Develop an interim management approach which takes into account the wider landscape post EU exit and:</p> <ul style="list-style-type: none"> • 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 UK-EU Trade and Cooperation Agreement 	<p>The sustainability objective</p>

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#	Objective	Rationale	Actions	Fisheries Act 2020 objectives
			<p>Determine how to take action to protect stocks from overexploitation in the absence of suitable evidence:</p> <ul style="list-style-type: none"> incorporate a flexible approach, so that responsive fishery management can be implemented in the absence of perfect information. <p>Provide a structure for the development of agile management regimes which are responsive to changes in stock status or patterns of fishing activity.</p>	
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 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	<p>Co-develop a harvest strategy, with appropriate harvest control rules, for English lobster fisheries with input from industry, researchers, and regulators.</p> <ul style="list-style-type: none"> HCRs should ensure that exploitation is aligned with actual or likely stock status according to the best available scientific evidence and that management measures are adjusted in response to changes. Development of HCRs should include exploration of appropriate 	<p>The scientific evidence</p> <p>The precautionary objective</p>

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#	Objective	Rationale	Actions	Fisheries Act 2020 objectives
		<p>unsustainable exploitation.</p> <p>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.</p> <p>A harvest strategy and HCRs should balance stock health and socio-economics to ensure that stocks are protected and that fisheries remain economically viable.</p>	<p>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.</p> <ul style="list-style-type: none"> • Development of a harvest strategy and HCRs is predicated on provision of better data on English lobster fisheries, as outlined in objectives 1 and 2. <p>Implement management measures designed to enhance stocks, rather than preserving them, as required.</p>	
7	Explore trade-offs between arrangements for providing access to	Appropriate access arrangements will support thriving lobster fisheries in terms of both economic	Explore options for:	The equal access objective

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#	Objective	Rationale	Actions	Fisheries Act 2020 objectives
	lobster fisheries that will ensure both: <ul style="list-style-type: none"> • long-term environmental sustainability; and • economic profitability 	and environmental sustainability.	<ul style="list-style-type: none"> • Fair and equitable access to the resource and equitable fishing opportunities • Community access regimes • Addressing issues around capacity (including latent capacity) • Newcomers 	
8	Government and shellfish industry to work together to take collective responsibility to: <ul style="list-style-type: none"> • 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 climate change and to	Work collectively to: <ul style="list-style-type: none"> • Assess the carbon footprint of English shellfish fisheries using a reliable metric which takes into account specifics of the shellfish industry (for example, 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- / by-products, e.g. shell waste, to minimise emissions in the shellfish supply chain. 	The climate change objective

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#	Objective	Rationale	Actions	Fisheries Act 2020 objectives
		<p>meeting net-zero commitments.</p> <p>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.</p>	<ul style="list-style-type: none"> • Maintain a watching brief on 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. <p>2. Review relevant research to outline likely impacts of changing climatic conditions on English shellfish fisheries, to assess:</p> <p>the likely impact on population dynamics of target species,</p> <ul style="list-style-type: none"> • economic viability of commercial fisheries, and likely impact(s) on coastal communities and wider society (for example, loss of employment) and; • communicate options for English shellfish fisheries to adapt and to operate under changing climatic conditions. 	

Future Fisheries Management Strategy

The Crab and Lobster FMP sets a pathway for our vision of long-term sustainable management of these fisheries. The crab and lobster specific objectives presented in Section 4 set out how this vision will be achieved. This section details the proposed future management approach for crab, lobster, and the data-limited shellfish species included in the FMP. For each species it covers:

- The current management landscape,
- The long-term management ambition, and
- The proposed approach to deliver on that ambition by (1) improving the evidence and research base and (2) delivering more effective effort management.

The current management landscape for crab and lobster in England is highly fragmented, as summarised in Annex 1 evidence statement, with a range of national and regional (IFCA) management measures including shellfish entitlements, MLS / MCRS (ranging from 115mm to 160mm for brown crab), pot limitations, permitting schemes, vessel length restrictions, and specific conservation regulations such as de-clawing bans or mandatory escape gaps. Although a national shellfish entitlement limits entry to the fishery, an entitlement alone does not prevent expansion of effort by those already operating in the fishery.

Vessels of 15m and over in length targeting brown and spider crab in ICES areas 5, 6 and 7 are subject to annual effort limits through Western Waters Effort Regime (WWER) (adopted from EU legislation). Limits are set based on kilowatt days at sea per calendar year and uptake is monitored by the MMO. In 2022 crab effort uptake through the WWER in area 7 was 310,904kW days at sea, which represented only 57% uptake, likely due to the area 7 effort limit now only applying in UK waters rather than the whole of area 7 since the UK left the EU. This suggests that the limit is now higher than actual effort in the fishery and is therefore not limiting fishing pressure.

In October 2021, Defra hosted a workshop with representatives from the shellfish industry which focused on discussing the WWER and future management approaches. There were mixed views received from industry, with some suggesting that a 'days at sea' based effort regime was not appropriate for static gear fisheries (as days at sea does not limit the number of pots fished or volume of crab landed). Others were keen for the WWER to be extended to all sectors. There was unanimous desire to move to a more evidence-based management approach in which management measures are linked to stock health.

The different management regimes are largely based on administrative boundaries, such as IFCA jurisdictions, administrative boundaries between UK administrations or

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with the EU, and do not necessarily reflect biological boundaries between stocks. This means that fisheries exploiting the same biological stocks may be subject to different management restrictions depending on where fishing activity occurs.

This fragmented management approach adds to complexity for both fishers abiding by regulations and regulators enforcing the measures. This complexity makes it difficult to reconcile variations such as different MLS to biological status of stocks and means it is more challenging to assess how effective a given measure is. It also contributes to the difficulties in accurately assessing the impact that fishing activity is having on stock sustainability.

As identified in section 3, the current evidence base strongly points to crab and lobster fisheries having high exploitation rates, stock sizes which mostly do not meet the MSY target reference point, and year-on-year increases in landings. These trends suggest that even with current management measures, fishing mortality is too high and should be reduced to ensure long-term sustainability of these fisheries. The available evidence demonstrates the need for robust management intervention and long-term planning to reduce exploitation rates to sustainable levels and allow stocks to recover towards MSY.

Crab and lobster

The overarching aim of the Crab and Lobster FMP is to deliver harvest strategies for crab and lobster fisheries in English waters which incorporate agreed harvest control rules (HCRs) and are supported by regular, reliable stock assessments. The aim of the harvest strategy should be to ensure that fishing mortality is managed at a level to deliver long-term sustainable stock health. HCRs will ensure that fishing effort remains at or below a pre-determined management target and if stock status falls below this level, then clear and decisive management interventions are taken.

In line with Section 6 of the Act, this FMP presents an opportunity to bring English crab and lobster fisheries from a point of likely overexploitation to a regime of iterative and agile management which is underpinned by the best available evidence and where management can quickly respond to changes in stock status. The proposed approach to achieve this is threefold:

- Addressing critical data and knowledge gaps via a consistent data collection and research programme
- Improving stock assessment methodologies for both crab and lobster to ensure high quality, reliable information is available to underpin management decisions, and
- Implementing fit for purpose management that effectively limits fishing effort in line with stock status while minimising regulatory burden on industry and providing for a viable and profitable shellfish sector.

Data-limited shellfish species

Although specific regional regulations exist in some IFCA jurisdictions, there are no national management approaches for crawfish, common prawn, spider crab, and velvet swimmer crab. Given the lack of information available on these, the FMP sets a more fundamental objective of annual monitoring of fishing activity to help establish reliable time series of data. This should enable indices of abundance to be set and trends monitored. In time this trend data could be used to identify whether further management action is required for these fisheries.

Approach

Recognising problems with the evidence base available to underpin good management, the future fishery management strategy needs to be adaptive. Hence, our approach will reflect the precautionary objective of the Act which states that “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.” As the baseline data improves, and as we increase our knowledge of these fisheries, the need for management interventions will need to be flexible in response.

Figure 6 shows a simplified, conceptual cyclical process for fisheries management improvements whereby management decisions are made based on the best available evidence at a given time. Management action is then taken, and the effects (negative and positive) of these actions are monitored through data collection, and adjustments are made if improvements are not evident, or if new information becomes available to inform decision making. This approach is aligned with the scientific evidence and precautionary objectives of the Act as well as section 4.1.7 of the JFS⁵.

⁵ [Joint Fisheries Statement JFS 2022 Final.pdf \(publishing.service.gov.uk\)](#)

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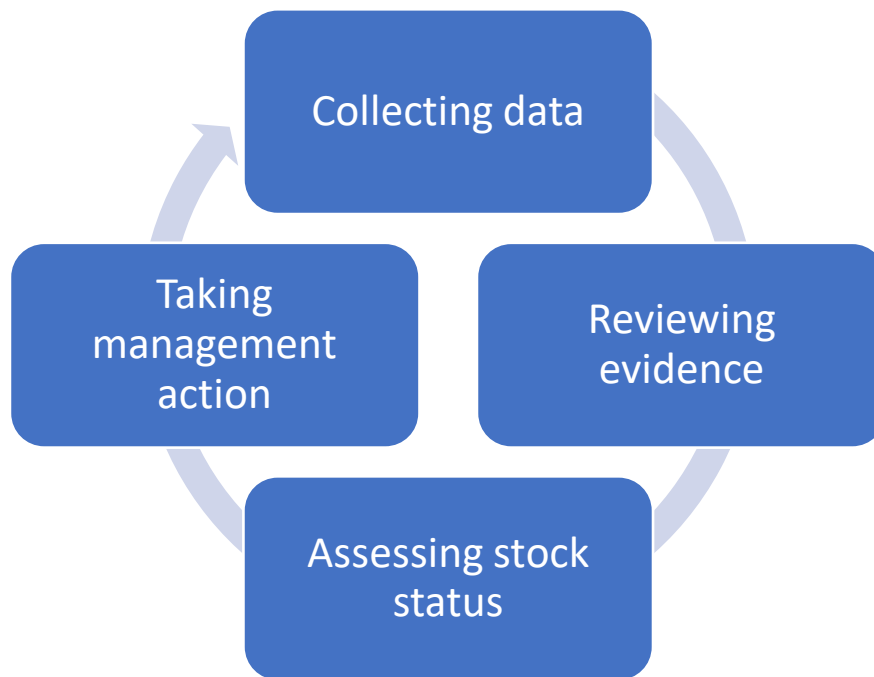


Figure 6: A conceptual diagram of the proposed iterative fisheries management cycle to drive continuous improvement through data collection, analysis, assessment, and management action.

In line with section 6(3) of the Act, this FMP sets out the actions required to transition crab and lobster fisheries in English waters from a state of limited, static management that has failed to deliver stocks at MSY, and reduce fishing pressure, to a regime of iterative and agile effort management, underpinned by the best available evidence. The proposed future management approach is fourfold:

- **Task 1:** Improving the availability of accurate, reliable, and fit for purpose data sets (FMP Objectives 1 and 3).
- **Task 2:** Addressing issues in current assessment processes and making the best use of available information until the evidence base improves (FMP Objective 2). Unlike some other shellfish fisheries there are already existing stock status assessments for crab and lobster that highlight the need for better management. There are already established reporting requirements to inform these models and the uncertainties and assumptions that should be addressed to improve the level of certainty of outputs have largely been identified already, these are presented in research needs 2.1, 2.2 and 2.3 in the Evidence and Research Plan (Annex 2).
- **Task 3:** Taking initial management action based on existing information and adjusting management as impacts are observed / new information becomes available (FMP Objectives 4 and 5).
- **Task 4:** Developing a harvest strategy with appropriate harvest control rules to set appropriate measures that a) limit fishing effort in the long-term, and b)

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can be reviewed and adjusted in response to changes in stock status (FMP Objective 6).

Task 1: Improving data (crab and lobster)

The priority is to establish a fit for purpose evidence base by improving national data collection approaches and, where possible, standardising reporting requirements between different sectors of the shellfish fleet to build an ongoing time series (Crab and Lobster Objective 1). This aligns with the 'scientific evidence' objective of the Act to ensure that the right data are collected, and that management is based on the best available evidence.

Fishery dependent data collection requirements include:

- Fishing effort (for example, pot numbers or pot hauls (or a proxy thereof, for example, deduced from steaming patterns from vessel monitoring systems (VMS) / inshore vessel monitoring systems (iVMS))
- Spatial distribution of fishing activity at an appropriate scale (e.g. ICES sub-rectangle) across all sectors of the fleet
- Fleet characteristics and appropriate segmentation to distinguish between 'sub-sectors' within the shellfish fleet (for example, vivier vs. day boats)
- Consistent reporting of recreational catches and contribution to total fishing mortality
- Bycatch (species and frequency of capture).

Scientific research needs include:

- Evaluating the appropriateness of current stock boundaries and alignment between management and stock areas (Crab and Lobster Objective 2)
- Research to improve understanding of growth rates and natural mortality rates
- Research to improve understanding of stock connectivity through migration, larval dispersal (crab only), and settlement and recruitment dynamics.

Data-limited species

For data-limited species covered in this FMP, the focus will be on establishing basic time series of accurate landings and effort. Alongside this there will be annual monitoring of fishing patterns and fleet performance and the periodic collection of biological data to enable indices of abundance to be established. Over time, such data can be used to monitor general trends in fishery performance as a means of identifying risks to long-term sustainability (Objective 9).

Task 2: Addressing issues in current assessment approaches

Whilst crab and lobster fisheries in English waters benefit from biennial stock assessments by Cefas, there are notable issues with current approaches. This includes uncertainties around growth rates and natural mortality, and stock connectivity as identified in the Evidence and Research Plan (Annex 2) in research needs 2.1 and 2.2 respectively. These issues are understood so the priority is to address the knowledge gaps and model uncertainties and in turn establish a fit for purpose stock assessment methodology.

As Task 1 progresses, and more information is made available, there will be a need to trial and test refined stock modelling approaches to review sensitivity of model parameters and model assumptions (using simulated datasets). This will give an indication of the likely accuracy and sufficiency of revised approaches and their applicability to management of crab and lobster fisheries.

The aim is to deliver reliable assessments of stock status relevant to MSY targets to determine if management interventions are required to reduce fishing pressure on the stock. A reliable assessment methodology should also enable future stock projections to assess how changes in fishing effort (due to changes in fishing measures) could have on the stock.

Task 3: Initial management action

While steps are taken to improve the evidence base, there is a need for short to medium-term management action to manage fishing effort and to address the stock status based on current crab and lobster assessments and exploitation rates, (Crab and Lobster Objective 5). This approach will be underpinned by the precautionary objective of the Act.

Cefas and Project UK have already undertaken research to evaluate different proposed management approaches and tools for crab and lobster fisheries⁶⁷. Table 3 provides an assessment of the different management interventions, their feasibility, and the potential contribution they can make to improving overall stock status. Linkages to FMP objectives and the Annex 2 Evidence and Research Plan are provided to show how data and knowledge gaps should be addressed to enable use of different management tools. This assessment highlights that over time, and with better evidence, more prescriptive management measures can be introduced to manage fisheries to MSY.

⁶ Cefas report Management options for UK crab and scallop fisheries in Western Waters (Cefas, 2020)

⁷ Project UK SW crab management workshop: Final report (Project UK, 2022)

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There are also concerns from some in industry about latent capacity (the number of currently unused shellfish entitlements) in the sector. If latent entitlements were used in the future, this could put additional pressure on stocks. Shared Shellfish Principle 2 focuses on assessing the likely risk posed by capacity (including latent capacity) and developing appropriate measures to manage the risk of increased fishing pressure in the future.

Effective management requires a comprehensive understanding of total fishing mortality, which should include mortality from the recreational sector. It is not clear what share of fishing mortality can be attributed to the recreational sector, so under Objective 1, work is required to (1) consider implementing regular reporting requirements to ensure recreational catches are accounted for in future data and (2) consider introducing measures to align recreational fishing effort or mortality with stock status, as appropriate. Five IFCA's already apply recreational permitting schemes which include provisions for catch reporting as well as pot limits, and daily catch limits in some jurisdictions.

Species specific management priorities in the short to medium term are summarised as follows:

- **Crab:** Neither stock sizes or exploitation rates have changed significantly between Cefas' 2017 and 2019 crab assessments, which suggests a strong need for immediate management action to bring exploitation rates down and allow stocks to recover to levels aligned with MSY. The 2020 Cefas report 'Management options for UK crab and scallop fisheries in Western Waters' acknowledged that better information on catch and effort is required to inform more reliable estimates of stock stocks, and in turn to improve management of brown crab fisheries.
The Cefas report also highlighted the '3-S' management approach which focuses on managing effort by limiting harvest by 'size, sex, and season', an approach already widely adopted in managing North American Dungeness crab fisheries. The FMP provides an opportunity to pilot finer scale management of selected CFU by applying the 3-S approach, building on regional management initiatives already in place in some IFCA jurisdictions.
- **Lobster:** Cefas assessments show decreasing stock size and high rates of exploitation, which point to the need for immediate management action. Proposed adjustments to MLS should provide additional protection to spawning stocks. More targeted measures to limit effort such as seasonal closures (temporal and spatial) or effort caps will also need to be considered as a priority in the FMP. Current evidence will be used to inform initial management interventions (informed by the options in Table 3). There will also be a focus on piloting more targeted effort management at individual LFUs during the early years of the FMP.

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- **Associated shellfish species:** For data-limited species it will be necessary to take precautionary management action, as necessary. In the absence of significant data, management decisions should still be informed by the best available evidence and make best use of fisher knowledge to ensure sustainable exploitation. There are opportunities to learn from existing regional management initiatives for these data-limited species. For example, a higher MLS for crawfish has been implemented in Cornwall and Devon and Severn IFCA jurisdictions; the introduction of this measure was based on reliable scientific evidence and alignment of the MLS with the species' size of maturity for females.

Task 4: Embedding long-term management approaches

Longer-term management approaches for crab and lobster fisheries focus on the development of a harvest strategy with appropriate harvest control rules (HCRs). This is predicated on the delivery of Tasks 1 and 2 and should be informed by outcomes of Task 3 regarding short- to medium- term management decisions and appraisal of measures. Table 3 outlines some of the management tools that could be applied in English crab and lobster fisheries if knowledge gaps were addressed. These management tools should all be considered as part of FMP Objectives 5 and 6 and the longer-term strategy for crab and lobster fisheries.

Over time, as both the evidence base and monitoring of management effectiveness improves, this process will become more straightforward. This cyclical process will allow future iterations of the FMP and implementation of the plan to focus on further refining the agility of management approaches at the right spatial scales to ensure long-term sustainability. This could include, but is not limited to, the application of pot limits, catch limits, or other effort limits (for example, days at sea) to reduce exploitation rates in line with MSY targets.

Across lobster and crab fisheries in English waters there are several different fleet trade expectations dependent on crab and lobster fisheries. Broad distinctions can be drawn between 'inshore and offshore' vessels (or large / small, vivier vessel / day boats); these differences are influenced by vessel size, power, capacity, and fishing patterns. Future management of crab and lobster fisheries should consider the impacts on different fleet segments. While the FMP provides a national-level strategic management plan, its implementation will require tailored approaches to reflect both regional and fleet differences.

Proposed initial management interventions

To proactively address concerns about the long-term sustainability of the crab and lobster fisheries and to deliver on the precautionary principles of the Act, four 'initial management interventions' are proposed as part of a package to be considered and

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developed further. These early interventions are intended to safeguard stocks and the fisheries whilst more information is gathered to inform evidence-based responsive management in the future.

These are preliminary management proposals for which there is:

- Existing literature appraising the likely feasibility and / or appropriateness of the measure in the UK crab or lobster fishery context.
- Evidence of broad stakeholder support or acceptance through FMP engagement events, the Crab and Lobster Management Group, and the Project UK SW crab management workshop initiative.
- Requirement for regulatory intervention as opposed to voluntary agreements given the proposed nature or scale of the intervention.
- Sufficient scientific evidence to support the introduction of the measure.
- Sufficient regulatory rationale to suggest that the proposed interventions will contribute to the delivery of fisheries management objectives laid out in the FMP.

Proposal 1: Harmonisation of lobster and crawfish MLS

Increased fishing pressure can impact the age / size structure of a stock which in turn impacts reproductive capability and the ability of the stock to recover. A larger MLS is likely to have conservation benefits in terms of supporting a larger spawning stock biomass and enhanced reproductive capacity. MLS are easily enforced at the point of landing (and via at sea inspection), are already applied in UK shellfish fisheries, and are already accepted by industry as an effective means of limiting removals.

This proposal seeks to explore standardising and/or increasing the MLS for lobster and crawfish in English waters to harmonise with various IFCA's measures. The intention is to provide additional protection for spawning stocks, simplify the management landscape, and make effective enforcement more straightforward. This management intervention is aligned with Lobster specific Objective 5.

Proposal 2: Prohibiting the landing of soft brown crab for bait

The Sea Fisheries Act (Shellfish) 1967 prohibits the landing of any brown crab that 'has recently cast its shell', unless it is to be used for bait. The proposal is to limit the landing of soft-shelled brown crab thus closing the legislative loophole which currently allows soft-shelled brown to be used for bait. The proposed changes would apply to brown crab (also known as edible crab) (*Cancer pagurus*) fisheries in English waters (ICES Divisions 4b, 4c, 7a, 7d, 7e, 7f, 7g, 7h, 7j).

The purpose of this management measure is twofold:

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- 1 To address stock sustainability pressures by prohibiting the removal of soft-shelled individuals before they are able to reproduce within a given moult cycle.
- 2 To create appropriate incentives to ensure brown crab landings attract the highest market value.

Crustaceans, such as brown crab, grow by moulting their shell and expanding into a new 'soft' shell. Moulting occurs before spawning, and female crabs mate during this soft-shell period. When moulting, crabs are more vulnerable to fishing, and the volume and quality of their meat decreases, as does the per-unit meat value. Despite the poor price and poor quality of the product, and the potential impact on stock sustainability from removing crabs from the population before spawning, there is a market for soft-shelled crab for use as bait, primarily in the whelk fishery.

The English whelk fishery has expanded over the last decade in response to increased prices and demand from Asian markets. Between 2010 and 2019 the number of UK registered vessels landing whelks increased by 165 (34%), creating concerns around bait provisioning to support continued growth. Brown crab mixed with dogfish is the most commonly used whelk bait, potentially creating a market for lower quality soft-shelled crab.

Ensuring that all soft-shelled brown crab caught in pots are immediately returned to the sea will protect individuals at this more vulnerable stage of their life cycle and allow them to reproduce within that moult period. As such, the proposed landings ban is expected to lead to more mature individual crabs being retained within the population, helping to protect stocks from over-fishing, and to support stock recovery and subsequently increased catches.

A ban on all landings of soft-shelled crab could be easily enforced at the point of landing and is already widely accepted by industry as an effective means of improving stock sustainability.

The successful implementation of these proposed changes will require a Statutory Instrument to amend the existing Sea Fisheries (Shellfish) Act 1967. A Fishing Industry Science Partnership project between Bangor University, Seafish, Devon and Severn IFCA, is focused on developing a durometer-based methodology for defining soft-shelled brown crab which could compliment this proposal by improving the enforceability of any such restrictions.

Proposal 3: Pilot finer scale management for brown crab and lobster in selected fishery units

The current management landscape for brown crab and lobster in English waters is fragmented; there are a wide range of management measures in place including minimum landing sizes (with crab MLS ranging from 115mm to 160mm), voluntary

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and regulatory closures, access restrictions, vessel length restrictions, gear regulations, and pot limits. This level of complexity makes it more difficult for fishers to abide by regulations and for regulators to effectively enforce regulations.

The Cefas report '[Management options for UK crab and scallop fisheries in Western Waters, 2020](#)' cites the '3-S' approach for managing crustacean fisheries, implementing measures based on size, sex and season. The FMP provides an opportunity to pilot finer scale management regimes at the Crab Fishery Unit (CFU) and Lobster Fishery Unit (LFU) spatial scale, as opposed to management delineated by administrative boundaries. In line with the 3-S approach the focus would be on more effective application of MLS (and harmonisation as appropriate), restrictions based on the sex of shellfish to sustain spawning stock, and exploration of area-specific seasonal closures. Implementing specific management at stock level would:

- Allow measures to be targeted to discrete biological stocks;
- Ensure fishers exploiting the same stock in different areas are subject to the same regulations, and
- Allow better assessment of the effectiveness of management measures allowing regulators to refine approaches to reach stock size or exploitation rate reference points.

The following CFU and LFU are proposed to be considered for priority management action due to their stock sizes being well below MSY and their exploitation rates being close to or above the maximum reference point. These proposed CFU and LFU should be further evaluated, and the pilot scheme refined through consultation and discussion with stakeholders.

- Western English Channel CFU (Southwest brown crab) where stock size was considered near MSY and exploitation rate moderate in 2019, however there are anecdotal concerns about significant increases in fishing effort in the area in recent years, which are not yet reflected in stock assessment data
- Northumberland and Durham lobster LFU (stock size below the minimum reference point and high exploitation rates, near the maximum reference point limit in 2019)
- Yorkshire Humber lobster LFU (stock size below the minimum reference point and high exploitation rates, near the maximum reference point limit in 2019)

Proposal 4: Implement measures to improve the information base on recreational crab and lobster fishing

Recreational shellfish fisheries are largely exempt from reporting requirements (apart from some IFCA districts that require recreational reporting), this means that not all removals from stocks are accounted for. Measuring total fishing mortality is fundamental to understanding exploitation rates and stock health. Introducing regulations to ensure that data are gathered on recreational catches could allow

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fishery managers to assess the likely impact of recreational fisheries and introduce appropriate management, where necessary, to limit impacts on stocks. This proposal is aligned with FMP Objectives 1 (data collection); 2 (assessing stock status); and 5 (short- to medium-term management).

Longer-term Interventions

As the evidence base improves, the potential measures identified in Table 3 will be further developed as options for more targeted measures to be applied to manage fishing effort as required. Linkages to FMP objectives and the Evidence and Research Plan in Annex 2 are provided to show how data and knowledge gaps should be addressed to enable the use of different management interventions. As better evidence is gathered for English crab and lobster fisheries, further adaptive management measures can be introduced to manage fisheries to MSY. This cyclical process will allow future iterations of the FMP to focus on progressing fisheries management from more rudimentary and precautionary approaches whilst the evidence base is developing towards regimes of agile management.

Any fisheries management intervention will result in a range of social, economic, and biological impacts. When implementing a new fisheries management measure, there is a statutory requirement to estimate the anticipated wider national benefits (for example, improved stock status of target species) as well as likely impacts on stakeholders and means of mitigating negative impacts. Broader impacts on local communities, economic social and human rights impacts will be set out in associated impact assessments that will be required as part of the development and implementation of specific measures.

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Table 3: Summary of possible management measures for crab and lobster fisheries in English waters an appraisal of each measure's likely current feasibility/ timing based on existing evidence, justification for the appraisal, and additional supporting information where available. Based on outputs of the CMG WWER workshop, Cefas report [Management options for UK crab and scallop fisheries in Western Waters](#) (Cefas, 2020), [Project UK SW crab management workshop: Final report](#) (Project UK, 2022), and Future management of brown crab in UK and Ireland (Nautilus Consultants, 2009).

As a guide, actions identified as short term are expected to be undertaken in 1-2 years of publication of the plan, medium term in the next 3-5 years and long-term measures 5+ years to reflect the more complex work required to develop them.

Measure	Likely current feasibility/ timings	Justification and additional information
MLS / MCRS variations (lobster and crawfish)	Short-term: no apparent evidence barriers to implementation	<p>Opportunities exist for harmonisation or increase of national MLS for lobster and crawfish, which could be explored as a short-term approach to increasing stock protection. MLS are easily enforced (shoreside) and easy for fishers to abide by.</p> <p>Analysis of the level and likely impact on industry of decreases of catch compared to potential long-term benefits to the stock would be carried out. This should include exploring whether phased MLS increases over a set number of years could reduce impacts on the industry.</p>
MLS / MCRS variations (brown crab)	Short-term: no apparent evidence barriers to implementation	<p>Crab MLS 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 MLS would provide increased protection to stocks.</p> <p>Effectiveness of MLS would be maximised with better understanding of regional or local spawning cycles to align MLS with likelihood of allowing crabs to spawn multiple times before capture.</p>

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Measure	Likely current feasibility/ timings	Justification and additional information
		<p>MLS increases are likely to result in a short-term decrease in CPUE but long-term improvements. This could be mitigated by phasing MLS increases over a set number of years.</p> <p>Research needs 1.1, 1.2, 2.1, 5.1 and 5.2 in Annex 2 Evidence and Research Plan address data and knowledge gaps related to this management measure.</p>
<p>Ban on landing soft ('white') crab</p>	<p>Short-term: no apparent evidence barriers to implementation and research underway to address knowledge gaps</p>	<p>Landing of soft brown crab is prohibited under the Sea Fisheries (Shellfish) Act 1967 <i>unless</i> 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.</p> <p>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.</p> <p>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.</p> <p>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.</p>

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Measure	Likely current feasibility/ timings	Justification and additional information
		<p>However, there is currently no accepted definition of a soft brown crab beyond subjective inspection of individuals, which has the potential to complicate effective enforcement. A FISP-funded research project is underway 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.</p>
<p>Restricting landings based on sex</p>	<p>Longer-term: some research required to understand efficacy and application</p>	<p>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.</p> <p>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.</p> <p>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).</p> <p>V-notching schemes already exist in some regions. This scheme requires that berried lobster 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.</p> <p>A ban on landing egg-bearing (berried) lobsters is already in place in English waters via The Lobsters and Crawfish (Prohibition of Fishing and Landing) (Amendment) (England) Order 2017 (legislation.gov.uk)</p>

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Measure	Likely current feasibility/ timings	Justification and additional information
		<p>which was introduced to improve stock health through increasing protection for spawning stock and juveniles and, in the long term, 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). However, the act of ‘scrubbing’ of egg-bearing lobster to remove eggs, thus allowing the animal to be landed, could pose a risk to effective enforcement of restrictions based on sex.</p> <p>Research needs 1.1, 1.2, and 2.1 in the Evidence and Research Plan address data and knowledge gaps related to this management measure.</p>
Seasonal closures	Longer-term some research required to understand efficacy and application	There was 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 e.g. to protect spawning, the likely impacts on industry and other stocks/ species would need to be explored.
Assess the impact of fishing effort within the fleet	Longer-term: some research required to understand efficacy and application	<p>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 need to understand the risks posed by increased effort within these fisheries to the long-term sustainability of crab and lobster stocks. The scale of risks posed by fishing effort will vary between fisheries, meaning a range of measures will need to be applied to be effective.</p> <p>Assessing fishing effort is also important to understand the expected impacts of applying various management measures. This includes the likelihood of effort being displaced into other fisheries if action is</p>

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Measure	Likely current feasibility/ timings	Justification and additional information
		<p>taken to remove effort (for example, days at sea, pot limitations) from the crab and lobster fleets. Latent capacity will be considered as part of assessments of fishing effort within the fleet and subsequent potential management proposals.</p>
<p>Managing recreational fishing effort</p>	<p>Longer-term: some research required to understand efficacy and application</p>	<p>Effective fisheries management and stock assessment should account for all removals from the stock. There are currently some small-scale and recreational fisheries which are exempt from catch reporting requirements meaning that total fishing mortality is under-reported.</p> <p>Though some IFCAs apply permits, pot limits / 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.</p> <p>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.</p>
<p>Pot limits</p>	<p>Longer-term: significant research required to address gaps to inform evidence-based management</p>	<p>Initial considerations are underway 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.</p> <p>A more thorough analysis would need to be carried out if pot limits were to be developed further, which would need to consider the following:</p>

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Measure	Likely current feasibility/ timings	Justification and additional information
	action and enforcement considerations	<p>How 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 / individual animal behaviour) and be able to distinguish between pot types in current data series.</p> <p>Diversity of different vessels and fishing practices involved in the fishery could limit applicability.</p> <p>Implementation of iVMS may provide a proxy of pot numbers hauled in the future as will improving the fishery dependent data collection.</p> <p>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.</p> <p>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.</p> <p>Effective enforcement of pot limits may require additional gear marking regulations and at sea inspection which would be resource intensive and expensive.</p> <p>Research needs 1.1 (fishery-dependent data); 2.1, 2.2 and 2.3 (assessing stock status); and 5.4 (evaluating input controls) in the Evidence and Research Plan address data and knowledge gaps related to this management measure.</p>
Catch limits	Longer-term: significant research	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

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Measure	Likely current feasibility/ timings	Justification and additional information
	<p>required to address gaps to inform evidence-based management action and enforcement considerations</p>	<p>currently be possible to provide an analytical basis for catch forecasts and to provide annual scientific catch limit advice.</p> <p>Initial catch limits could be set on a precautionary basis and whilst would not necessarily be based on high quality scientific data on stock health/ biomass, a catch limit could provide increased protection to stocks. There is however a recognised risk that this approach could lead to fishing effort being limited unnecessarily, and so the potential impacts on industry would need to be explored.</p> <p>Whilst developing a thorough analysis of how and whether catch limits should be developed for English crab and lobster fisheries, the following would need to be considered:</p> <p>Lack of support from stakeholders, voiced at both the Crab and Lobster FMP stakeholder engagement events (Seafish, 2022) and Project UK SW crab management workshops, that catch limits are not a suitable management option for crab fisheries in English waters, at this time.</p> <p>Catch limits are widely seen by stakeholders as creating a risk of consolidation of fishing opportunities in the hands of fewer larger operators.</p> <p>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.</p> <p>Further consideration would be required on how to allocate future catch limits and to ensure fleets and communities remain economically profitable.</p> <p>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 required</p>

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Measure	Likely current feasibility/ timings	Justification and additional information
		<p>More detailed research needs 1.1 (fishery-dependent data); 2.1, 2.2 and 2.3 (assessing stock status); and 5.4 (evaluating input controls) in the Evidence and Research Plan address data and knowledge gaps related to this management measure.</p>
<p>Effort limits (days at sea)</p>	<p>Longer-term: significant research required to address gaps to inform evidence-based management action and enforcement considerations</p>	<p>Effort limits are already in place for vessels of 15m and over targeting brown and spider crab in ICES areas 5, 6 and 7 under the retained EU Western Waters Effort Regime. Management of the regime is ‘desk based’ meaning enforcement is straightforward. Whilst the WW 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 historic track record</p> <p>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’.</p> <p>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.</p> <p>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.</p>

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Measure	Likely current feasibility/ timings	Justification and additional information
		Research needs 1.1 (fishery-dependent data) and 5.4 (evaluating input controls) in the Evidence and Research Plan address data and knowledge gaps related to this management measure.

Managing Environmental Considerations

The FMP will contribute to policies relating to the wider marine environment, specifically the requirement to ensure the health of our seas for future generations, ambitions to restore biodiversity, and to address climate change.

Environmental Improvement Plan 2023 for England: This details the goals that government will pursue to improve the environment within a generation. It sets out how marine biodiversity will be protected and restored and how the management of fishing should take an 'environment first' approach. It sets out a series of ambitious targets with the following relevance to the Crab and Lobster FMP.

- **Ensuring that all fish stocks are recovered to and maintained at levels that can produce their maximum sustainable yield.**
The Crab and Lobster FMP sets out the roadmap to achieve this objective by ensuring the appropriate data and evidence is available and that a reliable stock assessment model is in place.
- **A series of targets relating to protecting and restoring wider marine biodiversity including increasing the proportion of protected and well-managed seas, better managing existing Marine Protected Areas (MPAs), and ensuring populations of key species are sustainable with appropriate age structures.** The Crab and Lobster FMP sets out an approach to better understand the impacts that pot fishing can have on the marine environment and to ensure action is taken when such impacts are adverse.

UK Marine Policy Statement (MPS) and individual Marine Plans in English waters: The MPS establishes the overarching framework to support the formulation of Marine Plans, to ensure marine resources are used in a sustainable way. The MPS details the objectives that will drive Marine Plans and the overarching outcomes that are sought. These include sustainable economic development, a low-carbon economy, a sustainable marine environment, and realising the societal benefits that the marine area can provide.

There are 11 Marine Plans covering English waters (see Annex 1) and collectively they put into practice the objectives for the marine environment that are identified in the MPS. Marine Plans should provide for fishing and aquaculture use and ensuring that decisions on other marine uses support habitats for fish stocks (nursery or spawning grounds).

The Crab and Lobster FMP objectives align with the MPS objectives in terms of the shared ambitions to deliver:

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- long-term stock sustainability and a diverse and healthy marine environment
- Ensuring crab and lobster fisheries are managed to deliver economic prosperity to coastal communities and across the seafood supply chain.
- Opportunities for stakeholders to engage in and collaborate on management decisions relating to crabs and lobsters
- Decision making underpinned by scientific and socio-economic evidence, with decisions then monitored to ensure they are effective

Measures developed under the Crab and Lobster FMP should take account of the requirements of the relevant Marine Plan. Similarly, decisions on wider marine access and use made under a Marine Plan should consider the objectives of the Crab and Lobster FMP. Marine spatial planning and fisheries management plans policies need to be developed in a joined-up way to ensure more effective use of the marine space and resources.

The issue of increasing spatial pressures and the challenges it can pose to fisheries, including where relevant any social, economic, and environmental implications resulting from possible displacement need to be considered. The government has established a Marine Spatial Prioritisation programme to help support a more strategic approach to managing future pressures in English seas. The programme will engage with stakeholders and evaluate existing and emerging evidence to understand future demands and determine the best way of managing them. Outputs from the programme will inform the implementation phase and subsequent reviews of the FMP, as well as our future approach to marine planning.

The UK Marine Strategy (and Good Environmental Status): The UK Marine Strategy provides the framework for delivering clean, healthy, safe, productive, and biologically diverse oceans and seas. It consists of a simple 3-stage framework for achieving good environmental status (GES) in our seas through protecting the marine environment, preventing its deterioration and restoring it where practical, while allowing the sustainable use of marine resources.

The Crab and Lobster FMP will be the primary mechanism to deliver GES across all crab and lobster fisheries in English waters. This will be achieved by improving the science and information base on the status of stocks, establishing if fishing has an adverse impact on the marine environment and intervening if it does, and ensuring that crab and lobster stocks are responsibly and responsively managed so that fisheries are profitable and capable of delivering social and economic benefits.

The Marine Protected Areas network: This is one of the main tools for protecting marine habitats and species, and so help deliver GES, as well as commitments in domestic legislation and international commitments under the Global Biodiversity Framework, including to protect 30% of our seas by 2030. The MPA network has been established with 178 sites covering 40% of English waters. Regulators for all industries are required to ensure the activities they oversee do not damage interest

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features of MPAs. IFCA and MMO are putting in place byelaws where necessary to protect MPAs from fishing. Defra aim to have measures in place to protect all MPAs by the end of 2024.

Highly Protected Marine Areas (HPMAs): Building on the network of MPAs, HPMAs are areas of the sea (including the shoreline) that allow high levels of protection and full recovery of marine ecosystems. HPMAs will allow nature to fully recover to a more natural state by prohibiting extractive, destructive and depositional activities such as dredging, fishing and anchoring to allow the ecosystem to thrive. The first three pilot HPMAs (Northeast of Farnes Deep, Allonby Bay, and Dolphin Head) were selected following a 12-week consultation and analysis of responses and due to the ecological importance of nature recovery in the sites. The sites will be designated before 6th July 2023, and Defra is currently exploring options for additional sites. Future options will also be subject to consultation.

Marine wildlife bycatch mitigation initiative: The marine wildlife bycatch mitigation initiative sets out how the UK will achieve its ambitions to minimise and, where possible, eliminate the bycatch (accidental capture) and entanglement of sensitive marine species in UK fisheries. This will be achieved by improving monitoring of bycatch, identifying, and managing (through bycatch mitigation measures) bycatch hotspots.

The Act explicitly requires, through the ecosystem objective, that incidental catches of sensitive marine species should be minimised and where possible eliminated. While sensitive marine species bycatch is considered low in potting fisheries it is proposed that a bycatch monitoring plan is implemented across all crab and lobster fisheries in English waters to understand the extent of interactions and the scale of risk that these interactions pose to marine species populations.

Climate Change Act 2008: This legislation establishes the target to reach net zero by 2050. The FMP will ensure that appropriate research and tools are in place so that the shellfish supply chain is equipped to minimise its emissions, and to enable the fishing industry to understand and adapt to the environmental impacts of climate change. The FMP will address the Climate Change Act 2008 through brown crab objective 10 and European lobster objective 9.

The **Animal Welfare (Sentience) Act 2022** references that decapod crustacea and cephalopods are formally recognised as sentient beings and that this should be considered in government policy and decision making. This has led to increased awareness of the importance of animal welfare practices in the shellfish supply chain. Ensuring that appropriate handling and dispatch practices are in place across each point of the supply chain is a priority for the crab and lobster sector, recognising that such practices deliver economic benefits to Animal welfare considerations build and maintain industry reputation amongst consumers but also bring economic benefits to UK shellfish businesses which can consistently deliver high quality

seafood products to market. As such there is considerable stakeholder interest in this issue which will be addressed via the shared shellfish principles.

Implementation, monitoring and review

Implementation

Defra's Crab and Lobster FMP sets out a vision and goals for these fisheries, together with the policies and management interventions necessary to achieve these goals. The publication of this FMP will propose new measures but will not implement them. The actions and measures contained within this FMP will undergo a subsequent implementation phase where appropriate mechanisms will be required to deliver them. Such mechanisms could include voluntary measures, license conditions, national and regional byelaws, and statutory instruments. This implementation phase will build on the existing evidence base, any action taken throughout the FMP's development, and the options discussed with stakeholders.

Specific timings on this process depend on the outcome of the FMP consultation, the costs and benefits of the proposals, and the length of time required for implementation.

Subsequent implementation roadmaps will be subject to regular monitoring and review to ensure progress. The Crab and Lobster FMP is subject to a statutory review process at a maximum 6 years after publication, at which point it will be necessary to evidence what has been achieved through the implementation of those actions and measures. In line with the strategic environmental assessments developed alongside this FMP, this review process will build in monitoring for potential environmental effects, to help establish whether any changes are needed in the management of the respective fisheries.

Monitoring performance

The Crab and Lobster FMP is subject to a statutory review process at a maximum of 6 years after publication, at which point it will be necessary to evidence what has been achieved through the implementation of those actions and measures.

Delivery of the actions and measures for the crab and lobster FMP will be monitored and assessed against a set of performance indicators to ensure the overarching outcomes and actions are effective in achieving FMP goals and the requirements of the Act. Initial performance indicators will be included in the published FMP and further developed during the first reporting cycle. In line with the Act, the long-term outcome for crab and lobster stocks in English waters is that these fisheries are managed to ensure stock status reaches and remains at or above MSY, and that any environmental effects arising through the implementation of the crab and lobster

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FMP are monitored and addressed where required. For data poor or data limited stocks such as crab and lobster, it is not possible to say how quickly stock status at or above MSY will be achieved. Therefore, initial performance assessment will be based on contributing components which can demonstrate ahead of the six-year review that meaningful progress has been made to deliver on this plan.

These contributing components will include but are not limited to:

- Data collection programmes developed, implemented, and funded to provide regular time series of data to inform management
- Establishment of indices of abundance with trends monitored for data limited species

The crab and lobster FMP proposes a number of specific management measures to deliver progress that will be tested against the above indicators. Following the outcome of the consultation, which will decide which measures should be prioritised, detailed monitoring plans and target delivery dates will be put in place. These plans will include key milestones to deliver outcomes following publication of the final FMP later this year and the next iteration at the 6 year review point.

Review and revision of the Crab and Lobster FMP

The crab and lobster FMP must be reviewed when appropriate and at least every six years. This formal review will assess how the FMP has performed in terms of delivering against the objectives of the Act.

The findings of these reviews will also inform the development of subsequent iterations of the crab and lobster FMP. Further, the FMP will be assessed in the round as part of the process to report on the contribution of FMPs to the delivery of the JFS. The Act requires fisheries policy authorities to report on the JFS every three years and review the JFS whenever deemed appropriate, or at least within six years of publication.