Department for Environment Food & Rural Affairs

Proposed Fisheries Management Plan for Channel Demersal Non-Quota Species

Annexes

Date: July 2023

Version: public consultation

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Department
for Environment
Food & Rural Affairs

Proposed Fisheries Management Plan for Channel Demersal Non-Quota Species

Annex 1 Evidence Statement

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Summary

NB. We are aware that there is repetition between this section and following. This is intentional and due to our ambition to publish as two separate documents (non-technical and technical) to facilitate accessibility

The Channel Demersal Non-Quota Fisheries Management Plan

The Channel Demersal Non-Quota Species Fisheries Management Plan (the FMP) and associated Evidence Statement (ES) covers 19 non-quota demersal species (focal species) targeted or otherwise caught within demersal fisheries in the FMP area of the English Channel (Figure 1). The 19 species considered are:

Bony fish

- Bib (also known as pouting or pout) (*Trisopterus luscus*)
- Brill (*Scophthalmus rhombus*)
- Lemon sole (*Microstomus kitt*)
- Turbot (*Scophthalmus maximus*)
- John dory (*Zeus faber*)
- Striped red mullet / Surmullet (*Mullus surmuletus*)
- Grey gurnard (*Eutrigla gurnardus*)
- Red gurnard (*Chelidonichthys cuculus*)
- Tub gurnard (*Chelidonichthys lucerna*)

Sharks, skates and rays

- Lesser spotted dogfish / small spotted catshark (*Scyliorhinus canicula*)
- Stary smoothhound (*Mustelus asterias)*
- Common smoothhound (*Mustelus mustelus)*

Cephalopods

- Common cuttlefish (*Sepia officinalis*)
- Common octopus (*Octopus vulgaris*)
- Curled octopus (*Eledone cirrhosa*)
- Veined squid / Long-finned squid (*Loligo forbesii*),
- European common squid (*Alloteuthis subulata*)
- Common squid / European squid (*Loligo vulgaris*)

Different common names can be used for some species. The FMP and its supporting documents use those names commonly understood in the FMP area (listed first).

Depending on the information sources used, species may also be discussed as groups, for example smoothhounds (*Mustelus* spp.) or cuttlefish (*Sepiolidae*).

The FMP is defined by English waters of ICES divisions 7d (east English Channel) and 7e (west English Channel) (Figure 1 below). Relevant evidence, however, is not restricted to the FMP area but is wider for example national fisheries statistics for contexts or international experience of related management approaches.

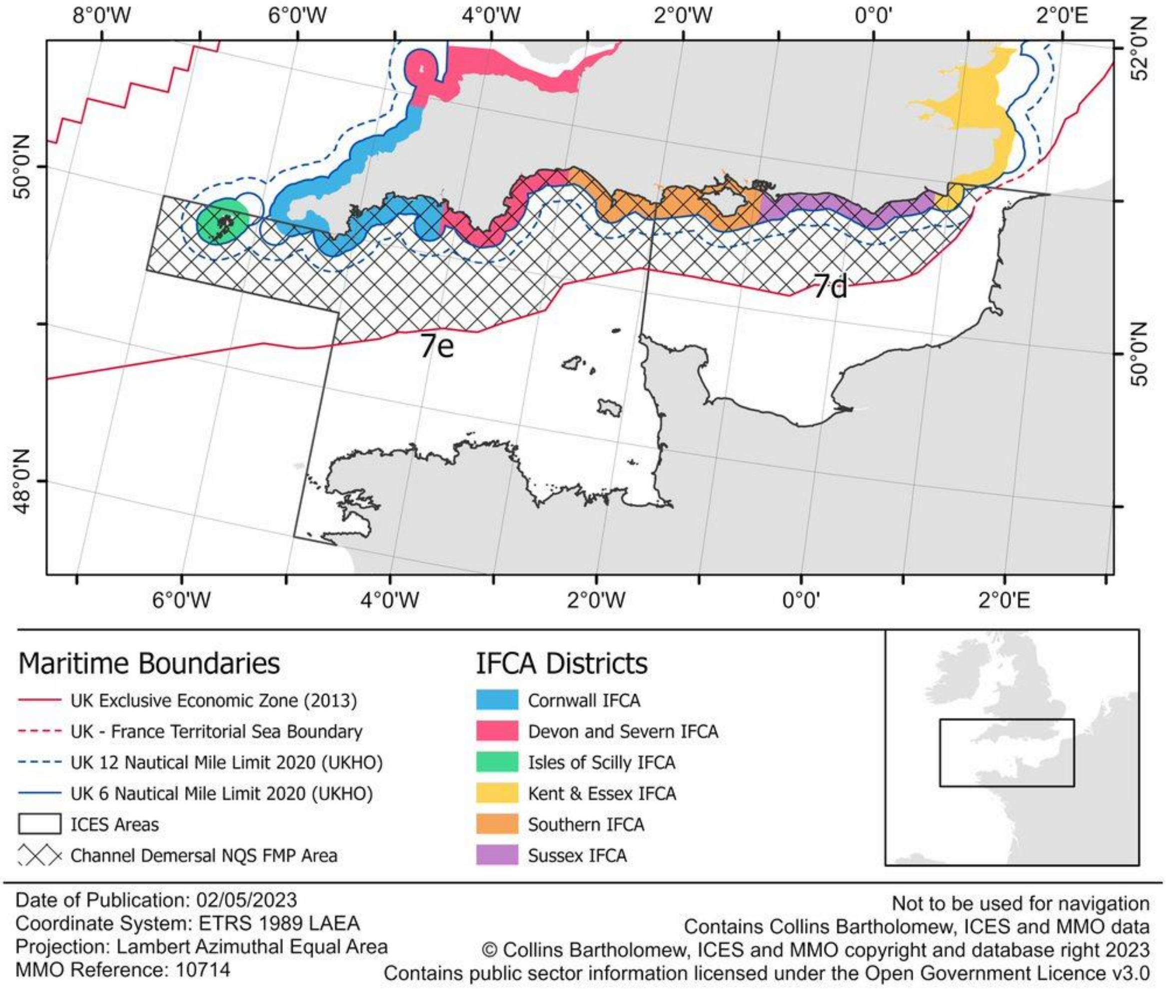

Figure 1. Geographic extent of the Channel Demersal Non-Quota Species Fisheries Management Plan

The Evidence Statement

The Evidence Statement (ES) has been produced to support the development and implementation of the FMP and is made up of three parts including:

- Approach to Evidence
- Evidence Review
- Research Plan

The Approach to Evidence details the Marine Management Organisation's approach to, and processes for, considering evidence to develop the FMP including roles and responsibilities, what it means to be evidence based and how evidence will be developed through time including using the Research Plan.

The Evidence Review summarises the known ecological, social, economic and management evidence (available for this iteration) of the FMP. The review collates and analyses evidence for the 19 species and their associated fisheries operating within English waters across the English Channel in the scope of the FMP. The review has also identified a range of evidence gaps to progress FMP objectives.

The Research Plan collates evidence gaps from the Evidence Review and FMP, in one place, organises and prioritises those needs such that a clear plan for future research can be formulated. The evidence plan will also track evidence delivery as needs are met.

Evidence Review

Known evidence has been used to support the development of management outcomes for the FMP with a focus on achieving and maintain stock sustainability and optimising ecological as well as local social and economic benefits to the fisheries.

We have summarised the key evidence for the 19 species together with their emerging evidence gaps below. The underpinning information against which these summaries are based is detailed in the Evidence Review and cross linked to the FMP.

Bib (*Trisopterus luscus*)	**Bib was identified as a species of concern by both government and stakeholders given its economic and ecological importance. It is a vital prey species for a number of fish, mammal and bird species. It is the third most commonly landed FMP species by weight and the ninth most valuable species considered in the FMP. Bib are also a key recreational species due to ease of capture, albeit they are not regularly retained by anglers.** **Bib are predominantly found in the west of the Channel. They reach reproductive capable quickly and are known to live up to seven (males) and five (female) years. Whilst targeted as part of a mixed fishery (using pelagic trawls, drift and fixed nets, and beam trawls), their survivability when discarded remains unknown. There is however a risk of over exploitation since the peak catch season overlaps with its**

	spawning season (February to August) in the Channel. While some data exists from surveys, commercial landings and market sampling, it remains a data-poor fishery and there is currently no stock assessment or time series of the size of the population meaning the stock status and any impact fishing operations may be having on said stock remains largely unknown. We also want to better understand the social and economic benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.
Brill (*Scophthalmus rhombus*)	Brill was scoped in based on both stakeholder and government concern regarding its sustainability. Bib is not generally a popular species for the recreational sector but is targeted and retailed by some as a prized food fish. Whilst some management is in place (brill is jointly managed with turbot using a combined species total allowable catch), the combined approach is thought to be hindering effective management of individual stocks. The stock remains above the maximum sustainable yield, it has shown significant declines since 2015-2016. Work to define the stock boundaries is therefore required together with work seeking to understand the spatial distribution of the stock. A fisheries-independent survey that had adequate catchability of large flatfish and that covered the entire distribution area of the stock would improve the assessment. Given the limited data from existing trawl surveys, but high commercial value of the stock necessitating improvement to assessments and management, one option could be using “Close Kin Mark Recapture” studies. Whilst it is landed as a mixed fishery, there also remains a lack of discard survivability data. We also want to understand the social and economic benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.

Common cuttlefish (*Sepia officinalis*)	The common cuttlefish is a species of concern for both the government and stakeholders. They are a critical summer fishery for the inshore sector (and are of particular importance in the western Channel), providing a valuable and vital alternative to quota species and the often-saturated shellfish market. They are also increasingly valuable to the offshore sector, especially in the southwest. They have also been highlighted as an emerging fishery for the recreational sector throughout the Channel. However, landings have been found to be decreasing in line with their increasing popularity. The common cuttlefish has a short lifespan and limited reproductive opportunities, so we need to know more in order to best understand how to make the population sustainable while keeping the fishery profitable for fishers. We are also recommending prioritising stock assessments together with further research into the species foraging behaviour, ageing and growth profile, and its reproduction cycles, how these change throughout its life and recruitment. We also want to better understand the social and economic benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.
Common octopus (*Octopus vulgaris*)	The common octopus has been scoped into this FMP given both government and stakeholder concerns regarding their sustainability. They are primarily landed as bycatch by inshore vessels (within the western end of the Channel) as part of a mixed demersal winter fishery (using trawls and dredges) and are also landed by EU vessels also working within 7e particularly. Whilst they are not currently caught in significant numbers, there is the potential for to become a major species of interest (especially in the western end of the Channel). Concerns have been raised as they have become rarer in English waters and given its short life span and the high reproductive mortality (deaths of individuals capable of reproducing) of this species. There is no data to indicate its significance to the recreational sector. The common octopus can be found within the hard rock or reef habitat of the western English Channel. The only current management is a 750g minimum landing weight, which it not thought to universally enable all individuals to reach maturity. Landings data is limited as landings are not currently recorded at a

	species-specific level, so both a stock assessment and gathering species specific landings data is necessary. We also want to better understand the social and economic benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.
Common (or European) squid (Loligo vulgaris)	Both government and stakeholders expressed concern for common squid (or European squid) given potential risks to its sustainability and data deficiency. It has gained commercial value within the western Channel (as an important summer hand line fishery), making it valuable for commercial operations, but has also become a rapidly emerging and significant recreational fishery along the whole of the Channel, and with that taken on particular importance to charter boats. However, there are currently no stock assessments for the common squid and no time series abundance indices available. There is also no management in place specific to squid in the English Channel. The Common Squid is widely distributed all year round in the Channel and North Sea. The migratory movements of the common squid are mainly related to sexual maturity and spawning, with adults moving towards shallow coastal waters in the westernmost part of the English Channel for mating and spawning in November-December. Small squid hatched near the coast migrate towards deep water, mostly in autumn and winter. Population maturity is generally reached by summer, and they have a life expectancy of 12 months. Aggregated landings data is available for squid catches, but there is a need to gather species-specific data. There is also a need to understand species composition of squid population in the Channel and to gather age and maturity data to assess the effect of fisheries on different development stages or to monitor spatial distribution of the different development stages and spawning migrations. We also want to better understand the social and economic benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.
Curled octopus (Eledone cirrhosa)	The curled octopus was scoped into this FMP given the emerging market for this bycatch species caught as part of a (largely) winter mixed demersal operation. Yet it remains a data deficient species, with no published assessments outside of limited trawl survey data

	which records only counts. There is no data on the significance of this stock to the recreational sector, but it is thought to be limited. The curled octopus is distributed across UK waters and is easily confused with the common octopus. The curled octopus prefers soft-bottom habitat between the coast and the shelf. Landings data is limited as landings are not recorded by specific octopus species so it is essential to undertake a species-specific stock assessment and gathering accurate landings data for this species. We do not yet understand the local social and economic importance of these fisheries and the benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.
Elegant cuttlefish (Sepia elegans)	This species has been added given concerns around its sustainability and its data deficiency. The elegant cuttlefish fishery is a highly profitable one for English Channel operations. However, cuttlefish data is currently recorded at a higher taxonomic grouping (with common cuttlefish data) meaning not much is known about the species specific landings and the species stock has not been assessed. Furthermore, recreational catches are not reported despite being a rapidly emerging fishery. Whilst elegant cuttlefish are known to have a south-westerly distribution, occurring in UK waters in the Celtic Sea and the western English Channel, their seasonal cycle and spawning sites are largely unknown. As such, life history studies, including early life-cycle stages, and species ecology are required. This is crucial as they might be at risk from offshore trawling operations occurring whilst the animals are still immature or maturing. For elegant Cuttlefish, little is also known on the ecology and behaviour of the population within the English Channel, although a mature female caught within a Channel survey in March 2022 may indicate that spawning does occur, despite the Channel being the northernmost part of the species range. We do not yet understand the local social and economic importance of these fisheries and the benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.

European common squid (Alloteuthis subulata)	The European common squid has been scoped into this FMP due to concerns over suspected stock overexploitation and the current lack of species-specific management. In particular, the impact that commercial fly-seining is having on Channel squid stocks. Anecdotal evidence suggests that there is also an emerging recreational charter boat fishery for cephalopods but there is no data to confirm the size or extent of this fishery. European squid is a key commercial species for Channel commercial operations yet, the status of the stock is unknown due to a lack of stock assessment and species-specific landings information. However, broader assessments suggest that European squid is overexploited. They are at particular risk due to their 12-month lifecycle, highly variable recruitment levels, and that environmental impacts on abundance can be significant. Therefore, alongside species specific landings data, age and maturity data is also necessary to understand the effect of fisheries on spawning migration and spatial distribution. Methods for collating landings data for different squid species are needed. We do not yet understand the local social and economic importance of these fisheries and the benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.
Grey gurnard (Eutrigla gurnardus)	Grey gurnard was scoped in given a widespread concern over the impact of a recent significant increase in demersal seine fishing (flyseining) within the Channel by larger vessels. Within these operations gurnard is caught as a bycatch. Concern was also prompted by a lack of species-specific management for this species and the observed decline in biomass in recent years. This species is also known to be a key recreational species across the whole Channel. Grey gurnard is not a species known to be of widespread commercial importance, and as well as the demersal seine fishery, is also caught as bycatch in demersal fisheries using otter trawls. This means it suffers high discarding rates (estimated to be around 81% of catches). However, it is a more important species to the recreational fishing sector for which landings are considerably higher (3.8 tonnes a year). A significant decline in biomass has been observed since 2017, but there are high levels of uncertainty in the data. This is partly because most grey

	gurnard catches are as bycatch, which means landings data do not accurately reflect catches, and discards data are only available from 2012. There is also a lack of species-specific gurnard data which needs to be addressed, and the ICES assessment currently only includes scientific surveys from the North Sea and none within the English Channel. We do not yet understand the local social and economic importance of these fisheries and the benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.
John dory (Zeus faber)	John dory was prioritised as a high value species, providing a vital and valuable alternative to quota species and shellfish for both inshore and offshore fleets in the southwest where the majority are caught and landed. However, despite its high commercial value and being subject to increasing exploitation (with an increasing trend towards landing smaller individuals), there is currently no species-specific management in place in the UK waters of the English Channel. There is some targeting of this species by recreational fishers but limited data. Whilst John dory is distributed around the UK, the western end of the English Channel serves as a nursery area. It is sensitive to temperature and there is concern the stock is potentially shifting northward. Monthly catches are highest from April to November, reaching the highest prices in the summer months when spawning occurs. Given the strong commercial value and concerns, we have recommended prioritising stock assessments with additional data on discarding (as John Dory is caught in mixed demersal fisheries). Further work on relative abundance is also required, given the potential for a northward shift in distribution. We do not yet understand the local social and economic importance of these fisheries and the benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.

Lemon sole (Microstomus kitt)	Lemon sole was identified as a key species to scope into this FMP as it is caught in larger quantities than other non-quota species, yet we do not understand the state of the stock. Lemon Sole is a predominantly landed in the western end of the English Channel with catches proportionally higher from March to June. This stock is generally caught as bycatch species under mixed demersal fisheries. There are no signs of over-exploitation, however, there is limited information on early juvenile behaviour and distribution. They are generally found at greater depths in offshore areas in comparison to adults. This means they are targeted by offshore vessels when they are juveniles. Further evidence on the distribution of juvenile lemon sole is required to understand the location of nursery grounds, as well as further work to understand stock boundaries. There is a need for a full analytical assessment with improved data on age and length distributions in landings and discards. We do not yet fully understand the local social and economic importance of these fisheries and the benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.
Lesser spotted dogfish (Scyliorhinus canicula)	Lesser spotted dogfish were added due to government and stakeholder concern that they are not currently covered by management arrangements despite being the second most important demersal NQS for UK vessels fishing in the English Channel. Lesser spotted dogfish are an important bycatch fishery and source of bait for the whelk fishery. Anecdotal evidence suggest dogfish may be trawlers to increase total catch size and therefore the weight of bass that can be retained under the 5% bass catch rules Although generally not targeted by recreational anglers, their abundance means they are a common catch. It has however been reported than landings and sizes have declined. Lesser spotted dogfish are slow to mature and reach maturity at approximately six years. Despite this, landings are proportionally higher during the summer months. This corresponds with their peak egg-laying in June and July. Given their primary use for pot bait, there is a gap in landings reported since it is unclear whether reporting fully quantifies pot bait landings. There is also a lack of species-specific data as historically landings were grouped into generalised categories, and recent data may be impacted due to

	distribution overlaps between lesser spotted dogfish and greater spotted dogfish. Discarding is generally considered to be several times higher than landings but is currently not quantified or incorporated into assessments by ICES despite the availability of stock-level data. While studies on beam and otter trawls have suggested that dogfish discard survivability is high, discard mortality is not quantified across other gears and further work is required to understand discard level and survivability across all fleets and gear types. We do not yet fully understand the local social and economic importance of these fisheries and the benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.
Red gurnard (Chelidonichthys cuculus)	Red Gurnard was prioritized for this FMP given the drastic decline in catches reported by both inshore vessels. This has been anecdotally attributed to a dramatic increase in large-scale demersal seine fishing (flyseining) where they are landed as part of a bycatch profile (particularly within the Eastern Channel). Concern was also prompted by a current absence of management measures. This move was supported by the recreational sector to whom this species is of particular importance throughout the Channel. A lack of species-specific landings data for gurnards results in issues with reliability in the ICES assessment, so there is a need to collect more survey data specifically for red gurnard in the Channel before catch advice can be provided. Furthermore, while we know that high levels of discarding take place (due to it being a bycatch species) estimate of discards are currently uncertain and there are no data on survivability. We do not yet fully understand the local social and economic importance of these fisheries and the benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.
Smoothhound (Mustelus asterias and Mustelus mustelus)	Two species of smoothhounds known to populate the FMP area (starry smoothhound (*Mustelus asterias*) and common smoothhound (*Mustelus mustelus*) however, the former is more common to UK waters). These are difficult to tell apart, with no definitive external diagnostic identification features, meaning fisheries landings tend to be recorded at the genus level. To

	further complicate the situation, the species can hybridise. Identification issues means that species level data is less robust than data combined at the genus level. This FMP has therefore grouped starry smoothhound and common smoothhound, henceforth referred to as smoothhound. Both government and stakeholders deemed this species necessary to scope into this FMP given the lack of smoothhound specific management in the FMP area in the face of concerns about the level of discards, the reliability of landings from the under 10-metre fleet and its use as pot bait. There are also concerns that there will be an increase in landings due to the recent allocation of spurdog quota. It is also an important target species for recreational anglers. Catches have remained stable since 2005 and surveys indicate the biomass has increased since 2013. There are estimates on the levels of discards but given that much is caught as a bycatch and the fluctuations in market demand, the estimates on the levels of discarding are unreliable. More reliable estimates of discards are needed alongside more robust survivability data. A portion of smoothhound landings is used for pot bait by the inshore fleet, but there are concerns that landings used for pot bait may not be accurately recorded. Finally, it is important to understand the catch composition of smoothhound, to ensure fishing pressure is not focused predominantly on one sex. We do not yet fully understand the local social and economic importance of these fisheries and the benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.
Striped-red mullet (Mullus surmulletus)	Both government and stakeholders championed for striped-red mullet to be scoped into this FMP given concerns around its sustainability. It has become a highly valuable option for the commercial sector (predominantly by offshore vessels – in particular the Scottish demersal seine fleet) operating in the eastern end of the English Channel. As such, landings of this species have seen a substantial increase over recent years. Concern has been raised since landings within the Eastern Channel are in decline due to the exploitation of 0–1-year fish, indicating unsustainable exploitation. There is currently no

	management in place specific for this species in the English Channel. Striped red mullet is commonly distributed in UK waters. The species migrates though the Channel to the North Sea for spawning (between May and July), leading to distinct differences in population structures in summer and winter months. A combination of no minimum landing size and high juvenile fishing pressure due to market demands, indicate the stock would benefit from improved technical measures. Striped red mullet are not common in inshore habitats, so are less accessible to sea anglers and there are no recreational catch estimates. Work on stock identification and delineation is required, including investigating landings at age for 7d and 7e. For 7d, improved discard data and modelling are also needed. We do not yet fully understand the local social and economic importance of these fisheries and the benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.
Tub gurnard (Chelidonichthys lucerna)	The tub gurnard was scoped into this FMP based on both government and stakeholders concerns over the lack of species-specific management in the English Channel, despite its high commercial and recreational value. Its vulnerability to temperature changes as well as habitat loss was also cause for concern. Tub gurnards are the largest of the gurnards found in UK waters and are abundant in the English Channel where they are primarily caught as bycatch by demersal seines, otter trawls and beam trawls, and netting. They migrate through the Channel to the southern North Sea in spring, returning in autumn. Males and females reach maturity at three and four years respectively, with spawning occurring in the Celtic Sea during May and June. Landings are proportionally higher during the winter months. The stock(s) is not currently assessed and in order for this to take place, stock assessment units would have to be defined and data quantity and quality evaluated to determine the best assessment or advice approach to take. The most likely approach is to assess the stock based on survey data only, as catch data is highly unreliable. High discard rates of smaller, less valuable individuals mean landings data is not reflective of actual fisheries mortality and there are historical data inaccuracies associated with lack of species-specific data. Furthermore, Tub gurnard can be

	misidentified with other gurnard species which can make catch data unreliable. We do not yet fully understand the local social and economic importance of these fisheries and the benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.
Turbot (Scophthalmus maximus)	Turbot was scoped into this FMP due to both stakeholder and government concern at its sustainability. It caught and landed in larger quantities that other non-quota species and is the third most commercially valuable species. Whilst turbot stocks are assessed in the North Sea, there is no specific stock assessment for Turbot in the English Channel. Furthermore, whilst management in the form of a combined total allowable catch is imposed within the North Sea, this excludes the English Channel where there is no specific management in place for this species Turbot is also a favored species of recreational fishers who target in largely in the spring and early summer. Assessment in the North Sea indicates fishing pressure is below the maximum sustainable yield however, recruitment is variable. The data available for Turbot includes landings data, commercial fisheries by at-sea observers and scientific trawl surveys which provides fishery-independent information on catches of Turbot. However, the surveys conducted are not expected to provide reliable abundance indices for Turbot. More robust assessments of the stock are required, including a specific assessment incorporating the English Channel. There is also a need to understand the connectivity with the North Sea stock within the assessment. We do not yet fully understand the local social and economic importance of these fisheries and the benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.
Veined (or long-finned) squid (Loligo forbesii)	Both government and stakeholders recommended that the veined (or long-finned) squid was addressed by this FMP, owning to concerns around a lack of specific management measures and stock assessment in the face of suspected overexploitation within the FMP area. The veined squid is widely distributed within the NE Atlantic and common in the North Sea. Its reproduction is not confirmed in the Channel but spawning in UK waters occurs mostly from December

	- February. The key concerns for veined squid stocks are that it has a short 16-month life cycle and highly variable recruitment levels. Of the three squid species included in the FMP veined squid is of least concern. However, given that in the FMP area this species is primarily caught as bycatch there is a need to get a better understanding of species-specific landings data and data on age and maturity. There is no data on this stock and the recreational sector, but there is anecdotal evidence of an emerging targeted recreational fishery. We do not yet fully understand the local social and economic importance of these fisheries and the benefits these fisheries bring to both fishers targeting this species and their associated communities. This will allow us to make the right decisions for this species and those who depend on them.

Approach to Evidence

Evidence based means the FMP is based on information from a variety of sources, and the strengths and limitations of it is understood. The evidence is being used to build understanding and decrease uncertainty.

The evidence we use includes policy and legislation, scientific papers and reports but also expert opinion, local knowledge and intelligence from industry and the values and concerns of those who may be affected by the FMP.

Evidence can often be limited. Non-quota species are frequently more data poor than quota species for example. Evidence related to ecology of species is more readily available than social evidence linked to fishers and fishing communities. When evidence is limited four approaches are available

- Produce the evidence
- Use the minimum necessary to get by
- Learn by doing i.e., produce the evidence while doing the work
- Use a precautionary approach until the evidence gap can be filled

These different approaches have different costs (money, risks/impacts) but provide a way to progress. Which approaches will be used depends on resources to support development and implementation of the FMP programme.

Evidence is not just used for development of the FMP. Different types of evidence are used throughout all stages of the FMP life cycle as shown in Figure 2.

Figure 2. A seven stage Fisheries Management Plan policy cycle

Substantial evidence gathering collation and analysis has been undertaken for this FMP, but further evidence remains to be developed or obtained. The research plan collates and prioritises what further evidence is needed.

It will not be possible for any one group to deliver the evidence needed to enable the FMP to meet the FMP goals and goals of wider fisheries management and policy. Therefore, evidence will be produced through a combination of:

- In-house expertise
- Commissioning experts
- Working in partnership with Defra group and the FMP programme
- Collaborating with stakeholders including industry and academia
- Providing direction for others to produce relevant evidence independently

Within this evidence statement, we have identified evidence gaps which may need to be filled to achieve the stated FMP goals. In the short term, Defra will collate and prioritise these evidence gaps across the FMP programme, look to deliver evidence to support in addressing some of the most pressing and key questions identified within the FMPs. However, all evidence gaps identified across the FMP programme will not be able to be funded by Defra alone. In the longer term, to support the phased approach of FMPs and progress towards meeting the Fisheries Act Objectives, Defra are developing an evidence pathway that promotes collaboration between industry, academia and fisheries managers to address these identified evidence gaps for FMPs.

In delivering MMO core functions and progressing MMO goals, overlapping evidence gaps have been identified. Such needs are listed in the Research Plan and MMO, through meeting business as usual evidence gaps, is expecting to also contribute to delivery of FMP evidence gaps both of this FMP and of the wider FMP programme.

Research Plan

The Research Plan details approximately 100 evidence gaps (at time of writing) identified through the FMP and Evidence Review as a searchable and filterable database. As the FMP is a live plan that will direct management and make fisheries activity sustainable, evidence should be incorporated as it arises and could change management. Where evidence gaps are delivered or refined, or as new needs emerge, it will be necessary to update the ES and Research Plan. The research plan covers:

- An evidence need description
- The rationale for that evidence gaps including associated FMP goals
- Priority of that evidence and whether activity is underway
- Useful sorting data including theme, sub-themes or species

In future iterations the research plan will also record existing ongoing activity we are undertaking or are aware of that contribute to delivery of the need.

1 Introduction

1.1 Structure of the Evidence Statement

The Evidence Statement (ES) is structured as follows:

Summary: A summary of the key information about each species, the approach to monitoring and the research plan (above).

Part 1 (sections 1-3): Provides an introduction (this section) and context for the ES and its relationship to the FMP and Research Plan. It also sets out our approach to evidence and details development of the FMP's research plan.

Part 2 (sections 4-5 and annexes): The main part of this ES detailing the evidence that has informed the FMP. This included the following sections:

- Evidence themes addressed for this iteration
- Data and methods used
- Caveats and limitations
- Remaining evidence gaps
- Additional known evidence yet to be considered

The FMP process has been supported by extensive stakeholder engagement. This engagement, which is detailed in the FMP Record of Engagement, has been a source of both evidence and evidence gaps and should be considered alongside the ES.

1.2 Purpose of the Evidence Statement

The Channel Demersal Non-Quota Species (NQS) Fisheries Management Plan (the FMP) sets out the road map to achieve long-term sustainable management of non-quota demersal fisheries in the English Channel. This Evidence Statement (ES) and its Research Plan, together with a Stakeholder Engagement Report have been produced to support the development and implementation of the FMP.

The ES details the scientific information that has been drawn on in developing the FMP and sets out the strength of that evidence and outstanding evidence gaps to deliver FMP objectives.

The ES enables the Marine Management Organisation (MMO) to show the FMP is based on the best available evidence and scientific advice, transparent decision making and partnership working as required by the Joint Fisheries Statement (JFS).

The ES also shows that the FMP has been developed in line with the ‘scientific evidence objective’ of the Fisheries Act (2020), such that the UK will take an evidence-based approach to fisheries and aquaculture management.

1.3 Scope of the Evidence Statement

1.3.1 Species considered

The Channel Demersal NQS FMP and this ES covers 19 non-quota demersal species (focal species) targeted or otherwise caught within demersal fisheries in the FMP area of the English Channel (Figure 4). The species considered within the FMP and ES are:

Bony fish

- Bib / Pouting / Pout (*Trisopterus luscus*)
- Brill (*Scophthalmus rhombus*)
- Lemon sole (*Microstomus kitt*)
- Turbot (*Scophthalmus maximus*)
- John dory (*Zeus faber*)
- Striped red mullet / Surmullet (*Mullus surmuletus*)
- Grey gurnard (*Eutrigla gurnardus*)
- Red gurnard (*Chelidonichthys cuculus*)
- Tub gurnard (*Chelidonichthys lucerna*)

Sharks, skates and rays

- Lesser spotted dogfish / small spotted catshark (*Scyliorhinus canicula*)
- Stary smoothhound (*Mustelus asterias)*
- Common smoothhound (*Mustelus mustelus)*

Cephalopods

- Common cuttlefish (*Sepia officinalis*)
- Common octopus (*Octopus vulgaris*)
- Curled octopus (*Eledone cirrhosa*)
- Veined squid / Long-finned squid (*Loligo forbesii*),
- European common squid (*Alloteuthis subulata*)
- Common squid / European squid (*Loligo vulgaris*)

Depending on the taxonomic resolution of supporting evidence, species may also be discussed at different taxonomic resolutions for example genus e.g., smoothhounds (*Mustelus* spp.) or family e.g., cuttlefish (*Sepiolidae*).

1.1.2 Geographic extent

The geographic extent of the FMP influences the evidence sought and is defined by English waters of ICES divisions 7d (east English Channel) and 7e (west English Channel) (Figure 1). Relevant evidence however is not restricted to the FMP footprint but is wider, for example national fisheries statistics that provide contexts or international experience of related management approaches.

1.1.3 Fisheries objectives in scope

The FMP vision and goals (set out in Chapter 1 of the FMP) developed in this iteration of the FMP focus on progressing the sustainability and precautionary objectives of the Fisheries Act (2020) although goals have been developed around key themes of evidence, social and economics and sustainable fisheries that contribution to all Fisheries Act objectives. This ES therefore considers all the fisheries objectives in scope. The objectives are detailed in section 1 of the Fisheries Act (2020) [1]

[1] Fisheries Act (2020) https://www.legislation.gov.uk/ukpga/2020/22/section/1/enacted#:~:text=%E2%80%9Cprecautionary%20approach%20to%20fisheries%20management,target%20species%20or%20their%20environment.

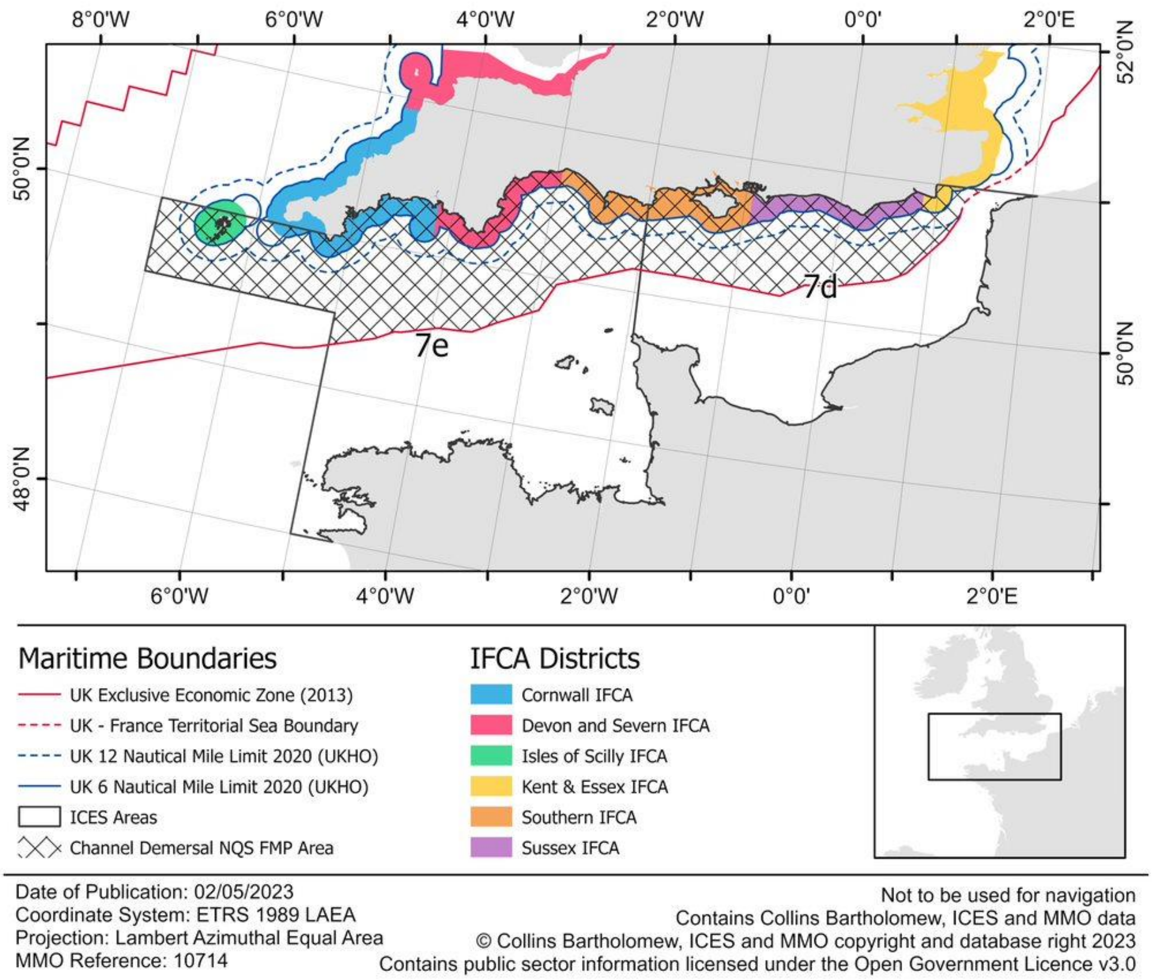

Figure 4. Geographic extent of the Channel Demersal NQS Fisheries Management Plan

1.2 Roles and responsibilities

FMPs and their ES are owned by the fisheries policy authority and signed off by the Secretary of State. The fisheries policy authority for England is the Department for Environment Food and Rural Affairs (Defra). Drafting of fisheries management plans and supporting material has been delegated by Defra to other bodies. Specific roles and responsibilities regarding the development of the Channel Demersal Non-Quota Species Fisheries Management Plan and Evidence Statement are outlined below (Figure 2).

- Marine Management Organisation – the MMO has delegated authority for drafting the FMP and is therefore leading on the Evidence Statement and the associated Research Plan.
- Channel Demersal Non-Quota Species FMP Working Group – this is a collection of arm's length bodies (ALBs) and industry representatives

(including both recreational and commercial fisheries) that provide the FMP authors with specific technical advice including on issues or evidence gaps.

- FMP Evidence Group – led by Defra includes people writing other FMPs, and relevant representatives from government and arm's length bodies (ALBs). The Evidence Group provides advice on evidence, procedures, and integration across FMPs.
- Defra Policy team – As fisheries policy authority Defra agree the evidence statement and its content with ultimate sign-off by the Secretary of State.

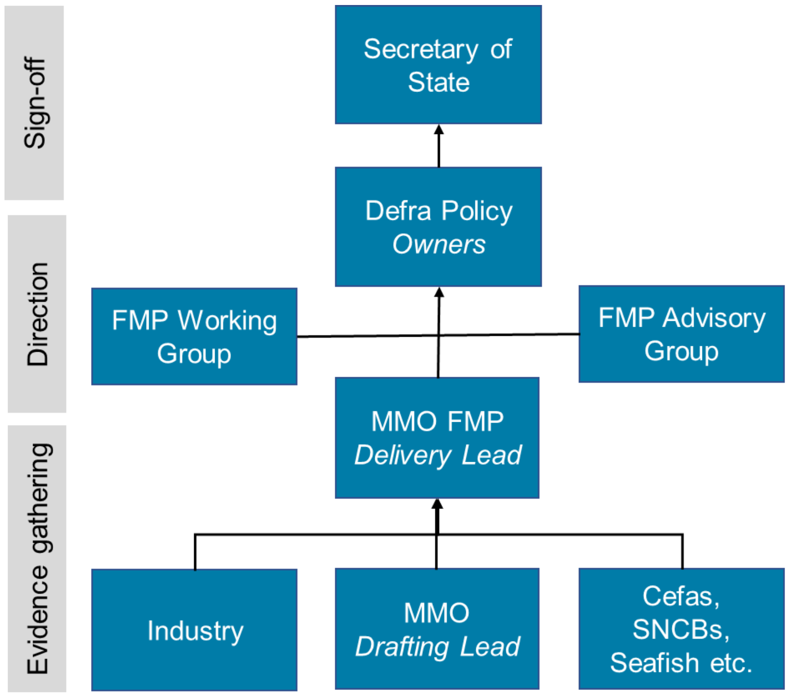

Figure 5. Roles and responsibilities for the Evidence Statement

2. What is an evidence-based Fisheries Management Plan?

2.1 Evidence and being evidence based

What does an evidence-based Fisheries Management Plan mean?

Evidence based means the FMP is derived from and informed by objective evidence from a variety of sources. We, understand the strengths and limitations of the evidence and have analysed the evidence to build knowledge and decrease uncertainty.

What is evidence?

Evidence is data, information or knowledge that informs a decision. Evidence includes existing policy and legislation, scientific papers and reports but also expert opinion, local knowledge and intelligence from industry and the values and concerns of those who may be affected by the FMP.

Confidence in evidence

All evidence should be considered carefully for trustworthiness and relevance. It is possible that the best available evidence is limited or not robust at the time of publication, and as such we have been careful or reserved when making decisions based on it. To increase the confidence in that evidence, the evidence used in the FMP development was triangulated across multiple different sources and/or had rigorous controls. For example, MMO has established a process for evidence quality assurance and we draw on fisheries statistics that are published under National Statistics standards.

2.2 When evidence is limited

As the FMP has a statutory requirement to be evidence based, it is important to consider what happens when evidence is limited, unsuitable or absent.

Produce the evidence needed

The FMP programme has identified a range of evidence gaps and these are prioritised within the Research Plan (provided as a separate appendix Microsoft Excel document to the Evidence Statement). Delivering new evidence may be a simple task of further effort on collation of existing information or substantially more challenging for example initiating a long-term programme requiring substantial data collection for a long period at sea. A range of examples include:

- Evidence exists but requires collation (e.g., historic landings data);
- Data exists but needs further method development, new analysis or a short time to gather a bigger dataset (e.g., Under 10 catch recording);
- Existing evidence collection programmes may be modified to obtain new data (e.g., redesign/expand fisheries independent stock surveys);
- Novel and emerging evidence from new technologies requiring roll out and implementation as well as time for data collection and analysis (e.g., iVMS, REM);
- New research streams must be developed or commissioned (e.g., genetic sampling to inform stock structure).

Evidence may be collated and delivered by government, industry or other stakeholders like non-governmental organisations or academia. Where evidence is not available in a timely manner or unlikely to become available due to costs and priorities, several further approaches are available, each with different pros and cons. Approaches are listed below.

The minimum necessary

Evidence is sought that meets the minimum requirements of a specific goal rather than trying to achieve the biggest or best outcome across multiple goals or actions or seeking excellence with diminishing returns. Working in this way results in a reduced need for evidence at the expense of the best solutions or some ambitions. Goals may still be achieved but at greater risk or impacts or less secondary benefit.

Learning by doing

Action may be taken on the best available evidence of the time however limited to set a direction toward delivering a goal or objective. Evidence is then collected through monitoring and evaluation to feed back into the actions. This approach has history in adaptive management. Learning by doing changes what evidence is needed or when, and that evidence may be more accessible, timely or cheaper to produce.

Precautionary approach and precautionary principles

Precautionary actions seek to manage any risks to long term sustainability of the fish or ecosystem from inaction due to lack of evidence by acting in a precautionary way. More evidence tends to reduce the need or level of precaution required so that more benefit, particularly extractive benefits, may be obtained.

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

Precautionary principles - An accepted definition of the precautionary principle comes from the Rio Declaration on Environment and Development (1992) which states that "w*here there are threats of serious or irreversible environmental damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation (UNEP 1992).*" Even within UK and EU law, the precautionary principle is highly malleable and performs many different functions. In relation to this FMP there are two relevant elements; application to management interventions for marine protected areas under the Conservation of Habitats and Species Regulations 2017 (as amended) together with the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) and decision making by the Secretary of State in relation to policy under the Environment Act (2021).

The criteria of "*threat of serious or irreversible environmental damage*" in the precautionary principle is generally interpreted to require a higher level of environmental risk to trigger use when compared to the precautionary approach to fisheries management. Both precautionary approaches and precautionary principles may be used if evidence is limited but risks are identified.

2.3 How has evidence been used

Figure 6 shows a conceptual diagram of the FMP cycle. Evidence has been or will be central for all stages of the FMP cycle although different types of evidence are produced or needed at the different stages.

Figure 6. A seven stage Fisheries Management Plan policy cycle

1. Issues identification and definition – Scientific and stakeholder sourced evidence was used to identify and clarify issues for consideration in the FMP

2. Data, research and analysis for plan making – A detailed phase of deeper and wider analysis exploring the issues and options of addressing them

3. Plan formulation – Drawing on available evidence for plan drafting

4. Consultation – Expected to provide a range of new evidence includes stakeholder views on proposed interventions, identification of new evidence and ongoing activity

5. Plan adoption – A gateway ensuring the FMP meets criteria including being evidence based

6. Plan implementation – Supported by evidence from monitoring and evaluations and from evidence drawn from iterative and adaptive

7. Plan monitoring and evaluation – The conclusion of monitoring and evaluation and capture of appropriate learning and change to inform the next cycle of FMP issues identification, analysis and intervention formulation.

The technical evidence used to support the FMP's development and formulation is set out in the Annex's.

Each sub-section follows the same format progressing as:

- What evidence was scoped out for this iteration and why?
- Data and methodology used
- Summary of findings
- Caveats and Limitations
- Evidence gaps
- Additional evidence yet to be considered

3 Evidence gaps and developing the Research Plan

As outlined in Figure 3, evidence is used throughout the FMP cycle. Substantial evidence gathering collation and analysis has been undertaken although further evidence remains to be developed or obtained. The research plan collates and prioritises what further is needed. We make a clear distinction between knowledge gaps (things we don't know), of which there are substantial lists, and evidence gaps (things we don't know, but need to understand to deliver the FMP). The Research Plan focuses on current evidence gaps.

3.1 Identifying evidence gaps

Evidence gaps have been identified through different mechanisms.

Mandatory Requirements – There are specific mandatory requirements set out in Article 6 of the Fisheries Act (2020) (Table 1) for the FMP to be legally compliant.

Evidence collation to date – A large quantity of evidence has been collated and analysed via the ES. However, more potential evidence is available than could be integrated due to time constraints and further data collection will be needed.

Resulting evidence can be developed and integrated in subsequent iterations of the FMP.

FMP advisory groups – The FMP Working Group and Evidence Advisory Group have provided technical advice and suggestions on outstanding evidence gaps and existing evidence and providing feedback during development.

Stakeholders – Two rounds of stakeholder engagement (as recorded in the Record of Engagement) and feedback on draft documents has helped further inform and develop the list of evidence gaps and the Research Plan.

Evidence that is needed to develop the FMP and progress the FMP objectives has been identified in both the ES and FMP. These needs are collated in the research plan.

3.2 Prioritising evidence gaps

Evidence priorities are defined using a MuSCoW prioritisation (MUst, Should, COuld and Won't have at this time). Priorities are defined below and have been determined by the MMO under advice from steering and advisory groups.

- **Must have** the minimum required to deliver the FMP. Without the evidence the FMP is either not legal, or not viable.
- **Should have** applies to evidence that is important but not vital. May come with significant risks, cause significant issues or difficulties if not delivered but can be worked around or tolerated.
- **Could have** evidence priorities that are wanted or desirable but of less risk if we don't have it.
- **Won't have this time** evidence gaps that have been agreed as not being delivered within this iteration of the FMP. Needs are still recorded for transparency and might be included at a later time, phase or iteration of the FMP programme.

The MuSCoW prioritisation approach is particularly suited to prioritising activity where timeframes and or resources are fixed. While delivery of "must have" evidence is important, it would be the aspiration to deliver all evidence gaps except those assigned a 'won't have at this time' status. Flexibility and contingency are created by delivering by priority where resources are limited.

3.3 Delivering evidence gaps

Evidence gaps may be addressed by a range of non-exclusive means including:

- **In-house** – The MMO produces the evidence either specifically for the FMP or as part of ongoing evidence work, for example integrated with evidence required to perform statutory MMO functions.
- **Commission** – Evidence may be delivered by commission, particularly where independence from the governance and regulatory is desired, or for the provision of specialist skills or additional staffing.
- **Partnership** – MMO will work with Defra and its bodies in a co-ordinated and integrated way in support of the FMP programme including on evidence projects of shared interest
- **Collaboration** – MMO will work with the diversity of stakeholders interested in the FMP and the FMP programme to collaborate on evidence production for example, industry, industry representatives, academia.
- **Direction** – By making the evidence gaps and research priorities of the FMP clear and accessible to the public via the Research Plan, others may integrate delivery of needs into their own work.

3.4 Resourcing for new evidence

Within this evidence statement, we have identified evidence gaps which may need to be filled to achieve the stated FMP goals. In the short term, Defra will collate and prioritise these evidence gaps across the FMP programme, to look to deliver evidence to support in addressing some of the most pressing and key questions identified within the FMPs. However, all evidence gaps identified across the FMP programme will not be able to be funded by Defra alone. In the longer term, to support the phased approach of FMPs and progress towards meeting the Fisheries Act Objectives, Defra are developing an evidence pathway that promotes collaboration between industry, academia and fisheries managers to address these identified evidence gaps for FMPs.

In delivering MMO core functions and progressing MMO corporate goals, overlapping evidence gaps have been identified and prioritised. Such needs are listed in the Research Plan and MMO, through meeting business as usual evidence gaps, is expecting to also contribute to delivery of FMP evidence gaps both of this FMP and of the wider FMP programme.

3.5 The Research Plan

The Research Plan (provided as a separate appendix to the Evidence Statement) draws together the FMP evidence gaps identified across the evidence statement and prescribes them a suggested rating. The Research Plan details approximately 100 evidence gaps deemed important to progress the FMP objectives and the objectives of the Fisheries Act. The Research Plan contains:

- An evidence need description
- The rationale for that evidence need including associated FMP goals
- Priority of that evidence and whether activity is underway
- Useful sorting data including theme, sub-themes, or species
- Existing activity we are aware of that is addressing some or all of the need

Needs are expressed at different resolutions, can reflect common topics across different species and on occasion have dependency on meeting other evidence gaps. The MMO will work with Defra, its arm's length bodies and advisors, industry, and others to support the development of a programme of research and collaboration which enables priority evidence gaps to be addressed.

3.6 Iterating the Evidence Statement and the Research Plan

As the FMP is a live plan that will direct management and make fisheries activity sustainable, evidence should be incorporated as it arises and would change management. Where evidence gaps are delivered or refined, or as new needs emerge, it will be necessary to update the ES and Research Plan. In order to keep the Research Plan relevant and up to date (as relevant information/evidence gaps appears), it should be updated and reviewed no less than every 6 years, or as required to support FMP review.

There are points at which review of the ES and research plan might be relevant. These are outlined below. These triggers for review collectively suggest annual or biannual review is desirable and if undertaken, would enable contribution to track and review progress to objectives and provide clear priorities for further evidence intake or needs prioritisation and ensure work remains relevant to the current context.

Yearly – activities occur on a yearly cycle that are relevant to the evidence base including fisheries negotiations, publication of stock assessments and national statistics, and project cycles from procurement to publication in a financial year.

Ad-hoc – completion of longer-term projects e.g., FMP programme evaluations, policy and legislation changes, government and government agendas, international interactions and obligations, academic science etc all occur outside of systematic timetables that may change context, or address or create evidence gaps worth incorporating**.**

With FMP tranches as they progress – Tranche one and two FMP's are expected to be adopted by the end of 2023 and whilst Tranche three FMPs are expected to be adopted by 2025. These steps will provide new evidence produced by others, different interactions among FMPs and learning from progression through consultation, adoption and use to be considered.

Aligned to FMP goal timeframes - The FMP has short term (1-2 year), medium term (3-5 year) and long term (6-10 year) sub goals thus 2 yearly review of progress and the state of evidence would be a minimum necessity for defining success within a timely manner for short term goals.

Government Spending Reviews - The current Spending Review has set budgets to March 2025 and are normally for 3-year periods. Preparation for the next spending review usually starts about a year in advance and will be a key time for resourcing FMP related activity (mid 2024).

3-yearly report on JFS and FMPs progress and effectiveness reporting - The effectiveness of the FMPs will be regularly assessed, and the results reported at least every three years as part of the JFS report, as required by the Fisheries Act (2020) (on or before November 2025).

6-yearly review of the JFS - The Fisheries Act (2020) requires the fisheries policy authorities to review the JFS whenever they consider it appropriate to do so, and in any event within six years of its publication or most recent review (on or before November 2028).

6-yearly review of the FMP - Each FMP will be reviewed at least every six years or sooner if relevant evidence, international obligations, or wider events require a change in the policies set out in the FMP.

4 Evidence review supporting the Fisheries Management Plan

The evidence presented in this section follows the structure of the FMP chapters and addresses the following questions where possible:

- Why evidence is needed, and evidence themes addressed for this iteration
- Data and methodology used
- Caveats and limitations
- Evidence gaps
- Additional evidence yet to be considered

The MMO has undertaken substantial evidence gathering supported by relevant government, arms-length, advisory and regulatory organisations including:

- Department for Environment, Food and Rural Affairs (Defra)

- Marine Management Organisation (MMO)
- Centre for Environment Fisheries and Aquaculture Science (Cefas)
- Seafish
- Inshore fisheries and conservation authorities (IFCAs)
- Natural England (NE)

Evidence has also been gathered through stakeholder engagement within a ‘Record of Engagement’. This has been provided as a supporting document in the FMP.

We recognise that there is further evidence available. We will aim to collate and evaluate this evidence as part of future iterations.

4.1 Governance and policy

The governance and policy sub-section of the FMP sets out the governance framework, policy goals of delivering the FMP and the FMP’s objectives. The evidence that has informed FMP goals has been drawn from across this ES and from supporting documents including the Record of Engagement which can be found in Annex 3 of the FMP.

This section is focused on the key policy and legislation linkages and supports chapter 2 of the FMP.

4.1.1 Why evidence is needed and what evidence was sought

The key policy and legislation linkages have several considerations for the FMP. These may include:

- Placing legal requirements on what the FMP or ES must include (e.g., the Fisheries Act 2020);
- Setting conditions which the FMP must satisfy or align to (e.g., Equality Act 2010 or Trade and Co-operation Agreement 2020) ;
- Statutory or non-statutory targets that the FMP should contribute to (e.g., Marine Strategy Regulations (2010) (SI 2010/1627) require fishery bodies in the UK to take action to achieve or maintain Good Environmental Status (GES) in all UK waters;
- Direction or guidance (e.g., FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries).

4.1.2 Data and methodology used

Key policy and legislation linkages were identified through non-systematic desk-based review of existing policy and policy reviews. Consideration of policy and legislation signposting in key documents and guidance for the FMP process, for example, the JFS. Findings were supplemented by expert input from across the Defra group.

4.1.3 Summary of findings

Policy and legislation linkages screened as relevant are identified below and expanded on within chapter 2 of the FMP.

Statutory Domestic Policy and Legislation

- Fisheries Act (2020)
- Statutory Instrument 2004 No. 1633: The Environmental Assessment of Plans and Programmes Regulations (2004)
- Marine and Coastal Access Act (2009)
- Environment Act (2021)
- Equality Act (2010)
- Marine Strategy Regulations (2010) (SI 2010/1627)
- Trade and Cooperation Agreement (2020)
- Net Zero Strategy: Build Back Greener (2021)
- Environment Improvement Plan (2023)
- Animal Welfare (Sentience) Act 2022

International Commitments

- US Marine Mammal Protection Act
- FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries
- UN Convention on the Law of the Sea (UNCLOS)
- Development Goals
- UN Convention on Biological Diversity (CBD), including the Global Biodiversity Framework
- Convention for the Protection of the Marine Environment of the Northeast Atlantic (OSPAR).

Non-statutory policy linkages

- International Action Plan on Bycatch
- Defra NQS policy
- Defra 2022 Flyseining consultation
- Quota limits
- MPA byelaws
- Remote Electronic Monitoring (REM)

Linkages among FMPs

- Future neighbouring and overlapping FMPs are given in the JFS Annex A.
- Draft FMPs that overlap including:
    - Crab and lobster FMP (all English waters)
    - Whelk FMP (all English waters)
    - King Scallop waters (all English waters)

There will be significant links to consider across FMPs including neighbouring fisheries management plans in the future. These include similar species looking at transboundary issues (Southern North Sea Non-Quota Demersal Fisheries Management Plan (for 2024), Southern North Sea and Eastern Channel Mixed Flatfish FMP (for 2024) and in total 19 FMPs that have a spatial overlap with the FMP e.g., Celtic Sea and Western Channel Demersal Fisheries Management Plan (which includes 7e for 2025) and Southern North Sea and Channel Skates and Rays Fisheries Management Plan (that includes 7d and 7e for 2024). With many interacting FMPs, unintended consequences will need to be considered.

4.1.4 Caveats and limitations

As the development of FMPs is a new policy area, several policy linkages and assessment process are yet to be developed, these include the form and format for integrated Sustainability Appraisal (SA) and Strategic Environmental Assessment (SEA) under Statutory Instrument 2004 No. 1633: The Environmental Assessment of Plans and Programmes Regulations (2004) or what having “regard to” equates to as required under the Marine and Coastal Access Act (2009).

4.1.5 Additional evidence yet to be considered

A full review of international commitments or non-statutory policy linkages and how these inform FMPs would be desirable for future FMP iterations. In many cases the policies and legislation would be relevant across many or all FMPs.

4.1.6 Evidence gaps

The following evidence gaps (Table 1) emerged from our evidence collation process.

Table 1. Policy and legislation link evidence gaps

Evidence gaps	Justification
Explore how FMPs and marine plans function together and	FMPs should pay regard to marine plans and vice versa. This mutual consideration supports policy integration. A wider exploration of how FMPs and marine plans function together

Evidence gaps	Justification
within a broader and coherent maritime planning system	and within a broader and coherent maritime planning system (along with other planning elements) would be beneficial.

4.2 Description of the fishery

The FMP covers 19 species caught as part of several mixed and multispecies commercial fisheries that contribute to fishers' landings and income. This sub-section supports chapter 3 of the FMP (particularly 3.3 and 3.4).

4.2.1 Why evidence is needed, and evidence themes addressed for this iteration

Sections 2(3)(c), 6(2)(b), 6(2)(c), 6(3)(a), 6(3)(b)(ii) of the Fisheries Act (2020) require FMPs to be based on certain evidence including fish stocks, types of fishing and fishing gears, and operational footprints of the stocks. These statutory requirements ensure that the characteristics of the fishery are well described and contextualised. This evidence helps to understand the health of fish stocks or the fishery, to identify issues on which the FMP may act. The evidence considered here which is focused on fisheries statistics can help support anecdotal evidence provided through engagement or consultation

This sub-section focuses on what fish was landed where and when, by whom and using what gear. This information is then used to explore and contextualise the relative importance of the FMP species in economic terms relative to wider fishery resources and to understand the dependence of fishers on these species.

4.2.2 Data and methodology used

MMO and Seafish analysed fishery dependant data routinely collated for management. Data included published sources such as summary statistics in MMO Annual Fisheries Statistics, Seafish Fleet data, or bespoke extractions of raw statistical or summary data underpinning these resources for specific analyses. EU landings were drawn from the work of the Scientific, Technical and Economic Committee for Fisheries (STECF).

Data covered landing weight (tonnes) and value (£) for UK vessels between 2013 and 2021 by gear and area for the focal species. Landings data to MMO or from EU data are not identified to species level for octopuses and squid (an evidence need) or mixed species specific and unspecified groups (like gurnards). Data therefore considered 15 species and/or species groups and could be explored against a range of variables (Table 2).

Data were used to explore relative importance of landings in the FMP and national context, to different administrations and to explore trends in landings over recent history. A summary of the data provided has been included in (Table 2). For some data sources it was possible to consider several parameters in combination e.g., UK landings of cuttlefish caught by beam trawl in 7d during 2017.

Table 2. Summary of fisheries statistical data provided

Parameter	Summary of data provided
Species	14 species and species groups. Squid and octopuses are not resolved to species
Landings	By weight (tonnes) and value (£GBP)
Nationality	Resolved by UK and EU based on available data sources. Third country data has not been included
Administration	UK data were further resolved to fisheries administration including home nations and Crown Dependencies
Year of landings	As either UK data timeseries (2016-2021), EU time series (2016-2020) or UK snapshot (2021 only)
Location	Presented at UK EEZ or FMP area level with FMP level considered as either ICES area 7d and 7e or as the 18 individual ICES rectangles that overlap the FMP area
UK vessel size	Landings for 2021 by vessel size (<8m, 8-10m, 10-12m, 12-15m, 15-18m, 18-24m, 24-40m and 40+m)
UK Fishing gear	Fishing gear type of UK vessels to FAO level 4 resolution
Country / Ports	UK vessel landings for 2021 to country and landing port
Seasonality	UK vessel landings for 2021 by month of landing
Number of vessels	Number of UK vessels that caught any focal between 2016-2021
Fisher dependence	Proportion that FMP species contribute to total landings of UK vessels
Port reliance	Proportion that FMP species contribute to total landings into ports
Economic performance	Economic performance indicators including fishing income, GVA, operating and net profit and GVA to fishing income margins
Employment	Number of fishers by fleet segments
Key recreational fisheries	Sea angling in the UK report 2016 and 2017 (2020) provided social and economic data, whilst the annual Sea Angling Diaries provided catch data

4.2.3 Summary of findings

A summary of findings is presented in Chapter 3 (in particular 3.1) of the FMP. A complete analysis is given in Annex 1 of this Evidence Statement.

4.2.4 Caveats and limitations

All fisheries data included within this FMP was based on data extractions in May 2023. Fisheries datasets are subject to retrospective amendments and corrections depending on data submission timelines and ongoing data quality and assurance checks and cross-checks. Methods used to produce estimates are constantly being assessed, iterated, and improved. Data here may differ from other historic or more contemporary data extractions.

The collection and collation of fishing activity data is complex and extensive and as such the data has its own caveats and limitations. Examples includes that landings do not necessarily equate to catches or sales (for example dogfish may be caught but not landed and when landed it may not be all sold based on market demand), the geographic scale at which landings are collected (usually ICES rectangle), the taxonomic resolution at which landings are reported (e.g., squid are not resolved to species) and changes in data collection and submission requirements mandated on fishers through time. As illustration, MMO (project MMO1264[2]) have explored the strengths and limitations of fishing activity data in the smaller vessels (under 12m) which comprise the numerical majority of the fleet in England (88% of vessels).

4.2.5 Additional evidence yet to be considered

There is further evidence that is yet to be considered in the FMP due to resourcing, data analysis or other constraints (Table 3). Addressing these needs generally does not need new data collection.

Table 3. Fisheries overview evidence that is yet to be considered

Evidence gaps	Justification
Fishing effort data.	Declining catch per unit effort is commonly an indication of stock health issues and fishing efficiency. Fishing effort data will help to target and assess the effectiveness of proposed management measures. It will also help qualify the impact of the measures and identify some of the unintended consequences. Effort data

2 MMO (2023). Mapping of under 12m vessel fishing effort. A report produced for the Defra Impacts Evidence Group, MMO Project No: 1246, April 2023, 43pp available at MMO1264_U12m_Fishing.pdf (publishing.service.gov.uk)

Evidence gaps	Justification
	are available, but due to time and resourcing constraints they haven't been analysed in the development of the FMP and ES up to this point.
Associated species caught in the Channel demersal NQS mixed fishery.	Identification of which species are caught alongside Channel demersal NQS as part of a mixed fishery carries important implications for the efficacy of management and the identification of unintended consequences on the wider fishery. The FMP will need to identify which other fisheries it overlaps with, and the relative importance of the FMP species. Catch association data are available, but due to time and resourcing constraints they haven't been analysed in the development of the FMP and ES up to this point.
Analysis of the importance of species and port landings comparable to the number of vessels a port services.	The top landing ports clearly display their significance to the fishery by the volume and value of fish landed there. However, this obscures the representative value of small coastal ports to smaller fishers. A useful analysis would be to explore the relative importance of a landing port to the population of fishers that land into it, and how dependent they are for landing Channel demersal NQS into this port for their annual income.
Multi-species fisheries	Data representing what was caught came from both mixed and multi-species fisheries, but analysis has focused only on the focal NQS increasing risk of unintended consequences or distorted interpretation.
Refined data extraction for cross-variable analysis	While a diverse set of variables were collated and explored, it was not possible to explore all combinations of variables desired based on the data extraction undertaken. Subsequent extractions and further exploration may provide further insights

4.2.6 Emerging evidence gaps

The following evidence gaps (Table 4) emerged from exploration of the evidence and have been listed in the Research Plan

Table 4. Fisheries overview evidence gaps

Evidence gaps	Justification
Spatial distribution of recreational activities and ports of known significance	Recreational fishing activity is not well defined, but an important aspect of the fisheries biomass taken and fish mortality. Potentially removing juvenile stocks from coastal waters. The impact of this fishery needs to be understood and quantified.
Develop methods to collate landings data to a species level	Landings data for these species are not defined to species level granularity, a methodology for identifying these groups to a species level is required for effective management.

Evidence gaps	Justification
for cuttlefish, octopus, gurnard and squid	
Data for EU vessels at a gear type resolution	EU data provided in the development of the FMP was aggregated to an annual level from STEFC datasets. A breakdown by gear, vessel size, area, landing ports, or season was not available. Therefore, EU vessel catches could not be analysed to the same degree as the UK fleet. Provision of this data will benefit the FMP through the production of a comparable overview of the fishing behaviours and trends.
Spatial use	Spatial use through imposed fishery restrictions will have an impact on the sustainability of the fishery. Further clarity is required to tie spatial restrictions into Channel demersal NQS fishery management. Spatial restriction data are available, but due to time and resourcing constraints they haven't been analysed in the development of the FMP and ES up to this point.
Clarity on historic <10m landings	Private sales historically haven't been declared for smaller vessels. This imposes limits on <10m catches and brings into doubt the reliability of the data to portray an effective picture of landings and the importance of Channel demersal NQS to these vessels.
Flyseining catches and reliability of the data	Stakeholder concerns have been raised over the impact flyseining fishing effort is having on Channel demersal NQS stocks therefore more analysis would inform management.
Targeted and non-targeted NQS activity and catches	Fisheries data is not separated into targeted and non-targeted fishing activity, making the link between species landings and fishing effort more complex.
Develop long term trends for fleet structure	This will help us better understand how the fishery has changed to help us better understand questions such as how healthy/ depleted are these populations when we take a longer-term view? Is this a traditional fishery or a new fishery, or a bit of both? Are the short-term declines in profitability part of a longer-term pattern, or a recent downturn. We are currently able to go back to 2012 years as data earlier than 2012 will not be available at FMP resolution so we will need to investigate other options to collect this data.
Develop long term trends for economics	This will help us better understand how the fishery has changed to help us better understand questions such as how healthy/ depleted are these populations when we take a longer-term view? Is this a traditional fishery or a new fishery, or a bit of both? Are the short-term declines in profitability part of a longer-term pattern, or a recent downturn. We are currently able to go back to 2012 years as data earlier than 2012 will not be

Evidence gaps	Justification
	available at FMP resolution so we will need to investigate other options to collect this data
Develop long term trends for landings	This will help us better understand how the fishery has changed to help us better understand questions such as how healthy/ depleted are these populations when we take a longer-term view? Is this a traditional fishery or a new fishery, or a bit of both? Are the short-term declines in profitability part of a longer-term pattern, or a recent downturn. We are currently able to go back to 2012 years as data earlier than 2012 will not be available at FMP resolution so we will need to investigate other options to collect this data.
Lesser spotted dogfish - Investigating seasonality data against other influencing factors i.e. trawling activity	Investigate correlation between seasonality and landings data ie could the seasonality be driven by increased landings by trawlers to allow for a higher 5% per trip bass allowance? Highest catches in May and November - this links with when bass are being landed.
Lesser spotted dogfish - why are most catches focused on ICES rectangle 29E6?	Investigate the landings data to try and understand why this was the e.g. Are there more here or are they targeted more there? Or are they caught as bycatch more here?

4.3 Stock overviews and assessment

This section supports Chapter 3 of the FMP and provides an overview of the biology, stock status and prioritised evidence gaps related to each of the species covered in the FMP. The following section highlights the methods used to gather this evidence, as well as a summary of evidence gaps specific to each species.

4.3.1 Why evidence needed, and evidence themes addressed for this iteration

Evidence collation aimed to build an evidence base to support any subsequent management decisions, as well as highlight evidence gaps for future research. This is essential to meet the requirement for an evidence-based FMP, as well as those obligations applied to regulatory bodies under the Scientific Evidence Objective of the Fisheries Act (2020).

4.3.2 Data and methodology used

A non-systematic literature review was conducted by CEFAS for each of the species in the FMP to collate key information on both ecology and stock status of each species.

The review focused on several key sources that synthesise existing information on the species. For finfish, Heessen, Daan, and Ellis (2015)[3] and the Marine Life Information Network (MarLIN)[4] provided the primary syntheses. Jereb et al., (2015)[5] provided core information on cephalopod species, whilst specific recreational fisheries data was gathered through the Sea Angling Diary[6]. Other species-specific literature is cited within each of the extended species overviews in Annex 2.

Stock assessments, where available, are conducted by the International Council for the Exploration of the Sea (ICES)[7]. Given that the majority of the NQS species under the FMP are considered to be data deficient, stock assessments had limitations.

4.3.3 Summary of findings

A complete analysis is given in Annex 2 of this Evidence Statement. A summary of findings is presented in Chapter 3 (particularly 3.1) of the FMP (Species biology, stock status, data collection and key evidence gaps).

4.3.4 Caveats and limitations

The primary challenge associated with meeting the above evidence gaps relates to the quantity and quality of data needed to understand UK fishery related impacts on the health of stocks, and the subsequent need to match this at the international scale through ICES. Each of the stocks covered by this FMP are distributed across both the UK and EU EEZ and are fished by vessels from numerous coastal states. Therefore, any effective stock assessment will require robust and complimentary catch/landings data from all fleets involved, as well as fishery independent data.

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[3] Heessen, H.J., Daan, N. and Ellis, J.R. eds., 2015. Fish atlas of the Celtic Sea, North Sea, and Baltic Sea: Based on international research-vessel surveys. Wageningen Academic Publishers.

[4] Various authors and dates per species. Available at MarLIN - The Marine Life Information Network - Species list accessed 28/01/23

[5] Jereb, P., Allcock, A.L., Lefkaditou, E., Piatkowski, U., Hastie, L.C., and Pierce, G.J. (Eds.) 2015. Cephalopod biology and fisheries in Europe: II. Species Accounts. ICES Cooperative Research Report No. 325. 360 pp. https://doi.org/10.17895/ices.pub.5493

[6] Sea Angling Diary

[7] Latest advice (ices.dk)

For those stocks already assessed these data (and respective data Channels) will exist to an extent, but the decision to improve or extend any existing assessment will need to be agreed at the bilateral or multilateral level through ICES, with each State committing to gather enhanced data to support improved assessments.

Those stocks that are currently unassessed present a greater challenge, particularly for cephalopods that exhibit significantly differing life cycles in comparison to finfish. Here, the likely approach is for an initial assessment to be conducted domestically, and then proposed to ICES.

4.3.5 Additional evidence yet to be considered

There is further evidence that is yet to be considered in the FMP due to resourcing, data analysis or other constraints (Table 5). Addressing these needs generally does not need new data collection.

Table 5. Stock overview and assessment evidence yet to be considered

Evidence gaps	Justification
Fishing effort data	Declining catch per unit effort is commonly an indication of stock health issues and fishing efficiency. Fishing effort data will help to target and assess the effectiveness of proposed management measures. It will also help qualify the impact of the measures and identify some of the unintended consequences. Effort data are available, but due to time and resourcing constraints they haven't been analysed in the development of the FMP and ES up to this point.
Associated species caught in the Channel demersal NQS mixed fishery	Identification of which species are caught alongside Channel demersal NQS as part of a mixed fishery carries important implications for the efficacy of management and the identification of unintended consequences on the wider fishery. The FMP will need to identify which other fisheries it overlaps with, and the relative importance of the FMP species each. Catch association data are available, but due to time and resourcing constraints they haven't been analysed in the development of the FMP and ES up to this point.
Analysis of the importance of species and port landings comparable to the number of vessels a port service	The top landing ports clearly display their significance to the fishery by the volume and value of fish landed there. However, this obscures the representative value of small coastal ports to smaller fishers. A useful analysis would be to explore the relative importance of a landing port to the population of fishers that land into it, and how dependent they are for landing Channel demersal NQS into this port for their annual income.
Multi-species fisheries	Data representing what was caught came from both mixed and multi-species fishery, but analysis has focused only on the focal NQS increasing risk of unintended consequences or distorted understandings

Evidence gaps	Justification
Refined data extraction for cross-variable analysis	While a diverse set of variables were collated and explored, it was not possible to explore all combinations of variables desired based on the data extraction undertaken. Subsequent extractions and further exploration may provide further insights

4.3.6 Emerging evidence gaps

A biological fish stock is a group of fish of the same species that live in the same geographic area and mix enough to breed with each other when mature. The identification of the geographic boundaries of stocks is required before any stock assessment or modelling can be contemplated[8].

Stock assessments are based on models of fish populations that require three broad types of information:

- Catch - amount of fish removed from a stock by fishing
- Abundance - the number or weight of fish in the stock
- Biology - fish growth rates, maturity, and natural mortality

Evidence for stock delineation and to progress stock assessment are the primary evidence gaps identified. Table 6 sets out the summary of evidence gaps across each of the 19 species. Given the data poor status of most the stocks, the evidence gaps are generally focused on either conducting initial assessments or improving existing assessments to better understand stock status and consequentially develop robust management. Seafish provide useful accessible guidance on stock assessment and management techniques[9] supporting for example descriptions of stock categories.

Table 6. Stock overview and assessment evidence gaps

Species	Key evidence gaps
Finfish and Elasmobranchs	
Bib (*Trisopterus luscus*)	To conduct an initial assessment (if required), stock units would require definition/delineation and an evaluation of existing data quality/quantity would be required. Survey data could be evaluated to provide initial abundance indices, given concerns around commercial and recreational catch data quality. Alongside other UK and international surveys, an

[8] ICES Scientific Reports. 4:72. 66 pp. http://doi.org/10.17895/ices.pub.20937001

[9] Seafish Fish stock assessment and management available at Fish stock assessment and management (seafish.org) accessed 18/05/23

Species	Key evidence gaps
	additional otter trawl survey that was conducted by the UK from 2018-2020 could be continued to inform a survey index for this stock. Although otoliths were collected until 2022, analysis has not been undertaken. Additionally, discard survivability is not quantified for both recreational and commercial catches.
Brill (*Scophthalmus rhombus*)	Additional work on stock delineation of Brill is required as the biological stock units for brill across the species distribution area are largely undefined. Data from at-sea observers, recreational fishers, and scientific trawls are limited, impeding the ability to assess temporal changes in stock size. Current scientific surveys in the stock area are not designed for catching Brill. A fisheries-independent survey that had adequate catchability of large flatfish and that covered the entire distribution area of the stock would improve the assessment. A new Dutch beam trawl survey began in 2019 and may help to address this issue. Close Kin Mark Recapture studies may help to improve assessments in view of limited survey data.
Grey gurnard (*Eutrigla gurnardus*)	Given bycatch, landings data do not reflect catches (and fishing mortality) well. The quality of the assessment is potentially impacted by the lack of species-specific data, and the fact that discarding data (which is estimated to be high at around 81% of catches), are only available since 2012. The ICES assessment also does not include any of the scientific surveys within the English Channel.
John dory (*Zeus faber*)	ICES assessment is the most viable route given the level of international interest and strong commercial value of the stock. This will require stock definition/delineation, as initial work suggests that a single stock in ICES subareas 4, 6-7 and 8.a-b may not function coherently. Discarding data and survey abundance indices would be required, and otolith reading would be useful. There is a perceived northward shift in distribution requiring further work on relative abundance.
Lemon sole (*Microstomus kitt*)	To move to a full analytical assessment, improved data on age and length distributions in landings and discards would be required. Additionally, a fishery-independent index covering the entire stock area across all length classes would be useful. Further evidence on the distribution of juvenile lemon sole is required to understand the location of nursery grounds, as would further work to understand stock boundaries and delineation.
Lesser spotted dogfish (*Scyliorhinus canicula*)	It is unclear on whether catch reporting fully quantifies pot bait landings. Species specific landings data are an issue given historic grouping into general categories, and the overlap of lesser and greater spotted dogfish in the Channel. Discarding requires further work, as ICES do not incorporate discards into the assessments and discard levels and survivability (albeit potentially high) are variable between gear/fleets.
Red gurnard (*Chelidonichthys cuculus*)	A lack of species-specific landing data, plus a lack of estimated discarding and survivability across various fleets/gears are key issues for the assessment. Additionally, work is required to analyse SW beam trawl surveys, explore candidate survey-based assessments, and ensure that advice captures a heavy distribution bias in 7d-e, and 7h.

Species	Key evidence gaps
Striped Red mullet (*Mullus surmuletus*)	Initial investigations by Cefas indicate that ICES' dual stock approach may not be appropriate, and that further work is required on stock ID and delineation. ICES make further suggestions on a specific stock basis (see Evidence Statement – Annex 2: Species overview and stock status) but stock ID should be prioritised.
Smoothhound (*Mustelus spp.*)	Species specific landings data, particularly as some countries continue to land smoothhound as 'dogfish and hounds' is a key issue. Additionally, and of particular concern for this FMP, is the unclear level of landings of *Mustelus* spp. for bait in pot fisheries, and the level of discarding (and consequential survivability) that occurs due to market demand for smoothhound and other, related species.
Tub gurnard (*Chelidonichthys lucerna*)	If an assessment is required, stock units would require definition, and the quantity and quality of data would require evaluation. An initial approach would be to utilise applicable survey data (given unreliable catch data), with the potential to continue the 2018-2022 UK otter trawl survey in the W. Channel and Celtic Sea to provide a time series stock index. Survey collected otoliths could also be read.
Turbot (*Scophthalmus maximus*)	As a high value stock, an improved assessment incorporating the English Channel should be considered. At-sea observer and survey data require improvement to provide temporal fluctuations in stock size. One option would be to consider the use of Close Kin Mark Recapture studies.
Cephalopods	
Common cuttlefish (*Sepia officinalis*)	There is a lack of information regarding cuttlefish recruitment, the proportion of cuttlefish that exhibit an annual versus biannual lifespan, as well as how cuttlefish are impacted by environmental/climatic drivers. Given the life history of cuttlefish, any management will likely have to be focused on in-year recruitment. Given that there are potentially three differing populations (Bay of Biscay, English Channel and North Sea), work is required to ID stocks. Currently, Cefas has been working on an assessment for cuttlefish in 7e, with the recommendation that assessments in the English Channel should be carried out within ICES to facilitate data exchange between countries. The emerging recreational fishery requires quantification to understand sector specific landings.
Elegant cuttlefish (*Sepia elegans*)	The ecology of the species is virtually unknown in the English Channel and improved knowledge is required to develop appropriate management strategies at species-level. Further studies of life history, including early life-cycle stages, are also required.
Curled octopus (*Eledone cirrhosa*)	There is currently no requirement for landings data to be recorded at the species level which makes landings estimations and stock identification problematic
Common octopus (*Octopus vulgaris*)	Despite a reduced abundance of common octopus, species-specific landing data is non-existent, leading to difficulty in stock identification and landing estimation for either species.

Species	Key evidence gaps
European common squid (*Alloteuthis subulata*)	Species-specific catch/landing reports are required for all species of squid, as is further work to understand the composition of differing species within the Channel. Further work is required to differentiate taxonomy and spatial distribution between other species and *A. subulata* Age and maturity data are also not currently available for squid to assess the effect of fisheries on different ontogenetic stages or to monitor spatial distribution of the different ontogenetic stages and spawning migrations. If an assessment is required for squid, assessment methodologies are limited by inaccurate statistical information and the level of bycaught squid in finfish fisheries. The emerging recreational fishery requires quantification to understand sector specific landings.
Veined squid (*Loligo forbesii*)	
Common squid (*Loligo vulgaris*)	

4.4 International fisheries management

This sub-section is focused on scoping out management measures implemented internationally for the same or similar species and has been used to support the development of FMP Chapter 2. Domestic management measures are picked up in Chapter 2 and Annex 4 of the FMP and the summary of both species specific and relevant general international and domestic measures can be found in Annex 3.

4.4.1 Why evidence is needed, and evidence themes addressed for this iteration

To scope out management measures implemented internationally to explore where comparable knowledge, experience and data exists regionally and globally for the species within the scope of this FMP.

4.4.2 Data and methodology used

A review of international management measures was undertaken for several of the species/groups of interest in the FMP. Reviews were based on systematic literature searches adopting the adopt the Reporting standards for Systematic Evidence Syntheses (ROSES) method and ROSES *pro forma* (Haddaway et al., 2018) and based on key word search returns from the search engine Google Scholar. An excel spreadsheet was used to record search terms, their findings and to identify literature available for download.

4.4.3 Summary of findings

Examples of pertinent legislation implemented internationally is set out in Annex 3.

4.4.4 Limitations and challenges

Reviews were completed for cephalopods and elasmobranchs but remain incomplete for roundfish, and flatfishes remain outstanding.

4.4.5 Additional evidence yet to be considered

The known evidence sources yet to be integrated and integrated includes the following report on international fisheries management regimes

- Reeves et al. (2018) An international review of fisheries management. Cefas contract report C7372 285pp available at https://www.researchgate.net/publication/341549803_A_review_of_international_fisheries_management_regimes

4.4.6 Emerging evidence gaps

The following evidence gaps have been identified (Table 7)

Table 7. International fisheries management evidence gaps

Evidence gaps	Justification
Scoping out what species-specific management used internationally and how successful	Further work assessing the full extent of international management and their known successes for all species but especially for multi-species fisheries and flatfish species from the FMP would be useful as this work was not completed as part of this phase of work.

4.5 Ecosystem interactions

This sub-section supports Chapter 6 of the FMP underpinning the wider environmental goals of the FMP. Further detail is provided in Annex 4:

- Overlap and risk to features afforded protection through Marine Protected Areas
- Overlap and risk to Good Environmental Status
- Sensitive species bycatch and associated impact
- Protected endangered and threatened species
- Fish habitats

4.5.1 Why evidence is needed and what evidence was sought

The primary aim of this advice is to help guide the long-term work of the frontrunner FMPs by identifying what initial actions they can take to contribute to the achievement of Good Environment Status (GES), the overarching aim of the UK Marine Strategy.

4.5.2 Data and methodology used

As the statutory nature conservation bodies, Natural England and JNCC provided written advice to MMO on nature conservation issues related to demersal non-quota species fisheries related in Secretary of State waters. This advice encompassed

- MPA Risk Assessment
- Wider Seas (beyond MPAs) Risk Assessment
- Risks arising from FMPs to UK MS Descriptors: Interim advice by gear type

Conservation and protection information was extracted from Defra commissioned work (MF1287 – section 13) that collated evidence underpinning Fisheries Management Plan development.

Fish habitat analysis drew insights from limited but relevant literature produced by MMO, Cefas and Natural England.

4.5.3 Summary of findings

Detailed findings are provided in Annex 4 and summarised in support of the FMP within Chapter 6 of the FMP.

4.5.4 Caveats and limitations

Data deficiency is a significant challenge for example limiting IUCN extinction risk assessments. Where it exists, data is usually limited or inadequate for desired purposes e.g. to determine the population level consequences and impacts on delivery of MPA objects resulting from specific levels of bycatch or to identify fish habitats.

4.5.5 Additional evidence yet to be considered

For bycatch there are current initiatives are outline by the Marine wildlife bycatch mitigation initiative that brings together, and builds on, existing work such as the UK Bycatch Monitoring Programme and Clean Catch UK trialling a range of monitoring and mitigation measures in different fisheries along Cornwall's south coast (7e), a high-risk area for bycatch. Data such as bycatch self-reporting generated is yet to be explored. Further fish habitat work is awaiting publication from both Natural England commissioned research and from Marine Scotland under the ScotMER programme.

4.5.6 Emerging evidence gaps

The following evidence gaps (Table 8) have been identified

Table 8. Ecosystem interactions evidence gaps

Evidence gaps	Justification
Bycatch levels specific to the FMP relevant fisheries and area	Developing existing programmes such as the UK bycatch monitoring programme to assess additional data e.g. through REM or self-reporting or more targeted modelling such as that employed for considering wind impacts may be relevant considerations. Map out species sensitive to bycatch and associated impact
Describing seabed integrity	To understand extent, unity and functioning (collectively integrity) of seabed ecosystems and its change in time and space. High integrity provides robust and resilient systems. Fishing is a pressure that can impact integrity.
Implication of the candidate Highly Protected Marine Area	There is a candidate Highly Protected Marine Area (Dolphin Head) identified for approximately 55km south of Selsey Bill, West Sussex. It is yet to be considered here
Identification of fish habitats	Identification of fish habitats is the precursor to appropriate management and protection to areas that have a disproportionate contribution to the survival of fishes and thus contribute to fish stock health and sustainable fisheries
Explore natural capital approaches to FMP iteration and decision making	A natural capital approach to policy and decision making considers the value of the natural environment for people and the economy

4.6 Economic evidence

4.6.1 Why evidence is needed and what evidence was sought

This sub-section is focused on the economic evidence including:

- Fisheries landings data
- Direct economic performance and benefits for the commercial fleet
- Economic benefits of the recreational sectors targeting NQS

4.6.2 Data and methodology used

Data on fisheries landings were analysed by species, catching nation, gear, vessel size, ICES area, landing port location and seasonality. Values given over a 5-year timeseries from 2016-2021 were averaged to provide a 'per annum' value and summarised. Price per tonne of landed fish was calculated from the averaged per annum value and averaged per annum landed weight.

Data provided through the Seafish evidence commission, giving fleet performance, fuel prices and employment figures were summarised as part of the evidence.

4.6.3 Summary of findings and emerging evidence gaps

A summary of the findings can be found in Annex 5 of the FMP.

4.6.4 Caveats and limitations

The commission was focused on the reliance of vessels on the focal species of this FMP, economic performance indicators, and employment in terms of fixed term employment (FTEs). It did not explore wider economic links.

4.6.5 Additional evidence yet to be considered

None recorded

4.6.6 Emerging evidence gaps

The following evidence gaps have been identified

Table 9. Economic significance evidence gaps

Evidence gaps	Justification
Mapping out the economic benefits from local vessels to local communities.	The economic significance of local vessels to local ports, and their reliance on these species has not been included in the evidence gathered for the first iteration of the FMP. Data focused on vessels, ports and species which bring in the most value blur the relative importance of smaller vessels to coastal ports, and therefore need to be assessed to understand impacts of changes to FMP management to the most dependent fishers and communities.
Drivers behind employment in the Channel demersal NQS FMP.	Identification of the primary drivers in the change of employment in the Channel demersal NQS fishery is a clear evidence gap that has not been addressed in the development of the first iteration of the FMP.

Evidence gaps	Justification
Economic benefits of the recreational sector.	Economic benefits, both indirect and direct, from recreational fishing and tourism are not very well understood. As this is potentially a sizable contributor to seasonal community income, more needs to be done to understand the value of the sector and identify opportunities to promote it.
Understanding and forecasts surrounding falling economic performance.	The fishery has been on a declining trajectory for economic performance since 2016. Further research will be required to determine the drivers behind this, what impacts this will pose to the fishery in the future, and what if anything can be done about it.
Mapping indirect economic benefits (natural capital) across the commercial fleets.	By broadening our measurements of economic value to include more indirect indicators, we are better placed to be able to address goal two - 'better understand and optimise social and economic benefits' together with the sustainability objective (at a fisheries level) and the national benefit objective. Restricting economic value to first sales data, number of boats and fishermen is very limiting, and we should aim to go beyond the status quo. This would also help to address gender aspects, particularly when many of the 'indirect economic values' of fisheries are linked to women's roles and activities
Mapping out economic consequences of equal and equitable access across the heterogenous sectoral landscape.	To justify how the FMP will manage the fisheries in a manner to address the wider environmental and social concerns. This is linked to the equal access and national benefit objective at a fisheries level. To link equal access and the national benefit objective, the evidence need is three-fold i] the benefits and burdens of access to marine and fisheries space ii] availability of marine space and fishing opportunities and iii] capabilities approach to marine space and fishing opportunities (including markets). The resulting information addresses evidence gaps on for example, reliability of markets, resilience within fishing communities, affordability of fishing and decarbonisation towards carbon neutrality.
Map out relative importance of these species by community dependency.	The data presented through the evidence commission highlights quite clearly the most important ports and species by volume of weight and value landed. This provides an overall picture for the fishery but does not capture the reliance on a per vessel/per port basis. Channel demersal NQS may present a relatively high proportional income to many of the smaller coastal landing locations, signifying a higher level of dependence and relative importance.
Fuel consumption and price analysis.	Understanding the fuel consumption and impact of and vulnerability to fuel prices of the fishery is relevant to understanding fishery profitability and climate pressure from emissions.

4.7 Social evidence

This sub-section is focused on the social and cultural evidence. To date, social evidence has not been collected for this FMP, therefore, this sub-section has focused on setting out the emerging evidence gaps (Table 10).

Table 10. Social evidence gaps

Evidence gaps	Justification
Improved evidence baseline	
Design and trial methods to collate fisher's knowledge (both commercial and recreational components) in a manner which provides scientific rigor to anecdotal evidence gleaned from both commercial and recreational components.	This is necessary to improve our knowledge and help fill pertinent evidence gaps regarding the fisheries, the wider environment and the communities which depend on it. This in turn will enables informed decisions to be made. This local knowledge may also open new areas of investigation which may not be picked up from high level environmental research undertaken by experts not so embedded in the local context.
Design and trial methods to facilitate participation in scientific collection processes.	This is necessary to encourage and enable wider participation in the data collection process to develop our evidence base and support the development of more informed decisions. This provides a transparent and open process which should counteract known issues of trust between the industry, anglers, management and scientific community.
Trial methods to present the underpinning data to ensure it is user friendly for a range of audiences.	This is necessary to ensure that the evidence is communicated in an accessible way to wider stakeholder groups so that they can understand the key findings used to underpin the FMPs management outcomes.
Optimising social benefits	
Map the social (including heritage, wellbeing and cultural) benefits and how contributions flow from pertinent fishing fleets into their affiliated coastal communities and vice versa.	By understanding what these benefits are and where they feed into, we are best placed to put measures in place to optimise said social and economic benefits.
Develop historical context of the pertinent fisheries to understand their operational landscape.	This would help us understand cultural and heritage values associated with the fisheries and why these fisheries have gained importance. This means we would be well placed to understand the associated sensitivities and put measures in place to support and build on these values.
Map out barriers to benefits being actualised (to include both direct, i.e.	By understanding what barriers exist, we can examine how management outputs could address this within

Evidence gaps	Justification
regulatory, and discreet, i.e. conflict barriers).	the existing landscape to optimise local social and economic benefits.
Develop indicators to support an appropriate social impact assessment.	This would enable us to predict and avoid (where possible) local and national social and economic impacts.
Develop indicators to develop a social and economic baseline to support an evaluation to follow impacts and monitor where and at what level social and economic benefits are realised.	This would enable us to monitor how and if social and economic benefits are being realised because of management outputs.
Map out adaptive capacities of associated fishing operations together with barriers adaptation.	To enable us to understand how the industry may respond to new management objectives and where adaptive capacity may be hindered or encouraged. This will help us predict ‘unintended consequences’ of management measures as well as where we can offer support resilience.
Map out the social consequences of equal access across the heterogenous sectoral landscape.	To help us understand how a move to facilitate equal access may create local impacts or benefits.
Develop and trial trade-off methodology.	This will enable us to better understand how to balance conservation objectives with social and economic objectives.
Engagement and capacity building	
Investigate how to map out community networks to develop and evolve the engagement and communications plan.	To help us understand how we can best work with, and through, target communities.
Scoping out what matters most to different parts of the fishing sector to enable them to live well.	To develop management outputs which can support fishing communities in building their resilience and working in a way which is more harmonious with the environment.
Identify capacity needs, i.e. skills needed, to pursue both alternative opportunities within the industry or alternative pathways to income, or to engage in a meaningful manner.	To develop management outputs which can support fishing communities in building their resilience and working in a way which is more harmonious with the environment.
Behavioural incentives	
Investigate and trial how to incentivise gear modification to avoid bycatch.	To support a move towards greener operations. This is linked to the bycatch objective, climate change

Evidence gaps	Justification
	objective and ecosystem objectives at a fisheries level.
Investigate and trial how to incentivise a move to green operations in terms of blue carbon.	To help understand how to support a move towards greener operations. This is linked to the bycatch objective, climate change objective and ecosystem objectives at a fisheries level.

4.8 Climate change (mitigation and adaption)

This evidence section supports Chapter 6 of the FMP.

4.8.1 Why evidence is needed and what evidence was sought

The fisheries objectives, as set out in the Fisheries Act (2020), collectively define sustainable fishing and balance the achievement of a thriving, profitable seafood sector with a healthy and resilient marine environment in the long term. The Fisheries Act (2020) and JFS recognise the significance of the climate change through a specific climate change objective in the Fisheries Act (2020).

The JFS notes "responding to climate change within the seafood sector requires consideration of both how the sector can mitigate climate change and how the sector can adapt to climate change". This sub-section therefore explores:

- Climate change impacts on focal fish species distribution and behaviour
- Climate change impacts on fisheries
- Climate change pressures generated of fishing

This evidence supports two goals within the FMP related to climate change:

- Understand the impact of, and map species sensitivities to, climate change on Channel demersal NQS
- Identify where climate change mitigation and adaptation measures can be implemented to reduce impacts on the fishery

Currently there is no specific goal in the FMP seeking to reduce the contribution of the fishery to climate change, as relevant under climate change and ecosystem approach objectives.

4.8.2 Data and methodology used

Evidence came from Defra commissioned evidence projects and other key literature identified via non-systematic, non-exhaustive search, including Marine Climate Change Impacts Partnership report cards that specifically examine fisheries.

4.8.2 Summary of findings

Findings are summarised in Chapter 6 of the FMP and in detail in Annex 5 of the evidence statement.

4.8.3 Caveats and limitations

When species specific evidence could be obtained on redistribution of population under climate change, redistribution was generally referenced to national scales and conclusions for the UK EEZ and may not reflect the local patterns within the FMP boundaries. Wider evidence such as the potential for phenology changes and fleet emissions are not FMP species or fleet specific, such that it must be assumed that general patterns and risks identified are applicable within the specifics of the FMP area and associated fish and fisheries.

4.8.4 Additional evidence yet to be considered

- Townhill et al (2019) produced species distribution models that could be reanalysed for changes specific to the FMP area, not just the UK EEZ
- A wider body of academic literature exists than was available in the timeline
- Seafish are updating their review of climate change adaptation in wild capture. Expect delivery March 2023 and publication later
- Parker R, Benson L., Graves C., Kröger S., Vieira R. (2020) Carbon stocks and accumulation analysis for Secretary of State region: (2021) Cefas Project Report for Defra, 42 pp. available at Science Search (defra.gov.uk)
- The UKRI funded MSPACE project[10] will produce interim project deliverables in the near future

4.8.5 Evidence gaps

A range of evidence gaps relevant to considering climate change and the FMP are detailed in Table 11 below.

[10] Marine Spatial Planning Addressing Climate Effects (MSPACE) https://www.smmr.org.uk/funded-projects/marine-spatial-planning-addressing-climate-effects/ under the Sustainable Management of UK Marine Resources (SMMR) Strategic Priorities Fund.

Table 11. Climate change adaptation and mitigation evidence gaps

Outstanding evidence gaps	Justification
Undertake research into the impact of climate change on Channel demersal NQS.	Adapt the fishery management strategy to align with species sensitivities.
Explore species distribution, centres of population and changes in habitat suitability at the local scale.	Understand distribution of species and change in abundance within the FMP area.
Develop Species Distribution Models for missing species and improve confidence in existing models.	Understand distribution fop? species and change in abundance within the FMP area.
Collate or collect further information on phenology to explore any changes in focal species.	Monitoring for and assessing the impacts of climate of stocks.
Incorporation of ongoing research including Seafish and MSPACE project that aims to support government in designing and implementing economically viable and socially acceptable climate-smart marine spatial plans.	Using best available evidence in decision making.
Explore FMP level fleet emissions and opportunities for alternative fuels.	Understand the contribution of the fisheries in scope of the FMP to greenhouse gas emissions and opportunities for greening the fleet.
Research will be undertaken to identify opportunities to implement climate change mitigation and adaptation measures.	Climate adaptation and mitigation are aligned with work being delivered externally / nationally.
Continue work programmes to understanding UK continental shelf carbon stocks and the impacts of trawling disturbance	Better understand impacts to the wider system resulting from prosecuting fisheries in scope of the FMP.

4.9 Performance indicators, monitoring and evaluation

4.9.1 Why evidence is needed and what evidence was sought

Evidence generated by monitoring is required to meet the legal requirement under Section 11 of the Fisheries Act (2020) that places a duty on Defra to report on the extent to which the FMP has been implemented and how associated management measures have affected the stock levels. Monitoring will also inform on progress towards plan goals. Well thought-out monitoring against relevant targets and indicators have a number of functions including;

- describing what success looks like
- tracking progress towards objectives and potential for contribution to wider policy agendas
- identifying needs for change or improvement (amending the plan and learning by doing)

4.9.2 Data and methodology used

Logic models were developed that described the process by which change is expected to be delivered. A logic model approach is in line with Magenta Book, Central Government's guidance on evaluation. The logic model which (provided in FMP Section 8.1), once constructed, forms a basis upon which to identify monitoring need.

Existing indicators that may be utilised were identified from key existing monitoring associated with policy areas including the UK Marine Strategy (UKMS) and the 25 Year Environment Plan (YEP). This was supplemented by a non-systematic review of literature pertaining to fisheries related indicators. Data sources identified by stakeholders during engagement events have also been explored for their potential use in monitoring the FMP.

4.9.3 Summary of findings

Potentially relevant existing indicators that would benefit from deeper exploration were identified, including for example source data and lag times, reporting frequency etc. MMO has proposed several new indicators based on existing data, for example to assess levels of engagement and the development process. Further indicators may require all new data collection, analysis and interpretation as indicators, including, for example, REM or angling club historic data sets.

4.9.4 Caveats and limitations

The ambition of this ES is that the FMP is evidence-led not just in development but through all stages including use, evaluation, and amendment, and as such becomes an adaptive process that enables changes to be made as and when evaluation and evidence requires. Defra are assumed to be the lead body for monitoring the FMP and ensuring that the monitoring approach is fit for purpose.

As there are still questions around who owns the ES and the FMP monitoring requirements as well as what resources will be available for both, the ES presents suggestions for monitoring below. The MMO suggests that Defra adopt a programme wide monitoring approach to ensure consistency across all FMPs and to relieve pressures on resources for all organisations involved.

4.9.5 Additional evidence yet to be considered

At present there is no outstanding evidence. However, developing indicators to monitor the effects and effectiveness of FMPs explicitly tied to the FMP goals and outcomes is sought. Further examination of identified indicators and potential evidence gaps may occur as FMP goals solidify.

4.9.6 Evidence gaps

Some dimensions of the FMP goals are expected to be well serviced by indicators, for example environmental outcomes, may draw on GES descriptors and the extensive monitoring associated. Other dimensions, notably social indicators require substantially more work and are recorded as evidence gaps. These are listed in Table 12.

Table 12. Indicator, monitoring and evaluation evidence gaps

Outstanding evidence gaps	Justification
Indicator baselining.	A baseline allows you to describe the process, state or context at a set time to compare change over time to?
Indicators describing progress of goal to optimising benefits for coastal communities.	Adapt the fishery management strategy to align with species sensitivities.
Develop social indicators for procedural/ participatory justice and recognition and mis-recognition as justice.	Required to realise the impacts of good governance, such as transparency, the flow and timeliness of information from relevant authorities to interested parties and stakeholders, and to understand change in cultural norms, values and representation in fisheries management. Includesinequities, inequalities, and injustices of heterogeneous fishing groups.
Collection analysis and interpretation of existing or emerging data as indicators, for example REM or angling club historic data.	Understand distribution fop species and change in abundance within the FMP area.
Indicators for monitoring the social and indirect economic value of the NQS fisheries to coastal communities.	There is a lack of indicators for the social and indirect economic value of fisheries. Indicators need to collect data that can be used to assess cultural aspects of the fishery and what value this brings to coastal communities.

5 Proposed measures

There are an extensive set of potential interventions available to fisheries managers to ensure stocks are exploited sustainably and wider impacts of fishing are managed to deliver social and economic benefits long term. Frequently, these management measures can act to control fishing effort shaping who, when, where and how fishing is to be conducted. Measures may also control what is caught, the weight and size of species caught or the composition of the total catch and bycatch. However, interventions may also include voluntary codes of conduct, evidence collection and monitoring programmes.

Measures proposed reflect those set out in Chapter 5 of the FMP, but are discussed here in detail, setting out the terms of their justification, proposed timelines and how they link to the goals.

5.1 Proposed general measures

5.1.1 Towed gear measures

Recommendation and timeframe

We recommend considering building an evidence base to evaluate viable options for towed gear management measures in ICES area 7d and 7e. We recommend this is considered in the medium to long-term, in particular in relation to 0-12nm, which could enhance stock sustainability and deliver social and economic benefits to the whole sector.

Justification

Engagement identified stakeholders concerns on the impact of towed gear fishing on the inshore stocks, and the impact this has on the inshore fishers and dependent local communities. Measures could aspire to reduce the fishing pressure within the 12nm area of the coast, support the inshore fleet and coastal communities and potentially reduce environmental concerns around benthic habitat integrity.

Further Commentary

A medium to long-term time frame allows for additional evidence gathering including on how many vessels possible measures might affect, effectiveness of possible measures for protecting these stocks, and to understand the impact of displacement on the marine environment beyond 12nm. Consideration will have been given to the implications for the TCA. Evidence should be gathered alongside existing programmes such as Celtic Sea measures and the Lyme Bay consultation which are due to be reviewed this and next year.

5.1.2. Minimum Conservation Reference Sizes

Recommendation and timeframe

We recommend that a minimum conservation reference size is implemented for cuttlefish (23cm), lemon sole (25cm), brill (30cm) and turbot (30 cm). We recommend this is implemented within one to two years (short term).

Justification

Cuttlefish, lemon sole, turbot and brill were identified as key species to prioritise being the dominant non-quota species included in the FMP relative to the other non-quota species. Landings data for these species and their life history are described in Annex 5 of the FMP and Annex 2 of the ES including sizes at maturity and spawning behaviour. In all cases age at maturity data suggest catches include juveniles that have not yet reached reproductive age.

This measure is intended to protect juvenile fish from being landed when using more specific gear such as fixed nets.

Further Commentary

MCRS for lemon sole, turbot and brill was discussed during both rounds of stakeholder engagement and was highlighted by commercial stakeholders. It was deemed a simple measure to implement and could significantly help these fish populations, especially brill.

A range of similar measures exist such as Southern or Cornwall IFCA measures or have previously existed that are informative in defining the MCRS thresholds proposed (see Table 13).

Table 13. Species specific size restriction including historic minimum landing sizes, current EU market sizes and existing IFCA minimum conservation reference sizes compared against FMP recommendations

Species	FMP recommendation	Historic MLS	EU market sizes	IFCA MCRS
Cuttlefish	23	None	None	None
Lemon sole	25	25	25	25
Brill	30	30	None	30
Turbot	30	30	None	30

This is a precautionary measure as we do not have the research to back up survivability of these species once caught but this is something we are intending to gather in the short-term. We have aligned our recommendation with the IFCA MCRS in the short term while the FMP establishes appropriate MCRS for the stock and fishery. We will monitor the effectiveness of the measure over the next few years to see if it is influencing the discards or any unintended consequences.

Implementing a MCRS for turbot, brill and lemon sole in all or part of UK waters of area 7 would prevent landings of low value product. This would prohibit landings of specimens below MCRS caught in that area, and any undersized species would need to be discarded. Catches below MCRS taken in EU waters could legitimately be retained on board and marketed although the MCRS could be extended to EU waters for UK vessels.

Although there are some consequences such as diverging rules, these are not significant except for the potential extension of TAC areas which would nullify the objective as the landing obligation would apply. However, this extension would potentially be a medium-term goal under the Southern North Sea Flatfish FMP so until that is implemented the MCRS should have a benefit.

5.2 Additional species-specific measures

5.2.1 Additional cuttlefish specific measures

Recommendation and timeframe

(In addition to MCRS for Cuttlefish (23cm)).

This FMP proposes the introduction of codes of practice on cuttlefish trap handling within one to five years (short/medium term), introduction of underwater structures (where compatible with wider environment) to benefit egg deposits within one to five years (short/medium term), and temporary seasonal closures within one to two years (short-term).

Justification

Codes of practice on cuttlefish trap handling and Underwater structures to benefit eggs

The use of traps has been encouraged as a low impact fishing method specifically targeting spawning cuttlefish, which are at the end of their life cycle (e.g., Dunn 1999). However, female cuttlefish can lay eggs on the traps, which if removed leads to egg mortality and ultimately loss of recruitment. Impact of egg mortality from cuttlefish traps has yet to be quantified within the English Channel but is of concern for fishermen (including during our engagement), scientists, and fisheries managers. Southern IFCA operates a voluntary code of conduct for their cuttlefish fishers stating best practice to leave their traps or pots in the sea after the fishing season has ended until egg hatching (Southern IFCA, 2018). In engagement, The Blue Marine Foundation made the recommendation to implement Codes of Practice on cuttlefish trap handling to reduce egg mortality and investigate trap modifications, such as the inclusion of egg-laying ropes.

In the short to medium-term we recommend implementing a code of practice on cuttlefish trap handling to reduce egg mortality. During our stakeholder engagement we heard multiple times that eggs were being washed off traps as they made the trap too heavy to pull up or it was deemed easier to wash them off to haul. This would help the stock as it would increase recruitment if more eggs survived to adulthood. Research would be needed to develop this code of conduct, working alongside the industry and organisations like Seafish is the best way this can be developed and implemented.

We recommend for a short- to medium-term management strategy to look at underwater structures that could benefit eggs. For example, include egg laying ropes on traps or protecting existing breeding habitat such as seagrass. This would also help the stock as it will increase recruitment. Evidence on the best modifications would need to be gathered and work alongside industry to develop this.

Temporary seasonal closures for trawlers

Short term management could look at seasonal restrictions for trawlers to protect juvenile cuttlefish. Cuttlefish short life expectancy of two years also needs to be considered in this management strategy. A seasonal measure would protect critical spawning seasons from high impact fishing gear. This was also suggested in the proceedings of Blue Marine Foundation's Cuttlefish Symposium[11]. The highest level of recruitment tends to be during Autumn (Challier et al, 2005[12]) (however smaller levels of recruitment occur throughout the year). This suggests that upon recruitment sites being identified there should be a seasonal closure of these grounds, to ensure the highest recruitment numbers for future stocks, as this has been outlined previously as a potential issue for cuttlefish populations. More evidence would need to be collected for this management measure to be effectively implemented. The actual spawning patterns and recruitment evidence would need to be collected for the Channel stock and determined. This is a short-term management recommendation, over one to two years depending on evidence collection.

Once implemented we will monitor the effectiveness of the measures to see if they are having a positive effect on the stock and take note of any negative effects such as discards or any unintended consequences. The measures will be flexible and adaptable if this was to happen.

Further Commentary

Landings data for these species and their life history are described in Annex 2 of the FMP and Annex 1 and 2 of the ES.

The trap fishery also has some inshore restrictions. The Sussex IFCA Shellfish Permit Byelaw restricts the number of traps or pots that can be deployed by any single vessel when targeting cuttlefish to 300 within the Sussex IFCA district (Sussex IFCA, 2018). Southern IFCA operates a voluntary code of conduct for their cuttlefish fishers. This states that it is best practice for fishers to leave their traps or pots in the sea after the fishing season has ended, allowing for any cuttlefish eggs deposited on the traps to complete gestation and hatch (Southern IFCA, 2018).

International management of cuttlefish is limited. Fisheries that operate along the coast of Normandy, France, function under a licence system designed to limit fishing effort and access to the fishery. In France, inshore trawling is banned within the 3nm limit. However, some exemptions are given in specific coastal zones during spring and late summer (International Council for the Exploration of the Seas, 2017). There are also some restrictions imposed to trawling through IFCAs along the English Channel which will indirectly benefit cuttlefish (see legislation review).

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11 Blue Marine Foundation (2022). Cuttlefish Symposium 2021 Proceedings Report available at Blue-Marine-Foundation-Cuttlefish-Symposium-Proceedings-Report_WEB-FINAL.pdf (bluemarinefoundation.com accessed 18/05/23

12 Challier et al. (2005) Environmental and stock effects on recruitment variability in the English Channel squid Loligo forbesi Aquatic Living Resources 18: 353-360

5.2.2 Additional octopus measures

Recommendation and timeframe

This FMP proposes that monitoring arrangements are introduced to enable catches to be monitoring and for evidence gathering to commence. We recommend this starts within one to two years (short term).

Justification

The octopus fishery was identified by stakeholders as although catches have remained consistent over 2016-2021. 173 tonnes of octopus was landed from 7d and 7e in 2016 and 191 tonnes being landed in 2021. We recommend monitoring the octopus fishery as it emerges as it could end up becoming a profitable targeted fishery like cuttlefish in the future if the value of them increases.

Further Commentary

From literature reviews measures such as closed areas worked previously for the MSC certified Octopus fishery in Spain. In Spain a maximum capture weight is also set as well as mesh sizes for bottom trawling. We need to gather more evidence before considering any management or if there is any need for management.

5.3 Additional fisheries specific measures

5.3.1 Flyseining measures

Recommendation and timeframe

Short-term

- We propose introducing an engine restriction of 221kw in ICES areas 7d and 7e in UK waters 0-12nm for flyseiners.
- We propose that all flyseiners use 100mm mesh as standard.
- We propose considering a gross tonnage limitation of 300GT for all flyseiners.
- Subject to the outcome of the Consultation on Expanding the Use of REM in English Waters, we propose introducing an early adopter scheme that would become mandatory in time.

Medium-term

- We propose introducing MCRS for gurnards, red mullet, bib commonly captured in flyseines
- We propose considering further consultation with further details of introducing a permitting scheme for flyseiners

- We propose considering an overall engine size limitation to 600kw for all flyseiners
- We propose considering days at sea/time spent in area scheme for flyseiners or seasonal closure for flyseiners
- Subject to the outcome of the Consultation on Expanding the Use of REM in English Waters, we propose that REM becomes a mandatory requirement
- We propose considering potential maximum rope diameter
- We propose considering potential maximum rope length

Justification

Flyseining (also known as fly dragging, fly shooting or Scottish seining) was identified as an issue based on multiple stakeholder engagements and by Defra who conducted a public consultation on flyseining in 2022. The government response to the consultation will be published soon, but the response showed a strong support for action, with 78% in favour of introducing some form of measure to manage flyseine vessel pressure. There was a more mixed response on the specific proposals, though removing the derogation that allows for a 40 mm mesh size for a targeted squid fishery received the most and clearest support: Defra are looking at taking forward an SI to remove the squid derogation in English waters. Other measures require further consideration and are covered in this FMP.

This FMP proposes the implementation of a mesh size of requirement of ≥100mm for all flyseiners. This would mean the 80mm mesh derogation be removed. This measure seeks to enhance sustainable yield by improving escape of smaller individuals of the species being targeted, in this case squid, red mullet and gurnards.

Stakeholder concerns are particularly from the English inshore sector and NGOs. Occurring over the last 18 months concerns relate to increasing efficiency of larger flyseine vessels and flyseining impact on demersal NQS stocks such as red mullet, gurnard, and squid and seafloor habitats. As such stakeholders have called for urgent management interventions applied to EU and UK vessels

Introduction of a vessel size restriction (power and weight) were suggested as part of the Defra flyseining consultation, which could work in conjunction with other measures proposed to limit flyseining impact, such as an engine size limitation and rope restrictions as a precautionary measure across FMP waters whilst further evidence is gathered through a monitoring programme.

The FMP proposes to consider a limit of 221kw inside 0-12nm to all vessel types including flyseining. The existing power measure has already proven to be effective for managing pressures of large vessels in the sea space used by the inshore fleet. It was said engine power is not a main component of the flyseining fishery, however it was suggested it could work alongside other measures.

Subject to the outcome of the Consultation on Expanding the Use of REM in English Waters, the FMP recommends introducing an early adopter scheme on board flyseiners that would become mandatory in time.

The FMP proposes considering a permitting scheme for flyseiners. This could help to regulate flyseine fishing in the English Channel. This could allow effort to be monitored and restricted if necessary, as a scheme would ensure the number of vessels in the fishery did not increase dramatically. This could also help provide a mechanism to impose measures on these vessels.

The FMP proposes to consider either days at sea or time spent in area with gear on board for the flyseiners as a precautionary measure. Another potential is to introduce seasonal closures if this is deemed more effective for preserving stocks. This could restrict flyseine fishing effort and is considered measurable, therefore, simpler to enforce. Data could be gathered on how this measure helps to reduce the unsustainable impact on Channel demersal NQS and help to determine if regulating days at sea or introducing a seasonal closure could be effective at sustainably managing fishing impact.

Further restrictions could help to reduce the efficiency of the flyseine fleet. This was a suggestion proposed through the flyseining consultation. Rope length was also suggested as a way of limiting effort. These measures alongside the introduction of engine size limitations would seek to reduce fishing pressure on Channel demersal NQS stocks while further evidence is gathered to fully understand the impact on the stocks and the environment. There might be the potential to measure rope length via devices on board vessels that record the rope length shot and hauled as well as VMS and AIS tracks. Rope diameter is considered less effective as there is concern that changing from ropes to cables would get around this measure or increase rope length to combat a smaller diameter. However, this all needs more evidence to be gathered to determine this.

Combined all these measures should help to reduce the flyseining effort on NQS. There is an overall management approach with suggesting combined measures of restricting engine size, rope diameter and increasing mesh size to 100mm for flyseining gear.

Further Commentary

On 12 July 2022, the European Parliament Fisheries Committee voted in favour of an amendment to the EU’s Access Regulation to ban Belgium and Netherlands fleets from demersal seining in French territorial waters (0-12nm), following reports that the technique was having a “devastating” effect on local fishers. While this did not have the power to ban the fishing method, MEPs said the vote sent an important message to decision-makers about the impact of flyseining on coastal fishing communities.

In this FMP these are precautionary measures based on serious concerns from the industry. On the back of Defra's 2022 flyseining consultation, we have developed these measures which we deem to be the most effective given the best available evidence we have to date. As we gather more, we will be able to implement more effective measures or revise existing measures to suit the evidence.

5.3.2 Recreational measures

Recommendation and timeframe

We recommend the introduction of voluntary guidelines and education setting out how recreational fishers can fish more sustainably. This should include voluntary MCRS information, guidance on methods and equipment to reduce damage to fish, as well as information on how anglers can handle and release fish to reduce post-release mortality.

We have also recommended that opportunities to how to enable and encourage recreational fishers to input evidence and data to compliment the FMP are scoped out and trialled.

Justification

The purpose of these is to support evidence gathering, engagement and partnership working with the recreational sector. They should encourage the introduction of good practices to improve sustainability of the stocks. Guidelines and education provided on a voluntary basis to anglers intend to promote sustainability across the sector. This should include a voluntary minimum landing size suggested to anglers for each species that does not have a compulsory MCRS applied currently to ensure that only mature fish are kept, and juveniles are released. This should include actions to make these voluntary guidelines, relevant compulsory measures, and IFCA byelaws within 6nm clear and accessible to all recreational anglers, particularly those who are new and unfamiliar with the sport.

Further voluntary measures suggested to anglers fishing in all UK English Channel waters will help reduce mortality to fish that are intended for release. This will include education on the use of less damaging gear, such as the use of barbless or circle hooks, as well as guidelines and education on handling and release protocols such as the use of landing nets and procedures to address barotrauma. This is particularly important for species like bib, smoothhound and dog fish which are regularly caught by recreational anglers but are less likely to be retained.

Further Commentary

Here, the FMP recommends involving the Angling Trust to gain traction and understand their existing guidelines and help them to become more widespread in the recreational fishing community.

As part of efforts to continue to involve the recreational sector as key data collection partners and continue to build a robust evidence base of recreational data, additional opportunities where recreational fishers can input into evidence gathering needs to be understood.

Stakeholders clearly voiced support for a sea angling license if funding gathered from the sale of licenses were to be used to promote the sector and the stocks/habitats it depends on. Whilst Defra has no current intention to introduce a sea angling licence, and the introduction of a licence is beyond the scope of this FMP, work to evaluate the appropriateness of this measure could be considered as an evidence need.

Annex One: Fisheries overview

A1.1 Data and methods

A1.1.1 Source

Data combined UK (2012-22) and EU (2013-21) landings data. UK data was sourced from MMO Sea Fisheries Statistics, EU data from STECF Fisheries Dependant Information product.

Landings provided are estimates due to national apportionment (outlined below) and subject to change based on any future iterations and improvements to the apportioning method.

Weight of landings is live weight tonnage. Value is nominal i.e., not adjusted for inflation and derived from first sale landed value in pounds sterling (£GBP).

Data are presented at two-time scales:

- 2016-2021 is used to describe the current status of the fishery (usually as annual averages or cumulative values)
- 2013-2021 includes further historic data to explore change in EU27 and UK landings through time. This timeframe is limited by access to the EU data.

At this time there is no intention to explore more historic data. 2022 data would be available from early 2024 after publication of the next UK Annual Fisheries Statistics in September 2023 and the EU27 data from STECF Fisheries Dependant Information publication in February 2024.

A1.1.2 Apportionment

All landings data provided use reported landings data as input but become landings estimates due to the need to spatially apportion landings reported at ICES rectangles to the scope of the FMP for administrative boundaries that do not match ICES boundaries. 2012-20 data requires apportioning to UK waters. ICES rectangle spatial factors are used to apportion landings between different EEZ based on the spatial sea surface area that falls within each country's waters. This assumes landings were made evenly over the surface area of an ICES rectangle which may not be the case. From January 2021 onwards fishers had to report whether they fished in UK waters or not, as such apportionment is not required from 2021 onward and reported data was used instead. As data for this FMP is limited to 7d (east Channel) and 7e (west

Channel) there was no need to consider apportionment among UK nations for 2021 data.

Landing estimate uncertainty is larger for this FMP than for other FMPs progressed to date given the FMP surface area to shared boundary ratio that this FMP has.

A1.1.3 Species codes inclusion

Landings are recorded against 3 letter codes that define the species, or if necessary, a more generic group e.g. genus, family or other grouping. Bib (BIB), brill (BLL), lemon sole (LEM), turbot (TUR) and john dory (JOR) are all represented by species level data in which we have confidence.

The smoothhounds are also reported to species level as stary smoothhound (Spp. = SDS) and common smoothhound (Spp. = SMD). MMO catch recording guidance[13] provides for both options. However, there is ongoing low confidence in the ability to separate these species at sea and suspicion that records of common smoothhound are almost totally starry smoothhound. Thus, these data were aggregated for analysis at Genus level (smoothhounds, *Mustelus* spp.) and coded in data as SDS*.

Two species have both species level data and genus data; striped red mullet (MUR+MUX) and lesser spotted dogfish (SYC+SYX). Most catches of striped red mullet are recorded under MUR (in excess of 1000t tonnes in some years e.g. 2019-2021). Less than 2 tonnes of landings are given under the generic code (surmullets nei = MUX) annually. MUX may include some striped red mullet or the more Lusitanian species *Mullus barbatus*, which can occur in the FMP area. Given the small impact MUX makes on statistics (~0.2% relative to MUR landings), MUX records were retained on the assumption it is mostly striped red mullet when captured in UK waters. The two landing codes were aggregated and assumed to be at species level i.e. striped red mullet (MUR+MUX=MUR*).

For lesser spotted dogfish (small spotted catshark), there has been a drive to improve accuracy of data recording. Before 2016 about 10% of landings were recorded as SYX. Current levels are around 2%. MMO's latest catch recording guidance includes a request to use SYC over SYX. These suggest much of the SYX coded landings are synonymous with SYC. The two landing codes were aggregated and assumed to be at species level i.e. lesser spotted dogfish (SYC+SYX=SYC*).

Gurnards are reported at both species level and family level. For example, these include grey (GUG), red (GUR), and tub (GUU) gurnards, and the higher "Gurnards,

13 MMO (2023) Catch recording guidance v1.5, available at [CR_Guidance_v1.5_April_23.pdf (publishing.service.gov.uk)](https://assets.publishing.service.gov.uk) accessed 25/05/23

searobins nei" group (GUX). Grey, red and tub gurnards are the three most common species in UK waters although long-finned gurnard (*Chelidonichthys obscurus*), the piper gurnard (*Trigla lyra*) and the streaked gurnard (*Triglopourus lastoviza*) also occur in the UK. Species specific landings data exist for piper gurnard (GUN) in the FMP area but because piper gurnard is not a focal species of the FMP these were excluded. GUX (Gurnards, *searobins nei*) landings were generally between 50% and 95% of those of red or tub gurnard and an order of magnitude greater than grey gurnard and piper gurnard landings and so represent a relevant catch code. GUX is expected to largely contain landings of the three more abundant gurnard species in the FMP area with minor contributions from the rarer species. Thus, we either analysed gurnards individually at mixed levels including both species and family (GUG,GUR,GUU,GUX) or as an aggregated group (gurnards = GUG+GUR+GUU+GUX=GUX*) discounting irrelevant species level data as appropriate.

For common cuttlefish and both octopus, data are only resolved to a taxonomic resolution coarser than family; "Cuttlefish, bobtail squid nei" (CTL) and "Octopus etc. nei" (OCT) respectively. Groups codes are the only option for analysis and so included as is.

Squid are presented at a range of resolutions. The veined squid has three resolutions; species specific data (SQF), potentially genus data (*Loligo spp*. = SQC) and potentially families of squid (*Loliginidae* and *Ommastrephidae* = SQU). Common squid reports under the same genus (SQC) and family codes (SQU) as veined squid but has no species level data. European common squid has species specific (OUL) and family (SQU) reporting. There were very low landings (<1 tonne) recorded to species level (SQF,OUL). SQC had the highest landings, but SQU catches can be notable (between 0.2% and 17% of SQC). Therefore, veined squid data was aggregated into the *Loligo* spp. genus data (SQF+SQC=SQC*). European common squid was aggregated into the higher "various squid nei" data (OUL+SQU=SQU*) and where appropriate *Loligo spp.* was aggregated with various squid nei (SQC*+SQU*=SQU**) to become "squid".

While there will be no double counting (codes are exclusive) using genus, or family level landings data increases uncertainty. If the group includes many species there is potential for species outside the FMP to be included. If, in UK waters the group is represented by a single species, codes across taxonomic levels can be synonymous. Mixed reporting levels usually depends on existing practice, taxonomic expertise and local context. For example, reporting practices vary between UK and EU for some species and the error introduced by including generic codes or focussing only on species specific codes will vary with the relative abundance of the different included species in place and time. As such, it is not initially possible to quantify the uncertainty in landings based on inclusion/exclusion of aggregated landings codes. The analysis has been conservative and included generic codes such that all landings of the focal species are included but some non-focal non-quota species may also be captured.

A1.1.4 The tolerances and limits of data

The analysis conducted below explores a range of factors that may influence landings from the FMP area including year and season, gear type, nationality, and vessels size and can break this down by numerous categories and resolutions. Data is available on the contribution of individuals species or species groups. However, given the FMP is only a small part of English waters, the focal species only a small part of the landing from the FMP area, and each factor has many levels (12 months, 6 size classes for vessels) it becomes possible for data to be cut too finely such that there are many gaps or small changes in landing behaviour or uncommon landing events appear as large changes in proportion. As such analytical decisions have been made throughout as to the level of aggregation appropriate for the analysis and where necessary issues of confidence noted.

The analyses focus on the species of the FMP. However, it is necessary to recall that these species are a subset of the landings by the vessels considered herein. Landings not considered here will include quota species and non-quota species not currently in the FMP that may be deliberately targeted or incidentally caught. Conclusions drawn such as port rankings, dominant size classes or the contribution of the EU27 to landings are only relevant for the focal species of this FMP and should not be mis-interpreted as a generality of all landings from ICES area 7d and 7e or for the focal species outside of this area.

A1.2 Overview of the fishery

A1.2.1 Landings composition

Approximately 17,851 tonnes of focal species were landed annual from the FMP area, 31.7% of which was cuttlefish, 10.7% was lesser spotted dogfish and 10.4% bib. Landings by weight are detailed in table A1, Figure A1.

The UK vessels landings weight is dominated by cuttlefish (46.0%) and a range of secondary species contributing between 5 and 10% including various gurnards (11% combined) lesser spotted dogfish (8.9%), lemon sole (7.8%) and bib (6.5%). EU27 vessels landings were a bit more evenly distributed across species and in addition to those above (in different proportions) also included squid and red mullets contributing more that 5% of landings (table 1).

Table A1 Annual mean landings by weight of the UK and Crown Dependencies compared to the EU27 ranked by species or species group (2016-2021)

Species	UK Wt (tonnes)	% of UK	EU27 Wt (tonnes)	% of EU27	Total Wt (tonnes)	% of Total
Cuttlefish	4,113	46.0	1,554	17.4	**5,667**	31.7
Lesser-spotted dogfish	798	8.9	1,114	12.5	**1,912**	10.7
Bib	583	6.5	1,268	14.2	**1,851**	10.4
Squid	425	4.8	1,162	13.0	**1,587**	8.9
Tub gurnard	132	1.5	946	10.6	**1,078**	6.0
Red gurnard	122	1.4	906	10.2	**1,028**	5.8
Lemon sole	699	7.8	241	2.7	**940**	5.3
Red mullets	269	3.0	668	7.5	**937**	5.2
Gurnards	715	8.0	4	0.0	**719**	4.0
Smoothhounds	248	2.8	457	5.1	**705**	3.9
Turbot	269	3.0	173	1.9	**442**	2.5
Brill	231	2.6	151	1.7	**382**	2.1
John dory	136	1.5	235	2.6	**371**	2.1
Octopus	187	2.1	27	0.3	**215**	1.2
Grey gurnard	6	0.1	12	0.1	**18**	0.1
TOTAL	**8,934**		**8,918**		**17,851**	

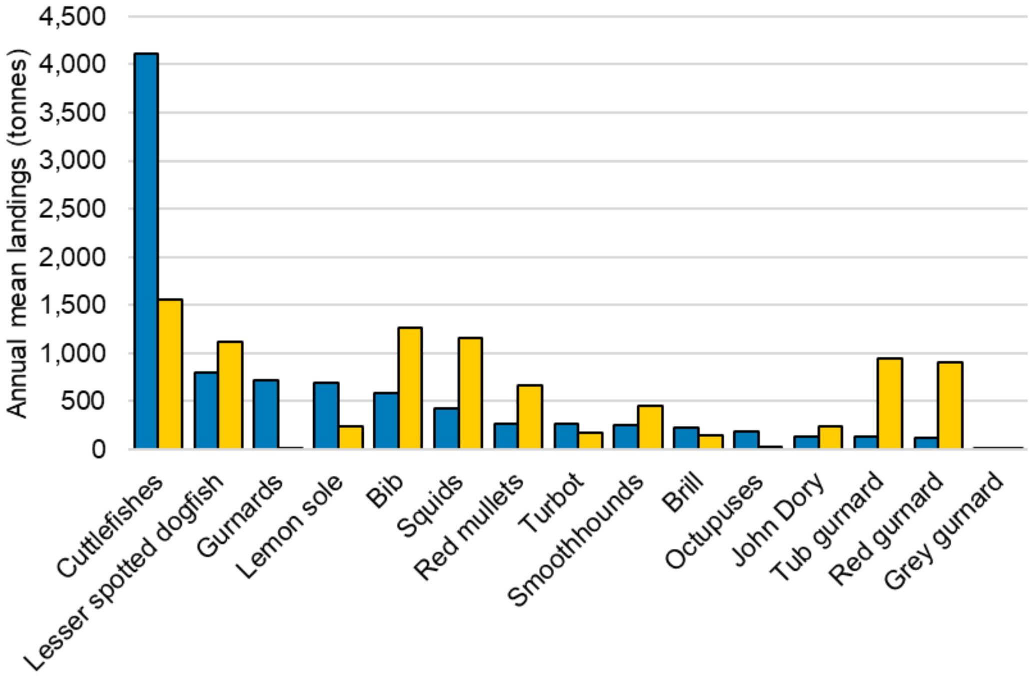


Figure A1 Annual mean landings by ranked by weight (tonnes) of UK landings (blue) compared to the EU27 (yellow) (annual average of 2016-2021)

Species rankings by landings value (Table A2, figure A2) differed compared to landings by weight. Some valuable species became much more prominent e.g., turbot from 11 of 15 by weight to 3 of 15 by value and john dory from 13th by weight to 6th by value. The low commercial value lesser spotted dogfish are particularly notable being ranked 2nd by weight, but 13th by value.

Table A2 Annual mean landings by value of the UK and Crown Dependencies compared to the EU27 ranked by species or species group (2016-2021)

Species	UK Value (£GBP)	% of UK	UK Value (£GBP)	% of EU27	Total (£GBP)	% of Total
Cuttlefish	12,372,748	47.6	4,841,653	20.1	**17,214,401**	34.36
Squid	2,127,373	8.2	6,144,174	25.5	**8,271,547**	16.51
Turbot	2,927,154	11.3	1,789,285	7.4	**4,716,439**	9.42
Red mullets	945,206	3.6	3,412,247	14.2	**4,357,453**	8.70
Lemon sole	3,106,416	11.9	1,025,640	4.3	**4,132,055**	8.25
John Dory	960,016	3.7	2,231,467	9.3	**3,191,482**	6.37
Brill	1,612,333	6.2	1,056,239	4.4	**2,668,572**	5.33
Tub Gurnard	182,047	0.7	1,230,317	5.1	**1,412,363**	2.82
Bib	227,865	0.9	694,701	2.9	**922,566**	1.84
Red Gurnard	167,668	0.6	643,388	2.7	**811,056**	1.62
Gurnards	679,093	2.6	6,896	0.0	**685,989**	1.37
Smoothhounds	147,345	0.6	525,930	2.2	**673,274**	1.34
Lesser spotted dogfish	217,753	0.8	455,415	1.9	**673,168**	1.34
Octupuses	326,514	1.3	28,983	0.1	**355,498**	0.71
Grey Gurnard	4,217	0.0	4,554	0.0	**8,771**	0.02
TOTAL	**26,003,747**		**24,090,888**		**50,094,634**	

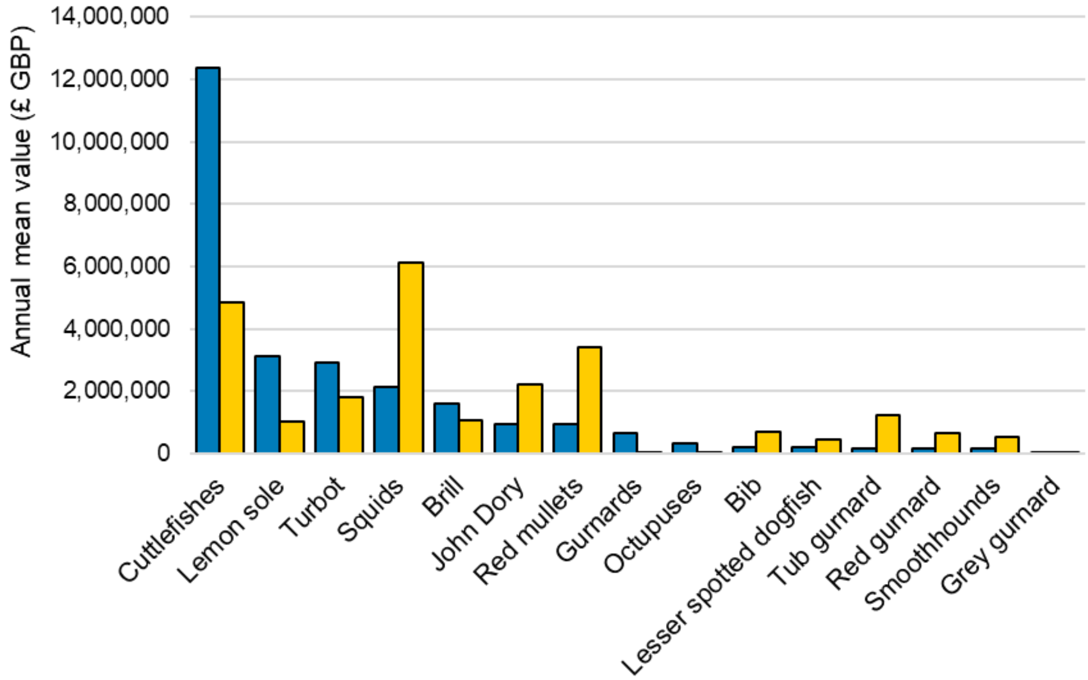


Figure A2 Annual mean landings by ranked by value (£GBP) of UK landings (blue) compared to the EU27 (yellow) (annual average of 2016-2021)

Although not inflation corrected across the years, an approximation of value by weight can be derived as £GBP per tonne (Figure A3). This illustrates the large variation in relative value that informs on the substantial changes in rank importance between weight and value seen above. Value per tonne ranges from a £352 (lesser spotted dogfish) to up to £10,666 (turbot).

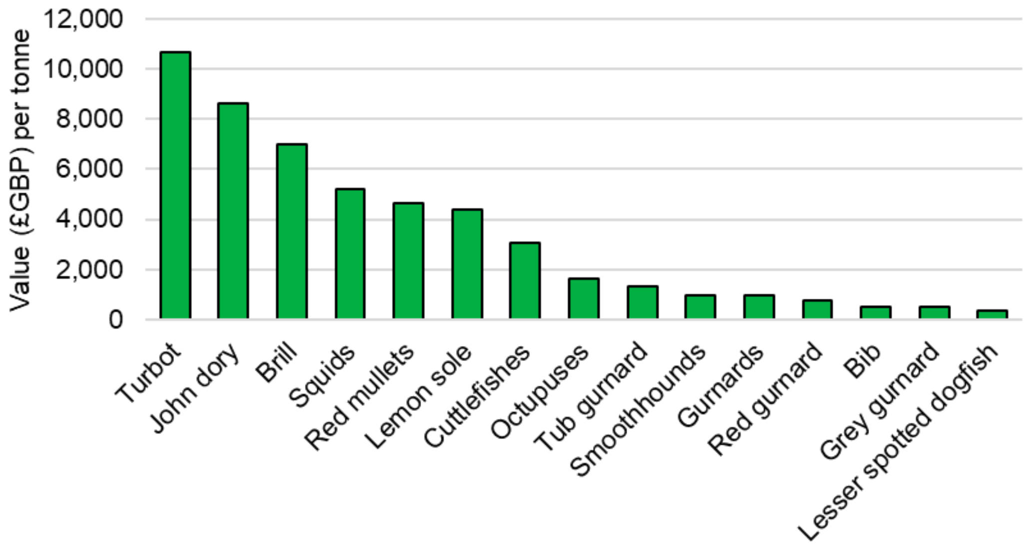


Figure A3 Species value per weight (annual average of 2016-2021)

A1.2.2 Landings through time

Figure A4 show landings (by weight) though time separated as major and minor contributions to total landings.

The squid and cuttlefish show notably high variability in catches year to year and no trend through time. Variability for cuttlefish is about ±50% of the multi-annual mean of approximately 6,000t. This variability will have implications for fisher's behaviour, fishery resilience and management and may present challenges for stock assessment and the ability to detect change through time.

For the other major species, only lesser spotted dogfish showed stable catches through time. Bib, gurnards (combined) and lemon sole all showed statistically significant declines in landing weight over time. Except for smoothhounds, none of the minor species showed any temporal trends in landing weight, remaining stable over the period of analysis. Smoothhound catches have been increasing from under 600t in 2013 to over 800t in 2021, an increase of 33% although from low levels.

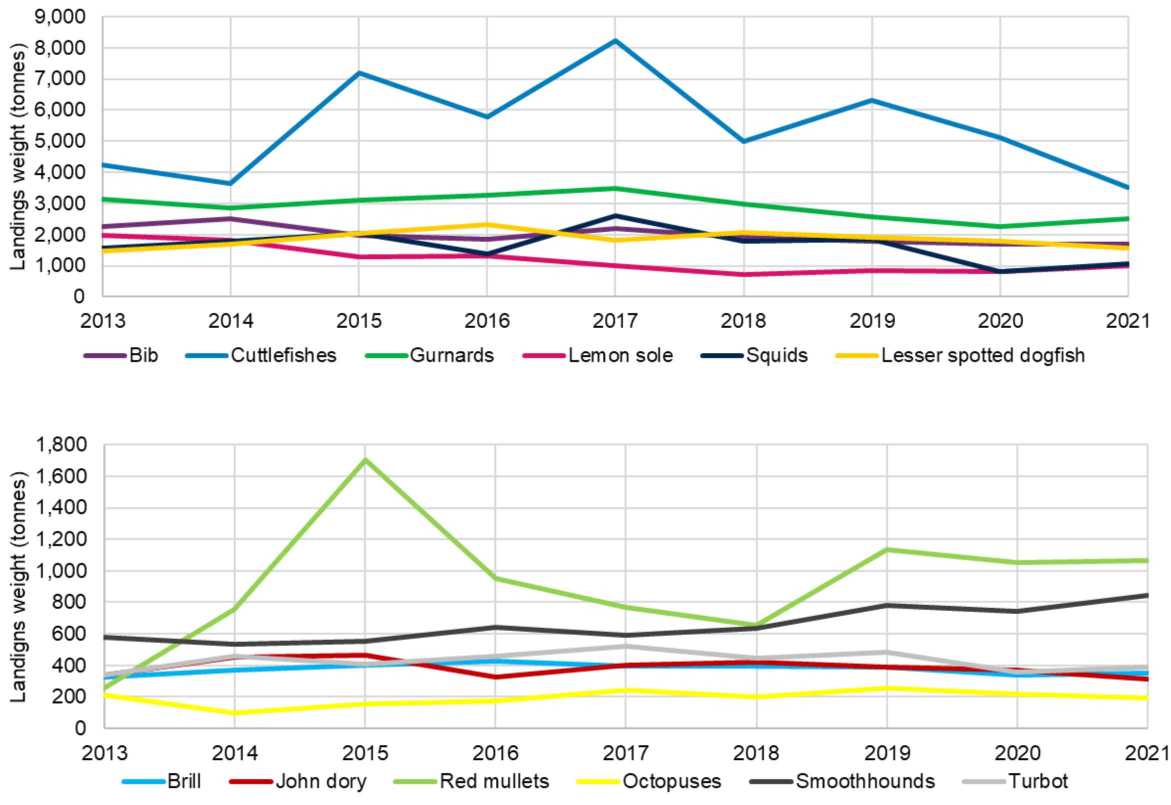


Figure A4 Landings (tonnes) over time of the focal species of the Channel Demersal NQS FMP for higher and lower volume landings. Note y-axis scale difference between upper (higher volume species) and lower (lower volume species) panels

A1.2.3 Nationality

Focal species are captured by both UK and EU vessels. Over the 2016-2021 period used to represent current context, 49.9% of landings by weight were by EU27 vessels (Figure A5 left). No data was supplied to separate EU27 landings to nationality. English vessels contributed 46.3% (Figure A5 left). Among the UK vessels, 92.5% of landings were English, 4.9% Scottish, 1.2% Welsh with all others below 1% of UK landings (Figure A5 right).

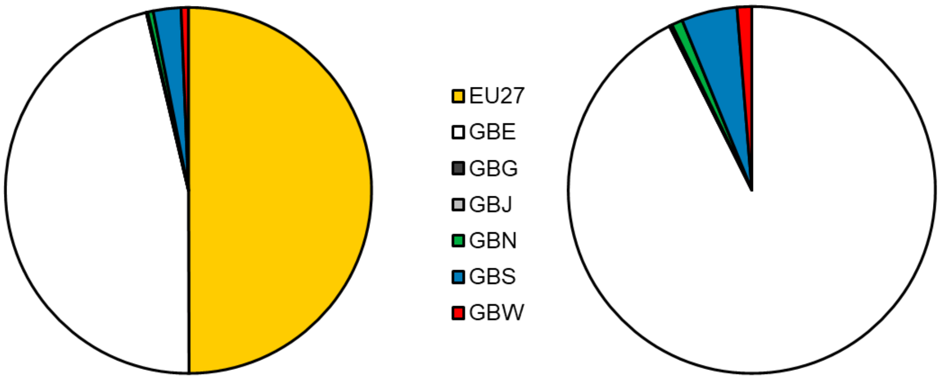


Figure A5 Proportion of landings (tonnes) by EU27 and UK (left) and for UK administrations and Crown Dependencies (right) (2026-2021)

A1.2.4 Vessel size

Vessels varying in size from under 8m to over 40m length landed focal species from the FMP area. 78.3% of landings were by vessels greater than 12m although size class composition is different between UK and EU27 fleets (Figure A6). The EU27 component was dominated by larger vessels, with 95.4% of EU27 landings from vessels greater than 18m compared to only 61.2% for UK vessels. 13.7% of the UK landings were from under 10m vessels. For the EU27, this size class represented only 0.3%.

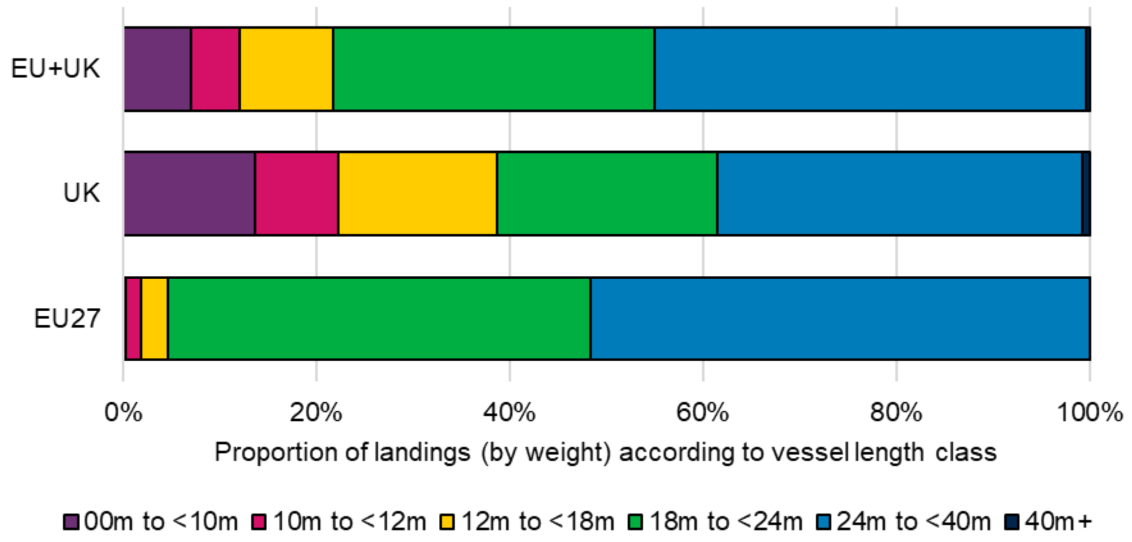


Figure A6 Proportion of landings vessels by size class (2016-2021)

Because EU27 and UK landings are very similar by weight (Figure A7), patterns observed from proportionality data are also observed in absolute landings.

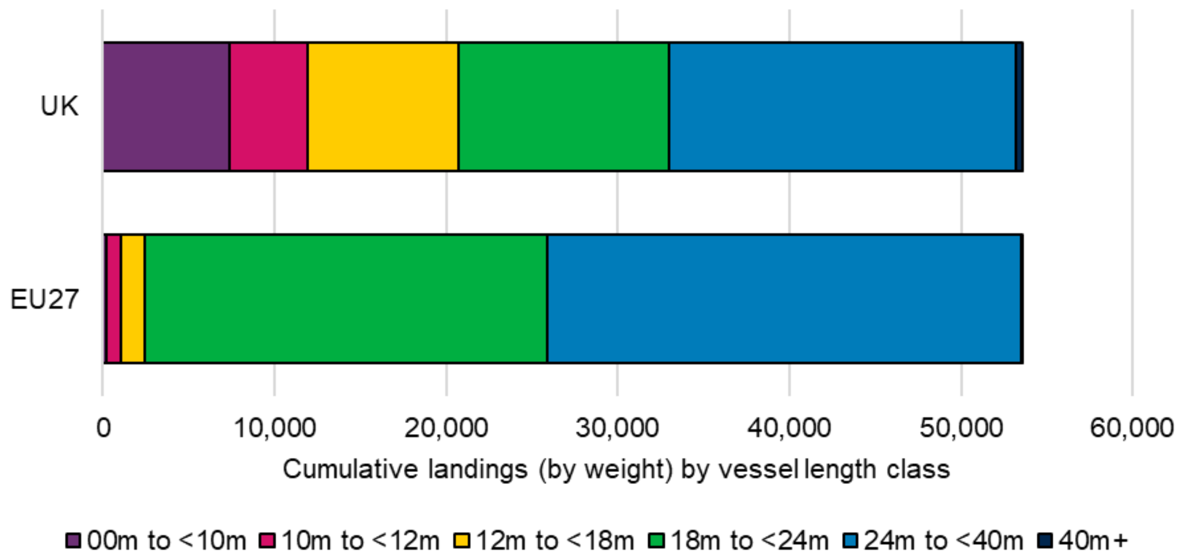


Figure A7 Cumulative landings (tonnes) vessels by size class (2016-2021)

The proportion that EU27 over 10m vessels (51.2%) and UK 10m and under vessels (6.8%) each contributed to the total landings has remained constant over the period analysed (Figure A8). While these proportions relate to weight-based landings, the same hold for value (Figure A9).

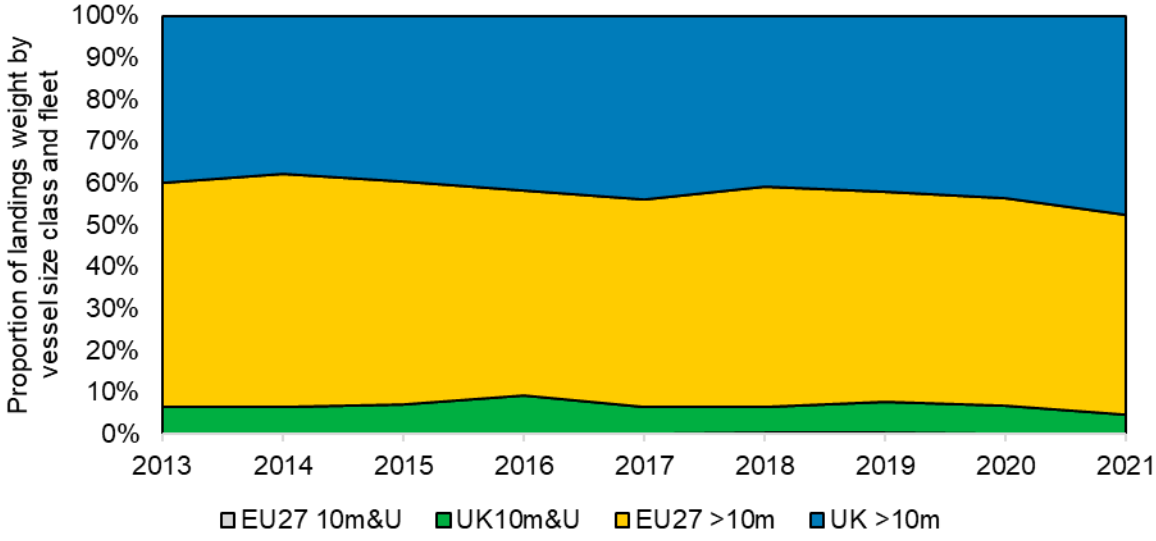


Figure A8 Proportion of landings (2016-2021) by vessel size class by weight (top) and value (bottom)

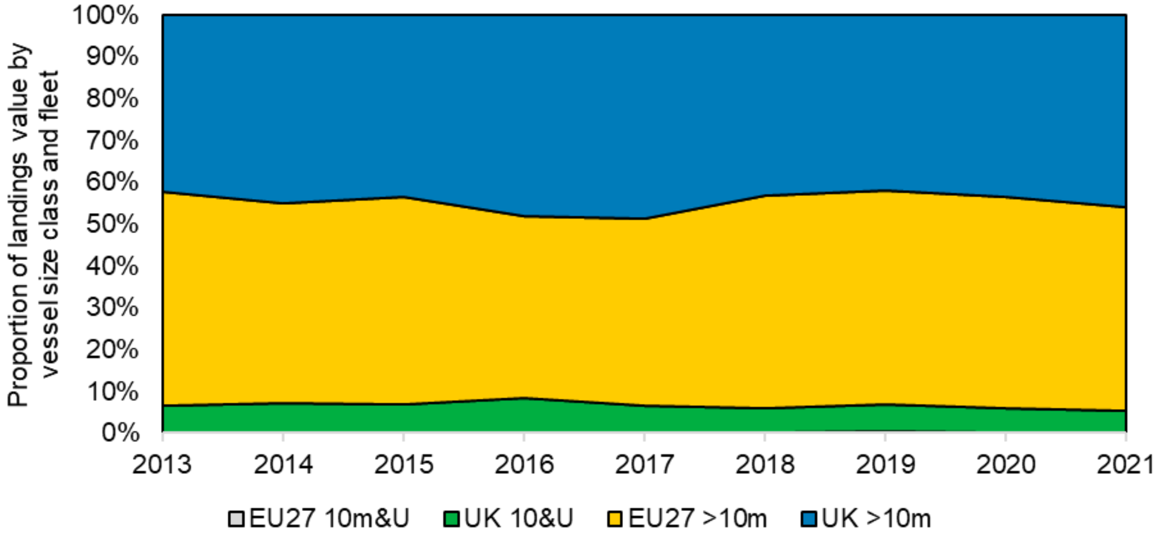


Figure A9 Proportion of landings (2016-2021) by vessel size class by weight (top) and value (bottom)

A1.2.5 Gear

UK vessels primarily employed beam trawls (47.5%), demersal trawls (36.5%) and demersal seines (7.7%) although drift and fixed nets (3.7%) and pots and traps (3.6%) also made contributions. Other gears represented only 1% or less of landings (Figure A10 left).

For EU27 vessel landings relative to UK landings, beam trawl was less important, but demersal trawl and seines were more important. Demersal trawls were the dominant gear type (60.2%), followed by demersal seine (19.9%), beam trawl (16.0%), and drift and fixed nets (2.3%). Other gears represented only 1% or less of landings (Figure A10 right).

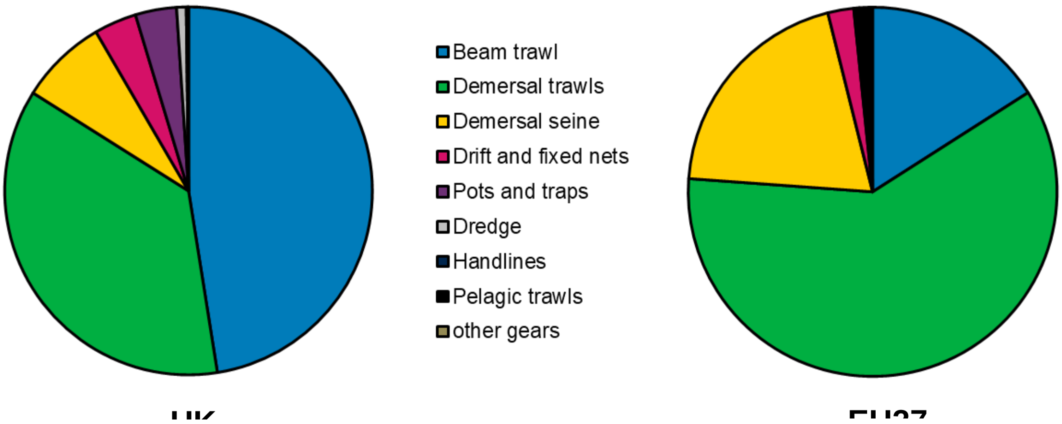


Figure A10 – Proportion of landings weight by gear type (2013-2021) for UK (left) and EU (right)

Considered across all vessels, there has been no change in the rank importance of gears over recent years (Figure A11) although there has been a steady decline in the proportion of landings value (£GBP) from demersal trawl (down from 52.8% in 2013 to 35.2% in 2021) and an increase in landings first from beam trawling (from 25.9% to an average of 34.7% since 2018), and subsequently from demersal seining (12.8% in 2013 to 22.5% in 2021).

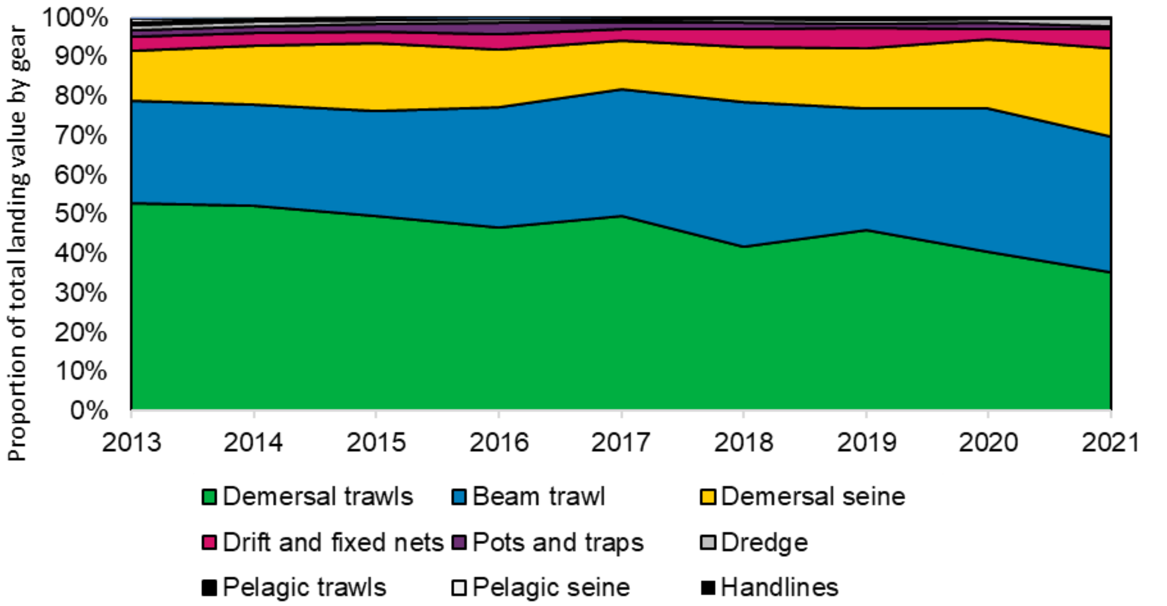


Figure A11 – Proportion of landings weight by gear type over time (2013-2021)

A1.2.6 Ports

Port of landing for EU vessels is not currently listed in the data source. The EU27 represents approximately 46% of landings by weight and 43% of landings by value (over the period 2013-2021) from the FMP area. It is unlikely that EU27 port landings reflect those of the UK fleet being more likely to land to continental ports, and already observed to have different landings composition and gear and vessel characteristics. EU27 landings to port behaviour should not be extrapolated from UK data and individual port landings will have different error rates from the total fishery when relying only on UK data.

Catches by UK vessels from the FMP area have been landed in 174 different ports, mostly in England (126) but also Scotland (7), Northern Ireland (2), Wales (8) Guernsey and Jersey, and ports in Belgium (2), Denmark (1), France (14), Iceland (2), Ireland (2), Netherlands (6), and Spain (2).

Over the 2013-2021 period 48% of total landings (90.3% of UK landings) by weight and 52% (91.5% of UK landings) by value were landed at 10 ports (Table A3). The UK landings from the FMP area are received by predominantly three ports with Brixham accounting for a majority (53.3%) of focal species landings and Plymouth (12.1%) and Newlyn (10.3%) of landings and a range of more minor ports listed in Table A3.

Table A3 Landings of FMP species/groups to the top 10 ports

Port of landing	Annual Weight	Annual Value	% of total weight	% of total value	% of UK weight	% of UK landings
Brixham	5,736	15,667,796	28.6	29.8	53.3	52.3
Plymouth	1,300	3,935,018	6.5	7.5	12.1	13.1
Newlyn	986	3,092,777	4.9	5.9	9.2	10.3
Boulogne	526	1,366,264	2.6	2.6	4.9	4.6
Looe	305	1,037,364	1.5	2.0	2.8	3.5
Shoreham	224	471,705	1.1	0.9	2.1	1.6
Newhaven	196	373,045	1.0	0.7	1.8	1.2
Vlissengen	182	525,352	0.9	1.0	1.7	1.8
Mevagissey	164	641,851	0.8	1.2	1.5	2.1
Lyme Regis	110	286,195	0.5	0.5	1.0	1.0
			48.6	52.0	90.3	91.5

In the majority of ports, FMP focal species (FMP landings in Figure A12) represent only a small proportion of the total landings received via the port, usually less than 10%. However, in both Brixham and Boulogne, focal species from the FMP area contribute up to approximately 33% of received UK landings (Figure A12).

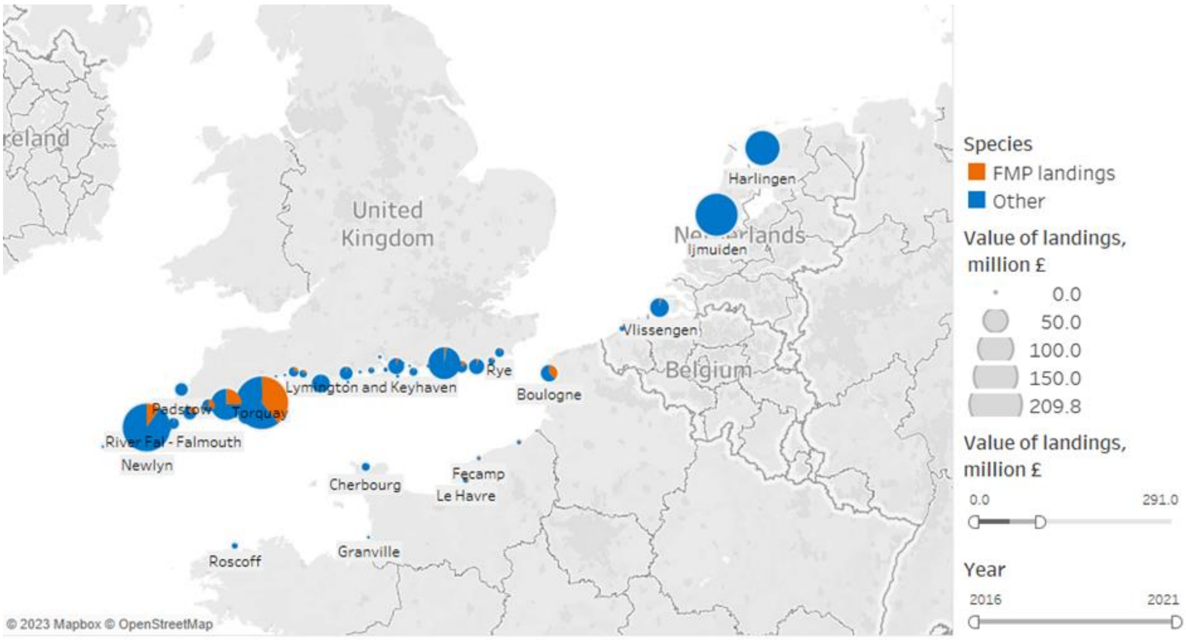


Figure A12 Ports reliance on FMPs related value of landings (2016-2021). Cumulative landings (pie size) and proportion (pie segments) of FMP focal species relative to other species for UK vessels into ports (ports with above 1 tonne cumulative landings of FMP species and overall value of landings above 1 million shown)

A1.3 Landings in more detail

A1.3.1 Seasonality in landings

Landings by species are not uniform throughout the year. It is possible to identify “summer” and “winter” fisheries where catches are particularly high for the species, although landings for all species were recorded in every month or quarter.

Above average UK landings by month suggest spring-summer peaks for lemon sole and smoothhounds, and summer-autumn fisheries for lesser spotted dogfish, john dory and turbot. The other species showed a winter fishery pattern with above average catches October to March (Figure A13).

While the use of seasonality suggests an environmental driver for monthly (or quarterly) patterns, fleet behaviour such as quota utilisation or mixed fishery behaviour may also contribute.

Species	J	F	M	A	M	J	J	A	S	O	N	D
Lemon sole												
Smoothhounds												
Lesser spotted dogfish												
John dory												
Turbot												
Brill												
Gurnards												
Cuttlefish												
Grey gurnard												
Red gurnard												
Tub gurnard												
Red mullets												
Squid												
Octopuses												
Bib												

Figure A13 Seasonality in UK landings (tonnage) with landings above monthly mean identified (grey)

Species	Q1	Q2	Q3	Q4
Lemon sole				
Smoothhounds				
Lesser spotted dogfish				
John dory				
Turbot				
Brill				

Species	Q1	Q2	Q3	Q4
Gurnards				
Cuttlefish				
Grey gurnard				
Red gurnard				
Tub gurnard				
Red mullets				
Squid				
Octopus				
Bib				

Figure A14 Landings seasonality by quarters for UK and EU27 combined landings above the quarterly mean (grey)

Quarterly data using both UK and EU27 landings (Figure A14) shows a similar pattern, identifying summer species and winter species but not so well.

The source of differences between seasonality patterns using monthly and quarterly aggregations was not investigated. It may be caused by different seasonal behaviours between UK and EU27 fishing patterns although it is more likely to be an artifact of aggregating 3 months together per quarter. Administrative quarters (Q1-4) do not exactly match seasons (spring-winter), particularly in the sea where sea temperature lags air temperature. Receiving EU27 data aggregated to quarter may therefore distort or confuse seasonality.

A1.3.2 Spatial variation in landings

Landings composition varies by ICES area between 7d and 7e (east and west Channel respectively). A comparison of total landings of FMP species caught in 7d:7e by both weight and by value indicate a 1:2 disparity. UK vessel landings are concentrated in the western Channel, by weight of catch at 5.3:1 and the value of catch at 7.2:1. For the EU vessels the breakdown of landings are closer to parity between 7d:7e at 0.9:1 by catch weight and 0.8:1 by catch value (Figure A15).

Proportionality of landings value is significantly greater for EU27 landings in 7d (80%) than the UK (20%) vessels. The reverse of this is shown for 7e, EU27 vessels landing value equates to 33% of the total whereas UK vessels land 67% (Figure A16).

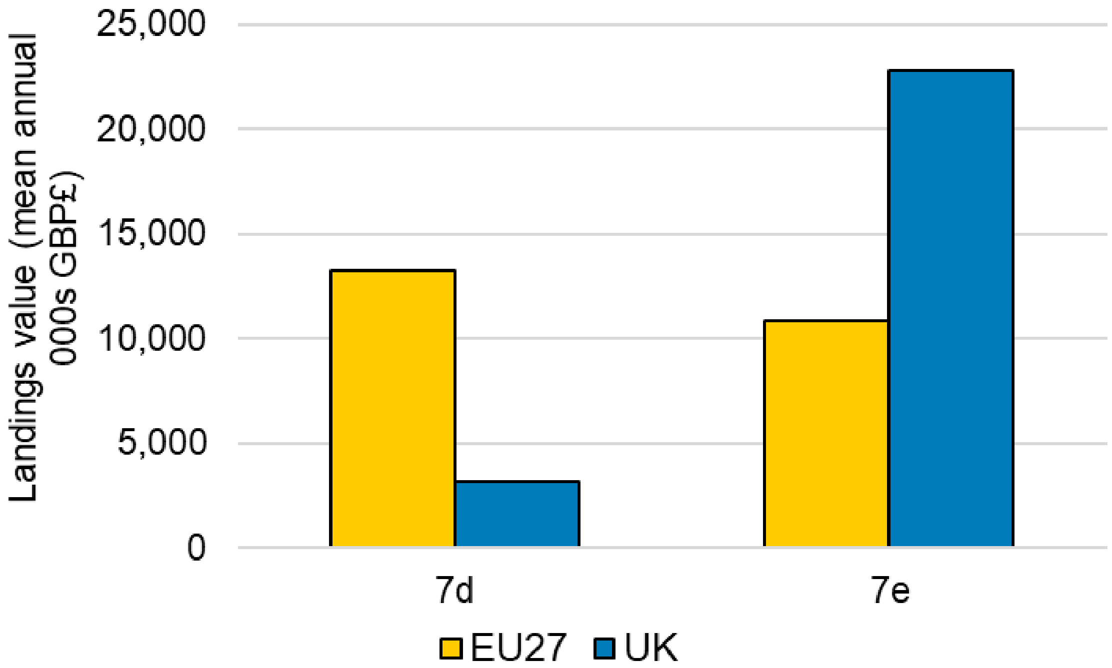


Figure A15 Absolute landings value in 7d and 7e by EU27 vessels (yellow) and UK vessels (blue)

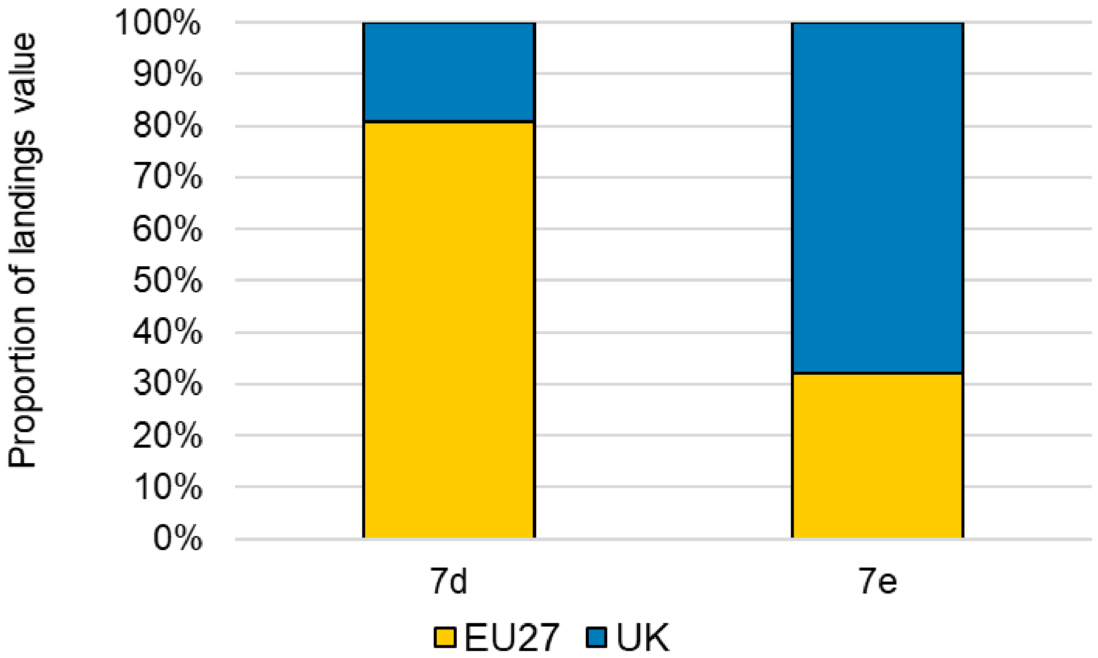
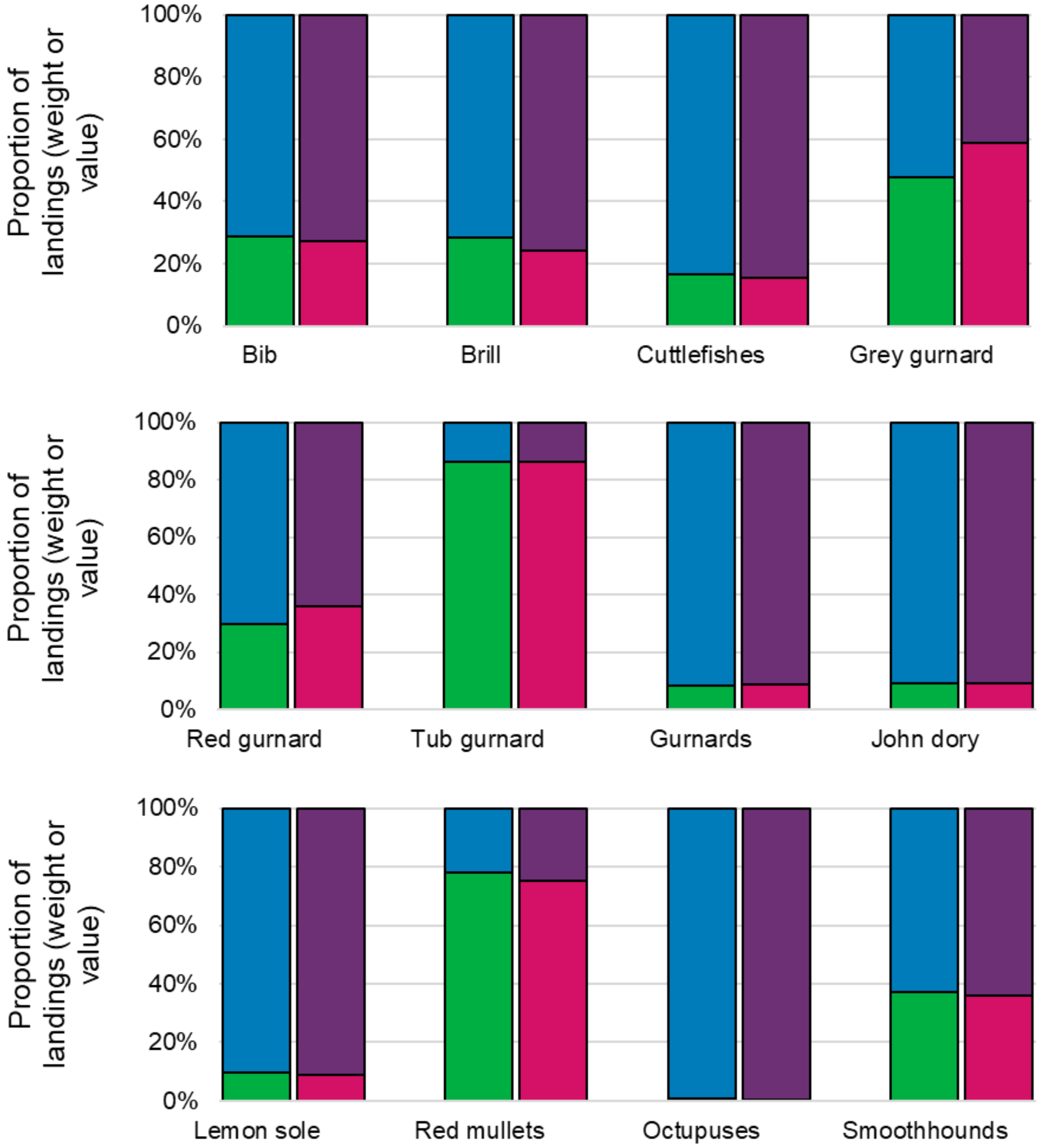


Figure A16 Proportional landings value in 7d and 7e by EU27 vessels (yellow) and UK vessels (blue)

Species like lemon sole, john dory, the cuttlefish and octopus are more frequently or almost exclusively landed from 7e. In contrast tub gurnards and squid are more commonly landed from 7d (Figure A17). Conclusions are robust regardless of defining landings by weight or value. Reasons for these spatial differences are not explicitly assessed but may include variation in community composition (for example the greater North Sea ecosystem often encompasses 7d) and differences in management measures between 7d and 7e that influence fishing behaviour.



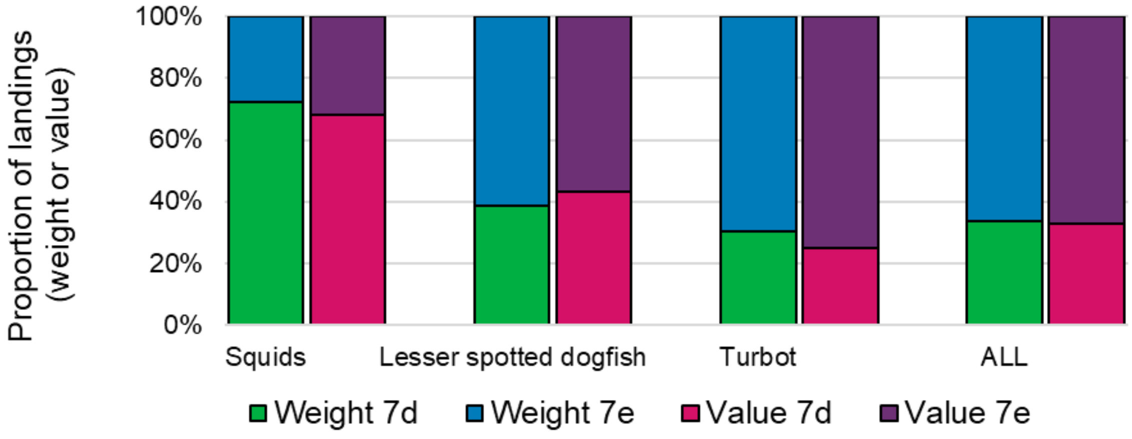


Figure A17 Proportion of landings (by weight: green/blue, by value (pink/purple) between 7d (green/pink) and 7e (blue/purple) for all vessels (2016-2021)

A1.3.3 Landings composition by nationality

As noted in nationality data above, EU27 data is not resolved to nation and the EU27 and England together account for 96.2% of landings by weight. What is landed varies between EU27 and England (Figure A18 and A19). The low weight of landings from Jersey and Guernsey (Figure A18) mean their landings compositions should be treated cautiously if not discounted. It is also important to recall that this analysis focuses on landings of a specific subset of species included in the FMP. These species will be caught alongside others.

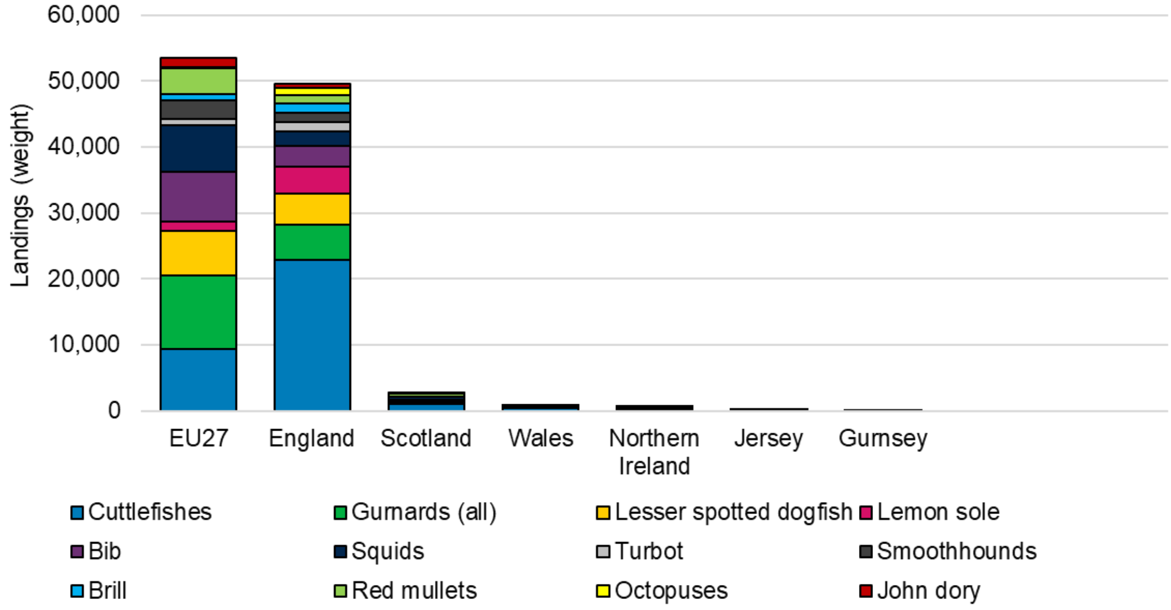


Figure A18 Landings (weight) by species among nationalities (2016 to 2021 cumulative)

Catch composition differences between the UK and EU were discussed above and thus analyses focuses on the UK home nations (because Jersey and Guernsey catches are too limited). Cuttlefish and gurnards (all combined) and lemon sole are commonly landed by all. Dogfish are an almost exclusively English landing. While both Northern Ireland and Scotland have a higher proportion of squid than England, these are one (Scotland) or two (Northern Ireland) orders of magnitude smaller in absolute tonnage terms. A similar higher proportion of red mullets was also observed in Scottish landings but from low absolute landings value. Other species landed by non-English UK vessels contribute less than 60t in total (<10 tonnes on average annually) to landings for each nation.

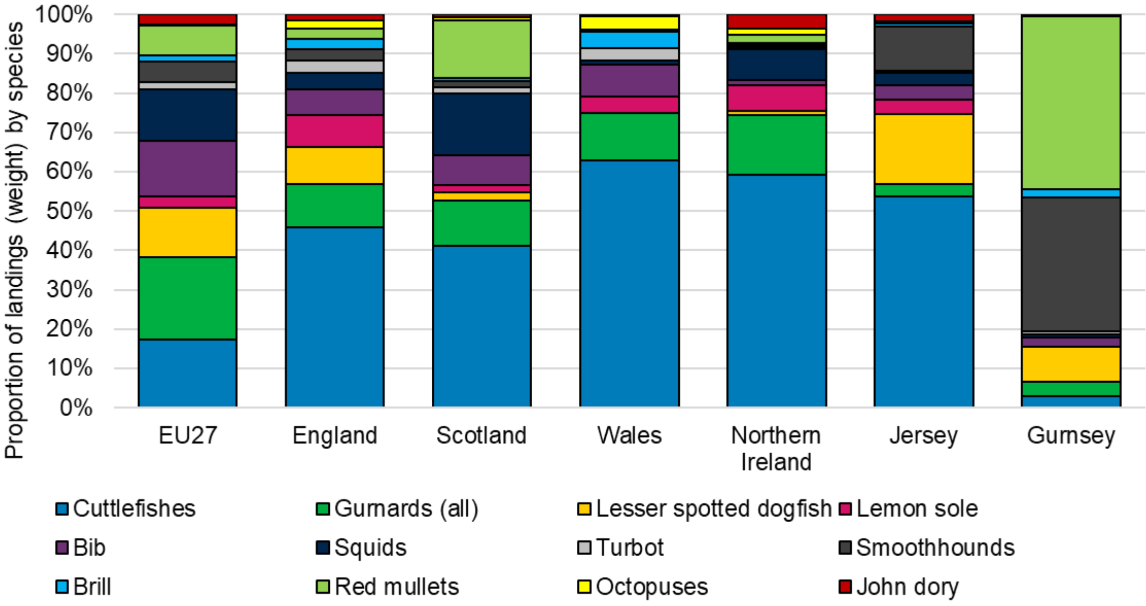


Figure A19 Proportionality of landings (weight) by species among nationalities (2016 to 2021 cumulative)

A1.3.4 Landings composition by vessel size

Landings (by weight) varied by vessel length class with the majority coming from vessels between 18 and 40m in length (Figure A20).

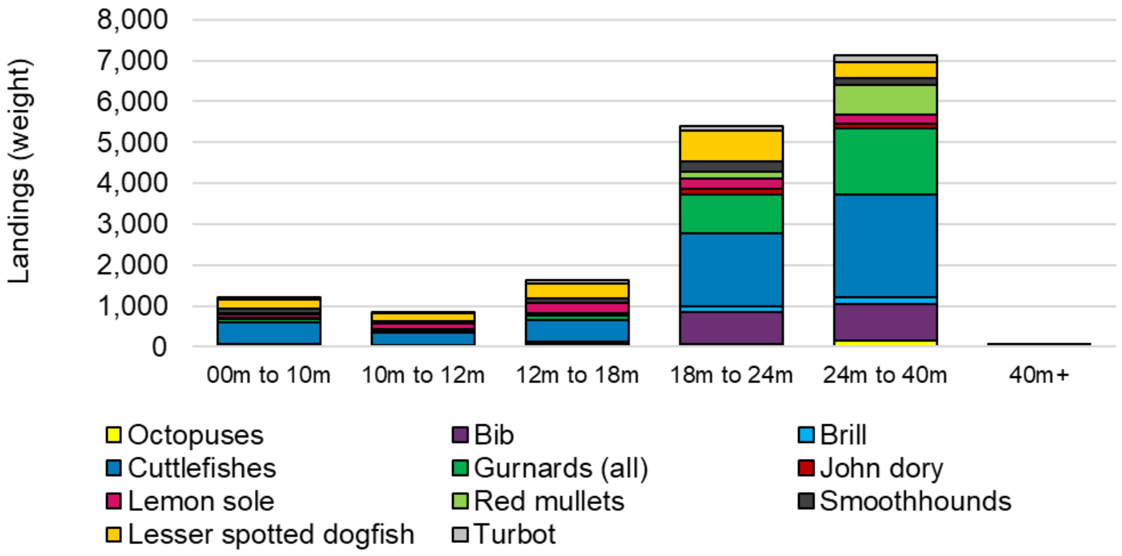


Figure A20 Mean annual landings (weight) by species among vessel size classes

There are clear changes in landings composition among the size vessel size classes with higher proportions of lesser spotted dogfishes and lemon sole landed from vessels 18m and under while gurnards and bib are more characteristic of landings from vessels over 18m and red mullets make an increasing contribution to landings weight as vessel size increases (Figure A21).

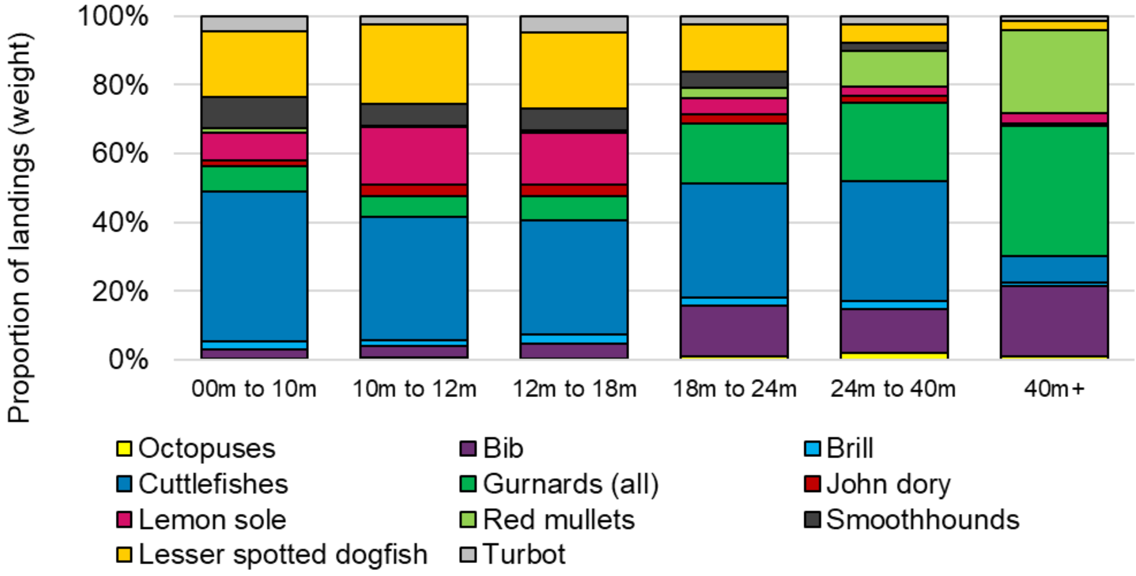


Figure A21 Proportion of landings (weight) by species among vessel size classes

A1.3.5 Landings composition by gear

Towed demersal gears; demersal trawl, beam trawl and demersal seine, dominate the landings (Figure A22).

The towed demersal gears show a spread of species particularly bib, cuttlefish and gurnards but each show distinct characteristics, for example a higher proportion of john dory and lemon sole caught using demersal trawl, particularly large contribution of cuttlefish from beam trawls and the presence of a large proportion of red mullets in demersal seines (Figure A23).

Drift nets have a notable high proportion of elasmobranchs with 52.9% in drift and fixed net landings (35.5% of total drift and fixed net landings are lesser spotted dogfish). There is also a high proportion of cuttlefish landings relative to other species caught when using pots and traps, suggesting gear selectivity (among the species considered).

While considering both absolute and relative landings composition by gear, it is important to recall that this analysis focuses only on those species of relevance to the FMP. Quota species, and non-quota species not included in the FMP, may also be caught alongside. Thus, these data do not reflect landings at a gear level *per se*. They are an analysis on a subset of the total landings.

Although composition of landings by dredge, pelagic trawl and handline are all presented, their annual average landings are low for pelagic trawl (143t), dredge (109t) and for handlines 20t) such that some caution should be applied to interpreting conclusions based on composition in Figure A23 for these gears.

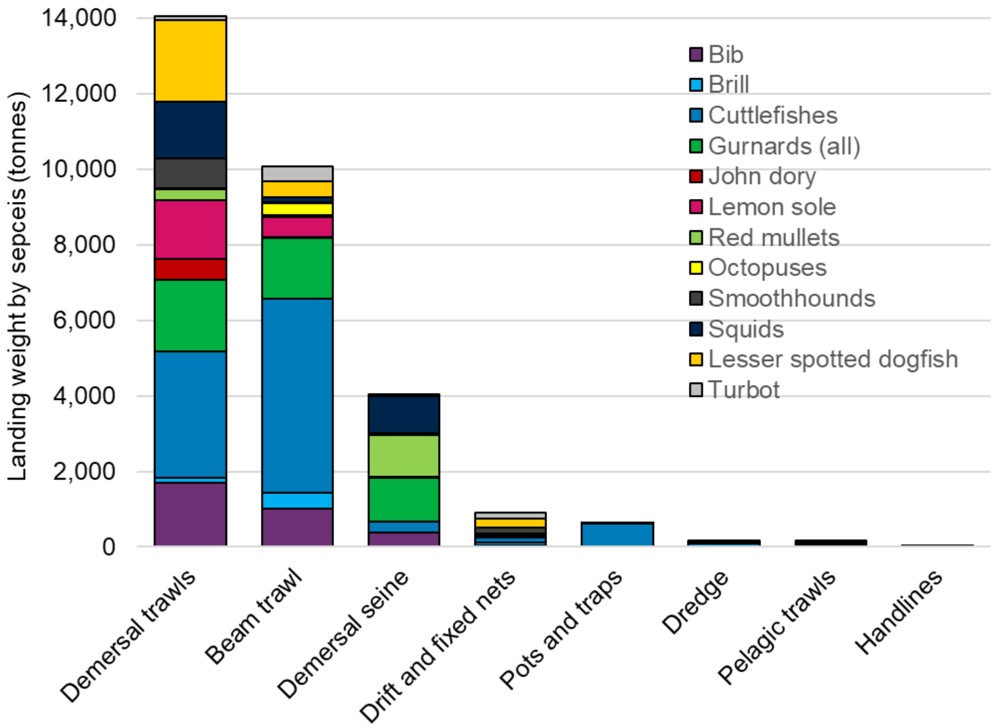


Figure A22 Mean annual landings (2016-2021) weight of species by gear type

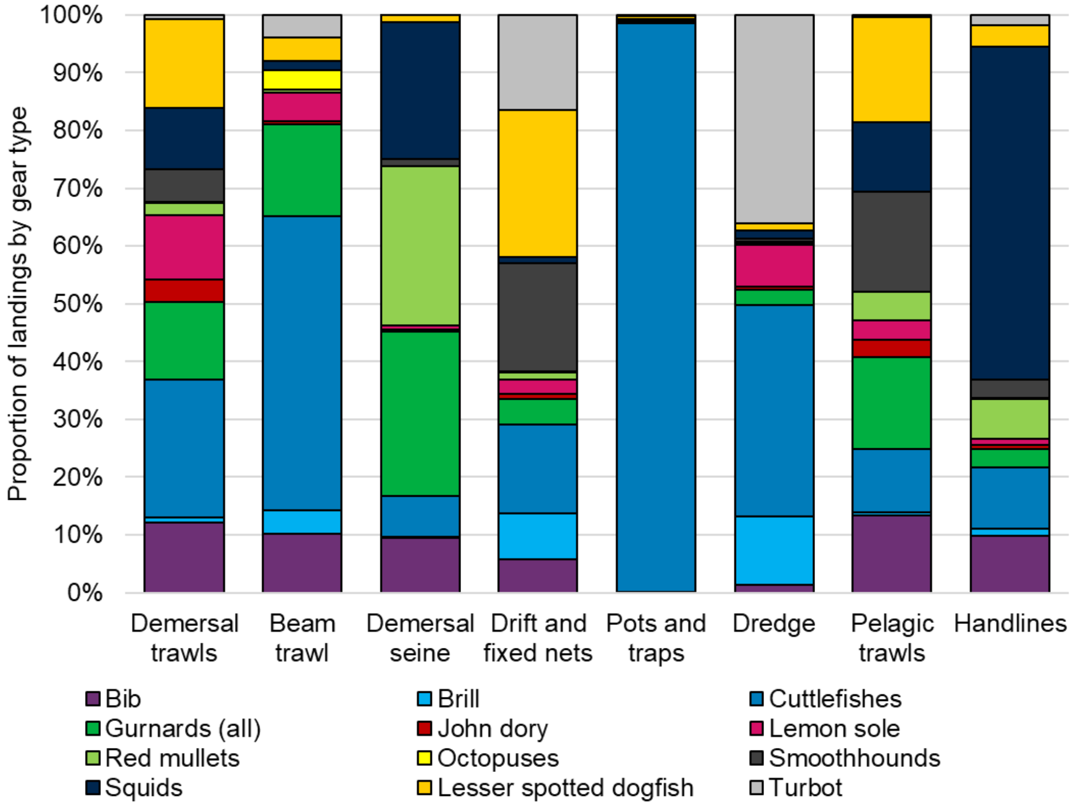


Figure A23 Proportion of species landings (2016-2021) by gear type

For vessels under 10m where landings are derived from sales notes, some limited erroneous data can be introduced as gear use is not recorded in the sales note. MMO adds the nominal gear of the vessel against its landings based on normal behaviour. Thus, if a vessel switches gear for a short period, landings may be recorded against the common, rather than actual gear type. The three main gear types by vessels of length 10m and under were pots/traps, handlines and demersal trawls (see gear by vessel size below) and we make the assumption these have distinct vessel requirements and as such switching behaviour is rare. In the future data entered via the new catch recording application CatchApp will negate this issue as gear type is entered by the fisher. CatchApp data does not yet have an appropriate time series for use here.

A1.3.6 Landings composition by port

Data are only for UK fleets. EU27 landings are not included and given differences in the gear composition and the absence of 10m and under EU vessels, EU27 landings may differ from UK behaviour. There were strong port specific variations in gurnard landings, so these have been combined. Figure A24 provides a breakdown of species landings into the top 10 ports by weight.

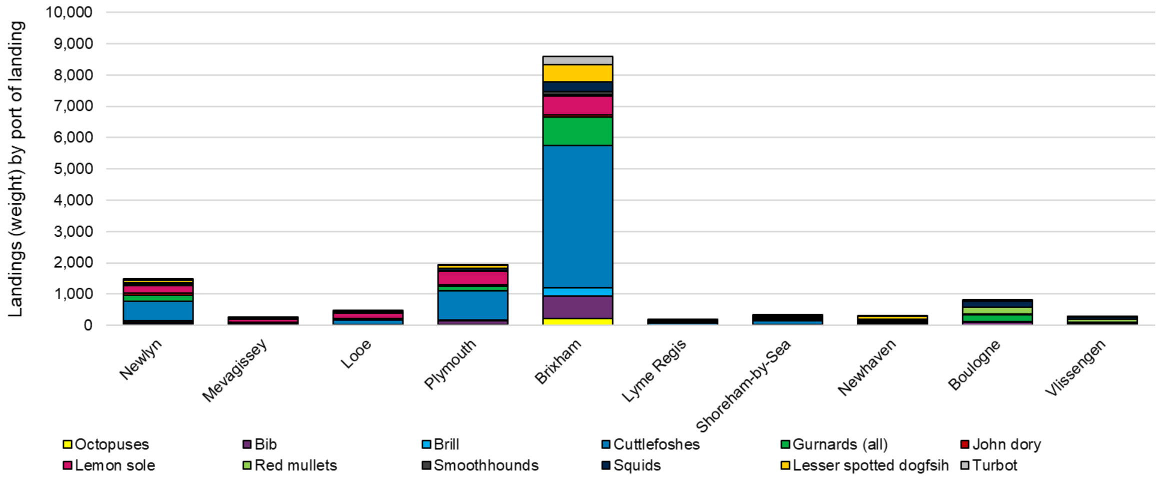


Figure A24 Cumulative annual landings (2016-2021) weight of species by the top 10 ports (west to east)

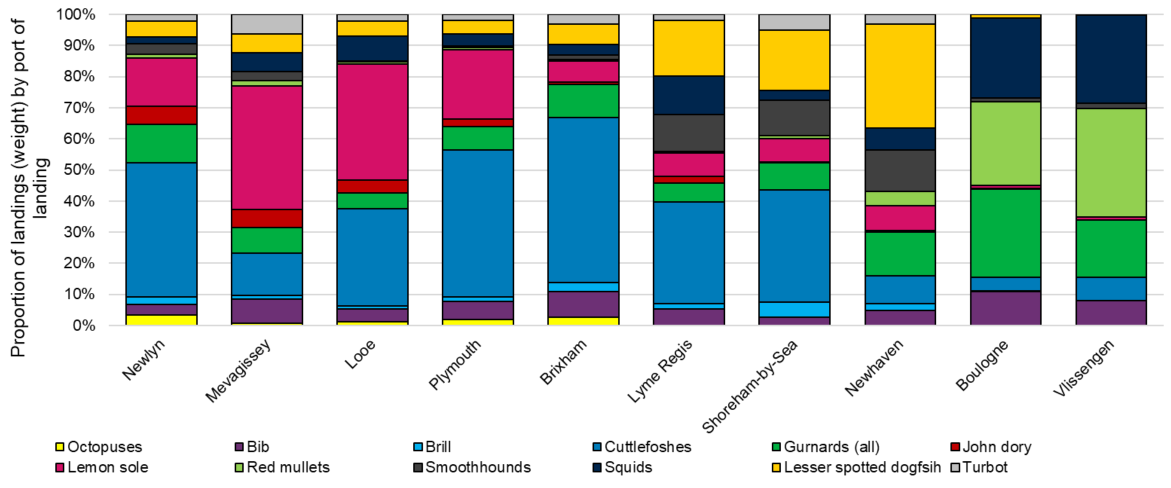


Figure A25 Proportion of landings (2016-2021) weight of species by the top 10 ports

There are a number of observable patterns including virtually no lesser spotted dogfish, lower cuttlefish and higher gurnards, red mullets and squid landings into continental ports. There are quite large landings of elasmobranchs into more eastern Channel English ports but further west, the proportion of dogfish is reduced, and the area receives higher landings of cuttlefish and lemon sole, while octopuses and john dory start to represent notable proportions (Figure A25).

A1.3.7 Total landings by gear and vessel size

UK vessels 18m and under landed more than EU27 vessels of the same size class (Figure A26). This is assumed to be because the UK fleet has a particularly large number of small vessels in its fleet compared to some EU27 nations. Where small EU27 vessels exist, they would also face an undesirable and potentially unsafe transit distance if operating from continental ports to fish UK waters.

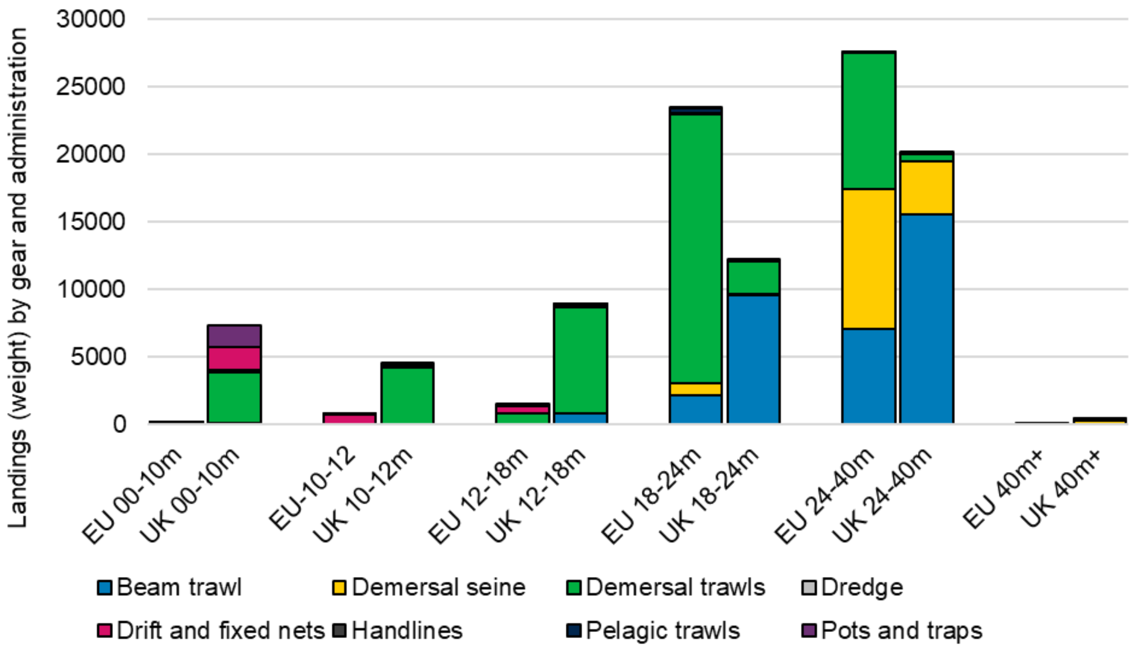


Figure A26 Cumulative landings (2016-2021) weight by vessel size, gear type for UK and EU27 vessels

Proportionality data (Figure A27) for the EU27_10m and under, and the EU27_40m+ vessels should be treated cautiously given their limited contribution to landings weight. The proportion of landings by vessel size and gear type show clear patterns. For example, potting was conducted by smaller vessels and the gear contribution to landings diminishes as vessel size increases. The use of drift and fixed nets is a UK centric gear choice, and there are clear preferences in the UK fleets for beam trawling particularly for vessels larger than 18m. EU vessels of comparable size landed using demersal trawls more frequently. The contribution of flyseining (the dominant gear within the demersal seines) can also be observed, particularly in the 24-40m size class (Figure A27).

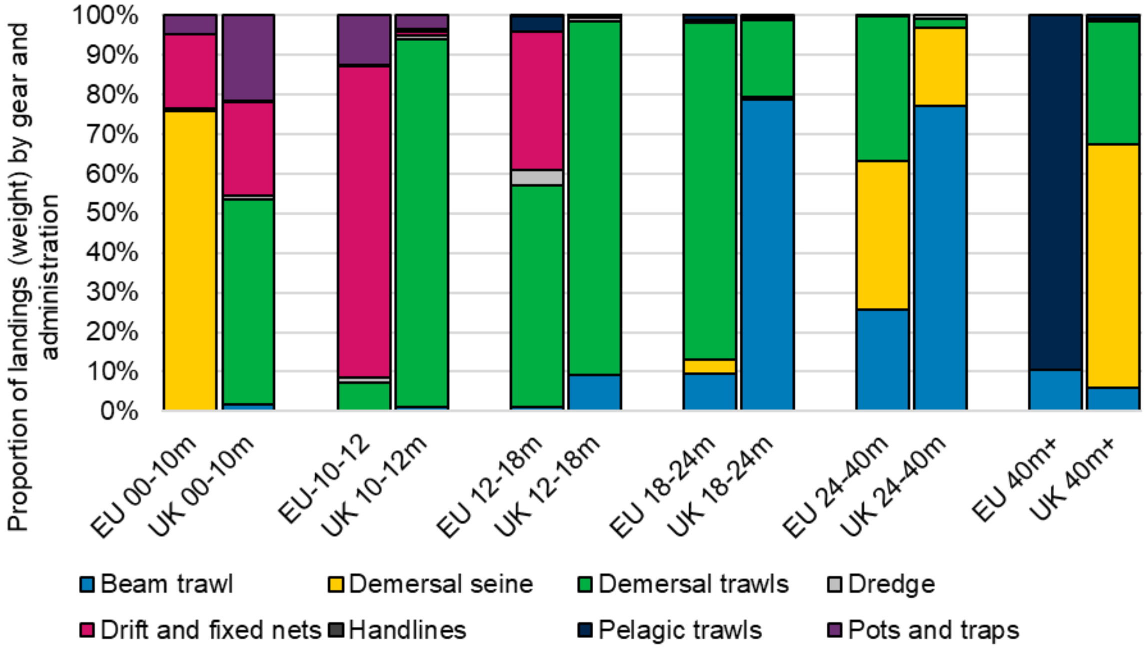


Figure A27 Proportion of landings (2016-2021) weight by vessel size, gear type for UK and EU27 vessels

A1.4 Issue driven analysis

A1.4.1 Flyseining

There was extensive stakeholder engagement related to flyseining.

Total landings on focal species by weight from flyseining (Scottish seine) over 2016-2021 was 12,783t, approximately 2130t per annum. Flyseining was the dominant gear type within the demersal seines group accounting for 81.6% of landings. It is a fishery that is predominantly prosecuted by large and EU27 vessels. 52.3% of all demersal seine landings were accounted for by EU27_24m–40m_flyseiners. UK_24m–40m_flyseiners were the second biggest contributor to landings accounting for 24.4% of demersal seine landings by weight, i.e, less than half at of the EU27 landings. Figure A28 provides the cumulative weight of landings for FMP species by flyseine gears from 2016-2021.

Both UK and EU27 landing composition are very similar, with roughly equal proportions of striped red mullet, squid and gurnards that together make more than 80% of the flyseine landings of focal species, although bib and cuttlefish also contribute.

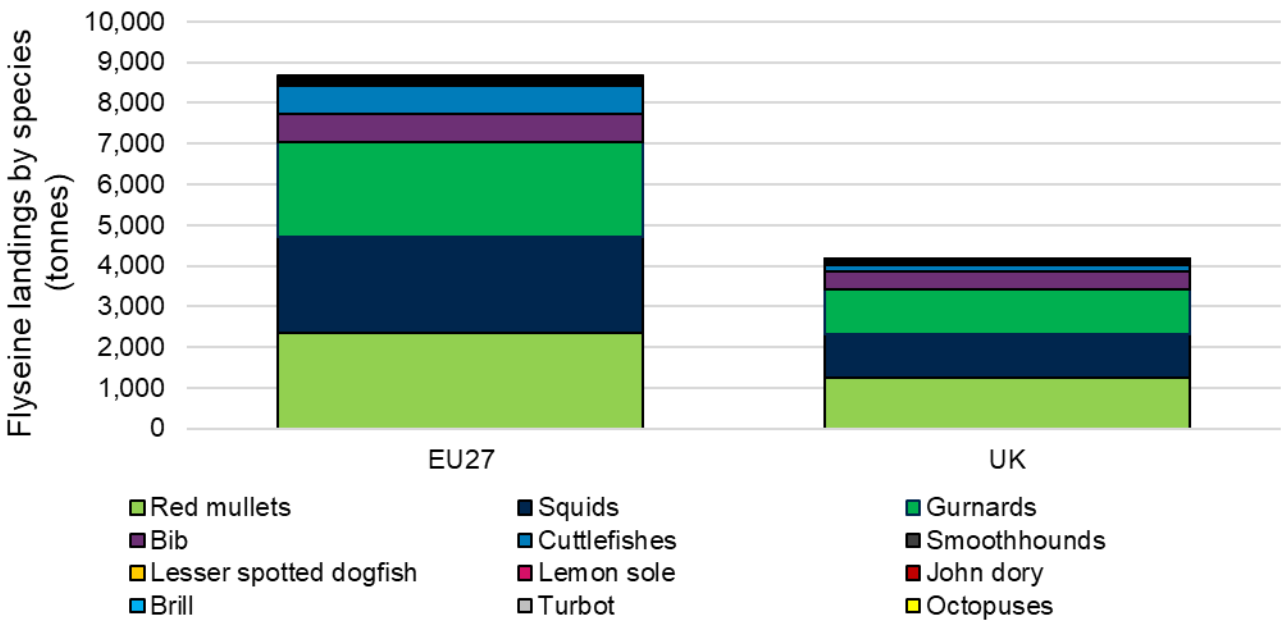


Figure A28 Flyseine landings cumulative weight (2016-2021) by species for EU27 and UK vessels

A1.4.2 Cuttlefish

Cuttlefish were the dominant species landed by weight with approximately 5667t landed annually from the FMP area between 2016 and 2021. Its landings are highly volatile year to year.

Cuttlefish were primarily landed by the bigger offshore vessels including UK_12m+ and EU27_18m+ vessels (Figure A29). In vessels under 12m, landings (by weight) are predominantly from pot and trap fisheries or drift netting, mid-sized vessels of 12-24m in length obtain almost all landings from demersal trawling, while in vessels over 18m in length beam trawling and demersal seine are important gear types (Figure A30).

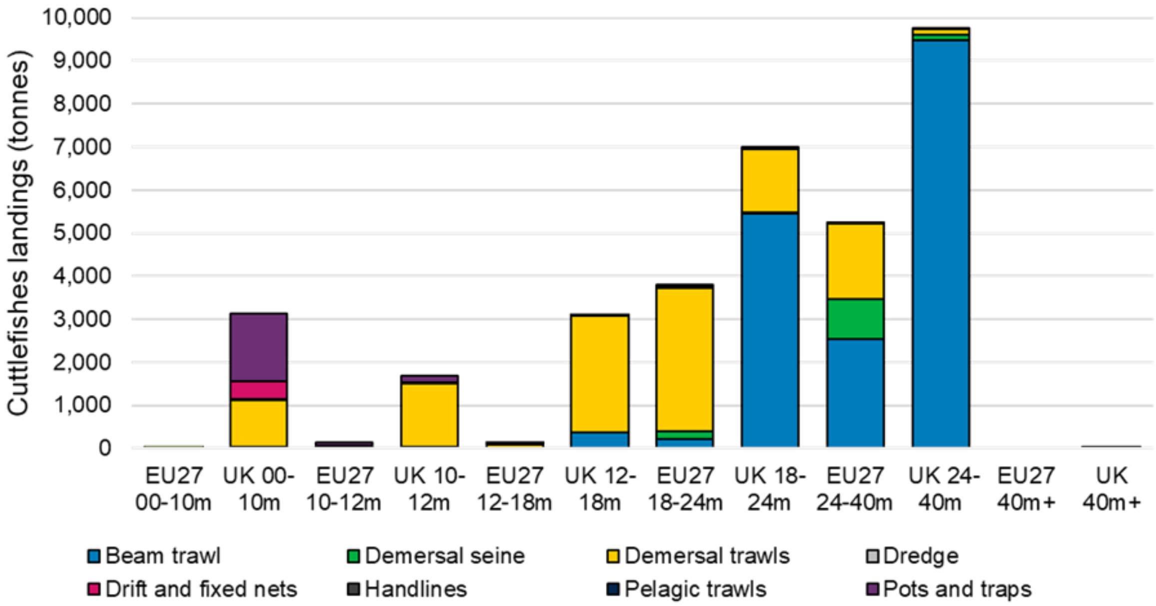


Figure A29 Cumulative cuttlefish landings weight (2016-2021) by vessel size and gear type for UK and EU27 vessels

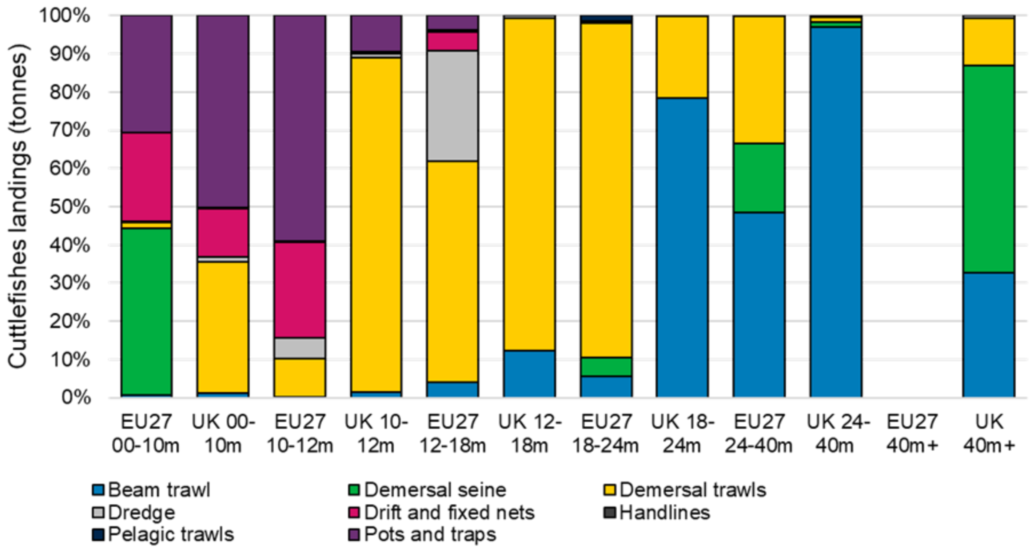


Figure A30 Proportional cuttlefish landings weight (2016-2021) by vessel size and gear type for UK and EU27 vessels. No cuttlefish landings were recorded for EU27_40m+ vessels

Low absolute landings of cuttlefish for EU27 vessels under 18m results in low confidence in proportionality (Figure A30) for these vessel size classes.

A1.5 Fleet economics

Data are collected by Seafish during the Fleet Economic Surveys and is estimated based on the methodology described in the UK Economic Fleet Estimates and Fleet

Enquiry Tool1 as well as information shared with Seafish as part of Data Collection Framework work by MMO. Data encompass:

- Number of vessels by Home Nation 2016-2021 (Seafish 2023)
- Number of vessels by level of economic dependence (Seafish 2023)
- Number of vessels by vessel size categories (>20% economically dependent on the FMP) (Seafish 2023)

A1.5.1 Number of vessels

As of 2021, 717 home nation registered vessels participated in the Channel demersal non-quota fishery. Vessel numbers have declined since 2017 (925 vessel) however, this may be attributed to increased cuttlefish fishing effort during this peak catching period.

Figure **A328** shows the total number of vessels that caught Channel demersal NQS in English waters during 2016-2021 by their economic dependence on value of landings from Channel demersal NQS in English waters vs other landings species (NQS outside of the scope of this FMP and quota species).

As of 2021, 191 (26.6%) of vessels participating in the fishery obtained 20% or more of their landings value from the fishery although economic dependence is also decreasing. In 2017, 291 (31.5%) obtained 20% or more of their landings value from the fisher.

Figure **A328**A32 shows the number of UK vessels >20% economically dependent on Channel demersal NQS by vessel size categories.

The fishery is prosecuted by mainly smaller vessels with no apparent changes in fleet size composition over the 2016-2021 period (Figure A33). In 2021, 54.4% of the fleet were 10m and under, and 69.2% of the fleet, 12m and under.

Numerically most vessels land into Brixham, Newlyn and Plymouth, although in excess of 20 ports across the south of England are utilised (Seafish 2023) with many only by vessels 12m and under. Larger vessels (>18m) also land into continental Europe including France, Belgium and the Netherlands (Seafish 2023). Continental landings can be significant from a small number of vessels with Vlissengen (Netherlands) and Boulogne (France) occurring in the top 10 ports (MMO 2023).

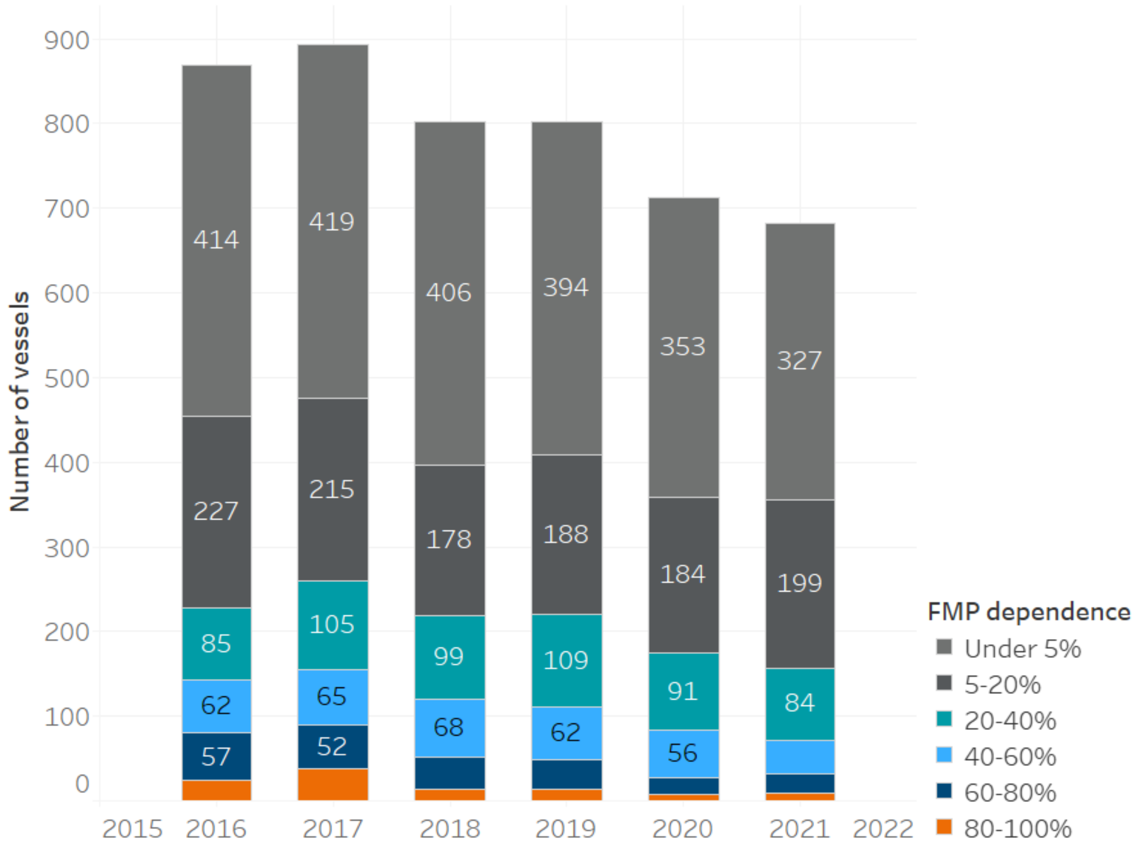


Figure A31 *7* **Number of UK vessels involved in the Channel demersal NQS fishery by level of economic dependence**

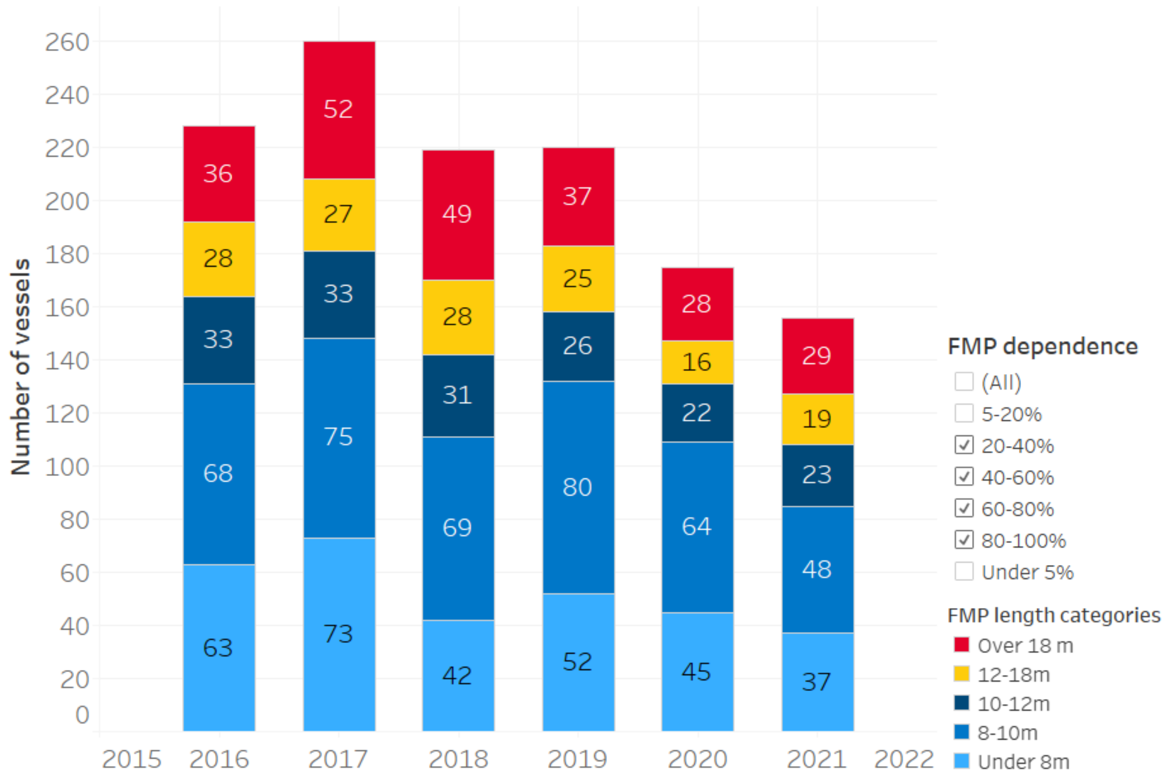


Figure A328 Number of UK vessels by vessel size categories (>20% economically dependent on the FMP)

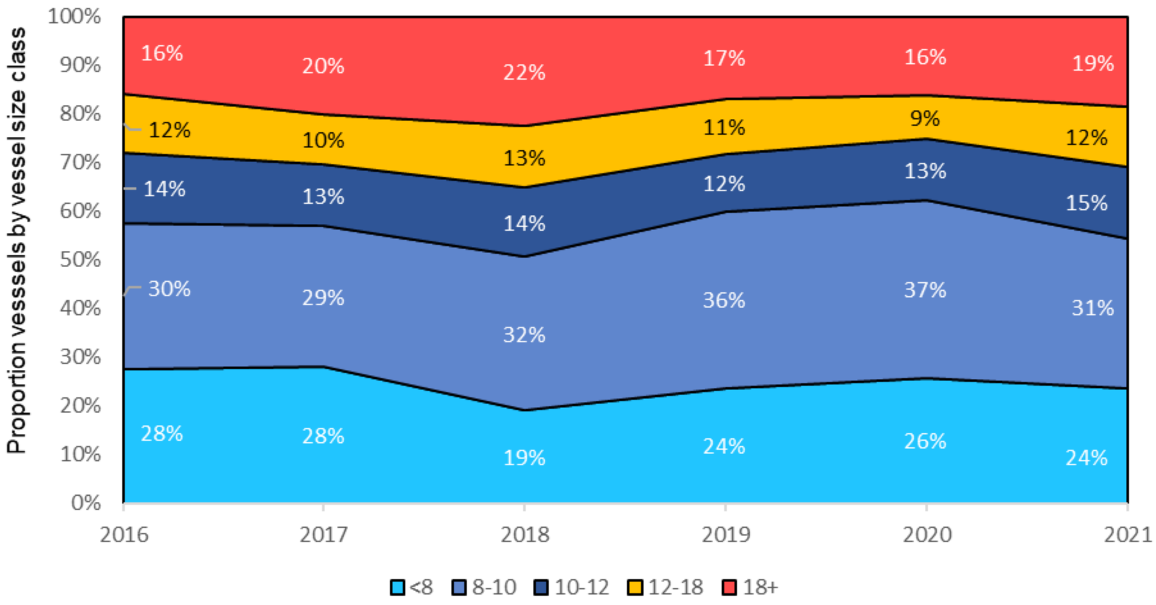


Figure A33 **Number of UK vessels by size given as a proportion of size class**

A1.5.2 Economics of the commercial fleet

Table A4 and Figure A34 below show the main economic performance indicators used to analyse fishing fleets. Note: forecast based on 2021 preliminary activity data provided by MMO and 2020 costs structure. This data shows that while the fishery had been significantly impacted during the 2020-2021covid pandemic, prior to this fishing income, GVA, and operating profit had been on a negative trajectory.

Table A4 Economic performance indicators associated with FMP in 2016-2021

Home Nation	2016	2017	2018	2019	2020	2021 (note)
Fishing income (£000)	26,413	37,015	25,573	25,409	17,519	18,787
GVA (£000)	13,407	18,564	10,922	10,920	6,848	6,646
Operating profit (£000)	6,635	8,882	3,991	4,283	2,177	1,830
Net profit (£000)	5,310	6,962	2,792	3,075	649	
GVA to fishing income margin	51%	50%	43%	43%	39%	35%

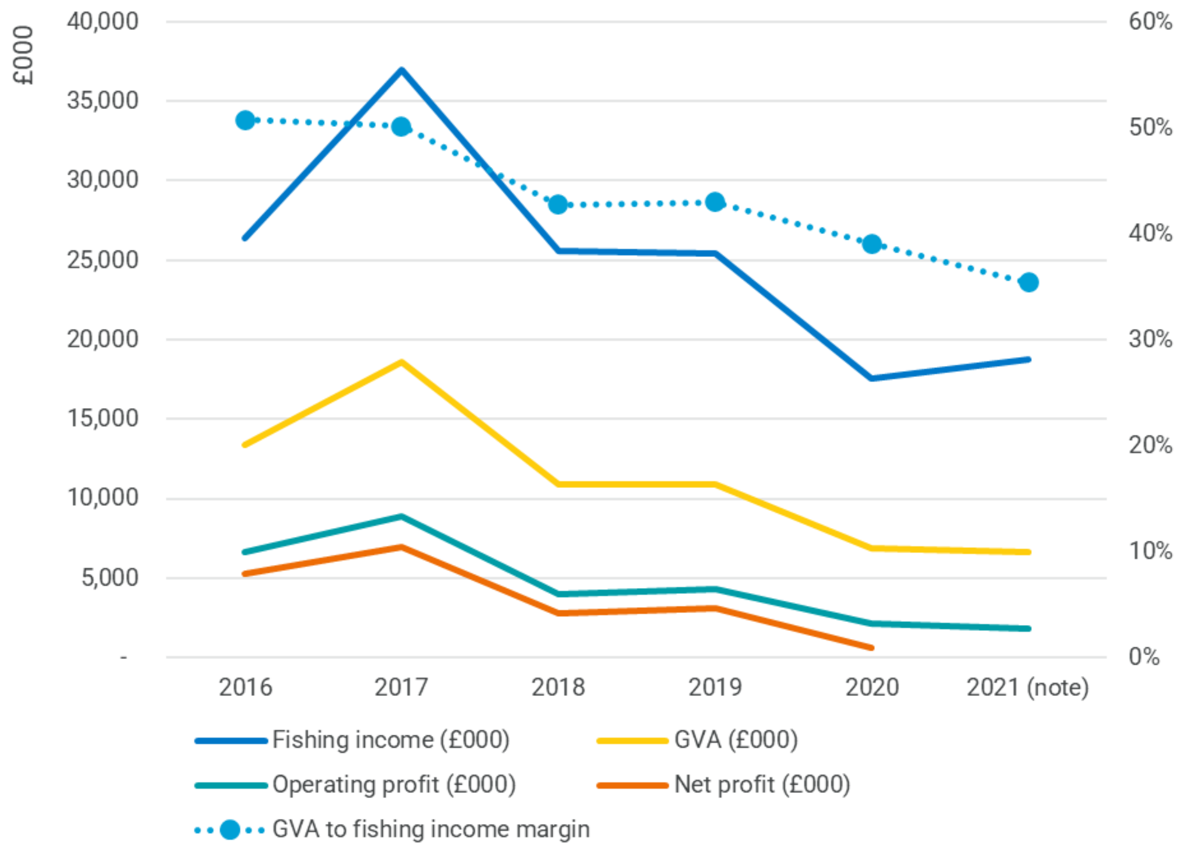


Figure A349 Economic performance indicators associated with Channel Non Quota Demersal species landings from English waters, 2016-2021

The gross value added (GVA) is normally considered to be a proxy of sector contribution to gross domestic product and is important as a measure of value created by the sector to society. Operating as well as net profits are measures representing business performance and important for business owners as indicators of their business profitability. Operating profit only accounts for operating costs, while net profit also takes into account depreciation of the capital invested and financial business costs, such as loan interest. Margin of each economic indicator as a ratio of fishing income could show economic efficiency and profitability of the operations and its evolution over time. Please note that factors impacting economic performance are analysed in more detail as part of Economics of the UK Fishing Fleet annual reports[5].

Employment (FTE) by fleet segments data showed that an overall contraction of the number of employees within the fishery, based on full time equivalents (FTEs). This data looked at the number of employed fishers and gave this value as a proportion of the vessels landings and required number of persons to catch these Channel demersal NQS. Employment figures largely reflect the Cuttlefish landings, the peaks in 2016, 2017 and 2018 can be attributed to the increase in effort targeting Cuttlefish during those years and the subsequent fall in Cuttlefish landings that followed.

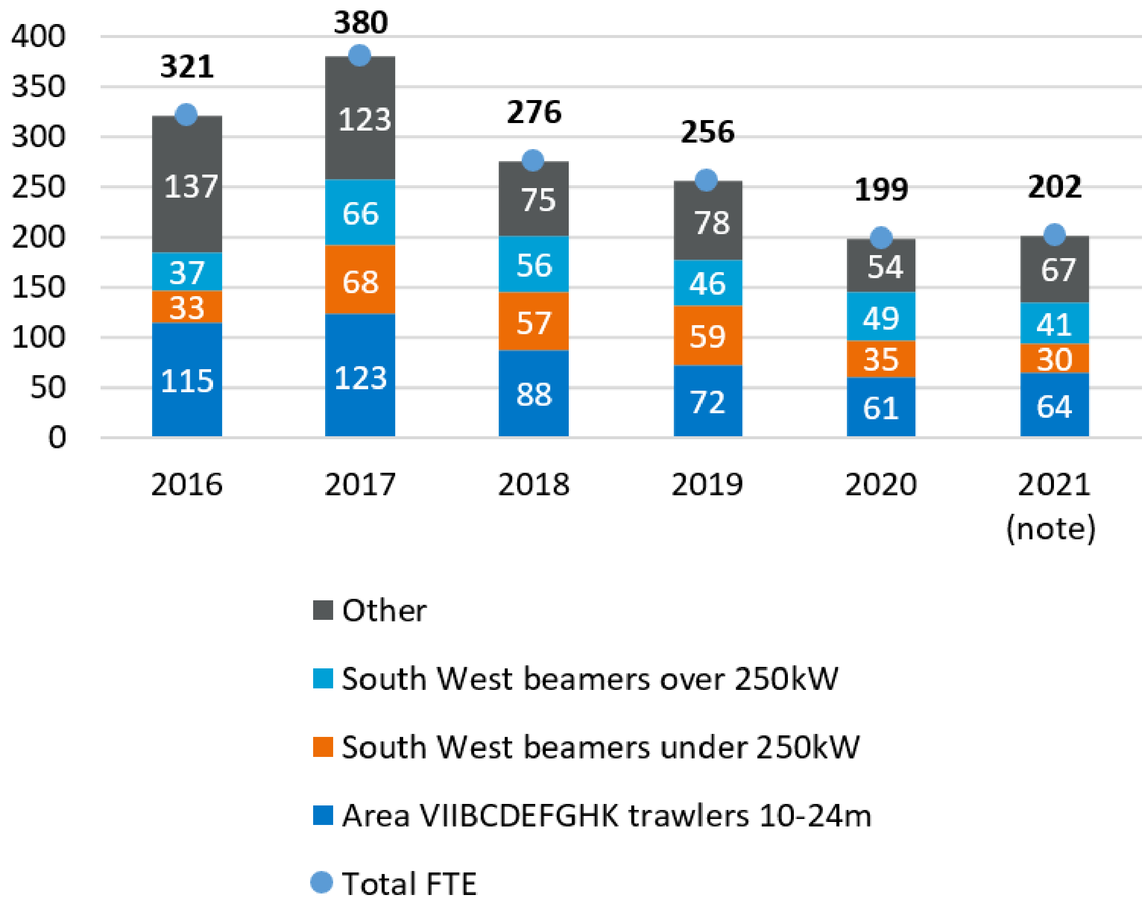


Figure 10A34 Employment (FTE) associated with FMP by Seafish fleet segments in 2016-2021

Figure A34 shows employment calculated in full time job equivalent and partitioned based on the same methodology used for economic performance indicators. Please note that information about social and demographic characteristics of the employees is as published as part of the 2021 Employment in the UK Fishing Fleet report[6]. Socio-demographic characteristics cannotbe partitioned to FMP level, however use of fleet segments associated with the FMP can help to understand potential demographic profile of employees.

A1.5.3 Economics of the recreational fishery

Recreational fishing has an approximate total economic impact to the south coast of £840million per annum and provides over 7000 FTEs (CEFAS, 2016). There are key recreational ports and marinas across the south coast, with an estimated 170 charter boat operators supporting around 394,000 angler trip days per annum within the South Inshore Marine Plan area alone. There is also a high intensity of shore angling throughout the year, with a notable increase in activity within the summer months given the tourism season.

Whilst further work is required to understand the direct social and economic impact of fishing activity related to each species within the scope of the FMP, it appears that some are either highly valued or caught regularly by recreational fisheries and therefore contribute to key recreational fisheries (see below). Additional work is also required to understand the exact methods by which anglers target the FMP species.

Key Recreational fisheries

The following species are considered to form key recreational fisheries:

- **Bib**: Although not a valued sportfish and not regularly retained by anglers, the wide distribution and abundance of Bib, their ease of capture, as well as their importance as prey for larger species suggests importance to recreational fishers across the south coast. Anecdotal evidence also suggests a high level of discard mortality for Bib.
- **Lesser spotted dogfish**: Dogfish are generally considered a recreational bycatch whilst targeting other species, but, like Bib, given the high level of catches and their ease of capture across the south coast, the species is important to recreational anglers.
- **John Dory**: An increasingly popular target fish for boat-based anglers, particularly in 7e. Little is known about the amount of catches or levels of retention, although the species is valued as a food fish.
- **Gurnards:** Red, grey, and to a lesser extent tub gurnard are all caught by recreational anglers, with limited retention. Stakeholders have voiced concern about reduced catches of gurnards, and their importance to the recreational sector.
- **Smoothound**: A valued sportfish, smoothound are targeted across the south coast by both shore and boat anglers, although fishing activity for the species is both localised and seasonal (spring/early summer). Retention of smoothound is reported to be low amongst recreational fishers.
- **Turbot**: Whilst not regularly targeted by shore anglers, the south coast has localised areas for seasonal (spring/early summer) boat-based turbot fishing. Valued as a food species to recreational anglers, turbot are likely to be retained, although anecdotal evidence suggests voluntary release of immature or smaller individuals.
- **Brill**: Similar to turbot.
- **Squid**: A recreational fishery for squid has emerged over recent years, both from boat and shore. Whilst limited formal data is available to quantify catches and landings, numbers of specific online forums and sites for squid angling suggests that effort is increasing, and retention rates are likely to be high.

Annex Two: Species overview and stock status

A2.1 Bib (*Trisopterus luscus*)

A2.1.1 Biology

Information on life history traits, habitat use and other environmental considerations for bib (also known as pout or pouting) mainly compiled from Heessen, Daan, and Ellis (2015) and the Marine Life Information Network (MarLIN) (Barnes, 2008). Other supporting literature contained within the reference list.

Distribution and Appearance

Widely distributed across the Northeast Atlantic, most common in the English Channel, Bristol Channel, and Irish Sea. Deep bodied, coppery colouration with 3-4 pale vertical bands. Characteristic first dorsal pointing upwards, with protruding lower jaw and a single long barbel.

Maturity and Growth

Fast growing juveniles. Maturity at two years of age and an approximate size of 18cm. Slow growth in adults, 27cm in 2nd year, 32cm in 3rd year. Max size of 32cm, with a life expectancy of 7 years and 5 years for males and females respectively.

Spawning and Reproductive Behaviour

Annual spawning season from February to August in southern North Sea and English Channel. Broadcast spawner, with fecundity ranges in 42,000 – 270,000 oocytes, dependent upon size. Planktonic larval stage with recruitment into estuarine nursery areas and movement to deeper water as adults. Inshore spawning migration.

Ecosystem Role

Prey for many different fish, mammalian, and bird predators. Predate mostly on crustaceans, shrimp, small squid, and small fishes.

Habitat and Vulnerabilities

Prefer rocky and sandy benthic habitats, particularly around reefs or wrecks. Immature fish occur in large schools, preferring inshore waters, whilst larger individuals prefer deeper, outer-shelf waters. Migrates to depths of less than 50m to spawn. Highly intolerant of decreased salinity.

A2.1.2 Stock status

Stock Status

The stock is not currently assessed, and no time series of abundance indices are available.

Gears for targeting the species

Primary gears include pelagic trawls, drift and fixed nets, and beam trawls.

Recreational fisheries

Although generally not targeted recreational catches are approximately 292t per annum, with retention of circa 45t.

Management

There is no management in place specific to bib in the UK waters of the English Channel.

A2.1.3 Existing evidence and data gaps

Existing Biological and Fisheries Evidence

Currently, fisheries data are available in the form of national and international landings data. Additionally, data from commercial fisheries are also collected by at-sea observers, with these data including the numbers and length composition of pouting/bib taken by various fleets, and whether the captured individuals are discarded or retained. Market sampling provides additional information on the length composition of landed pouting/bib. Otoliths were collected for ageing until recently (pre-2022), and aged in the lab, but are no longer collected due to cost and low priority for this unassessed species.

Fisheries independent data are available through the main UK surveys in the English Channel. These are Eastern Channel and southern North Sea beam trawl survey (BTS7D), the western Channel sole and plaice survey (UK-FSP) and the South-west Ecosystem beam trawl survey (Q1SWBEAM). Currently, no additional biological information is collected on pouting/bib during these surveys, although otoliths were collected until 2022.

Evidence gaps

Bib is generally a data poor species, and any attempt to begin to assess the stock would require a definition of stock units, and an evaluation of data quality and quantity. The recommended approach to assessing pouting/bib stocks is based on survey data only, as commercial, and recreational catch data are unreliable currently.

In the English Channel, additional to the UK BTS7D and Q1SWBEAM (7e), and UK-FSP (7e), France also conducts an ICES otter trawl survey in 7d (FR-CGFS). If the stock unit extended beyond the English Channel, other ICES surveys cover the North Sea (NS-IBTS), the Celtic Sea and Bay of Biscay (FR-EVHOE), Irish Sea (NWGFS) and south and west of Ireland (IE- IGFS), and West of Scotland (SCOWCGFS and SWC-IBTS).

An additional otter trawl survey was conducted in the Western Channel and Celtic Sea by the UK in 2018-2020 to fill in a gap in the ICES otter surveys. Carrying on this time series could help inform a survey index for this stock. To provide information on life history traits it is recommended to read the otoliths that have been collected in the past and to keep collecting pouting/bib otoliths

A2.1.4 References

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A2.2 Brill (Scophthalmus rhombus)

A2.2.1 Biology

The summary of life history traits, habitat use and other environmental considerations for brill were primarily compiled from Heessen, Daan, and Ellis (2015). Other supporting literature is given within the reference list.

Distribution and Appearance

Widely distributed across the North-east Atlantic, from western Norway and the Shetland Islands southwards to north-western Africa. Large bodied, left eye flatfish. Body more oval than turbot. Generally brown in colour (depending on substrate) with numerous small dark and lighter spots, and a conspicuous dark spot on the midline of the posterior half of the fish. The blind side is white and slightly translucent.

Maturity and Growth

Maturity at 33cm-41cm and 18-25cm for female and male brill respectively. This equates to around 3 years of age for females. Little known on growth rates. Max size 61cm-100cm.

Spawning and Reproductive Behaviour

Annual spawning season from February to August in southern North Sea and English Channel, with 16-week period to release eggs. Whilst there is no information on spawning migrations, spawning concentrations do occur off the Danish coast and southwestern North Sea. Broadcast spawner,although fecundity ranges are unknown. Wind-driven currents transport the larvae from offshore waters towards the surf zone of sandy beaches. Young-of the year settle on the bottom from June onwards. General movement to deeper water at maturity.

Ecosystem Role

Juveniles likely prey for a variety of fish and birds. Predators of adults unknown. Juveniles feed on copepod nauplii, larval decapods and molluscs. Adults feed on shrimps, squid, and fish, including gadoids and clupeids as size increases.

Habitat and Vulnerabilities

Preference for sandy bottoms, appear to largely avoid muddy sediments and gravel. Ontogenetic shift observed, with larger fish found in deeper waters. Lack of information on vulnerabilities.

A2.2.2 Stock status

Stock Status

Assessed by ICES as a data category 3 stock, but co-managed with turbot under a combined species TAC. Management of these stocks under a combined species TAC may hinder effective management of the exploitation rates of the individual species. Although brill stock size is unknown, there are signs of overexploitation. Currently fishing pressure on the stock is above the $F_{MSYproxy}$. The stock size (biomass) index is above MSY $B_{trigger}$ but has shown significant declines since 2015-2016.

Gears for targeting the species

Primary gears include beam trawls, otter trawls, drift and fixed nets, and dredges.

Recreational fisheries

Recreational catches are likely low and have not been estimated, but brill is known to be caught and likely retained by recreational anglers given its value as a prized food fish.

Management

There is no stock-specific management in place specific for brill in the UK waters of the English Channel. As mentioned, there is a combined TAC for both brill and turbot, with this TAC covering UK and EU waters of Subarea 4 and UK waters of Division 2.a (T/B/2AC4-C).

A2.2.3 Existing evidence and data gaps

Existing Biological and Fisheries Evidence

Currently, fisheries data are available in the form of national and international landings data. Additionally, data from commercial fisheries are also collected by at-sea observers, with these data including the numbers and length composition of brill taken by various fleets, and whether the captured individuals are discarded or retained. ICES utilise the standardised landings per unit effort (LPUE) from the Dutch beam trawl fleet (vessels > 221 kW) as a biomass index of stock development.

Three main UK surveys in the English Channel collect data on brill: Eastern Channel and southern North Sea beam trawl survey (BTS7D), the western Channel sole and plaice survey (UK-FSP) and the South-west Ecosystem beam trawl survey (Q1SWBEAM). Biological data collection provides the length, weight, sex and maturity stage of individual brill, with otoliths collected to provide information on age.

Evidence gaps

Additional work on stock delineation of brill is required as the biological stock units for brill across the species distribution area are largely undefined.

Data from at-sea observers, recreational fishers, and scientific trawls are limited, impeding our ability to assess temporal changes in stock size. Current scientific surveys in the stock area are not designed for catching brill. A fisheries-independent survey that had adequate catchability of large flatfish and that covered the entire distribution area of the stock would improve the assessment. To address this issue in future assessments, a Dutch science–industry partnership initiated a new beam trawl survey in the central and southern North Sea for turbot and brill in 2019.

Given the limited data from existing trawl surveys, but high commercial value of the stock necessitating improvement to assessments and management, one option could be using “Close Kin Mark Recapture” studies.

A2.2.4 References

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A2.3 Cuttlefish - Common cuttlefish (*Sepia officinalis*) and elegant cuttlefish (*Sepia elegans*)

A2.3.1 Biology

Information on life history traits, habitat use and other environmental considerations is taken from the Marine Life Information Network (MarLIN) (Barnes, M.K.S, 2008). Other supporting literature contained within the reference list.

Distribution and Appearance

Common Cuttlefish are widely distributed across the north-east Atlantic, from the Faroe Bank and the Shetland Islands southwards to north-western Africa. Found in the central and southern North Sea, and in the English Channel (Lordan *et al*. 2001a). Elegant Cuttlefish has a more westerly distribution, occurring primarily in the Celtic sea and western English Channel (Jereb et al., 2015).

Common Cuttlefish are broad and somewhat flattened, appearing oval in cross section. Mantle length is typically up to 45 cm and average body weight is 1-2kg. Paired fins run from behind the head to the tip of the body. *Sepia officinalis* has eight arms and two elongated tentacles which end in a tentacular club, with five to six rows of suckers that are specially adapted for prey capture.

Elegant Cuttlefishs are small (mostly under 7cm) with an oblong mantle that is almost twice as long as wide, and brown/red colouration. Tentacular club suckers differ markedly in size. There are 3–greatly enlarged suckers in the middle of the club, and although several dorsal suckers are enlarged, they are never as large as the medial suckers.

Maturity and Growth

Within the Channel, common Cuttlefish males begin to mature at 8.1cm-9.1cm (age 1 year). However, 50% of males are mature at 14.6cm, and all males are mature at 17cm. In female common Cuttlefish, the smallest sexually mature individuals are 14.2 cm ML, 50% were mature at 16.4 cm, and all females were mature at 23.0 cm (Dunn, 1999a).

Growth is driven by temperature and sex, but also slows with increased size and maturity. In the English Channel, growth was fastest between July and October in males (32.7mm per month), and between August and December in females (25mm per month). There was no growth in males between October and December, or between April and May. Slowest growth in females (<4mm per month) was between December and May (Dunn, 1999a).

Elegant Cuttlefish grow at 2-3mm a month, with maturity reached at 3.5 – 4.5 cm for males and females mature at 4.5-6.5 cm in length (Jereb et al., 2015). Life expectancy is 12-18 months.

Spawning and Reproductive Behaviour

Common Cuttlefish are an intermittent terminal spawner. Spawning takes place from February to July in the English Channel (Jereb *et al*., 2015). Females die shortly after spawning. Elaborate courtship behaviour, during which spermatophores are transferred to a special pouch under the buccal mass of the female. Females lay 150-4000 eggs, with a potential fecundity of 3700-8000 oocytes. Females lay eggs in depths less than 30–40 m, attached in clusters to various plants, sessile animals such as tubeworms, or other hard structures (including fishing gear). The length of embryonic development varies with temperature and ranges from 40–45 d at 20°C to 80–90 d at 15°C. No larval stage, hatchlings behave like juveniles and adults.

Little is known about the seasonal cycle of elegant Cuttlefish within UK waters including if elegant Cuttlefish spawn within UK waters.

Ecosystem Role

Cuttlefish are prey for a variety of fish, mammals, and birds (i.e., Blanc and Daguzan, 1999). Cuttlefish predate on crustaceans, bony fish, molluscs, polychaetes, and nemertean worms. The main crustacean prey items are mysids, shrimps, prawns, and crabs, but also amphipods, isopods, and ostracods. Cuttlefish feed on gobies, sandeels, whiting, and wrasses, but can also prey on some flatfish. Amphipods, mysids, caridean shrimps, and other small crustaceans, which commonly swarm in large schools just above the bottom, are important in the diet of juvenile Cuttlefish.

Habitat and Vulnerabilities

Substrate types: both species prefer sandy and muddy substrata covered by algae and marine grasses (Zostera and Posidonia). Common Cuttlefish exhibit a depth distribution extending from subtidal waters to 200 m. Individuals are most abundant in the upper 100 m, with large animals found at greater depth. Elegant Cuttlefish is a sublittoral species, living on sandy and sand-muddy bottoms up to 580 m depth.

Common Cuttlefish exhibit seasonal migrations between shallow and deeper water. In the English Channel, spawning season from early spring to mid-autumn in shallow areas; from late autumn, juveniles migrate from inshore nursery grounds to deeper waters in the west and middle part of the English Channel; from November, juveniles move further west to the offshore deep waters off the north part of the French Atlantic coast, and stay there until March. Common Cuttlefish are vulnerable to low temperatures (<10°C), heavy metal contamination, underwater noise, and microbial

(Pseudomonas and Vibrio) infections. Both species can adapt to salinity changes well. Potential threats from invasive blue crab.

A2.3.2 Stock status

Stock Status

Neither of the two Cuttlefish stocks are currently assessed, and no time series of abundance indices are available.

Gears for targeting the species

Primary gears include beam trawls, otter trawls, drift and fixed nets, demersal seines, dredges, and pots and traps. Cuttlefish trawling occurs offshore whilst the animals are still immature or maturing. The peak of the otter trawl fishery occurs from September to November in the Western Channel. Beam trawlers fish there longer, from September to April and target immature, maturing and pre-spawning animals. Static gears, primarily potters, are most active in April to June and target the inshore spawning Cuttlefish mainly in the Eastern Channel.

Recreational fisheries

No information obtained

Management

There is no stock-specific management in place specific for Cuttlefish in the UK waters of the English Channel.

A2.3.3 Existing evidence and data gaps

Existing Biological and Fisheries Evidence

Currently, fisheries data are available in the form of national landings data. Additionally, data from commercial fisheries are also collected by at-sea observers, with these data including the numbers and length composition of Cuttlefish taken by various fleets, and whether the captured individuals are discarded or retained. Market sampling provides length composition data of landed Cuttlefish.

Three main UK surveys in the English Channel collect fishery-independent data on Cuttlefish: Eastern Channel and southern North Sea beam trawl survey (BTS7D), the western Channel sole and plaice survey (UK-FSP) and the South-west Ecosystem beam trawl survey (Q1SWBEAM). Biological data is generally not collected.

Evidence gaps

UK landings of Cuttlefish are reported at species-complex level. Improved catch/landings reporting and further studies of the species composition of Cuttlefish in this area are required. Species level reporting of landings is poor to non-existent and is generally aggregated to higher taxonomic levels. Species level identification in biological sampling is improving but has historically been poor.

Overall, further work is required to define, delineate, and assess both Cuttlefish stocks. Common Cuttlefish from the Bay of Biscay, English Channel and North Sea are thought to be represented by three different populations or stocks (Bloor *et al*., 2013), though with extensive gene-flow between them (Wolfram *et al*., 2006). For elegant Cuttlefish, little is known on the ecology and behaviour of the population within the English Channel, although a mature female caught within a Channel survey in March 2022 may indicate that spawning does occur, despite the Channel being the northernmost part of the species range.

Whilst there is no routine stock assessment within the Channel, several test assessments have examined the feasibility of assessment methods, and subsequently exploitation rates of previous Cuttlefish age cohorts. These have presented mixed results, with low exploitation rates observed in the late 1970s (Gi Jeon, 1982), whereas more recent (1996-1999) results indicating full exploitation within the entire English Channel across each Cuttlefish age cohort (Royer *et al*. 2006). Currently, Cefas has been working on an assessment for Cuttlefish in 7e, with the recommendation that assessments in the English Channel should be carried out within ICES to facilitate data exchange between countries.

A significant evidence gap is the lack of information on the proportion of Channel common Cuttlefish that exhibit an annual versus biannual lifespan, and how this may be impacted by environmental and/or climactic drivers. Likewise, a lack of understanding on recruitment is a significant issue, and whilst current scientific work is underway to understand how to develop a recruitment index, sustainability in the fishery will likely require dynamic fishery management based on estimated recruitment. This is due to the variable life history of Cuttlefish, and the time lags associated with developing ‘traditional’ fish stock assessments.

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A2.4 Grey Gurnard (*Eutrigla gurnardus*)

A2.4.1 Biology

Information on life history traits, habitat use and other environmental considerations for grey gurnard was mainly compiled from Heessen, Daan, and Ellis (2015) and the Marine Life Information Network (MarLIN). Other supporting literature is given within the reference list.

Distribution and Appearance

Widely distributed across the North-east Atlantic, from Iceland to Norway and southwards to north-western Africa, including the Mediterranean and Black Seas. Occurs in all areas covered within the Channel Non-Quota Demersal FMP.

The smallest of the main UK gurnard species, the grey gurnard is a distinctive fish of grey-brown colouration with a large head with a sloping forehead and a body that tapers towards the tail. Two dorsal fins, the first is smaller and has 7-10 spines and a large black mark at the top. The second dorsal fin is symmetrical to the anal fin, both have 18-20 rays. Both pectoral and caudal fins are short, the latter being truncate. Reported up to 50cm, but more commonly 30cm length.

Maturity and Growth

Unknown growth rates and size at maturity, although females grow fast and are longer lived than males. Age at first spawning is 3-4 years. Life expectancy of 6-8 years. Natural mortality rate of 10-15% amongst adults.

Spawning and Reproductive Behaviour

Spawning between December-May, although some may spawn between March and April. Some vertical migration to mid and surface layers exhibited during spawning Unknown fecundity. Planktonic larval stage until 3cm length.

Ecosystem Role

Predators unknown. Preys upon demersal crustaceans and small fish.

Habitat and Vulnerabilities

Typically found offshore in depths of 10-340m, with a preference for sandy habitats, although can be found over mud, shell and rocks in lower abundances. Highly intolerant of decreased temperatures, some sensitivity to changes in salinity, turbidity, habitat loss and heavy metal contamination.

A2.4.2 Stock status

Stock Status

Grey Gurnard is biennially assessed as a data category 3 stock by ICES in ICES Subarea 4 (North Sea) and divisions 7d and 3a (eastern English Channel, Skagerrak and Kattegat)[2]. The area concerned with this FMP, eastern English Channel (Division 7d), is therefore on the edge of the distribution for this stock unit and will contribute a relatively small proportion of the catches, as most of the catches are taken in subarea 4.

Currently, the stock's biomass is above $L_{trigger}$ (a reference point defined as the lowest value of the biomass index multiplied by 1.4 based on IBTS Q1 survey).

Gears for targeting the species

Grey gurnard are primarily caught (and discarded) as bycatch within the beam and otter trawl fishery for roundfish and flatfish. Additionally, gurnard species are taken as bycatch species within industrial fisheries for sandeel and sprat.

Recreational fisheries

Recreational catches were on average an estimated 3.8 tonnes per annum between 2016-2021, all of which was returned. Whilst these estimates are subject to a high level of uncertainty, these values do demonstrate the importance of species like grey gurnard to recreational anglers.

Management

There is no stock-specific management in place specific for grey gurnard in the UK waters of the English Channel.

A2.4.3 Existing evidence and data gaps

Existing Biological and Fisheries Evidence

Data that are available for grey gurnard include national and international landings data. In the UK, additional data from commercial fisheries are also collected by at-sea observers, with these data including the numbers and length composition taken by various fleets, and whether the captured individuals are discarded or retained. Market (port) sampling provides additional information on the length composition of landed grey gurnards.

Scientific trawl surveys provide fishery-independent information on the catches of grey gurnard, including numbers at length and associated biological information. There are currently three main UK surveys in the English Channel: Eastern Channel and southern North Sea beam trawl survey (BTS7D), the western Channel sole and plaice survey (UK-FSP) and the South-west Ecosystem beam trawl survey (Q1SWBEAM). Biological data collection provides the length, weight, sex and maturity stage of individual fish, with otoliths collected to provide information on age. However, otoliths collected from gurnard species by Cefas have not been read (as of 2022).

Evidence gaps

As grey gurnard is generally a bycatch species, landings data do not reflect catches (and fishing mortality) well. Some concern on the quality of the assessment is apparently due to a lack of species-specific data, and the fact that discarding data (which is estimated to be high at around 81% of catches), are only available since 2012. The ICES assessment also does not include any of the scientific surveys within the English Channel. It only considers the North Sea International Bottom Trawl survey (NS-IBTS), an otter trawl survey that covers the North Sea.

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A2.5 John Dory (*Zeus faber*)

A2.5.1 Biology

Information on life history traits, habitat use and other environmental considerations for John Dory is mainly compiled from Heessen, Daan, and Ellis (2015) and the Marine Life Information Network MarLIN (Ballerstedt, S., 2008).

Distribution and Appearance

Widely distributed across the east Atlantic, Indian Ocean, and western Pacific. Some genetic differentiation suggests various species across the range. John Dory is commonly distributed around the UK; in English waters it occurs across ICES subareas 4 (North Sea) and 7 (English Channel, Celtic Sea and Irish Sea).

Distinct compressed lateral body of golden-brown colouration, with large protractile mouth and lower protruding jaw. 9-10 prominent spines within the first dorsal fin and 3-4 in front of the anal fin. Characteristic brown spot in the centre of the body. Reported up to 66cm.

Maturity and Growth

Growth equal across sexes until 3 years, after which male growth slows. Maturity reached at 4 years at 25cm within males and 35cm within females. Life expectancy of between 13-15 years.

Spawning and Reproductive Behaviour

Spawning over summer months, with the Channel area serving as a nursery for juvenile fish.

Ecosystem Role

Predators unknown. Preys upon crustaceans and small fish, with occasional cephalopods.

Habitat and Vulnerabilities

Typically found in depths of 50-150m, with no preference for substrate type. Some sensitivity to changes in temperature, salinity, turbidity, habitat loss and heavy metal contamination.

A2.5.2 Stock status

Stock Status

There is no assessment for John Dory stocks, and stocks are not delineated.

Gears for targeting the species

John Dory are primarily caught as bycatch in trawls and nets.

Recreational fisheries

Whilst it is likely that recreational fishers catch John Dory, recreational catches are low (16 fish were reported between 2016-2021). Consequentially no catch estimates are produced.

Management

There is no stock-specific management in place specific for John Dory in the UK waters of the English Channel.

A2.5.3 Existing evidence and data gaps

Existing Biological and Fisheries Evidence

Data that are available for John Dory include national and international landings data. In the UK, additional data from commercial fisheries are also collected by at-sea observers, with these data including the numbers and length composition taken by various fleets, and whether the captured individuals are discarded or retained. Market (port) sampling provides additional information on the length composition of landed John Dory.

John Dory (at marketable size) are generally captured in the range of otter trawl surveys conducted around the British Isles, with beam trawls capturing smaller individuals. Scientific trawl surveys provide fishery-independent information on the catches of John Dory, including numbers at length and associated biological information. Biological data collection provides the length, weight, sex and maturity stage of individual fish, with otoliths collected to provide information on age. However, John Dory otoliths collected by Cefas have not been read (as of 2022).

Evidence gaps

Given the strong commercial value and exploitation by several nations, there is strong reasoning for international collaboration to assess John Dory stocks, with the most applicable route through ICES.

Initially, work will be required to define and delineate stock assessment units. Cefas conducted an exploratory assessment assuming a single stock within ICES subareas 4, 6-7 and divisions 8.a-b (West of Scotland, North Sea and covering all the areas south to the Bay of Biscay including the English Channel). However, issues with models suggested that there are either inconsistencies within the input data, or the assumed stock area is not functioning as a coherent stock.

Additional data will be required on discarding (given that John Dory is caught in mixed demersal fisheries). If a collaborative assessment was conducted, some peaks in some national landings data would require further investigation. There is also a concern around a lack of abundance indices in some non-UK surveys.

To improve data richness and further develop a survey index for John Dory, a continuation of the time series from an otter trawl survey that was conducted in the Western Channel and Celtic Sea by the UK in 2018-2020 to fill gaps in ICES otter trawl surveys would be useful. It would also be pertinent to process and read otoliths collected through surveys to provide age distribution data. Furthermore, given the potential for a northward shift in John Dory distribution, further work on relative abundance is required.

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A2.6 Lemon sole (*Microstomus kitt*)

A2.6.1 Biology

Information on life history traits, habitat use and other environmental considerations for lemon sole is compiled primarily from Heessen, Daan, and Ellis (2015) and the Marine Life Information Network MarLIN (Barnes, M.K.S, 2008).

Distribution and Appearance

Lemon sole is distributed in the North-east Atlantic from Iceland and northern Norway and Iceland southwards to the Bay of Biscay. Lemon sole is commonly distributed around the UK; in English waters it occurs across ICES subareas 4 (North Sea) and 7 (English Channel, Celtic Sea and Irish Sea).

Lemon sole are medium sized demersal flatfish of brown/grey colouration and marbled patterning with a small head and mouth. The lateral line draws a shallow curve around the pectoral fin. Maximum reported length is approximately 63cm, but more commonly found under 45cm.

Maturity and Growth

Little information exists regarding growth rates. Males and females mature at lengths of about 14cm and 15.5cm respectively. 50% of males are mature at age 3, whereas 50% of females are mature at age 5. Most landed fish are up to 9 years old, with a maximum reported longevity of 23 years.

Spawning and Reproductive Behaviour

Adults spawn from January to November, 470 eggs per g body weight annually, therefore a 30cm fish producing approximately 100,000 eggs. Larval stages remain pelagic until settling into offshore areas. Larvae have been found alongside high abundances of adults off northeast Scotland, the German Bight, on coarse grounds of the Irish Sea, near the shelf edge and on offshore banks to the west of Scotland and Ireland. Little evidence around early juvenile behaviour, although they are generally found at greater depths in offshore areas in comparison to adults.

Ecosystem Role

Predators unknown. Preys upon a large range of invertebrates, including sessile polychaetes, small crustaceans, and brittle stars.

Habitat and Vulnerabilities

Typically found in depths of 1m-1105 m, with a preference for coarser grounds such as gravel or shell beds. No record of adult migration. Unknown sensitivities.

A2.6.2 Stock status

Stock Status

ICES assesses lemon sole as a data category 3 stock with advice provided under the MSY approach in Subarea 4 and divisions 3a and 7d (North Sea, Skagerrak and Kattegat, eastern English Channel)[3]. The biomass index shows a high degree of variability but has been above MSY $B_{trigger}$ since 2009. Fishing mortality is below likely proxies for MSY reference points, and there is no sign of overexploitation despite an unknown stock size.

Gears for targeting the species

Lemon sole are primarily caught by beam and otter trawlers, with some moderate catches by dredges and drift and fixed nets.

Recreational fisheries

Lemon sole are likely to be of limited interest to recreational anglers given their typical offshore distribution; consequentially very few are reported and no catch estimates are produced.

Management

There is a combined species TAC for lemon sole and witch covering UK and EU waters of Subarea 4 and UK waters of Division 2a (L/W/2AC4-C)1. The combined species TAC unit does not correspond with the assessment unit, as the ICES assessment unit includes both Divisions 3a and 7d. There is no stock-specific technical management in place specific for lemon sole in the UK waters of the English Channel. This stock is generally caught as bycatch species under mixed demersal fisheries.

A2.6.3 Existing evidence and data gaps

Existing Biological and Fisheries Evidence

Data that are available for lemon sole include national and international landings data. Additional data from commercial fisheries are also collected by at-sea observers, with these data including the numbers and length composition taken by various fleets, and whether the captured individuals are discarded or retained. Otoliths are collected for ageing.

Scientific trawl surveys provide fishery-independent information on the catches of lemon sole, including numbers at length and associated biological information. There are currently three main UK surveys in the English Channel, although none are used in the ICES assessment: the eastern Channel and southern North Sea beam trawl survey (BTS7D), the western Channel sole and plaice survey (UK-FSP), and the South-west Ecosystem beam trawl survey (Q1SWBEAM) Biological data collection from surveys in the North Sea and eastern English Channel provides the length, weight, sex and maturity stage of individual fish, with otoliths collected that provide age information.

Evidence gaps

To conduct a full analytical assessment, improved data on age and length distributions in landings and discards would be required. Additionally, a fishery-independent index covering the entire stock area across all length classes would be useful. Further evidence on the distribution of juvenile lemon sole is required to understand the location of nursery grounds, as would further work to understand stock boundaries and delineation.

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A2.7 Lesser spotted dogfish (*Scyliorhinus canicula*)

A2.7.1 Biology

Information on life history traits, habitat use and other environmental considerations for lesser spotted dogfish is mainly compiled from Heessen, Daan, and Ellis (2015).

Distribution and Appearance

Lesser spotted dogfish (hereby dogfish) is distributed in the North-east Atlantic from Iceland and northern Norway and Iceland southwards to the Mediterranean Sea and northwest Africa. Lesser spotted dogfish is commonly distributed around the UK; in English waters it occurs across ICES subareas 4 (North Sea) and 7 (English Channel, Celtic Sea and Irish Sea). It is most abundant in the outer parts of Lyme Bay, Eddystone grounds and parts of the Normano-Breton Gulf and at the southern entrance to St George’s Channel.

Dogfish are small sharks with a blunt head and founded snout, exhibiting a light brown colouration with characteristic spots and stripes. The underside is grey-white. The species exhibits sexual dimorphism, with differences in mouth, teeth and pelvic fins observed across males and females. Recorded up to 100cm, although most commonly observed at a maximum of 80cm body length.

Maturity and Growth

As an oviparous (egg laying) species, dogfish hatch at approximately 10cm in length and grow between 1-8cm a year. 50% of males are mature at 52-57cm, whereas 50% of females are mature at 55-58cm, both equating to around 6 years old. Life expectancy is typically 17 years.

Spawning and Reproductive Behaviour

Whilst mating takes place throughout the year, peak egg laying occurs in June and July with an incubation period of between 5-11 months. Individuals typically segregate by sex and size and then mix for mating.

Ecosystem Role

Predators are typically larger finfish and elasmobranchs, but also marine birds and mammals. Preys upon a large range of invertebrates, including crustaceans, polychaetes, and small demersal and pelagic fish.

Habitat and Vulnerabilities

Typically found in depths of 50m-100m, with no preference for bottom substrate. Limited adult migration as individuals typically remain within a home range of 30Km. Some recorded sensitivities to temperature and salinity changes, turbidity, and noise.

A2.7.2 Stock status

Stock Status

ICES biennially assesses two dogfish stocks that cover the spatial area of the FMP. Both are subject to the data category 3 framework:

- Lesser spotted dogfish in North Sea, Skagerrak and Kattegat, eastern English Channel (Subarea 4 and divisions 3a and 7d)[4]
- Lesser spotted dogfish in West of Scotland, Irish Sea, southern Celtic Seas (Subarea 6 and divisions 7.a–c and 7e–j)[5]

Catches across both regions are stable, with a slight (2%) increase in catches in Subarea 6 and divisions 7.a–c and 7e–j in 2019-2020 when compared to 2014-2018. Survey generated stock size indicators of the total biomass are utilised in both sets of advice, and again are reported to be stable since 2016.

Gears for targeting the species

Dogfish are frequently a bycatch species, primarily caught within otter and beam trawls, as well as drift and fixed nets intended for other species. However, there can be deliberate targeting as suggested by anecdotal evidence they dogfish are targeted by trawlers to increase total catch size and therefore the weight of bass that can be retained under the 5% bass catch rules.

Recreational fisheries

Although dogfish are generally not targeted by recreational anglers, their abundance means that they are commonly caught by the recreational sector. Within the English Channel catch estimates are, on average, 50,000 fish or 37 tonnes of lesser spotted dogfish kept, and 1.7 million fish or 1155 tonnes returned per annum.

Management

Dogfish are not subject to species-specific fisheries management measures in UK or EU waters.

A2.7.3 Existing evidence and data gaps

Existing Biological and Fisheries Evidence

Data that are available for dogfish include national and international landings data. Additional data from commercial fisheries are also collected by at-sea observers, with these data including the numbers and length composition taken by various fleets, and whether the captured individuals are discarded or retained.

Scientific trawl surveys provide fishery-independent information on the catches of dogfish, including numbers at length and associated biological information. ICES advice states that trawl surveys effectively catch mature dogfish, despite these surveys not being designed to sample dogfish populations. There are currently three main UK surveys in the English Channel: the eastern Channel and southern North Sea beam trawl survey (BTS7D), the western Channel sole and plaice survey (UK-FSP), and the South-west Ecosystem beam trawl survey (Q1SWBEAM). Biological data collection from surveys provides the length, weight, sex and maturity stage of individual fish. Dogfish are not aged, and maturity data is not collected from those individuals that are captured alive and released.

Evidence gaps

Landings patterns for dogfish exhibit high variability in UK waters given the use of the species as pot bait in whelk and crab fisheries. It is unclear whether reporting fully quantifies pot bait landings.

Issues with the availability and utility of species-specific data are also apparent given historical landings were grouped into generalised categories, and more recent data collected in the Channel may be impacted due to overlaps in distribution of lesser spotted dogfish with greater spotted dogfish.

Despite several countries reporting discards at the stock level, ICES do not quantify or incorporate discarding into each assessment. Furthermore, discarding is highly variable between fishing fleets, but generally considered to be several times higher than landings. Whilst studies on beam and otter trawls have suggested that dogfish discard survivability is high for those gears, discard mortality is not quantified across other gears. Consequentially, further work is required to understand the level of discarding across all fleets, and the respective survivability of dogfish caught in varying types of gear.

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A2.8 Octopus - Curled octopus (*Eledone cirrhosa*) and common octopus (*Octopus vulgaris*)

A2.8.1 Biology

The majority of the biological, environmental and life history traits are referenced from Jereb et al., (2015), however please refer to the reference list for additional supporting literature.

Distribution and Appearance

The common octopus (*O.vulgaris*) is globally distributed in temperate and tropical waters, with the SW of Britain representing the NE limit of the species' range. As a result of recent population crashes due to cold winters, it is now rare in English waters and occurs mainly in the western English Channel. Conversely, the curled octopus (*E. cirrhosa*), is commonly distributed in UK waters.

Whilst the common octopus can reach a larger weight and total size (100cm and 2kg), both species generally will have a mantle length of up to 25cm. Common octopus also have larger arms in comparison to mantle length than curled octopus (4-5.5 times larger versus 2.5-3 times larger).

Maturity and Growth

Both species exhibit high variability in growth rates depending on geographic location, with temperature a key driving factor. Common octopus can achieve a growth rate of 13% per day, whilst curled octopus can achieve around 3-5% per day.

For the common octopus, mantle length at first maturity is about 9.5-9.7cm in males and 13.5-14.4cm in females, equating to a body weight of 1-2.4kg (females). For Curled octopus, mantle length 9.1-10.9cm in males and 10.1-13.5cm in females. Body weight 400-1000g for males and 200g for males in the North Sea.

Life expectancy is typically 12-18 months, with mating generally being the terminal event in both species' lifecycles.

Spawning and Reproductive Behaviour

Both species sexually reproduce. Common octopus mate between April and October, whilst curled octopus mate between May and September. Females will lay and brood eggs in lairs within reefs or under rocks, or in sandy and muddy bottoms (common octopus) or rocky bottoms (curled octopus). Females die once eggs hatch. Larvae are planktonic that eventually settle to benthic life.

Ecosystem Role

Predated upon by larger finfish and elasmobranchs, but also marine birds and mammals. Both species are generalist carnivores and scavengers.

Habitat and Vulnerabilities

Both species occur in coastal waters to the outer continental shelf. Curled octopus prefer sand, rocks, and mud, whilst common octopus favour reef and rock habitats. Curled octopus have a slightly lower thermal range (9-18°C) compared to common octopus (10-20°C). Curled octopus also split across depths dependent on sex, where females predominate from 30m to 80m, and males below 100m depth. Both species are sensitive to reduced temperatures and salinities, with curled octopus exhibiting sensitivity to higher temperatures. Parasites and heavy metal contaminants also present a risk to both species. Some potential for noise and vibration sensitivity.

A2.8.2 Stock status

Stock Status

There are no published assessments for either species

Gears for targeting the species

Octopus within the Channel are primarily caught within otter and beam trawls, as well as dredges, drift and fixed nets intended for other species.

Recreational fisheries

No octopus were reported within the sea angling diary, so catches for the recreational sector cannot be estimated.

Management

There is a 750g weight specimen weight limit for octopus (Regulation (EU) 2019/1241 Annex VI part A, adopted by SI 2019/1312 Fisheries Act 2020 Schedule 11) in ICES divisions 7d and 7e.

A8.2.3 Existing evidence and data gaps

Existing Biological and Fisheries Evidence

Data available for octopus include national landings data. However, as both species of octopus are mainly taken as a bycatch in mixed demersal fisheries and recording of landings tend to be generic counts of octopus rather than to a species level, issues with data reliability are apparent.

In the UK, data are also captured from commercial fisheries by at-sea observers, with these data including the numbers taken by various fleets, and whether the captured individuals are discarded or retained.

Scientific trawl surveys provide fishery-independent information on catches of octopus, however only counts are recorded. There are currently three main UK surveys in the English Channel: Eastern Channel and southern North Sea beam trawl survey (BTS7D), the western Channel sole and plaice survey (UK-FSP) and the South-west Ecosystem beam trawl survey (Q1SWBEAM).

Evidence gaps

There is currently no requirement for landings data to be recorded at the species level which makes landings estimations and stock identification problematic for both species.

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A2.9 Red gurnard (*Chelidonichthys cuculus*)

A2.9.1 Biology

Information on life history traits, habitat use and other environmental considerations for red gurnard mainly compiled from Heessen, Daan, and Ellis (2015) and the Marine Life Information Network (MarLIN) (Barnes, M.K.S, 2008). Other supporting literature contained within the reference list.

Distribution and Appearance

Red gurnard is a widely distributed species within the northeast Atlantic. The species is abundant in the Channel (7d and 7e), the shelf West of Brittany (.h, 8a), and west of Scotland (6.a). It is predominantly caught in divisions 7d, 7e and 7h.

Red gurnards have a distinctively large head and tapered body, with 3 enlarged rays at the base each large pectoral fin and 3 short spines on each side of the snout. Alongside a vivid red colouration, a distinguishing feature from other gurnards is that the lateral line is delineated by short vertically expanded scales. Mean size of 20-30cm, 70cm maximum reported size.

Maturity and Growth

No information on growth, although females grow faster and live longer than males. Maturity reached at 14cm (3-4 years old).

Spawning and Reproductive Behaviour

Annual broadcast spawner, spawning from December until May in Brittany and between April to August in the English Channel. Eggs and larvae are planktonic, juveniles settle into demersal lifestyle.

Ecosystem Role

Predators unknown. Preys on crustaceans, smaller fish and infaunal epibenthic invertebrates.

Habitat and Vulnerabilities

Common over sand, gravel and rock seabed habitats on the continental shelf. Some vertical migration reported at night but limited geographical migration. Reported in depths of 15-400m, but most common between 20-250m.

Vulnerable to temperature changes, particularly reduced temperatures, as well as habitat loss, turbidity, decreased salinity and heavy metal contamination.

A2.9.2 Stock status

Stock Status

ICES provide advice for red gurnard as a data category 3 stock (moved up from data category 6 in 2021) across the NE Atlantic, but state that landings and discards data is not reliable enough to provide catch advice. However, using survey trend data, the assessment provides a biomass index which is stable and rising.

Gears for targeting the species

Red gurnard are primarily caught in the English Channel by the French fleet as bycatch within by demersal seines, otter trawls and beam trawls.

Recreational fisheries

Red gurnard are caught by anglers, with 62% of the UK's recreational catches coming from the Channel. On average, 79,000 fish or 15t are caught per annum by anglers fishing within the Channel, with a low retention rate.

Management

There is no management in place specific to red gurnard in the English Channel.

A2.9.3 Existing evidence and data gaps

Existing Biological and Fisheries Evidence

Data available for red gurnard include national and international landings data. However, the species is mainly taken as a bycatch in mixed demersal fisheries and is therefore subject to high levels of discarding, meaning that landings data do not reflect catches and fishing related mortality well. Furthermore, there are historical inaccuracies associated with a lack of species-specific landing data, which is still the case from some countries that feed data into the assessment.

In the UK, data are also captured from commercial fisheries by at-sea observers, with these data including the numbers taken by various fleets, and whether the captured individuals are discarded or retained. Market (port) sampling provides additional information on the length composition of landed red gurnards.

Scientific trawl surveys provide fishery-independent information on catches of octopus, however only counts are recorded. There are currently three main UK surveys in the English Channel: Eastern Channel and southern North Sea beam trawl survey (BTS7D), the western Channel sole and plaice survey (UK-FSP) and the South-west Ecosystem beam trawl survey (Q1SWBEAM). Biological data collection provides the length, weight, sex and maturity stage of individual fish, with otoliths collected. However, at the time of the writing, no gurnard otoliths have been read to provide information on age.

Evidence gaps

As mentioned previously, the lack of species-specific landings data in gurnards causes reliability issues within the ICES assessment, and consequentially leaves ICES unable to provide sustainable catch advice. Discarding rates are known to be high, although estimates on discarding remain uncertain. There is also little evidence regarding the survivability of red gurnard caught by various fleets/gears.

In summary, ICES WGWIDE (Working Group on Widely Distributed Stocks) report additional work needs to be done to consistently identify landings at the species-level across countries; the latest data on discards by fleet remain to be investigated; an analysis of the southwest beam trawl survey (7e must be conducted to provide a CPUE index for that division; candidates survey based assessment must be explored; and advice should also take into account that the species distribution is heavily focused on 7d, 7e and 7h.

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A2.10 Smoothhound (*Mustelus spp.*)

A2.10.1 Biology

Information on life history traits, habitat use and other environmental considerations for smoothhound mainly compiled from Heessen, Daan, and Ellis (2015). Other supporting literature contained within the reference list.

Distribution and Appearance

There are two species of smoothhound under this FMP, the starry smoothhound (*Mutelus asterias*), and the common smoothhound (*Mutelus mustelus)*. However, given similarities in appearance (and thus potential for misidentification), and as recent genetic studies that have indicated that *M. mustelus* may not occur in British waters, for the purpose of the FMP both will be addressed simultaneously at the genus level as *Mustelus spp (*Farrell *et al.,* 2009*)*.

Smoothhound is commonly distributed around the UK; in English waters it occurs across ICES subareas 4 (North Sea) and 7 (English Channel, Celtic Sea and Irish Sea). They have a slender body with pointed snout, the second dorsal fin larger than the corresponding anal fin. Pectoral and pelvic fins are large. Dorsal side is grey-brown colour and ventral side is pale or white. There may or may not be white spots on the flanks, leading to the historical differentiation between the two species. Max size is 151cm.

Maturity and Growth

Pups are born at 24-32cm and grow between 1-8cm a year. Maturity reached at 4-5 years and 70 cm for males, 6 years and 82cm for females (Farrell *et al.,* 2010a; McCully Phillips and Ellis, 2015). Life expectancy at least 18 years for females, less (13 years) for males (Farrell *et al.,* 2010b).

Spawning and Reproductive Behaviour

Viviparous and potentially biannual reproductive cycle with litters of 4-20 pups. Mating timings unknown, but parturition (birth) can occur from February to September. Seasonally high abundances of mature distended females and juveniles have been noted in the Bristol Channel, Solent, western Irish Sea, southern North Sea, and Holyhead region, indicating potential pupping areas.

Ecosystem Role

Potentially predated upon by larger sharks and marine mammals. Preys primarily on benthic crustaceans, namely crabs (McCully-Phillips *et al*., 2020).

Habitat and Vulnerabilities

Mustelus spp. inhabit most substrates, with a typically demersal lifestyle but can be found in mid-water. Evidence of sex-based dispersal and circannual migration, with fish spending the summer in the southern North Sea and overwintering in the English Channel and Bay of Biscay (Brevé *et al.,* 2020). Preference for depths of 10-50m but recorded up to 421m.

A2.10.2 Stock status

Stock Status

ICES provide biennial advice for *Mustelus spp*. across the entire Northeast Atlantic as a data category 3 stock[6]. Catches have remained stable at 3000-4000t since 2005, whilst the survey derived biomass index has overall increased significantly since 2013, although some variability has been observed in recent (2016-2020) years.

Gears for targeting the species

Smoothhound are primarily a seasonal bycatch in the English Channel by English and French demersal trawlers, fixed and drift nets, and beam trawlers.

Recreational fisheries

Smoothhound are a common and important target species for recreational anglers, and are particularly important for those fishing from private and charter boats. Within the English Channel around 250,000 fish being caught on average per year, equating to around 314 tonnes in total, although as a survey derived figure this comes with a moderate degree of uncertainty.

Management

There are no specific management measures for *Mustelus spp*. in the FMP area.

A2.10.3 Existing evidence and data gaps

Existing Biological and Fisheries Evidence

Data available for *Mustelus spp.* include national and international landings data.

In the UK, data are also captured from commercial fisheries by at-sea observers, with these data including the numbers taken by various fleets, and whether the captured individuals are discarded or retained. Market (port) sampling provides additional information on the length composition of landed *Mustelus spp.*.

Scientific trawl surveys provide fishery-independent information on catches of octopus, however only counts are recorded. There are currently three main UK surveys in the English Channel, although none are utilised in the ICES assessment: Eastern Channel and southern North Sea beam trawl survey (BTS7D), the western Channel sole and plaice survey (UK-FSP) and the South-west Ecosystem beam trawl survey (Q1SWBEAM). Biological data collection provides the length, weight, sex, and maturity stage of individual fish, with otoliths collected. However, *Mustelus spp.* are not routinely aged, and because determining maturity status requires dissection, it is not done if the animal is released alive during surveys. There is also some concern that larger *Mustelus spp.* may in fact be able to actively avoid mobile gears such as trawls and are therefore less likely to be sampled as part of the above scientific surveys.

Evidence gaps

A key sustainability issue is the separation of species level data, particularly as some countries that land *Mustelus spp.* report landings as ‘dogfish and hounds’, rather than individual species. Whilst most nations have improved landing codes, *Mustelus spp.* are often taken in inshore fisheries, and landings data for vessels <10m may not be complete. Of particular concern for this FMP is the landing of *Mustelus spp*. for bait in pot fisheries around the British Isles, as it is unclear whether such landings are reported consistently. As such, further work is still required to improve the quality of landings data, particularly for small vessels under 10m and where *Mustelus spp*. may be used as bait.

Related to this is the unreliable estimates on the level of discarding that occurs due to fluctuations in market demand for *Mustelus spp* and other, similar species (e.g. dogfish, spurdog). Better estimates of discarding are required, with more robust estimates of discard survival, especially of juveniles, also needed.

Given that there is observed sex-based spatial segregation within *Mustelus spp.,* it is essentially to ensure that fishing pressure is not focused on single sexes. Additional work is therefore required to understand catch compositions by sex across varying spatiotemporal scales.

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A2.11 Squid - European common squid (*Alloteuthis subulata*), veined or long-finned squid (*Loligo forbesii*) and common or european squid (*Loligo vulgaris*)

A2.11.1 Biology

Distribution and Appearance

A. subulata: Found across the Northeast Atlantic and particularly abundant in the English Channel and the North Sea. Similar appearance to both *Loligo spp.* but generally much smaller (males reaching 20cm in total length).

L. forbesii: Widely distributed across the Northeast Atlantic, although targeted northeast of Scotland. Some bycatch in the English Channel for vessels targeting *L. vulgaris.* A long, slender squid up to 90 cm in length with the fins forming an elongate diamond-shape in dorsal view, comprising two-thirds total body length. The tentacle club has median suckers only slightly larger than those on edges.

L. vulgaris: Distribution across the Northeast Atlantic, but with a lower abundance at higher latitudes in comparison to *L. forbesii*. Key commercial loliginid species within the English Channel. *Loligo vulgaris* is very similar to *L. forbesii* but distinguished immediately by the tentacle club, the median suckers of which are especially large, up to four times diameter of marginal suckers. *Loligo vulgaris* can be up to 54 cm in length and has a small shield-like part of the body projecting slightly over the head.

Given that the spatial jurisdiction of this FMP is focused on the English Channel, both *A. subulata and L. vulgaris* are of primary consideration for the purposes of this document and will therefore be the focus of evidence. However, given that *L. forbesii* is bycaught in the Channel, efforts should be made to distinguish species at the landings stage.

Maturity and Growth

For both species, length frequency data for the North Sea suggests the existence of several microcohorts, representing animals with different growth rates and/or hatching times (and potentially also mapping onto different spawning periods), which might be attributable to different spatial variation in water temperatures within the species range (Oesterwind *et al.,* 2010).

Maturity in *A. subulata* is reached by most of the population by summer months at 40-50mm mantle length (ML) for both sexes, although males may mature slightly earlier than females.

L. vulgaris mature at 120-179mm and 140-181mm for males and females respectively. Age at maturity is related to time of hatching; females hatched during the warm season have faster growth rates earlier in life and reach maturity at younger ages than those hatched in the cold season. Again, males mature at a lower minimum size than females.

Spawning and Reproductive Behaviour

A. subulata exhibits several differing spawning periods within any year. In the English Channel, there are three spawning groups of females that spawn in spring, summer, and autumn, respectively, with young individuals being recruited to the population twice during the year in spring and summer. Eggs are laid on solid substrate/surfaces, and hatch after 2-3 weeks depending on temperature (Lipiński, 1985). Larvae/Juveniles remain planktonic until 15-30d following hatching (Yau, 1994).

L. vulgaris spawn annually in the westernmost part of the English Channel in November-December (Laptikhovsky et al., 2022). Eggs are attached to the bottom between 2 and 120 m, in the English Channel mostly at 15-65 m. Embryonic development takes between 26-27 days at 22°C to 125 days at 13°C. Small squid hatched near the coast migrate towards deep water, mostly in autumn and winter (Jereb et al., 2015).

Ecosystem Role

Both species are important prey items in the Northeast Atlantic and are predated upon by a diverse range of fish (including elasmobranchs and large pelagic predators) and mammal (including dolphins and porpoises) species (Daly et al., 2001; Velasco et al., 2001; Jereb et al., 2015).

Fish prey forms the key diet of both species.

Habitat and Vulnerabilities

Whilst *A. subulata* has no known preference for substrate, *L. vulgaris* is most abundant over coarse sand, and generally scarce over silt. Both species require hard substrates/structure to lay eggs. Both species are found out to 500m in depth but are generally found shallower than 120m.

A. subulata is present year-round in the English Channel. Migratory movements by *L. vulgaris* are mainly related to sexual maturation and spawning with large adult animals moving towards shallow coastal waters for mating and spawning, likely in the autumn-winter in the English Channel (Jereb *et al*., 2015).

A2.11.2 Stock status

Stock Status

Neither stock(s) is currently assessed, and no time series of abundance indices are available.

Gears for targeting the species

Squid are primarily caught in the English Channel by beam trawls, otter trawls, demersal seines, dredges, and netting (fixed and drift).

Recreational fisheries

Both species of squid are caught recreationally. However, the numbers reported in the UK Sea Angling Diary are limited so catch estimates cannot be generated. Anecdotal evidence suggests recreational fisheries for cephalopod species (including squid) is rapidly emerging along the south coast due to the increased abundance in recent years, particularly from charter boats (Barrett et al., 2022), but the extent is not known. Given that lures required to catch squid are different from those used for fish, the numbers caught by UK sea anglers are likely to be limited.

Management

There is no management in place specific to squid in the English Channel.

A2.11.3 Existing evidence and data gaps

Existing Biological and Fisheries Evidence

Data available for both squid species include landings data, but these are aggregated as ‘squid catches’ rather than species specific data.

Data are also captured from commercial fisheries by at-sea observers, with these data including the numbers taken by various fleets, and whether the captured individuals are discarded or retained. Market (port) sampling provides additional information on the length composition of landed squid.

Scientific trawl surveys provide fishery-independent information on catches of squid. There are currently three main UK surveys in the English Channel: Eastern Channel and southern North Sea beam trawl survey (BTS7D), the western Channel sole and plaice survey (UK-FSP) and the South-west Ecosystem beam trawl survey (Q1SWBEAM.

Evidence gaps

Species-specific catch/landing reports are required for all species of squid, as is further work to understand the composition of differing species within the Channel. Age and maturity data are also not currently available to assess the effect of fisheries on different ontogenetic stages or to monitor spatial distribution of the different ontogenetic stages and spawning migrations.

If an assessment is required for squid, effective assessment methods are limited by inadequate and inaccurate statistical information and because most catches are bycatch in finfish fisheries (Boyle and Pierce, 1994). However, a small number of stock assessment exercises have been carried out in Europe. For the English Channel, Royer *et al.* (2002) highlighted a potential method utilising estimated natural mortality rates. The same study also suggested that the English Channel could be considered as a separate management unit given that Channel squid are almost exclusively exploited by the UK and France.

Taxonomic work is required to differentiate between *A. subulata and A. media* and then understand the biogeographic delineation of the two species for the purpose of effective data reporting and management.

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A2.12 Striped red mullet (*Mullus surmulletus*)

A2.12.1 Biology

Information on life history traits, habitat use and other environmental considerations for red mullet mainly compiled from Heessen, Daan, and Ellis (2015) and the Marine Life Information Network (MarLIN) (Barnes, M.K.S, 2008). Other supporting literature contained within the reference list.

Distribution and Appearance

Striped red mullet is a widely distributed species within the northeast Atlantic and is commonly distributed in UK waters, occurring across ICES subareas 4 (North Sea) and 7 (English Channel, Celtic Sea and Irish Sea) and most commonly encountered in the English Channel, southern and western North Sea and northern Celtic Sea.

Red mullet have longitudinal red and brown stripes and a distinct pair of long barbels under the jaw. The tail is forked, and the dorsal fins are widely separated with dark markings on the anterior fin. Maximum reported size is 70cm, with an average size of 25cm-45cm.

Maturity and Growth

Rapid growth up to 2 years. Mature between 1-2 years, equating to 15.5–18.9cm in females and 14.7–17.1cm in males. Life expectancy up to 10 years, usually less than 7 years.

Spawning and Reproductive Behaviour

Spawning occurs in the southern North Sea between May and July. Pelagic eggs, Juveniles are absent in waters shallower than 100m depth. Juveniles exhibit a more coastal distribution compared to adults.

Ecosystem Role

Predators unknown. Preys on benthic species including decapods, amphipods, fish, molluscs, crustaceans and polychaetes.

Habitat and Vulnerabilities

Preference for rocky, sandy, and muddy ground. Migration through the Channel to the North Sea, leading to distinct differences in population structures in summer and winter months. Reported in depths of 1-400m, but most common between 3-90m in the UK. Tolerant to changes in temperature and salinity, but vulnerable to heavy metal contamination.

A.2.12.2 Stock status

Stock Status

ICES provide advice for red mullet across 2 stock units:

- Northern stock (mur.27.3a47d): Covers ICES subarea 4 (North Sea) and divisions 7d and 3a (eastern English Channel, Skagerrak and Kattegat). Biannual advice, data category 5 assessment. Advice is based on catch data, as landings are assumed to be catches as there is a market for small fish and no minimum landing size.
- Western stock (mur.27.67a-ce-k89a): Covers ICES subarea 6 (west of Scotland), divisions 7.a-c,e-k (the Irish Sea, Ce.ltic Sea and western English Channel), subarea 8 and division 9.a (Bay of Biscay and west of Portugal). Triannual advice, data category 5 stock. ICES provided advice on landings for 2021-2023 for the western stock of striped red mullet based only on landings data.

For the northern stock, ICES reported that landings declined from 2015 until 2018, at which point 2019 landings increased due to a strong recruitment in 2019. In 2020 and 2021, landings again decreased. It appears that the stock is truncated and there is significant exploitation of age 0-1 fish. In addition, ICES length-based indicators (LBI) were computed for five years of commercial data. Most of the indicators appeared outside the established references in 2021. This indicated that the stock may be considered not to be exploited sustainably. The main concerns were for the big/old fish that are missing from the population. The LBIs showed that in relation to conservation criteria there was strong evidence of growth overfishing, meaning the fish is caught before it has realized its growth potential.

For the western stock, landings have been relatively stable (1500-2000t) since 2012.

Gears for targeting the species

Red mullet are primarily caught in the English Channel by the French fleet as bycatch within by demersal seines, otter trawls and beam trawls.

Recreational fisheries

Striped red mullet are not common in inshore habitats, so are less accessible to sea anglers. Only 72 fish have been reported between 2016 and 2021 in the sea angling diary survey, so no catch estimates could be generated.

Management

There is no management in place specific to striped red mullet in the English Channel.

A2.12.3 Existing evidence and data gaps

Existing Biological and Fisheries Evidence

Data available for striped red mullet include national and international landings data. The targeted fishery in the English Channel has rapidly grown since the late 1990s and is now mainly exploited by French bottom trawlers and gillnetters in 7e, and UK, Dutch, and French vessels in 7d. There is also a proportion of bycaught fish in the eastern Channel from French, Dutch and UK bottom trawl vessels. Landings are shared by these three fleets in recent years. For these stocks, there is no indication of discarding data, and all catches are assumed to be landed. France does provide landings age composition data which have been collected since 2004, mainly from the eastern Channel.

In the UK, data are also captured from commercial fisheries by at-sea observers, with these data including the numbers taken by various fleets, and whether the captured individuals are discarded or retained. Market (port) sampling provides additional information on the length composition of landed red mullets.

Scientific trawl surveys provide fishery-independent information on catches of octopus, however only counts are recorded. There are currently three main UK surveys in the English Channel: Eastern Channel and southern North Sea beam trawl survey (BTS7D), the western Channel sole and plaice survey (UK-FSP) and the South-west Ecosystem beam trawl survey (Q1SWBEAM). Biological data collection provides the length, weight, sex, and maturity stage of individual fish, with otoliths collected. However, data from these surveys are not currently utilised in ICES assessments, and no red mullet otoliths have been read to provide information on age.

There is also potential to utilise international surveys to provide additional survey indices for the assessments. For the northern stock, the CGFS (Channel Ground Fish Survey) occurs in the Eastern Channel in the last quarter, and the IBTS (International Bottom Trawl Survey) Q1 and Q3 occurring in the North Sea (and part of the Eastern Channel for the last years of the time-series of the first quarter survey). For the western stock, ICES has considered the French EVOHE survey covering the Bay of Biscay and Celtic Sea, the northern Spanish groundfish survey (SP-NSGFS), and the Portuguese groundfish survey (PT-IBTS).

There are two research projects of relevance to the western stock that are due to publish their final results in 2022/23, investigating the evolution of striped red mullet abundance indices from fishery dependent data, and the temporal evolution of the size and age at maturity for this species.

Fundamentally, work on stock ID and delineation is required for assessment and advice purposes, as Cefas investigations into the current stock structure of red mullet do not support ICES' dual-stock approach.

For the western stock, ICES suggests the investigation of catch at age data and applicability of French ages to other catches. A maturity ogive may also be created using French biological sampling and data from relevant groundfish surveys. WGWIDE recommends the development of a catch or survey-based assessment model and definition of reference points according to the assessment method.

ICES reports several evidence gaps for the northern stock. Regarding data and stock ID, the assessment would need age (length) data from countries other than France, further investigation and analyses of existing surveys and their representativeness for the stock, as well as re-investigation of discard data (that are expected to be very low). Regarding assessment work, new methods need to be investigated, including exploration of methods applied to short-lived species (two stage model, as well as a range of other models available), definition of reference points according to the assessment method, and forecast if appropriate.

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Stock Annex: Striped red mullet (*Mullus surmuletus*) in Subarea 4 and divisions 7d and 3a (North Sea, eastern English Channel, Skagerrak and Kattegat) - NEED TO FIND HOW TO CITE

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A2.13 Tub gurnard (*Chelidonichthys lucerna*)

A2.13.1 Biology

Information on life history traits, habitat use and other environmental considerations for tub gurnard mainly compiled from Heessen, Daan, and Ellis (2015). Other supporting literature contained within the reference list.

Distribution and Appearance

Tub gurnard is a widely distributed species across the Northeast Atlantic. The species is abundant in the Channel; the southern North Sea represents a major part of the distribution area and tub gurnard is found entering the area through the English Channel in spring and leaving again in autumn.

Tub gurnards are the largest of the gurnards found in UK waters. They have a distinctively large head and tapered body; the eyes are small and the snout protrudes to form 2 small spines at the front of the face. Body scales are small and the scales over the lateral line are not enlarged or spiny as in other gurnards. Pectoral fins have a striking bright blue-turquoise edge and often ornate pattern. Mean size of 20-30cm, 75cm maximum reported size.

Maturity and Growth

No information on growth. Maturity reached at 3 years and 29cm for males, 4 years and 27cm or females.

Spawning and Reproductive Behaviour

Annual broadcast spawner, spawning during May and June in the Celtic Sea. Planktonic larval stage, juveniles metamorphose at 17mm but remain pelagic until 3mm.

Ecosystem Role

Predators unknown. Preys on crustaceans and smaller demersal fish.

Habitat and Vulnerabilities

Preference for mud, muddy-sand and gravel substrate. Migration to deeper water in winter and inshore waters during summer. Common depths of 10-150m, but smaller individuals are known to frequent shallower depths. Some intolerance to temperature changes, as well as habitat loss, turbidity, noise, decreased salinity and heavy metal contamination.

A2.13.2 Stock status

Stock Status

The stock(s) is not currently assessed, and no time series of abundance indices is available.

Gears for targeting the species

Tub gurnard are primarily caught in the English Channel as bycatch by demersal seines, otter trawls and beam trawls, and netting.

Recreational fisheries

Tub gurnard are caught by recreational fishers in the UK, with 70% of catches from the English Channel. On average from 2016-2021, around 59,000 fish or 15 tonnes were caught in the English Channel.

Management

There is no management in place specific to tub gurnard in the English Channel.

A2.13.3 Existing evidence and data gaps

Existing Biological and Fisheries Evidence

Data available for red gurnard include national and international landings data. However, the species is mainly taken as a bycatch in mixed demersal fisheries, and whilst larger individuals are highly valued, a large proportion of catches are too small to be marketable. There is therefore a large rate of discarding, leading to landings data not being reflective of actual fisheries mortality. Furthermore, there are historical inaccuracies associated with a lack of species-specific landing data.

In the UK, data are also captured from commercial fisheries by at-sea observers, with these data including the numbers taken by various fleets, and whether the captured individuals are discarded or retained. Market (port) sampling provides additional information on the length composition of landed tub gurnards.

Scientific trawl surveys provide fishery-independent information on catches of tub gurnard. There are currently three main UK surveys in the English Channel: Eastern Channel and southern North Sea beam trawl survey (BTS7D), the western Channel sole and plaice survey (UK-FSP) and the South-west Ecosystem beam trawl survey

(Q1SWBEAM). Biological data collection provides the length, weight, sex and maturity stage of individual fish, with otoliths collected. However, at the time of the writing, no gurnard otoliths have been read to provide information on age.

Evidence gaps

If an assessment for tub gurnard is required, stock assessment units would have to be defined and data quantity and quality evaluated to determine the best stock assessment or advice provision approach to take.

The most likely approach for tub gurnard is to assess the stock based on survey data only, as catch data are highly unreliable. In the English Channel, additional to the UK BTS7D and Q1SWBEAM (7e), and UK-FSP (7e), France also conducts an ICES otter trawl survey in 7d (FR-CGFS). If the stock unit adopted was extended beyond the English Channel, other ICES surveys cover the North Sea (NS-IBTS), the Celtic Sea and Bay of Biscay (FR-EVHOE), Irish Sea (NWGFS) and south and west of Ireland (IE- IGFS), and West of Scotland (SCOWCGFS and SWC-IBTS). An additional otter trawl survey was conducted in the Western Channel and Celtic Sea by the UK in 2018-2020 to fill in a gap in the ICES otter surveys. Carrying on this time series could help inform a survey index for this stock. It would also be recommended to process the otoliths collected during the surveys as they are not currently read.

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A2.14 Turbot (Scophthalmus maximus)

A2.14.1 Biology

Information on life history traits, habitat use and other environmental considerations for turbot mainly compiled from Heessen, Daan, and Ellis (2015). Other supporting literature contained within the reference list.

Distribution and Appearance

Turbot is distributed from Iceland to northern Norway, southwards to north-western Africa, including the Baltic Sea, Mediterranean Sea and Black Sea. Turbot is distributed around the UK; in English waters it occurs across ICES subareas 4 (North Sea) and 7 (English Channel, Celtic Sea and Irish Sea).

Turbot are large, thickset left-eyed flatfish with a rhomboid body shape and equal sized pelvic fins. Only the tips of the first rays of the dorsal fin are free from the fin membrane. The dorsal side of larger individuals feels rough owing to irregularly scattered scales that are gradually transformed into bony tubercles, but these are small in juveniles. 100cm maximum reported size.

Maturity and Growth

Growth varies between sexes (females are bigger) and on spatiotemporal scales, with no growth in winter/spring due to gonad development. Maturity is reached at 20 and 34 cm for males and females respectively, corresponding to ages 1 to 2 for males and 2 to 3 for females. Fecundity of approximately 1 million eggs per kg body weight.

Spawning and Reproductive Behaviour

Spawning occurs from late March to August with a peak in May/June. Planktonic larval stage, juveniles recruit into surf zones of sandy beaches. From July onwards juveniles appear in shallow, knee-deep waters around the North Sea as well as off the west coast of Wales

Ecosystem Role

Predators unknown. Larvae feed on planktonic crustaceans, juveniles on a variety of benthic prey (polychaete worms, mysids etc.). Diet switches to fish at approximately 20cm body length.

Habitat and Vulnerabilities

Spawning occurs over sand and gravel substrates. Turbot are generally sedentary, although larger specimens are found in deeper, colder water. Common depths 1-190m. Spawning migration reported in April to shallower (4-30m) depths from mid-May to end of July. Important spawning grounds in the North Sea include the Aberdeen Bank, the Turbot Bank, around and to the north of the Dogger Bank, off the Danish coast, in the inner German Bight and in the southern North Sea.

A2.14.2 Stock status

Stock Status

Turbot stocks are not assessed in the English Channel. However, there is an assessment for Turbot in the North Sea which provides advice under the MSY approach and may have some applicability to stocks within the Channel[7]. In the North Sea, fishing pressure on the stock is below FMSY and spawning-stock biomass is above MSY $B_{trigger}$, B_{pa}, and B_{lim}, however, recruitment is variable and advised catches were decreased by 33% for 2022 on 2021 data given a decrease incoming recruitment.

Gears for targeting the species

Turbot are primarily caught in the English Channel by beam trawls, otter trawls, dredges, and netting (fixed and drift).

Recreational fisheries

Turbot are primarily caught by recreational fishers in the spring and early summer when they migrate inshore. Annual estimates of turbot caught by UK sea anglers in the English Channel were on average around 74,000 fish or 64 tonnes between 2016 and 2021, with release rates typically are around 65%.

Management

There is no management in place specific to turbot in the English Channel. Turbot within the North Sea are included in a Total Allowable Catch (TAC), but through a combined TAC for both turbot and brill (T/B/2AC4-C)1. This TAC covers UK and EU waters of Subarea 4 and UK waters of Division 2.a. The TAC unit does not correspond with the assessment unit and excludes the English Channel, although divisions 7de are included in the brill assessment. Management of the brill and turbot as a combined TAC may lead to the unstainable fishing of each individual species.

A2.14.3 Existing evidence and data gaps

Existing Biological and Fisheries Evidence

Data available for turbot include national and international landings data. The species is mainly taken in mixed demersal fisheries for other flatfish and roundfish, although some targeted netting for turbot may occur.

In the UK, data are also captured from commercial fisheries by at-sea observers, with these data including the numbers taken by various fleets, and whether the captured individuals are discarded or retained. Market (port) sampling provides additional information on the length composition of landed turbot.

Scientific trawl surveys provide fishery-independent information on catches of turbot. There are currently three main UK surveys in the English Channel: Eastern Channel and southern North Sea beam trawl survey (BTS7D), the western Channel sole and plaice survey (UK-FSP) and the South-west Ecosystem beam trawl survey (Q1SWBEAM. However, these surveys are not expected to provide reliable abundance indices for turbot. Biological data collection through surveys provides the length, weight, sex and maturity stage of individual fish.

Evidence gaps

Given the high value of turbot, more robust assessments of the stock are required, including a specific assessment incorporating the English Channel. However, data from at-sea observer programmes and scientific trawl surveys are limited and are unable to provide information on the temporal fluctuations in stock size. Therefore, given the limited data from existing trawl surveys, one option for improved stock assessments could be using “Close Kin Mark Recapture” studies, which have been developed to inform on the stock sizes of other high-value commercial species.

A2.14.4 References

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Annex Three: Species-specific management measures

A3.1 Examples of international species-specific management measures

Table A5. Examples of international species-specific management measures

Species group	Species	Management measures	Country/ region	Year
Elasmobranchs	Not specified	Landing obligation Maximum Sustainable Yield Total Allowable Catch (TAC) Minimum Conservation Reference Size	EU	2020
Elasmobranchs	Skates and rays	Minimum landing size	England (North Sea)	2018
Elasmobranchs	Spurdog, Skates and rays	Total Allowable Catch (TAC)	England (North Sea)	2018
Elasmobranchs	Smoothhound	Precautionary catch limits (bycatch species)	South Africa	2013
Elasmobranchs	Porbeagle	Total Allowable Catch (TAC)	UK	
Finfish	Red mullet (used as a proxy for stripped red mullet)	Trawl codend mesh size	Mediterranean	2014

Species group	Species	Management measures	Country/ region	Year
Cephalopods	Common octopus	Closed season Maximum capture weight	Spain	2008
Cephalopods	Patagonian longfin squid	Closed areas	Falklands Islands	2008
Cephalopods	Common octopus	Closed seasons and MPAs	Portugal	2014
Cephalopods	Common octopus	Closed seasons	Madagascar	2015
Cephalopods	Curled octopus	Bottom trawls mesh size	EU	2015
Cephalopods	Common cuttlefish	Limited entry system	France	2017
Cephalopods	European squid	Minimum size limit Mesh size for trawls and seines	Spain and Portugal	2013
Cephalopods	European squid	Minimum landing size	Malta and Albania	2013

A3.2 Relevant domestic management measures

A3.2.1 National management measures

There are national management measures in place across all UK waters controlling where and how fishing operations occur. The MMO manages fisheries activity from 0-200 nautical miles (nm) within English waters and leads on managing fishing activities between 6–200 nm (more detail can be found in Annex 4 of the FMP).

A legislation review was undertaken for this FMP. This scoped out management already implemented and pertinent to areas 7d and 7e which both directly and indirectly manages the NQS stock in scope for this FMP. Measures which directly impact NQS species are listed in Table 6. Table 6 sets out the EU regulation and then the measure that has amended this EU regulation for it to be enforced now the UK has left the EU.

Table A6. National management measures that directly impact NQS stocks

Regulation	Amended by	Target fishery	Legislative type	Area	Restrictions
Regulation (EU) 2019/1241 Annex VI part B2.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Flatfish and Non-TAC species	Gear - Fixed nets	7d	90mm mesh
Regulation (EU) 2019/1241 Annex VI part B2.2	SI 2019/1312 Fisheries Act 2020 Schedule 11		Gear - Fixed nets	7e	100mm mesh
Regulation (EU) 2019/1241 Annex VI part B2.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Red mullet	Gear - Fixed nets	7d and 7e	50mm mesh
Regulation (EU) 2019/1241 Annex VI part B1.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Sole and mixed demersal species	Gear – Beam Trawls	7d	80mm codend
Regulation (EU) 2019/1241 Annex VI part B1.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Sole and mixed demersal species	Gear – Beam Trawls	7e	80mm codend and headline panel with 180mm mesh

Regulation	Amended by	Target fishery	Legislative type	Area	Restrictions
Regulation (EU) 2019/1241 Annex VI part B1.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Sole and non-TAC species	Gear – Stern Trawls	7d	80mm codend and 80mm square mesh panel
Regulation (EU) 2019/1241 Annex VI part B1.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Whiting, Mackerel, and non-TAC species	Gear – Stern Trawls	7d	80mm codend
Regulation (EU) 2019/1241 Annex VI part B1.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Whiting, Mackerel, and non-TAC species	Gear – Stern Trawls	12nm in area 7e east of 5°W	80mm codend Max twine thickness – single 6mm, double 4mm Vessels of 12m or less with engine power of 221kw or less
Regulation (EU) 2019/1241 Annex VI part B1.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Sole and non-TAC species	Gear – Stern Trawls	12nm in area 7e east of 5°W	80mm codend and 80mm square mesh panel. Max twine thickness –

Regulation	Amended by	Target fishery	Legislative type	Area	Restrictions
					single 6mm, double 4mm Vessels of 12m or less with engine power of 221kw or less
Regulation (EU) 2019/1241 Annex VI part B1.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Squid	Gear – Stern Trawls	12nm in area 7e east of 5°W	40mm codend Max twine thickness – single 6mm, double 4mm Vessels of 12m or less with engine power of 221kw or less
Regulation (EU) 2019/1241 Annex VI part A	SI 2019/1312 Fisheries Act 2020 Schedule 11	Octopus	MCRS – 750g	7d and 7e	Any gear type

Table A7 sets out management measures that indirectly impact the NQS scoped into this FMP, for example, NQS species are caught alongside quota species and alongside other species not in scope of the FMP. These gear measurements listed in Table 16 will also have an indirect effect on our NQS stocks. As above Table 16 sets out the EU regulation and then the measure that has amended this EU regulation for it to be enforced now the UK has left the EU.

Table A7. National management measures that indirectly impact NQS stocks

Regulation	Amended by	Gear type	Area	Restrictions
Commission Regulation No. 494/2022 Article 3	SI 2019/753	Non-beam Trawl	7d and 7e	6mm single 4mm double twine thickness
SI The Prohibition of Fishing with Multiple Trawls Order 2003 No. 1559 Article 3	Fisheries Act 2020 Schedule 2	Multiple rigs	7d and 7e	More than 80mm codend
		Stern Trawl	7e Outer Celtic Sea Protection Zone	Baseline mesh size 100mm codend Square mesh panel optional but if fitted SMP must be further or equal to 9m from codline Strengthening bags prohibited
Regulation (EU) 2019/1241 Annex VI part B1.1	SI 2019/1312 Fisheries Act 2020 Schedule 11	Stern Trawl	7d	Baseline mesh size 100mm (and if landing more than 20% cod, saithe and haddock)
Regulation (EU) 2019/1241 Annex VI part B1.1	SI 2019/1312 Fisheries Act 2020	Beam Trawl	7d and 7e	Baseline mesh size 100mm (and if landing more than 20% cod, saithe and haddock)

Regulation	Amended by	Gear type	Area	Restrictions
	Schedule 11			
SI1284/1989 **Regulation (EU) 2019/1241 Annex VI part B2.2**	SI 2019/1312 Fisheries Act 2020 Schedule 11	Fixed nets	7d and 7e	Baseline mesh size 120mm (and if landing more than 20% cod, saithe and haddock) 71-89mm prohibited in some areas Max 2.5km for drift nets (Targeted fisheries use smaller mesh 7d and 7e 110mm mesh: pollock and hake 7d 90mm mesh: whiting, dab and bass 7e 100mm mesh: whiting, dab and bass)

There are also some specific regulations for NQS imposed in other sea areas which could affect fishing effort in 7d and 7e. For example, Table A8 sets out quota imposed on target species in other sea areas.

Table A8. Quota imposed on FMP species in other sea areas

Species	Sea area
Brill	4b and 4c
Lemon sole	4b and 4c
Turbot	4b and 4c

There are other regulations for species outside the scope of our FMP which indirectly effect our NQS stocks. Table A9 shows the Bass regulation, which from stakeholder engagement, we have learned could be affecting dogfish and smoothhound catches.

Table A9. Bass regulation

Regulation	Amended by	Area	Gear	Conditions
Article 10 of Council Regulation (EU) 2020/123	SI 2020/1542 SI 2021/698 SI 2021/1429 SI 2023/273	7d and e	Demersal trawls and seines	3.8 tonne per year and max 5% weight of any total catch per landing Prohibited to retain in February and March

A.3.2.2 Regional management measures

In addition to national management, the Inshore Fisheries and Conservation Authorities (IFCAs) set regional byelaws through which fisheries targeting NQS withing the 0-6nm limit can be managed both directly and indirectly. These local byelaws are listed below in geographical regions which the different IFCAs cover.

Kent and Essex IFCA

- Minimum Conservation Reference Size (MCRS) for octopus (750g).

Sussex IFCA

MPA management

- Chichester Harbour SAC – year-round prohibition of towed gear within specific zones of Chichester Harbour to protect *Zostera* spp. Seagrass
- Selsey Bill & the Hounds MCZ - Nearshore Trawling Byelaw - Trawling is now banned throughout the year in large areas along the Sussex coast to allow habitats to regenerate.
- Kingmere MCZ - Year-round prohibition of towed gear in specific zones of the MCZ and catch limits on bream
- Beachy Head West MCZ - Fishing with towed gears, such as trawls and dredges, is prohibited in the MCZ and some fish catch limitations

- Pagham MCZ - Fishing with towed gears, such as trawls and dredges, is prohibited in the MCZ and some fish catch limitations
- Utopia MCZ - Within the MCZ, it is prohibited to use towed gear (a trawl or dredge). Towed gear operators inside the buffer zone (0.5 nautical miles outside the MCZ boundary) must use an active vessel monitoring system.

Fisheries management

- Fishing Instruments Byelaw - establishes what fishing gears can be used within Sussex IFCA District. Restrictions on certain gear types in different parts of the district.
- Scallop closed season – Scallop dredging prohibited inside 6nm between June 1st and October 31st.
- Shellfish Permit Byelaw – permit system and additional regulation for fishing of lobster, crab, whelk, cuttlefish and prawns in Sussex IFCA District. Limits on pot numbers inside 3nm and 6nm to manage fishing effort.
- Fixed Engine Byelaw - No person shall place or use any fixed engine between the 1st day of May and 30th day of September in certain areas
- Size of Vessels - No vessel which exceeds 14 metres overall length shall be used in fishing for Seafish in the district, but there are some exceptions

Devon and Severn IFCA

MPA management

- Lundy MCZ – The whole site has been designated a ‘No Take Zone’
- Mobile Fishing Byelaw and Permit Conditions closed the fllowing areas to demersal mobile gear:
    - Start Point to Plymouth Sound and Eddystone SAC - for the whole SAC.
    - Skerries Bank and Surrounds MCZ - in large parts of the site but allows for seasonal opening to vessels using demersal towed gear in specific zones of the MCZ.
    - Lyme Bay and Torbay SAC and Torbay MCZ– in all of the Lyme Bay part of the SAC and the majority of the Torbay section of the SAC and MCZ, with seasonal opening for vessels using demersal trawl gear between 1st April and 30th June (rationale for the opening is to allow for trawling for cuttlefish).
    - Plymouth Sound and Estuaries SAC - Demersal mobile gear prohibited, apart from those using encircling nets in part of the site.
    - Axe Estuary, Otter Estuary, Exe Estuary (except for pushed mobile gear), Teign Estuary (except for in the Regulating Order area), Salcombe Estuary (except for dredging for scallops subject to gear, time, spatial restrictions), Devon Avon Estuary, Erme Estuary and

Yealm Estuary. The estuary limits are defined in the Mobile fishing Permit Byelaw itself.

Fisheries management

- No vessel which exceeds 15.24 metres overall length shall be used in fishing for or taking sea fish within the District. The Mobile Fishing, Netting, Potting and Diving Permit Byelaws are also contained in the Byelaw booklet. Also contained therein are Spear fishing restrictions in Lundy MCZ; and further fixed net restrictions
- D&S IFCA's Netting Permit Byelaw and Permit Conditions contain all the management measures for commercial and recreational permit holders relating to netting in the District.

Cornwall IFCA

Minimum Conservation Reference Size (MCRS)

- Brill 30cm
- Dab 15cm
- Lemon sole 25cm
- Red mullet 15cm
- Turbot 30cm

Marine Protected Sites

- The Manacles Marine Conservation Zone (Fishing Restrictions) Byelaw 2017 – Prohibits the use of bottom towed fishing gear.
- Whitsand and Looe Bay Marine Conservation Zone (Fishing Restrictions) Byelaw 2018 - Prohibits the use of bottom towed fishing gear.

Fisheries management

- Trawl restrictions between 1 January and 30 September in certain areas of the district
- Sea Fisheries Regulation Act 1966 - Prohibited to use any trawl net or any other towed net in connection with a vessel exceeding one or both of the following dimensions: 221 kW engine power or 18.28 metres overall length.
- The placing and use of fixed engines for taking sea fish is prohibited in the certain areas.
- Prohibited to fish using a net with a mesh size of less than 250mm within parts of the Cornwall Sea Fisheries District: (a) The Manacles (b) The Runnelstone
- Scallop dredge (limited fishing time).
- Methods of fishing (dredges).
- Live wrasse fishing (limited permit).

- Shellfish boats.

Annex Four: Ecosystem interactions

A4.1 Marine Protected Areas

Marine Protective Areas (MPAs) are collectively used to describe protected areas with a marine component. This is a widely used term, which covers a variety of sites site such as marine conservation zones (MCZ), special areas of conservation (SAC) and special protection areas (SPA). Further information on MPAs and types of protection they afford is available on MMO's website[14].

Many MPAs have been designated within the English Channel, offering protection to a variety of habitats and species (see Table A10 for a full list – MPAs have been grouped into those which have only benthic designated features, and those which include mobile fish or marine mammal designated features and those which have birds as designated features).

Assessment of the impact of fishing activity within MPAs has or will be carried out by the IFCAs for the inshore areas (0 – 6nm) or by the MMO (for all located outside of the 6nm limit and remain in UK waters). Stakeholders have worked closely with regulators to develop measures to mitigate impacts within inshore and offshore MPAs, but where mitigation is not possible, appropriate management has been introduced or will be shortly to ensure any fishing within MPAs is compatible with the MPA's conservation objectives. Current management measures already in place are detailed on the MMO and Association of IFCAs websites.

14 MMO (2020) What are Marine Protected Areas? Marine Developments Blog. Available at https://marinedevelopments.blog.gov.uk/2020/11/20/what-are-marine-protected-areas/ accessed 18/05/23

Table A10: MPAs located within scope of the Channel demersal non-quota species FMP

<table>
<tr><th>MPAs with benthic designated features</th><th>MPAs with mobile fish/marine mammal species</th></tr>
<tr><td rowspan="3">– Inner Bank MCZ
– Bassurelle Sandbank SAC
– Offshore Overfalls MCZ
– Offshore Brighton MCZ
– Pagham Harbour MCZ
– Solent Maritime SAC
– Yarmouth to Cowes MCZ
– Utopia MCZ
– South Wight Maritime SAC
– The Needles MCZ
– Wight-Barfleur Reef SAC
– Albert Field MCZ
– Studland to Portland SAC
– South Dorset MCZ
– West of Wight-Barfleur MCZ
– South of Portland MCZ
– Chesil Beach and Stennis Ledges MCZ
– Lyme Bay and Torbay SAC
– East of Start Point MCZ
– Dart Estuary MCZ
– Skerries Bank and Surrounds MCZ
– Start Point to Plymouth Sound and Eddystone SAC
– Devon Avon Estuary MCZ
– Erme Estuary MCZ</td><td>– Beachy Head East MCZ (Short-snouted seahorse)
– Beachy Head West MCZ (Short-snouted seahorse)
– Kingmere MCZ (Black seabream)
– Selsey Bill and the Hounds MCZ (Short-snouted seahorse)
– Bembridge MCZ (Short-snouted seahorse)
– Southbourne Rough MCZ (Black seabream)
– Poole Rocks MCZ (Black seabream, couch’s goby)
– Purbeck Coast MCZ (Black seabream)
– Torbay MCZ (Long snouted seahorse)
– Plymouth Sound and Estuaries SAC (Allis shad)
– Tamar Estuary Sites MCZ (Smelt)
– Whitsand and Looe Bay MCZ – (Giant goby)
– Isles of Scilly Complex SAC (Grey seal)</td></tr>
<tr><th>MPAs with mobile bird species</th></tr>
<tr><td>– Dungeness, Romney Marsh and Rye Bay SPA
– Solent and Dorset Coast SPA
– Pagham Harbour SPA
– Solent and Southampton Water SPA
– Poole Harbour SPA
– Exe Estuary SPA
– Falmouth Bay to St Austell Bay SPA
– Isles of Scilly SPA</td></tr>
</table>

MPAs with benthic designated features	MPAs with mobile fish/marine mammal species
– **Fal and Helford SAC** – **The Manacles MCZ** – **Helford Estuary MCZ** – **Lizard Point SAC** – **Western Channel MCZ** – **South of the Isles of Scilly MCZ** – **Isles of Scilly Sites MCZ**	

Whilst management within an MPA site considers fishing activity that occurs within the site boundaries, there remains the potential for fishing activity occurring outside of an MPA to have impacts on the features protected within an MPA. This can happen when either the pressures exerted by fishing activity can impact protected features beyond its spatial footprint or when the feature of an MPA is mobile and travels outside the site. An illustrative example of the latter is breeding bird species that fly many miles from their breeding grounds which sits within the boundary of an MPA to find prey. Additionally, mobile species that are designated features of terrestrial/riverine protected sites, such as migratory fish species that are protected under riverine SACs, fall within the scope of this FMP as they can be impacted by fishing activity within the spatial jurisdiction of the FMP. Table A11 presents an overview of the mobile species (fish, mammal, and bird) that should be considered under the FMP, as well as the risk profiles associated with each overall gear type utilised as part of the Channel NQS Fishery.

Table A11: Mobile designated features of MPAs (SPAs and SACs) and riverine SACs that are at risk of interaction with Channel NQS fishery gears

Species	Gear Interaction(s)	Risk/Data Requirements
Atlantic salmon	Static nets	Potential for significant impacts. Further data required.
Allis shad	Bottom towed gear and static nets	Moderate risk for bottom towed gear. Risk unknown for static nets. Further data required
Twaite shad	Bottom towed gear and static nets	Moderate risk for bottom towed gear. Risk unknown for static nets. Further data required
River lamprey	Unknown	Risk unknown for both gears. Further data required

Species	Gear Interaction(s)	Risk/Data Requirements
Sea lamprey	Unknown	Risk unknown for both gears. Further data required
Great northern diver	Static nets and bottom towed gear	Moderate risk for static nets. Low risk for bottom towed gear. Further data required
Gannet	Static nets and bottom towed gear	Moderate risk for static nets. Low risk for bottom towed gear. Further data required
Shag	Static nets and bottom towed gear	Moderate risk for static nets. Low risk for bottom towed gear. Further data required
Guillemot	Static nets and bottom towed gear	Moderate risk for static nets. Low risk for bottom towed gear. Further data required
Razorbill	Static nets and bottom towed gear	Moderate risk for static nets. Low risk for bottom towed gear. Further data required
Northern fulmar	Static nets and bottom towed gear	Moderate risk for static nets. Low risk for bottom towed gear. Further data required
Great cormorant	Static nets and bottom towed gear	Moderate risk for static nets. Low risk for bottom towed gear. Further data required
Harbour porpoise	Static nets and bottom towed gear	Moderate risk for static nets. Low risk for bottom towed gear. Further data required
Grey seal	Static nets and bottom towed gear	Moderate risk for static nets. Low risk for bottom towed gear. Further data required
Common seal	Static nets and bottom towed gear	Moderate risk for static nets. Low risk for bottom towed gear. Further data required
Bottlenose dolphin	Static nets and bottom towed gear	Moderate risk for static nets. Low risk for bottom towed gear. Further data required

The statutory nature conservation bodies (SNCBs) have screened risks posed by fisheries occurring outside MPAs on MPA features and have suggested there are two areas of risk that require further thought:

- The risk of bycatch of mobile species (fish) that are designated features of MPAs or other protected sites. For bottom towed gears, this was classified as moderate risk (bycatch is either documented or suspected but may be highly localised due to limited overlap between species and the gear used in this fishery). It was noted that use of static nets may also risk bycatch of birds and mammals, although their use in this fishery may be limited and further data is required to understand interactions.
- The potential bycatch of important prey species that designated species depend on. This was classified as low risk: a theoretical pathway exists for bycatch, but this may not be occurring at a scale which is of concern.

For those MPAs within the spatial jurisdiction of the FMP, these included the following mobile fish designated features: short-snouted seahorse, long-snouted seahorse, giant goby, couch’s goby, black seabream, allis shad, smelt and grey seal. Grey seal is a mobile marine mammal which is a designated feature of the Isles of Scilly Complex SAC in scope of the FMP. There are several SPAs which protect bird species within scope of the FMP.

The Channel demersal non-quota fisheries are dominated by the use of bottom towed gears. Towed demersal gears have the potential to result in the unintentional catch of a range of fish, marine mammal and bird species. Only a small proportion of landings in scope of this FMP are caught in drift or fixed nets. However, because netting is considered to have a much higher bycatch risk associated with it, some information on the risks is provided.

Bycatch risk from bottom towed gears

There is limited data on the bycatch of mobile fish species, although reports of UK incidental landings of shad, which can be several thousand kilogrammes, are made annually[1]. Despite evidence from several sources that show there is a bycatch risk of shad from demersal gear, especially in the Channel, assessing the impact in relation to SAC conservation objectives remains difficult. Available data is not sufficient to understand the scale or the spatial resolution of bycatch and the impact that this may be having on conservation objectives of the SACs. Further data would help establish the locations and scale of bycatch. Therefore, under the sustainability goals of this FMP, it is a priority to improving reporting pathways (for both fishermen and fisheries managers) and establishing bycatch monitoring programmes that will further improve understanding of protected mobile species bycatch within bottom-towed gears.

Grey seal is a mobile marine mammal which is a designated feature of the Isles of Scilly complex in scope of the FMP. Evidence suggests that bycatch of harbour porpoise (or other marine mammals such as grey seal) may occur on occasion, but current understanding is that bycatch from towed demersal gear outside of site boundaries is unlikely to be at a level that could impact MPA conservation objectives.

There are several SPAs, both within the spatial jurisdiction of the FMP and within adjacent areas, which protect bird species and are therefore of concern under the FMP. Benthic trawling does pose a particular risk to certain species such as deep diving shags, scaups, eiders, scooters, guillemots, great northern divers and cormorants. Falmouth Bay to St Austell Bay SPA has great northern diver as a designated feature and Isles of Scilly SPA has shag

Evidence has shown that bycatch of certain SPA bird species by bottom towed gear outside of sites may be occurring. While it is difficult to assess the scale as the data is sporadic at best, bottom towed gear is not generally considered to present a high bycatch risk to birds. A working assumption could be made that the likelihood that bird bycatch is having significant impacts on SPAs is therefore low. An improved monitoring regime on benthic trawlers is needed to fill the current data gaps to reduce uncertainties.

Bycatch risk from static gear

Evidence demonstrates that shad bycatch from netting does occur, however more data is required to quantify and understand the scale of risk posed. Existing management from IFCA netting byelaws and national restrictions on bass netting is likely to mitigate some of the associated risk.

There is a risk of salmon bycatch from static netting at levels that could be significant for individual SACs. Again, lack of usable data on bycatch rates means a quantitative assessment is not possible. However, there is existing management (IFCA netting byelaws) that reduces the risk of bycatch. More data are required on fishing activity levels and the associated levels of bycatch (e.g., through targeted bycatch monitoring and / or reporting) to provide more robust evidence on potential risk and/or the efficacy of management.

Static nets have long been recognised as posing a risk to marine mammals. The Bycatch Monitoring Programme was established to collect data on marine mammal bycatch to meet various international obligations. The results of the programme estimated that in 2019, between 502 to 1560 harbour porpoises and 375 to 872 seals (both grey and harbour) were entangled in static nets. While figures for seal bycatch are presented together, most bycatch observations are for grey seals. Estimations suggest the vast majority of bycatch occurs in tangle / trammel nets, with most occurring in ICES division 7f, 7e and 7d.

Harbour porpoise mortality due to bycatch is occurring at levels above precautionary thresholds in some management units. Assessing the impact of bycatch occurring outside the site boundary on the conservation objectives of SACs is complex. Existing MPA management work (Stage 4 of MMO byelaw process) will address site-level bycatch. There is also ongoing work focusing on understanding and mitigating the impact of bycatch on the wider population being progressed through Defra’s

Marine wildlife bycatch mitigation initiative and the Clean Catch UK programme, however an action plan to deliver the BMI has not yet been published. Together these should ensure SAC conservation objectives are met. Building the evidence base through self-reporting of bycatch events will help support this assessment.

Gillnets are known to pose a significant risk of bycatch of certain bird species. There is insufficient data to allow estimates of bird bycatch with any degree of confidence, but preliminary estimates suggest the combined impact of static nets across all UK fisheries could be of sufficient scale to be having population level effects for some SPA bird species. The large foraging ranges for some species and movements outside the breeding season means bycatch distant from the SPA may have a significant effect on classified bird features.

Protected Feature Bycatch: Conclusion

Overall, the proportion of the total estimated impact on features of designated sites that can be attributed to the Channel demersal non-quota species fisheries is not clear, but in some circumstances could be classed as moderate or potentially significant (Table 16). Methods exist to investigate the relative importance of mortality outside of sites (and is used in offshore wind casework) but the lack of good bycatch data at a suitable resolution prevents making such an assessment for fisheries. Reports looking into UK seabird bycatch hotspots may become available and better data on levels of bycatch is required. Self-reporting of marine mammal bycatch (and indeed fish and bird bycatch) could also be explored to enhance understanding. The FMPs sustainability and evidence goals should therefore seek to drive additional data collection to support wider ambitions such as the Marine wildlife bycatch mitigation initiative in addressing data gaps regarding bottom towed gear and static gear bycatch. Additional data will increase understanding and thereby allow better decision-making on what and where mitigation may be required.

Risk of prey species bycatch

None of the species in scope of the FMP are generally considered as forage fish. Some of the gear types included in the fisheries may have bycatch of species which can be considered forage fish. For example, the western English Channel (Division 7e) beam trawl fleet targeting Cuttlefish may have a bycatch of cod and whiting (gadoids, ICES 2021[2]). Although they are forage fish as juveniles, the direct risk to seabirds and marine mammals is likely to be low. If other forage fish species such as sandeel, herring, sardine, anchovy or sprat are bycaught in large numbers, the risk may need to be reassessed.

Allis shad

Based on the limited data available, there is a risk of towed demersal gear catching the two shad species. For the MPAs in scope of the Channel demersal non-quota species FMP, Plymouth Sound and Estuaries SAC is the only MPA which protects shad species. Reported total UK incidental landings of shad per year vary but can be several thousand kilogrammes (ICES 2014)[3].

In order to meet conservation objectives for Shad sites, the populations need to be restored. Access to spawning habitats (e.g. barriers from weirs) is a key driver resulting in their current status. The supplementary advice on conservation objectives for English sites states that *'controls on exploitation should include migratory passage within territorial waters, including estuarine and coastal net fisheries as well as exploitation within the river from rod fisheries.'* It also says *'By-catch of shad within commercial coastal and estuarine fisheries should be minimised through suitable changes to fishing patterns and methods and releasing any individuals caught alive'*[4].

A study by Trancart *et al.* (2014)[5] aiming to model shad distribution used observer programme data to identify bycatch in French commercial fishing activities from the coast to continental shelf of North-Western France and throughout the English Channel. The study used a large dataset (2003 – 2010; >9000 trawls, 43 different gear types, 6 – 320mm mesh size range) and found benthic bottom trawls (notably beam and otter trawls) accounted for 16.3% of shad bycatch occurrences.

However, whilst the study highlights the geographic locations of each fishing activity with a good number of these within the English Channel, the study focussed on bycatch from French waters, and therefore doesn't provide adequate insight into locations relevant to this fishery nor the quantity of shad caught.

The CEFAS observer programme (2015; unpublished[6]) reported more bycatch in the south/southwest with a particular hotspot in the southwest for Allis shad. Additionally, Wilson & Veneranta (2019)[7] reports differentiation between the two shad species, with higher propensity to catch Allis shad in set gillnets in comparison to Twaite shad which are more commonly caught in beam and midwater trawls.

Grey seal

Grey seal is a mobile marine mammal which is a designated feature of the Isles of Scilly Complex SAC in scope of the FMP. SACs tend to be small and are often associated with haul-out sites. Photo ID has shown that seals can travel extensive distances and individuals found within SACs are often spotted many miles away at other locations (e.g. Sayer et al (2019)[8]) so bycatch outside the site boundary has the potential to be of relevance.

Benthic trawling is not included in the current UK Bycatch Monitoring Programme, because it is not currently considered to present a high bycatch risk to marine mammals. A 2019[9] report did also include information from non-dedicated sampling in under the English / Welsh Data Collection Framework discard programme which focused heavily on demersal trawl gears. No marine mammals were recorded but it is noted that sampling protocols are not specifically designed for quantifying protected and sensitive species. Historically, there is evidence that shows harbour porpoise is occasionally caught by beam and otter trawlers (CEFAS observer programme report (2015; unpublished). However, the current understanding is this is not at a level that could have impacts on population. It is therefore also unlikely that isolated instances of bycatch outside of the boundaries of MPAs for harbour porpoise (or any other marine mammal) is of a sufficient scale to adversely impact conservation objectives.

Birds

There are several SPAs which protect bird species within scope of the FMP. Benthic trawling does pose a particular risk to certain species. This is highlighted by both anecdotal reporting during fish bycatch monitoring (CEFAS observer programme report (2015; unpublished[4])), and by previous work looking at the relative risk of bird bycatch which incorporated the behavioural traits of different species (Bradbury et al 2019[10]). This latter work highlights deep diving shags, scaups, eiders, scooters, guillemots, great northern divers and cormorants as the most sensitive birds to towed demersal gears.

Benthic trawling is not included in more recent work looking at seabird bycatch (e.g. Northridge et al, 2020)[11] and is not generally considered to present a high bycatch risk to birds, with work tending to focus on the impacts of static netting, longlining and in some cases pelagic trawling.

[1] ICES (2014). Report of the Working Group on Bycatch of Protected Species (WGBYC), 4–7 February 2014, Copenhagen, Denmark. ICES CM 2014/ACOM:28. 96 pp.

[2] ICES (2021): Celtic Seas ecoregion – Fisheries overview. ICES Advice: Fisheries Overviews. Report. https://doi.org/10.17895/ices.advice.9098

[3] ICES (2014). Report of the Working Group on Bycatch of Protected Species (WGBYC), 4–7 February 2014, Copenhagen, Denmark. ICES CM 2014/ACOM:28. 96 pp.

[4] E.g. Plymouth Sound and Estuaries SAC Conservation Objectives Supplementary Advice, available at Designated Sites View (naturalengland.org.uk)

[5] Trancart, T., Rochette, S., Acou, A., Lasne, E. & Feunteun, E. (2014) Modelling marine shad distribution using data from French bycatch fishery surveys. Marine Ecology Progress Series, 511, 181 – 192.

[6] C6273 report (CEFAS observer programme report (2015) (unpublished)

[7] Wilson, K., & Veneranta, L. (2019) Data-limited diadromous species – review of European status. ICES Cooperative Research, Report No 348, 273.

[8] : Sayer S, Allen R, Hawkes LA, Hockley K, Jarvis D, Witt MJ (2019). Pinnipeds, people and photo identification: the implications of grey seal movements for effective management of the species. Journal of the Marine Biological Association of the United Kingdom 99, 1221–1230. https:// doi.org/10.1017/S0025315418001170

[9] Northridge, S., Kingston, A. and Thomas, l. (2019) Annual report on the implementation of Council Regulation (EC) No 812/2004 during 2018. Sea Mammal Research Unit. Available at Science Search (defra.gov.uk) [Accessed 02/11/2022]

[10] Bradbury, G. Shackshaft, M. Scott-Hayward, L. Rexstad, E. Miller. D and Edwards. D (2017) Risk Assessment of Seabird Bycatch in UK Waters. Wildfowl & Wetlands Trust

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

A4.2 Wider seas advice (outside of MPAs)

The UK Marine Strategy Regulations 2010 (SI 2010/1627) provide the framework for delivering marine environmental policy at the UK level and set out how the vision of clean, healthy, safe, productive and biologically diverse oceans and seas will be achieved. The UK Marine Strategy (UK MS) sets out a suite of descriptors, targets and indicators to measure the health of the marine environment and the regulations require management action to be taken where necessary to achieve or maintain Good Environmental Status (GES), the overarching aim of the UK MS. The Secretary of State sets the characteristics of GES every six years as a suite of 'Descriptors' that collectively indicate the health of our seas. More information about the UK Marine Strategy can be found via the Marine Online Assessment Tool (MOAT) portal, hosted by Cefas: Introduction to UK Marine Strategy - Marine online assessment tool (cefas.co.uk). The UK Marine Strategy GES Descriptors are assessed as part of a 6-yearly assessment cycle; an updated assessment of our seas will be presented in 2024. The Fisheries Act (2020) and the Joint Fisheries Statement (JFS) reiterate the ambition across UK administrations to take action to achieve or maintain GES. The primary aim of this advice is to help guide the long-term work of the frontrunner Fisheries Management Plans by identifying what actions they can take to contribute to the achievement of GES.

This advice provides advice on the potential risks posed by fishing gears considered by Channel Demersal Non-Quota Fisheries Management Plan (hereby the FMP) against each of the relevant UK MS Descriptors (D1 biodiversity, D3 commercial fish and shellfish, D4 foodwebs, D6 seafloor integrity and D10 marine litter). The advice builds on existing evidence-based work on risk to UK MS descriptors by different fishing gears, previously commissioned by Natural England (French et al. 2022).

The major risks identified were those associated with bycatch in nets where there may be a risk of population-level impacts on some species of cetaceans (D1,D4), seals (D1, D4) birds (D1, D4) or fish (D1, D4) as well those posed by mobile gears to benthic habitats resulting in high levels of disturbance and the failure to reach UK

MS targets for benthic biodiversity and seafloor integrity (D1, D6). The risks to D3 'commercial fish and shellfish' are likely to be mitigated by the immediate focus of FMPs on the precautionary and sustainability objectives of the Fisheries Act, with which the UK MS shares a commitment to fishing at or below Maximum Sustainable Yield.

The current evidence is designed to introduce the potential risks posed by fishing gear to each descriptor. Future work will look to address key evidence gaps and to help develop appropriate mitigation options. This is expected to take several FMP cycles and will likely require coordination with other initiatives beyond FMPs.

Screening: MS Descriptors

The UK Marine Strategy Regulations require management action to be taken to achieve or maintain GES. The Strategy applies an ecosystem-based approach to the management of all relevant human activities. In doing so, it seeks to keep the collective pressure of human activities within levels compatible with the achievement of GES and does not compromise the capacity of marine ecosystems to respond to human-induced changes. The Fisheries Act (2020) enables regulators to deliver on this ambition through the Ecosystem Objective, stating that fish and aquaculture activities should be managed using an ecosystem-based approach, which is, in-part, defined in the Act by the achievement of GES. Equally, the recently published Joint Fisheries Statement (2022) lays out the ambition across UK administrations to take action to achieve or maintain Good Environmental Status (GES) in all UK waters (Joint Fisheries Statement, 2022). In order direct efforts as part of the FMP, the following GES descriptors (Table A12) have been subject to a screening exercise. This exercise identified that D1, D3, D4, D6, and D10 were relevant to this FMP against various ecosystem components (i.e., species and habitats).

Table A12. UK MS descriptors screened into or out of this advice

UK MS Descriptor	Ecosystem component	Screened (Y/N)
D1 – Biological diversity	Cetaceans	Yes
	Seals	Yes
	Birds	Yes
	Fish	Yes
	Pelagic habitats	No
	Benthic habitats	Yes
D2 -Non-indigenous species	N/A	No

UK MS Descriptor	Ecosystem component	Screened (Y/N)
D3 -Commercially-exploited fish and shellfish	N/A	Yes
D4 -Food webs	Cetaceans	Yes
	Seals	Yes
	Birds	Yes
	Fish	Yes
	Pelagic habitats	No
D5 -Eutrophication	N/A	No
D6 -Sea-floor integrity	Pelagic habitats	No
	Benthic habitats	Yes
D7 -Hydrographical conditions	N/A	No
D8 -Contaminants	N/A	No
D9 -Contaminants in fish and other seafood for human consumption	N/A	No
D10 -Litter	N/A	Yes
D11 -Introduction of energy, including underwater noise	N/A	No

D1 & D4 - Biological diversity of cetaceans

Overview of risks identified by different gears

An overview of the risks of different gear types to cetaceans have been summarised in Table A13. The highest direct risk identified posed by fisheries on cetaceans is their incidental bycatch, and the advice below focuses on the evidence base for these interactions.

Another fisheries pressure which has the potential to impact cetaceans at a population scale is the removal of prey species that they are dependent upon. Whilst none of the frontrunner FMPs target species that could be considered ‘forage fish’, some of the targeted species may constitute part of a cetacean’s diet (e.g., flatfish and cephalopods); or an FMP may have bycatch of some forage fish e.g., juvenile whiting and cod). If the fish species most likely to be bycaught are gadoids such as juvenile cod and whiting, the direct risk to cetaceans is likely to be relatively low. This is because cetaceans that consume a lot of gadoids tend to be more generalist feeders. Only weak interactions between forage fish populations and cetaceans occur when they are opportunistic generalists, feeding on whichever species happen to be abundant (Dickey-Collas et al. 2014). If other forage fish species such as sandeel, herring, sardine, anchovy or sprat are bycaught in large numbers, the risk may need to be reassessed. However, it should be noted that achieving Maximum Sustainable Yield (MSY) may not be sufficient to support GES for some species of cetaceans. This is because most MSY calculations do not take into account the minimal biomass required to sustain marine predators in the long term. Further work is needed to better elucidate the impact of prey reduction on cetacean populations and the ecosystem interactions between fish and higher predators.

Table A13. Risk to UK MS descriptor D1, D4 Cetaceans from specified fishing gears

Gear Type	Residual Risk to – Protected species bycatch (ETP) (French et al. 2022)	SNCB screening advice	Additional comments on risk	Further action thought to be needed for this descriptor-gear interaction to contribute to GES?
Boat dredge (DRB)	Low	Screened out	N/A	No action currently thought to be necessary for the FMPs under consideration, although requirement to report bycatch incidents would improve ability to assess risk
Beam trawl (TBB)	Medium	Moderate priority	N/A	More data collection required to understand the scale of the problem, requirement to report bycatch incidents would improve ability to assess risk
Bottom otter trawl (OTB)	Low	Moderate priority	Risk thought to be low, but improved data collection would improve confidence in this assessment	More data collection required to understand the scale of the problem, requirement to report bycatch incidents would improve ability to assess risk

Gear Type	Residual Risk to – Protected species bycatch (ETP) (French et al. 2022)	SNCB screening advice	Additional comments on risk	Further action thought to be needed for this descriptor-gear interaction to contribute to GES?
Multi-rig otter trawl (OTT)	Low	Moderate priority	Risk thought to be low, but improved data collection would improve confidence in this assessment	More data collection required to understand the scale of the problem, requirement to report bycatch incidents would improve ability to assess risk
Pair bottom trawl (PTB)	Medium	Moderate priority	N/A	More data collection required to understand the scale of the problem, requirement to report bycatch incidents would improve ability to assess risk
Scottish/ Flyseine	N/A	N/A	Risk currently unclear	More data collection required to understand the scale of the problem, requirement to report bycatch incidents would improve ability to assess risk
Midwater otter trawl (OTM)	Medium	Moderate priority	N/A	More data collection required to understand the scale of the problem, requirement to report bycatch incidents would improve ability to assess risk
Mid-water pair trawl (PTM)	Medium	Moderate priority	N/A	More data collection required to understand the scale of the problem, requirement to report bycatch incidents would improve ability to assess risk
Trammel nets (GTR)	Medium	Moderate priority	Northridge (2019) suggest high risk of harbour	Likely to require targeted evidence collection and consideration of mitigation e.g., co-ordinated through the bycatch mitigation initiative

Gear Type	Residual Risk to – Protected species bycatch (ETP) (French et al. 2022)	SNCB screening advice	Additional comments on risk	Further action thought to be needed for this descriptor-gear interaction to contribute to GES?
			porpoise bycatch in trammel nets.	
Gillnets (GN)	High	Moderate priority	N/A	Likely to require targeted evidence collection and consideration of mitigation e.g., co-ordinated through the bycatch mitigation initiative
Set gillnets (GNS)	High	Moderate priority	N/A	Likely to require targeted evidence collection and consideration of mitigation e.g., co-ordinated through the bycatch mitigation initiative
Drift gillnets (GND)	Medium	Moderate priority	N/A	More data collection required to understand the scale of the problem, requirement to report bycatch incidents would improve ability to assess risk
Hand and pole lines (LHP)	Low	Moderate priority	N/A	No action currently thought to be necessary for the FMPs under consideration, although requirement to report bycatch incidents would improve ability to assess risk
Hooks and lines (LX)	Low	Moderate priority	N/A	No action currently thought to be necessary for the FMPs under consideration, although requirement to report bycatch incidents would improve ability to assess risk
Pots, and traps (FPO)	Low	Low risk	Although entangleme nt in pot ropes is known to	No action currently thought to be necessary for GES, although requirement to report bycatch incidents would improve ability to assess risk

Gear Type	Residual Risk to – Protected species bycatch (ETP) (French et al. 2022)	SNCB screening advice	Additional comments on risk	Further action thought to be needed for this descriptor-gear interaction to contribute to GES?
			occur, in the waters covered by frontrunner FMPs it is not thought to be at a level which will affect reaching GES for this descriptor	

Further consideration and justification for risk of gear-descriptor interactions

Harbour porpoise and nets

Currently, the most deleterious anthropogenic pressure on harbour porpoise in northwest European waters is fisheries bycatch (IAMMWG, 2015). The UK bycatch monitoring programme monitors the levels of bycatch in certain fisheries, gear types and areas and extrapolates the data to give an indication of the scale of overall bycatch levels (Kingston et al. 2021). The fisheries monitored are nets, pelagic trawls, longlines and ring nets, as these are currently considered to present the greatest risk. Kingston et al. (2021), gives the harbour porpoise bycatch point estimate for 2019 as 833 individuals, assuming full compliance with acoustic deterrent device rules, which apply to >12m vessels. The metiers responsible for the highest estimated harbour porpoise bycatch were tangle/ trammel nets (376) and light gillnets (275). Other gillnets such as those targeting hake or flatfish and drift nets also contributed to overall bycatch, but at lower reported levels (Kingston et al. 2021).

In order to be compatible with UKMS GES targets, fisheries must not result in a situation where the long-term viability of a cetacean population is threatened by incidental bycatch. In addition, there should be no significant decrease in abundance caused by human activities and the population range should not be significantly lower than the favourable reference value for the species. Currently, for harbour porpoise the bycatch target is deemed to being achieved if estimated bycatch is below a threshold of 1% of the best population estimate.

According to 2016 estimates, annual bycatch estimates in the North Sea were below this threshold (0.36-0.58%) but above it in the Celtic Seas (1.06 -1.37%). However, according to the Bycatch Monitoring Programme Report for 2019 (Kingston et al 2021) harbour porpoise bycatch mortality in the Celtic Seas may now be below the 1% precautionary threshold. Thus the extent and risk of bycatch from fisheries may vary around the stated threshold value.

In conclusion, harbour porpoise bycatch in nets is currently of a scale that could threaten GES targets for D1, D4 cetaceans.

Risk of netting to other cetaceans

Common dolphin is regularly reported as bycatch within the UK Bycatch Monitoring Programme. The programme monitors the levels of bycatch in certain fisheries, gear types and geographic areas and extrapolates these data to give an indication of the overall scale of bycatch levels. The fisheries monitored are static nets, pelagic trawls, longlines and ring nets, as these are currently considered to present the greatest risk. In 2019, the common dolphin bycatch point estimate was 278 (Kingston et al. 2021). The metiers responsible for the bycatch were tangle / trammel nets (164) gillnets for hake (66) gillnets (24) and light gillnets (24). Spatially, bycatch of common dolphin is concentrated in ICES Divisions 7e-g.

Bottlenose dolphins are not regularly reported via the UK Bycatch Monitoring Programme and therefore estimates of total bycatch across the fleet have not been made. However, bottlenose dolphin is listed as one of the three species where bycatch presents the highest conservation threat in south-west UK waters by Clean Catch UK (alongside harbour porpoise and common dolphin). The reason for this disparity is unclear but may be due to the highly localised nature of the risk to coastal populations of bottlenose dolphins that is not adequately represented within the ongoing monitoring programme.

In order to be compatible with UKMS GES targets, fisheries must not result in a situation where the long-term viability of a cetacean population is threatened by incidental bycatch. No information could be readily found on environmental mortality limits for common dolphin or bottlenose dolphin. It is therefore not possible to assess against the incidental bycatch target.

Abundance trends do not appear to be available for common dolphin. Abundance trends for bottlenose dolphin are available (Pinn et al, 2018). For the four groups of coastal bottlenose dolphins in UK waters, the target of ‘no statistically significant decrease in abundance’ was met for the greater North Sea and the largest group in the Celtic seas found off Wales. However, there is insufficient monitoring data to establish trends in abundance for bottlenose dolphins off the west Coast of Scotland and off the coastal south-west of England.

In conclusion, several hundred common dolphin are estimated to be bycaught in nets each year but it is not yet possible to determine how much of a threat this poses to GES targets for D1 D4 Cetaceans. Estimates of bycatch of bottlenose dolphin are not available but concern has been raised on the levels of bycatch in the south-west. Again, it is not clear how this relates to GES targets for D1 D4 Cetaceans.

The OSPAR Intermediate Assessment (2017) reported insufficient information to assess changes in distribution over time except for (in relation to the UK only) harbour porpoise, white-beaked dolphin and minke whale in the North Sea, where there are comprehensive data from 1994, 2005 and 2016, and additional years for minke whale. Between 1994 and 2005, the distribution of harbour porpoise in the North Sea shifted markedly from primarily in the north to primarily in the south; this shift was maintained in 2016 and more sightings were made throughout the English Channel in 2016 than in previous years. There is some evidence of a similar but weaker pattern for minke whale. White-beaked dolphin distribution did not appear to change between 1994 and 2016.

Three or more comparable estimates of abundance are only available for harbour porpoise, white-beaked dolphin and minke whale in the North Sea. There is no evidence of any trend in abundance for these species in these regions. For other species, it is not possible to assess with any confidence whether populations are decreasing, stable or increasing. Nevertheless, the most recent estimates of abundance for 2016 are similar to or larger than earlier estimates for comparable areas. There is moderate confidence in the methodology though low confidence in the data availability.

The OSPAR assessment also identified harbour porpoise as subject to high risk to bycatch in the OSPAR Maritime Area; common dolphin and minke whale were reported as being at medium risk, but with no direct reference to static nets.

Risk of large cetacean entanglement in pot ropes

Entanglement of large whales in ropes and lines is increasingly being cited as a welfare issue and of potential conservation concern. Much of the work in the UK to date has focussed on Scottish waters (e.g., Scottish Entanglement Alliance), as this is where most overlap between large cetacean populations and static gear (and therefore risk) occurs.

In Scotland, it is estimated that 95% of pot entanglement cases have been unreported, and recent estimates suggest that 30 minke whales and five humpback whales are entangled annually (MacLennan et al., 2021). Minke and humpback whales are both frequent visitors to English waters and there are incidents of them becoming entangled with potting gear in England, though there is no formal study to quantify this.

In order to be compatible with UKMS GES targets, fisheries must not result in a situation where the long-term viability of a cetacean population is threatened by incidental bycatch. In addition, there should be no significant decrease in abundance caused by human activities and population range should not be significantly lower than the favourable reference value for the species. There is no estimate of mortality due to entanglement readily available which makes assessment against the targets difficult.

In Scottish waters, MacLennan et al 2021 reported that incidence of entanglement may be sufficient to impact at a local population level and is a concern for the conservation and recovery trajectories of minke and humpback whales. This suggests that in some places, it may be at scale that could threaten GES targets.

Within English waters, it is thought that there will be less overlap between the presence of large cetaceans and potting activity when compared to Scottish waters. However, both minke whale and (to a lesser extent) humpback whale are known to be present in English waters so some risk still exists. A study in the Cornwall IFCA region identified areas of highest interaction risk in Porthcurno, Falmouth Bay, St Ives, Newquay, and Padstow – all within 3nm. Whilst bycatch has not been currently evidenced, constant monitoring of these high-risk areas should be retained alongside coupling with effective mitigation techniques.

Current thinking is that large cetacean entanglement in English waters may not be occurring at high enough levels to have population level impacts, but this is based largely on the low levels of reported entanglement cases rather than a systematic assessment. At this current time, it is therefore generally considered more a welfare issue, which is outside the scope of the UKMS. However, this may change as populations continue to recover from past exploitation and the risk of entanglement increases, or as better evidence becomes available.

In conclusion, the occurrence of large cetacean entanglement in ropes and lines in English waters is not well understood but is currently thought to be below the level that would have population level impacts. If this is the case, it would not threaten GES targets. However, this may change in the future or as more evidence becomes available.

Risk from other gear types relevant to frontrunner FMPs

As well as netting and entanglement in pot ropes, other gears can pose a bycatch risk to cetaceans. The Bycatch Monitoring Programme also monitors pelagic trawls, longlines and ring nets, as these are currently considered to present the greatest risk. None of these methods are thought to be particularly relevant to the frontrunner

FMPs. Benthic trawling is not included in the UK Bycatch Monitoring Programme, because it is not currently considered to be a high-risk activity. However, the report of bycatch levels in 2019 report (Kingston et al. 2021) did also include information from non-dedicated sampling in under the English / Welsh Data Collection Framework discard programme which focuses heavily on demersal trawl gears. No marine mammals were recorded but it is noted that sampling protocols are not specifically designed for quantifying protected and sensitive species. Historically, there is evidence that shows harbour porpoise are occasionally caught by beam and otter trawlers (CEFAS observer programme report, 2015; unpublished). However, the current understanding is this is not at a level that would have impacts on the population.

Similarly, rod and line fishing is not currently considered to pose a significant risk to cetacean populations and is not included within the UK Bycatch Monitoring Programme’s sampling regime. Whilst there are anecdotal reports of bycatch of harbour porpoise when fishing with rod and line (albeit not in fisheries associated with frontrunner FMPs), it would appear to be only a very occasional occurrence and not at a level that could have impacts on population.

Strategic actions and next steps for UK MS Descriptor D1, D4 cetaceans

Bycatch

Bycatch is likely to be impacting some cetacean populations to the extent that it is contributing to the failure of this descriptor to achieve GES. Targeted evidence collection and consideration of requisite mitigation is required. Because bycatch is likely to be occurring across a range of gears, it appears that at the current time, a strategic approach is required to improve evidence collection and identify potential mitigation actions

The Bycatch Mitigation Initiative outlines how the UK government and devolved administrations will achieve their ambitions to minimise and, where possible, eliminate the bycatch of sensitive marine species, including cetaceans. Each fisheries policy authority is responsible for setting out how they will take action on bycatch and Clean Catch UK is one of the initiatives Defra has established to develop and implement effective bycatch policies in England. The focus of Clean Catch UK (CCUK) research is currently in south-west England fisheries. However, the outcomes may be applicable to bycatch mitigation strategies in fisheries taking place across the UK. Defra has yet to publish its action plan for how it intends to fully implement the BMI. Additional detail and an understanding of timeframes will be needed to know if these actions will be sufficient to mitigate the risks identified, or whether additional work is required.

Cetacean bycatch mitigation decision-trees have been developed by Natural England to help identify if a given fishery has bycatch and how to get guidance to address an identified bycatch problem. It is hoped that regulators and fisheries managers could use the decision-trees to improve understanding of cetacean bycatch in a fishery and to subsequently minimise or eliminate it or its potential. It has been suggested that the CCUK regional working groups may be an appropriate place to commence utilisation of the decision-trees, and this could be further explored as well as their use within individual FMPs.

Marine Mammal Bycatch Reporting Requirements

In order to continue to export fisheries products to the United States (US), and to assist conservation efforts in mitigating marine mammal bycatch, all UK fisheries, as of 2021, need to comply with international standards for the conservation of marine mammals. This means that there is now a mandatory requirement under fishing vessel licence conditions, whereby fishers need to report any bycatch of marine mammals to the MMO, within 48 hours of the end of the fishing trip. Such reporting will help managers to improve estimates of bycatch risk to marine mammals for individual fisheries. However, limited access and/or analysis of returns has occurred to date.

Prey species reduction

Whilst not thought to be a major issue for the frontrunner FMPs, there is further work required to better understand the potential impacts of prey reduction on cetacean populations. A collaborative approach between Defra and its ALBs to develop ecosystem modelling approaches will support a better understanding of the potential impacts of prey reduction on cetacean populations.

FMP-scale actions and next steps

Whilst a strategic approach is thought to be required to improve the evidence base for assessments for this indicator and to develop and trial mitigation or management options, the close involvement of FMP leads in any such approach will ensure alignment between strategic and operational objectives.

A4.3 Conservation and protection measures for FMP species

Defra commissioned work (MF1287) to collate evidence underpinning Fisheries Management Plan development including conservation considerations and bycatch. None of the FMP species have protection provisions from relevant conservation or protection designations (Table A14).

Table A14. Relevant conservation and protection designations and whether they encompass species considered in the FMP

Species Conservation Consideration	FMP species protection
UNCLOS Annex1 Highly migratory species	No
Bern Convention	No
Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)	No
CITES	No
OSPAR Threatened and/or Declining Species and Habitats	No
Habitats Directive (listed under Annexes II, IV and V of the Directive) and The Conservation of Habitats and Species Regulations 2010	No
Wildlife & Countryside Act 1981 Schedule 5 protected animals	No
Natural Environment & Rural Communities Act 2006 Habitats & Species of Principal Importance	No

The International Union for Conservation of Nature (IUCN) Red List highlights animals and plants at high risk of global extinction, according to the IUCN Red List Categories and Criteria. This method has been applied regionally as the European Red Lists to identify species that are threatened with extinction at the European level so that appropriate conservation action can be taken to improve their status. The data also records whether a species is endemic (known only from the European Marine Assessment Zone). Whilst European fish have generally all been subject to Red List assessments, not all European invertebrate species have been assessed. The current status of FMP focal species is given in Table A15, with only smoothhound being noted as vulnerable. However, many of these species' risk was not possible to define due to their data deficient status.

Table A15. European Redlist status of FMP species from Nieto et al 2015[15], Freyhof and Brooks 2011[16]

Species Name	Status	Endemic
Pouting (bib)	Least Concern	No
Brill	Least Concern	No
Cuttlefish	Not included	Not assessed
Gurnard/ latchet	Least Concern	No
Gurnard/ latchet	Least Concern	No
Gurnards - Tub	Least Concern	No
John Dory	Data Deficient	No
Lemon sole	Least Concern	No
Surmullet (striped red mullet)	Data Deficient	No
Squid	Not included	Not assessed
Lesser spotted dogfish	Least Concern	No
Turbot	Not included	Not assessed
Octopus	Not included	Not assessed
Smoothhound	Vulnerable (A2bd)	No

15 Nieto, A., et al. 2015. European Red List of Marine Fishes. Luxembourg: Publications Office of the European Union available at https://www.iucnredlist.org/resources/nieto2015 Accessed 16/05/23

16 Freyhof, J. and Brooks, E. 2011. European Red List of Freshwater Fishes. Luxembourg: Publications Office of the European Union. available at https://www.iucnredlist.org/resources/freyhof2011 Accessed 16/05/23

A4.4 Bycatch

Incidental bycatch is technically defined by ICES as "*all catches of species not targeted by fisheries operations (incidentally/accidentally caught), including those not taken on board, regardless of later treatment*". This can be challenging for NQS species. While fishers do target the species included in the FMP, other fishers supplement income by landing incidentally captured NQS species while targeting other species. Here, however, we focus on that bycatch that has no commercial value, particularly protected, endangered, and threatened species (PETS) of seabirds, fish, marine mammals, and marine turtles.

The way that bycatch data is collected under current UK monitoring obligations and measures and the difficultly with which an NQS "fishery" is defined means that it is not possible to attribute bycatch of PETS specifically to NQS fisheries. Risks and impacts are therefore based on gear type by area data.

Bycatch risk was calculated by the Strengthening regional cooperation in fisheries data collection project (fishPi). Based on likelihood of bycatch, presence of the species in the area (North Sea and Eastern Channel, and Western Channel) and effort (days at sea) by gear type. Gillnet, trammel net and drift nets and bottom otter trawl all presented a high bycatch risk. Other gears used in the FMP fishery presented more moderate risk including beam trawl although none were without risk.

A more comprehensive assessment can be found in Defra commissioned work (MF1287 – section 13) that collated evidence underpinning Fisheries Management Plan development.

A4.5 Fish habitats

Fish required healthy habitats to thrive. Different species have different habitat requirements, and such requirements may change through life. Traditionally called fish habitats, these are areas that support breeding, spawning, nursery functions, feeding, growth and migration on which a species depends. "Habitat" when related to fish habitat is a broad term that includes physical chemical and biological dimensions.

Activities on land or in the marine space (including fishing) may impact these habitats, reducing population level survival and impacting on stock sustainability and exploitable biomass. The identification and management of impacts on fish habitat is therefore one dimension of improving sustainability of fish stocks and addressing resilience in the wider ecosystem. These are both goals of the FMP.

Evidence for identification of fish habitat sits on a gradient of quality that at its lowest level considers presence/absence of a species. Higher levels include first species density distributions and uses, then spatially explicit growth, reproduction and survival and finally production rates. Almost all existing data to on EFH in England is limited to first or second levels and often restricted in space and time.

Key literature for the UK includes Ellis et al 2012[17] that records 19 key species but none considered by the FMP. Older literature including Coull et al (1998) include lemon sole shown in Figure A35 but confidence in this evidence is low given underpinning empirical survey data is almost 30 years old.

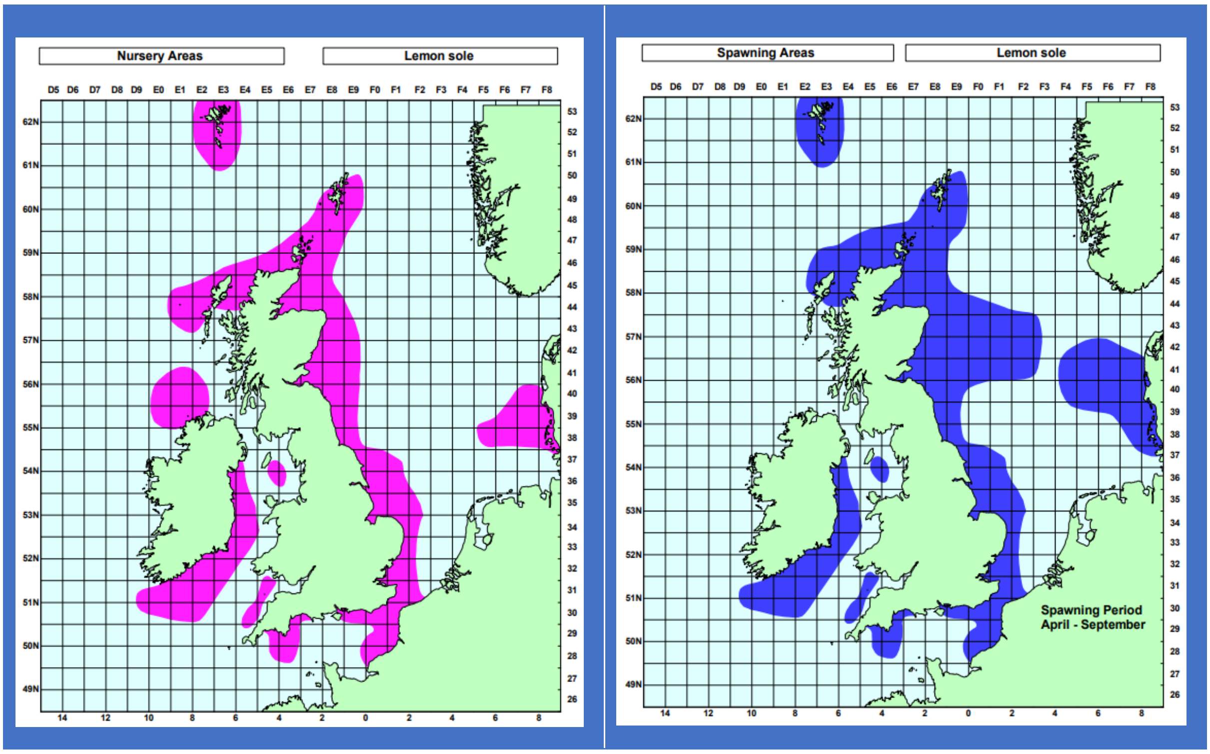

Figure A35. Lemon sole nursery (left) and spawning (right) areas as described by Coull et al 1998

Recently completed but yet to be published work by Natural England[18] explored empirical evidence for 35 species chosen to represent species of regulatory or conservation importance. Of the focal non-quota species, only cuttlefish was included where it was one of seven were selected for more detailed life stage analyses. The primary research focus was to explore the utility of EUNIS habitat and link distinct habitat types to species use allowing an indicative quantification of EFH. When results are accessible these will be incorporated into the FMP evidence base.

17 Ellis, J.R., Milligan, S.P., Readdy, L., Taylor, N. and Brown, M.J. 2012. Spawning and nursery grounds of selected fish species in UK waters. Sci. Ser. Tech. Rep., Cefas Lowestoft, 147: 56pp.

18 Wells, R.J., Teague, N., Davie, S., Kenworthy, J., Stephen, F., Moxham, E., Alvis, H., unpublished. Essential Fish Habitats for English Waters. APEM Ltd Technical Report P00007924. Natural England

MMO has also sought to identify EFH is support of marine planning and conducted several studies overlapping the FMP area. MMO (2013) project 1044[19] included lemon sole, and red gurnard using decision tree models. MMO1133 (Katara et al 2021[20]) used species distribution models and defined nursery and or spawning areas for 26 individual species including brill, common cuttlefish (Figure 5), lemon sole and striped red mullet. Models were underpinned by fishery independent surveys but for the focal species here data limitations (sampling efficiency and catch rates), and modelling assumptions uncertainty meant confidence in model predictions was low.

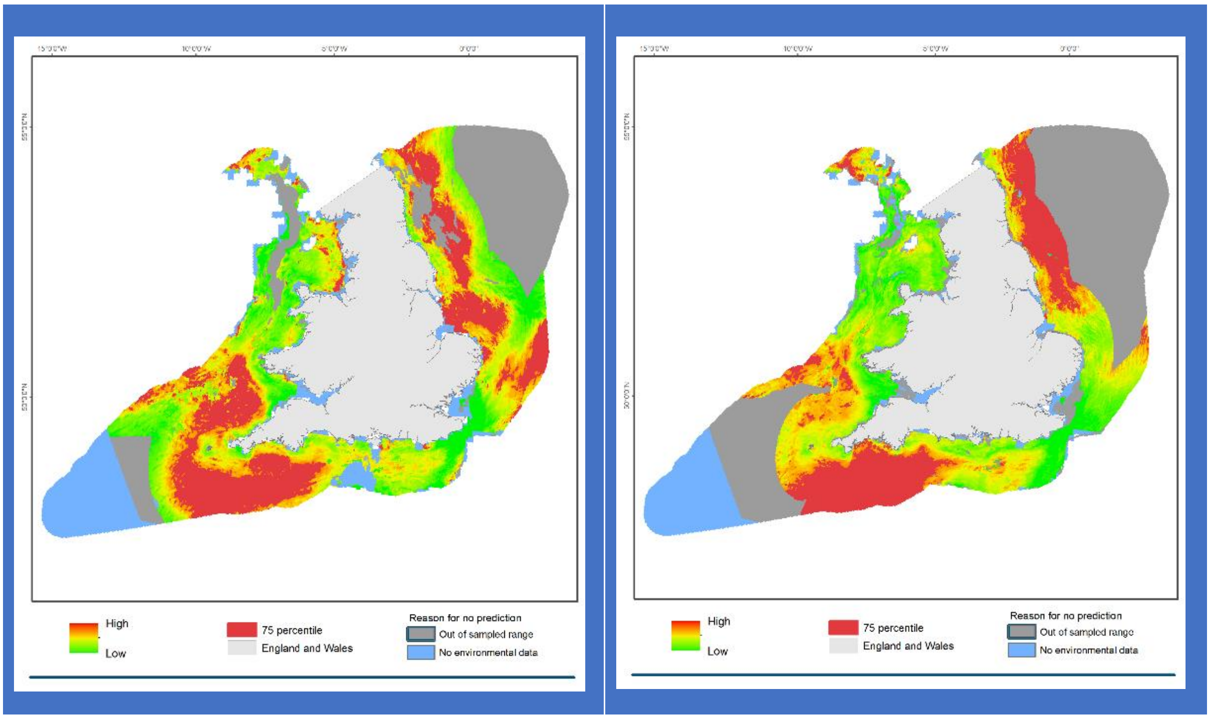

Figure A36. Prediction of the potential distribution of cuttlefish juveniles (left) and adults (right) based on approaches detailed in Katara et al 2021, low confidence

In addition, model outputs were combined with observed, low-resolution fish distributions to derive cross-species 'hotspot' spawning and nursery areas that identified. This identifies both spawning and nursery hotspots off the southwest peninsula and Isles of Scilly in ICES area 7e and in the inshore around the UK coast (Figure 6).

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[19] MMO 2013. Spatial models of Essential Fish Habitat (South Coast Inshore and Offshore Marine Plan Areas). A report produced for the Marine Management Organisation by the Institute of Estuarine and Coastal Studies, 73pp. MMO ProjectNo: 1044. ISBN: 978-1-909452-21-3

[20] Katara et al. 2021. Conservation hotspots for fish habitats: A case study from English and Welsh waters, Regional Studies in Marine Science 44, 101745 doi https://doi.org/10.1016/j.rsma.2021.101745

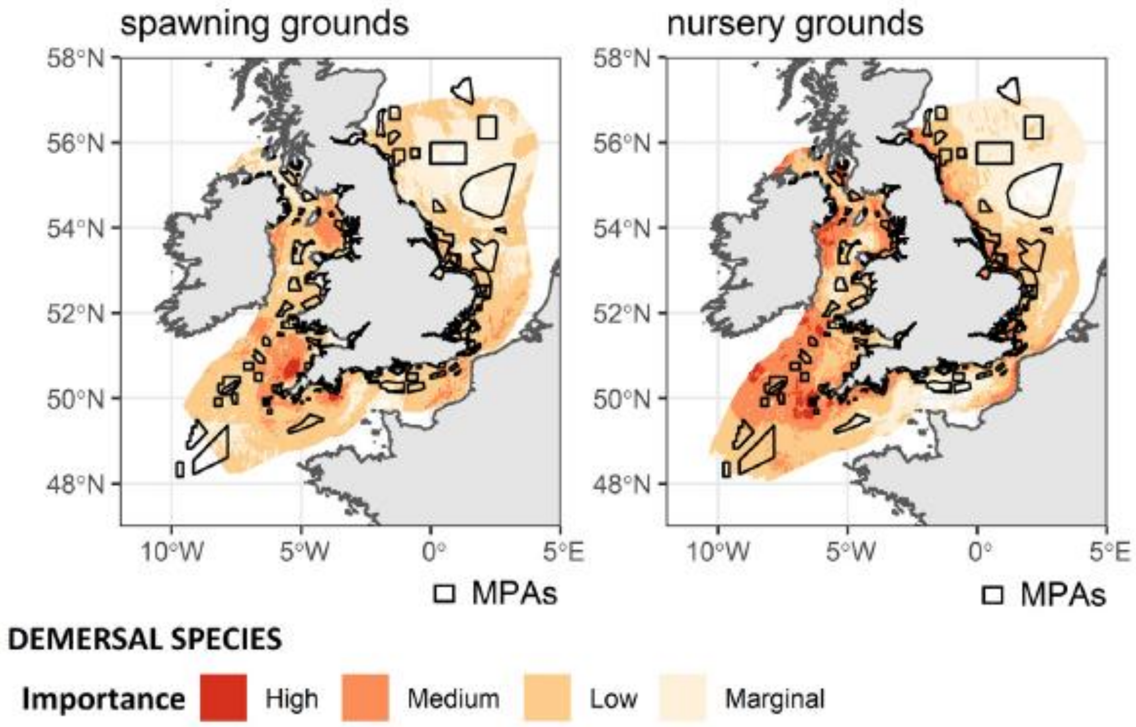

Figure A37. Nursery and spawning hotspots for demersal species. The weighted number of species is used as a proxy for the importance of the area and is presented in quartiles. Values greater than the median, denoted in the map as medium and high importance, highlight hotspots and overlapped with and marine protected areas [at time of publication] (MPAs; black outlines). From Katara et al 2021

Annex Five: Climate change mitigation and adaptation

This section focuses on the following dimensions of climate change

- Climate change impacts on fish species distribution and behaviour
- Climate change impacts on fisheries
- Climate change pressures of fishing

Under future climate change scenarios seawater temperature and salinity are predicted to alter. These are key determinants of fish habitat suitability, and such changes can result in shifts to distributions of marine species. Changes are predicted in all UK waters including the English Channel, with the neighbouring Southern North Sea identified as an internationally relevant climate change hotspot.

As species change, so will patterns of fisheries exploitation. Fishing opportunities will both come and go and the industry will need to adapt. Beyond impacts to the fish, climate change has the potential to impact both offshore fishing operations, for example thorough increased storminess, and onshore operations impacted by events like sea level rise and storm surge.

In order to address climate issues, the government has set legally binding targets to be Net Zero by the middle of this century requiring substantial reduction in UK's carbon emissions, including those from the fishing industry. In addition, we seek to absorb emissions through natural carbon sinks.

A5.1 Climate effects on fish species

To manage the evidence scope in this initial iteration of the FMP, the ES focuses on evidence for direct climate impacts on the FMP focal species. Impacts considered include

- distributional shifts and changes on productivity
- changes in the timing of life history events (phenology)

Other effects can occur such as change in body size although if and how this is occurring is more contentious. Ocean acidification impacts on fish physiology and early survival is also of particular concern for shellfish.

Effects of climate change on species distribution

Climate driven changes in species distribution have been assessed by a number of authors using arrange of methods. The summary below is based on Townhill et al

(2019[21]). Townhill e.g. predict change in i) the proportion of the UK EEZ suitable for species and ii) location of the population centre based on multiple different models collectively (ensemble modelling). Ensemble modelling overcome the challenges of single models. Outputs by Townhill et al (2019) explored a range of climate scenarios although only the RCP 8.5 (high emissions, low mitigation) that represent the biggest change is presented here.

Table A16. Predictions for UK seas suitability and latitude of population centre for selected species from Townhill et al (2019) UK EEZ RCP 8.5 Table shows that at a UK level, of the focal species assessed, most (9/13) are predicted to find UK waters become more suitable. Most species will see their centre of population move northward. Predictions for veined squid and Cuttlefish were weakest and are of particularly low confidence based on few models and lower fitness scores for individual models

Table A16. Predictions for UK seas suitability and latitude of population centre for selected species from Townhill et al (2019) UK EEZ RCP 8.5 scenario

Common name	Scientific name	UK suitability	cetroid	Model fit
Red gurnard	*Chelidonichthys cuculus*	reducing	northward	0.82 (5)
Tub gurnard	*Chelidonichthys lucerna*	increasing	northward	0.80 (5)
Grey gurnard	*Eutrigla gurnardus*	reducing	northward	0.82 (5)
Veined squid	*Loligo forbesii*	reducing	northward	0.66 (1)
European squid	*Loligo vulgaris*	increasing	southward	0.77 (4)
Lemon sole	*Microstomus kitt*	reducing	northward	0.80 (5)
Surmullet [red mullet]	*Mullus surmuletus*	increasing	southward	0.72 (4)
Turbot	*Scophthalmus maximus*	increasing	northward	0.77 (4)

21 Townhill et al (2019) Future projections of commercial fish distribution and habitat suitability around north west Europe. A report to Defra BX006

Common name	Scientific name	UK suitability	cetroid	Model fit
Brill	*Scophthalmus rhombus*	increasing	northward	0.78 (4)
Lesser spotted dogfish	*Scyliorhinus canicula*	increasing	northward	0.80 (4)
Common Cuttlefish	*Sepia officinalis*	increasing	northward	0.75 (3)
Pouting [bib]	*Trisopterus luscus*	increasing	southward	0.85 (5)
John Dory	*Zeus faber*	increasing	northward	0.83 (5)
Other species covered by the FMP were not assessed by this study				

Phenology (timings) and the impact on recruitment

The timing of cyclic and seasonal natural phenomena (phenology) is changing in response to climate change, with evidence among fisheries of shifts in the timing of spawning, hatching and migration. No information on these changes was identified for our focal species. Understanding phenology's role in fish recruitment is limited, and usually explored by correlating stock assessment based recruitment time-series with zooplankton abundance and temperature. Given data is currently absent for most stocks considered in the FMP, we are knowledge limited for these species. Spawning seasons have been recorded in Chapter 3 of the FMP and a noted temperature sensitivity for some FMP species listed although change has not been assessed and any in depth review of literature remains to be undertaken for the FMP.

A5.2 Climate impact on fisheries

Seafish (2015) explores climate risks and adaptation options for industry and informs our consideration of effects on industry. Industry view wild capture fisheries as inherently unpredictable and thus consider being highly adaptable, a core capability of the industry. Industry already faces significant pressures from sustainability, economic and political pressures.

Changes in fisheries resources are expected. Changes to growth rates, species distributions, year class strength, migration patterns and impacts on choke species have all been identified, although these present both opportunities and risks. Phenology alterations are generally expected to negatively impact fishing opportunities. These risks have not been explicitly assessed for the FMP species but are generalised to industry across the UK.

There are also risks to offshore operations, particularly physical working conditions, gear deployment and performance, and gear damage that are all expected to be negative under a future of increased storminess and waves.

Onshore, sea level rise and storm surges, storminess and waves, air temperature and changes in rainfall and run-off represent risks to shore side infrastructure such as ports and harbours, electricity supply etc and to fishing communities including housing and local amenities.

Impacts of fisheries on climate change - emissions

Fisheries impact on climate change in a number of ways, the most prominent of these are emission of greenhouse gasses while undertaking fishing, and environmental damage that hinders the ability of natural systems to sequester carbon.

Fossil fuels are the primary propulsion of the UK fishing fleet with emissions estimated as 802 kt CO2e in 2019 (equivalent to 0.18% of UK total territorial emissions, or 0.66% of UK domestic transport emissions)[22].

Nationally, total emission levels have been declining by almost a third (from 1150 kt CO2e in 2004) although this correlates with reduction in total vessel numbers and not per vessel reductions in emissions.

Our landings analysis (used to support Chapter 3 of the FMP) identify beam and otter trawl and nets as the main gears employed for the fishery. Beams trawls produce highest emission levels for both per-quantity and per-value of fish landed. Net fisheries by contrast are the lowest emissions producers by landed value and second lowest by quantity of landing (pelagic trawls being lowest). Demersal trawls and seine sit somewhat intermediate. This suggests that technological, operational or policy changes that reduce emissions of towed gears have the most potential for climate benefits and could be relevant to the FMP.

22 Cefas (2022) Carbon emissions in UK fisheries: recent trends, current levels, and pathways to Net Zero Final report for Defra project C8118 Towards Net Zero Carbon Fisheries

A5.3 Impacts of fisheries on climate change – natural systems

Fishing gear, particularly towed gears that interact with the seabed lead to seabed disturbance and reductions in seabed carbon stocks. There are increasing interest in protecting the most important and highly disturbed carbon stores. Epstein and Roberts (2022)[23] estimate cumulative disturbance of organic carbon by mobile bottom fishing to be 109 Mt per year and that reduction in overall fishing effort and switch to alternative fishing methods should be considered to reduce carbon impacts. How much of this carbon is remineralised following disturbance and therefore the magnitude of carbon emissions/savings however is uncertain and a future research recommendation.

While high fishing pressure and seabed disturbance from towed gear occurs within the FMP boundaries, (ICES Swept area data for example) when compared to other areas of the UK continental shelf, the English Channel carbons stocks are comparatively low and as such sites in the English Channel do not rank most highly of intervention and likely present only modest reduction in organics carbon disturbance.

23 Epstein G, Roberts CM (2022) Identifying priority areas to manage mobile bottom fishing on seabed carbon in the UK. PLOS Climate 1(9): e0000059. https://doi.org/10.1371/journal.pclm.0000059

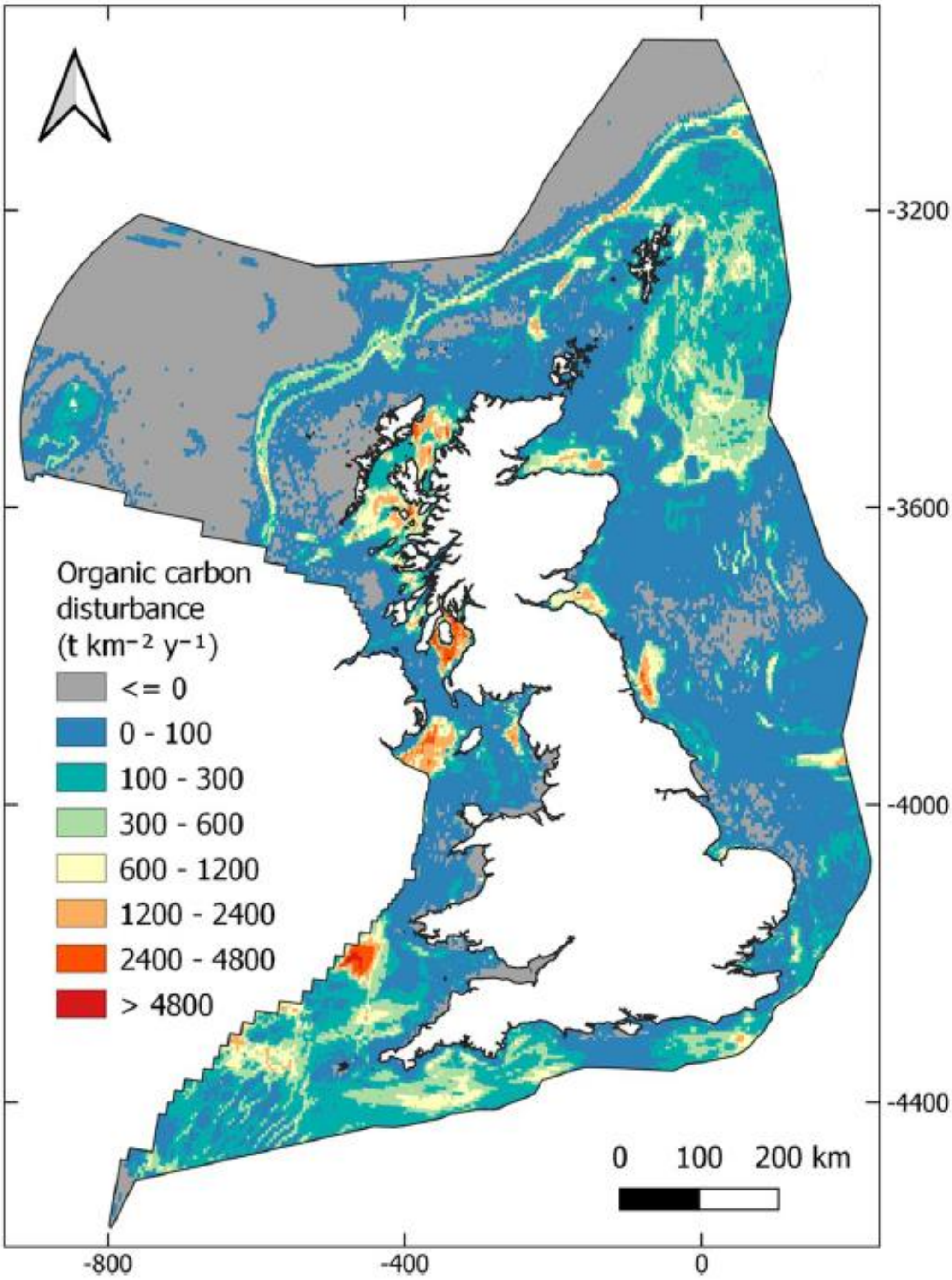

Figure A38. Annual cumulative disturbance of organic carbon in the top 10 cm of seabed sediments. from mobile bottom fishing as mean annual swept volume ratio. From Epstein and Roberts (2022)

A5.4 Future research considerations

- Explore species distribution, centres of population and changes in habitat suitability at the local scale.

- Develop Species Distribution Models for missing species and improve confidence in existing models.
- Expand to consideration of more indirect climate issues including for example changes in species interactions.
- Collate or collect further information on phenology to explore any changes in focal species.
- Incorporation of ongoing research including Seafish and MSPACE project that aims to support government in designing and implementing economically viable and socially acceptable climate-smart marine spatial plans.
- Explore FMP level fleet emissions and opportunities for alternative fuels.
- Continue work programmes in understanding UK continental shelf carbon stocks and the impacts of trawling disturbance.

Gap ID	Themes	Sub-Themes	Gap	Priority	Rationale	Goal (most relevant)	Status	FMP Focal Species	Comments
1	Economic	Economic dependence	Mapping out the economic benefits (direct and indirect/discreet) local operations bring to associated communities	Must	This is necessary to address the economic aspects of the sustainability and ecosystem objective at a fisheries level. This is also crucial to address the national benefit and equal access objective.The economic	Goal3: Better understand and optimise social and economic benefits	Not started	All FMP species	None
2	Fisheries management	Measures and interventions	What technical measures are implemented domestically? Where they found to be successful?	Must	To scope out the legal landscape and better udnerstand the legislative gaps.	Goal1: Deliver effective management of demersal non-quota species in the	Not started	All FMP species	
3	Fisheries management	Measures and interventions	What voluntary measures are implemented by recreational and commercial fishers and how successful are they?	Should	To address the sustainability objective and precautionary objective at a stock level and enables us to better understand how the FMP will manage fish activity in a manner to recover/maintain stocks within MSY (or proxy).	Goal1: Deliver effective management of demersal non-quota species in the	Not started	All FMP species	
4	Fisheries management	Recreational fisheries overview	What is the relevant geographical area for the recreational fisheries?	Must	To address the sustainability objective and precautionary objective at a stock level and enables us to better understand how the FMP will manage fish activity in a manner to recover/maintain stocks within MSY (or proxy).	Goal6: Develop the non-quota species evidence base	Not started	All FMP species	
5	Economic	Economic dependence	Map out economic value to recreational fishers and charter vessels	Must	Economic benefits, both indirect and direct, from recreational fishing and tourism are not very well understood. As this is potentially a sizable contributor to seasonal community income, more needs to be done to	Goal3: Better understand and optimise social and economic benefits	Not started	Not applicable	None
6	Environment	Habitat	What is the sensitivity of gear to the UKMS descriptors from gear types throughout the area covered by the FMP?	Must	This is necessary to understand how the FMP should manage the fishery to address specific environmental risks. It also enables the FMP to address the ecosystem and sustainability objective at a fisheries level.	Goal2.1: Deliver wider biological Sustainability. Sub-Goal2: Where	Not started	Not applicable	
7	Environment	Bycatch and protected species	Sensitive species bycatch and associated impact	Should	This is necessary to understand how the FMP should manage the fishery to address specific environmental risks. It also enables the FMP to address the ecosystem and sustainability objective at a fisheries level.	Goal2.1: Deliver wider biological Sustainability. Sub-Goal2: Where	Not started	Not applicable	
8	Social	Optimising social benifits	Map out the social consequences of equal access across the heterogenous sectoral landscape	Should	To understand how a move to facilitate equal access may create local impacts or benifits	Goal3: Better understand and optimise social and economic benefits	Not started	All FMP species	None
9	Social	Optimising social benifits	Develop and trial trade off methodology	Should	This will enable us to better understand how to balance conservation objectives with social and economic ones.	Goal1: Deliver effective management of demersal non-quota species in the	Not started	All FMP species	None
10	Implementation	Legislation	Review of international commitments and non-statutory policy linkages	Could	To identify what measures may influence what management outputs are taken forward	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Not applicable	
11	Implementation	Legislation	Marine Plan Policy Assessment	Could	To better understand policy overlaps	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Not applicable	
12	Fisheries	Recreational fishing	Leaning on other projects to map out spatial distribution of recreational arrangements and ports of known significance.	Must	Recreational fishing activity is not well defined, but an important aspect of the fisheries take and fish mortality. Potentially removing juvenile stocks from coastal waters. The impact of this fishery needs to be understood	Goal6: Develop the non-quota species evidence base	Not started	Not applicable	
13	Fisheries	Commercial fisheries	Develop methods to collate landings data to a species level for cuttlefish, octopus and squid	Must	Landings data for these species are not defined to species level granularity, a methodology for identifying these groups to a species level is required for effective management.	Goal6: Develop the non-quota species evidence base	Not started	All FMP species	
14	Fisheries	Commercial fisheries	Collect EU data for EU vessels at a gear resolution and develop gear type linkages to EU vessels (currently is of lower confidence	Must	EU data provided in the development of the FMP was aggregated to an annual level. A breakdown by gear, vessels size, area, landing ports, or season was not available. Therefore, EU vessel catches could not be	Goal6: Develop the non-quota species evidence base	Not started	All FMP species	
15	Fisheries	Commercial fisheries	Understand spatial squeeze and its ramifications at a wider scale	Should	Spatial use through imposed fishery restrictions could have an impact on the sustainability of the fishery. Further clarity is required to tie spatial restrictions into Channel demersal NQS fishery management. Spatial restriction data are available, but due to time and resourcing constraints they haven't been analysed in the development of the FMP and ES up to this point. Link to social science evidence gap.	Goal6: Develop the non-quota species evidence base	Not started	Not applicable	
16	Fisheries	Commercial fisheries	Collect fishing effort data for both EU and domestic vessels.	Should	Fishing effort data will help to target and assess the effectiveness of proposed management measures. It will also help qualify the impact of the measures and identify some of the unintended consequences. Effort data	Goal6: Develop the non-quota species evidence base	Not started	All FMP species	
17	Fisheries	Commercial fisheries	Map out interactions between target and non target fish caught in the Channel from an ecosystem perspective.	Should	Identification of which species are caught alongside Channel demersal NQS as part of a mixed fishery carries important implications for the efficacy of management and the identification of unintended	Goal6: Develop the non-quota species evidence base	Not started	Not applicable	
18	Fisheries/social science	Commercial fisheries	Develop clarity on historic <10m landings.	Could	Private sales historically haven't been declared for smaller vessels. This imposes limits on <10m catches and brings into doubt the reliability of the data to portray an effective picture of landings and the importance of	Goal6: Develop the non-quota species evidence base	Not started	All FMP species	
19	Fisheries	Commercial fisheries	Collate exactly what and the amount is landed through Flyseining operations	Should	Stakeholder concerns have been raised over the impact flyseining fishing effort is having on Channel demersal NQS stocks. This is an apparent evidence gap which we could look to close through additional monitoring	Goal6: Develop the non-quota species evidence base	Not started	Not applicable	

Gap ID	Themes	Sub-Themes	Gap	Priority	Rationale	Goal (most relevant)	Status	FMP Focal Species	Comments
20	Fisheries management	Fish stocks	Turbot - How is the channel stock connected with the NS stock	Should	Need to understand connectivity with North Sea stock within assessment. Current surveys not reliable for abundance data.	Goal6: Develop the non-quota species evidence base	Not started	Turbot (Scophthalmus maximus)	
21	Fisheries management	Fish stocks	Common Cuttlefish - Design and implement stock assessment	Should	Require stock assessment, preferably within ICES processes. Some previous and ongoing research can support this.Require further research on life histories including lifespans. Info on recruitment lacking. Require	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Common cuttlefish (Sepia officinalis)	
22	Fisheries management	Fish stocks	Common Octupus - Design and implement stock assessment	Could	Require assessment. No species-specific landing data. Can be confused with curled octopus. This is an emerging fishery hence could status.	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Common octopus (Octopus vulgaris)	
23	Fisheries management	Measures and interventions	All species - Scope out international management measures for remaining species	Should	To understand what is implemented elsewhere and how successful it it as a means to understand what we could do to support the move to wards sustainable fisheries.	Goal1: Deliver effective management of demersal non-quota species in the	Not started	All FMP species	
24	Fisheries management	Fish stocks	Octupuses - Collation and monitoring of octopus landings in space and time, including seasonality	Must	There is a proposed measure for this	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Octupuses	
25	Fisheries management	Measures and interventions	Engine restrictions, Identify how many vessels it will impact – economic, social, political etc., Identify unintended consequences -	Must	to support underpinning measures and measures impact assessment	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Not applicable	
26	Fisheries management	Measures and interventions	Mesh size, Identify unintended consequences – displacement, Identify how many vessels it will impact – economic, social, political etc.	Must	To support management measures and impact assessment and exploration of unintended consequences	Goal5: Better understand the wider non-quota species evidence needs	Not started	Not applicable	
27	Fisheries management	Measures and interventions	Fly Seining REM – evidence to show what issues are, Identify how many vessels it will impact – economic, social, political etc. ,	Must	to support underpinning measures and measures impact assessment	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Not applicable	
28	Fisheries management	Fish stocks	Cuttlefish Survivability study, Seasonality, Breeding/Spawning ground identification, Egg laying study, Underwater structure research,	Should	Related to underpinning measures proposed in the FMP	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Cuttlefishes	
29	Fisheries management	Measures and interventions	MCRS - impact of these MCRS on the fishery prior to implementation	Could	To support the development and implementaiton of measures	Goal1: Deliver effective management of demersal non-quota species in the	Not started	All FMP species	
30	Environment	Bycatch and protected species	Strengthening links with existing programmes such as the UK bycatch monitoring programme to support their ability to assess,	Should	It is critical to understand how the UK bycatch monitoring programe can support the development and implementation of the FMP and vice versa	Goal2.2: Deliver wider biological Sustainability. Sub-Goal2: Understand	Not started	Not applicable	
31	Environment	MPAs	Investigate how displacement of target fisheries as a consequence of HMPA and MPAmanagement into the wider area may	Should	To understand wider consequences and ensure management measures are appropriate	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Not applicable	Recommend this is picked up by other ALBs
32	Environment	Bycatch and protected species	Map out species sensitive to bycatch and associated impact	Should	To understand wider consequences and ensure management measures are appropriate	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Not applicable	
33	Economic	Employment	Drivers behind employment in the Channel demersal NQS FMP.	Could	To support ongoing work. Identification of the primary drivers in the change of employment in the Channel demersal NQS fishery is a clear evidence gap that has not been addressed in the development of the first	Goal3: Better understand and optimise social and economic benefits	Not started	Not applicable	None
34	Economic	Economic performance	Understanding and forecasting of economic performance	Could	The fishery has been on a declining trajectory for economic performance since 2016. Further research will be required to determine the drivers behind this, what impacts this will pose to the fishery in the future, and	Goal3: Better understand and optimise social and economic benefits	Not started	Not applicable	None
35	Economic	Economic dependence	Mapping indirect economic benefits (natural capital) across the commercial and recreational fleets	Should	By broaden our measurements of economic value to include more indirect indicators, we are better placed to be able to address goal two - 'better understand and optimise social and economic benefits' together with the	Goal3: Better understand and optimise social and economic benefits	Not started	Not applicable	None
36	Economic	Economic impact assessment	Mapping out economic consequences of equal access	Should	To justify how the FMP will manage the fisheries in a manner to address the wider environmental and social concerns. This is linked to the equal access and national benefit objective at a fisheries level. To link equal	Goal3: Better understand and optimise social and economic benefits	Not started	Not applicable	None
37	Social	Improved evidence baselined	Design and trial methods to collate fisher's knowledge (both commercial and recreational components) in a manner which provides	Should	This is necessary to improve our knowledge and help fill pertinent evidence gaps regarding the fisheries, the wider environment and the communities which depend on it. This in turn will enables informed	Goal6: Develop the non-quota species evidence base	Not started	Not applicable	None
38	Social	Improved evidence baselined	Design and trial methods to facilitate participation by both commercial and recreational fishers in scientific collection	Should	This is necessary to encourage and enable wider participation in the data collection process to develop our evidence base and support the development of more informed decisions. This provides a transparent and	Goal6: Develop the non-quota species evidence base	Not started	Not applicable	None
39	Social	Improved evidence baselined	Trial methods to present underpinning data to ensure it is user friendly for a range of audiences.	Should	This is necessary to ensure that the evidence is communicated in an accessible way to wider stakeholder groups so that they can understand the key findings used to underpin the FMPs management outcomes	Goal6: Develop the non-quota species evidence base	Not started	Not applicable	None

Gap ID	Themes	Sub-Themes	Gap	Priority	Rationale	Goal (most relevant)	Status	FMP Focal Species	Comments
40	Social	Social impact	Develop indicators to develop a social and economic baseline to support an evaluation to follow impacts and monitor where and at what	Should	To enable us to monitor how and if social and economic benefits are being realised because of management outputs.	Goal3: Better understand and optimise social and economic benefits	Not started	All FMP species	None
41	Social	Optimising social benifits	Develop historical context of the pertinent fisheries to understand their operational landscape	Could	This helps us understand cultural and heritage values associated with the fisheries and why these fisheries have gained importance. This means we are well placed to understand the associated sensitivities and put	Goal3: Better understand and optimise social and economic benefits	Not started	All FMP species	None
42	Social	Optimising social benifits	Map out barriers to benefits being actualised (to include both direct I.e., regulatory and discreet I.e., conflict barriers).	Should	By understanding what barriers exist, we can examine how management outputs could address this within the existing landscape to optimise local social and economic benefits.	Goal3: Better understand and optimise social and economic benefits	Not started	All FMP species	None
43	Social	Optimising social benifits	Map out adaptive capacities of associated fishing operations together with barriers adaptation	Should	To enable us to understand how the industry may respond to new management objectives and where adaptive capacity may be hindered or encouraged. This would help us predict 'unintended consequences' of management measures as well as where we can offer support resilience.	Goal3: Better understand and optimise social and economic benefits	Not started	All FMP species	Opportunities for Defra/MMO joint work
44	Social	Social impact	Develop indicators to support an appropriate social impact assessment.	Should	To enable us to predict and avoid (where possible) local and national social and economic impacts.	Goal3: Better understand and optimise social and economic benefits	Not started	All FMP species	None
45	Social	Engagement and capacity building	Investigate how to map out community networks to develop and evolve the engagement and communications plan.	Should	To help us understand how we can best work with and through target communities.	Goal4: Develop on partnership working in order to build capacity for	Delivering	Not applicable	Will be delivered by end of spring 2023
46	Social	Engagement and capacity building	Scoping out what matters most to different aspects of the fishing sector to enable them to live well	Could	To develop management outputs which can support fishing communities in building their resilience and working in a way which is more in harmony with the environment.	Goal4: Develop on partnership working in order to build capacity for	Not started	Not applicable	None
47	Social	Engagement and capacity building	Identify capacity needs I.e., skills needed to pursue both alternative opportunities within the industry or alternative pathways to income,	Should	To develop management outputs which can support fishing communities in building their resilience and working in a way which is more in harmony with the environment.	Goal4: Develop on partnership working in order to build capacity for	Not started	Not applicable	None
48	Social	Behavioural incentives	Investigate and trial how to incentivise gear modification to avoid bycatch	Could	To help understand how to support a move towards greener operations. This is linked to the bycatch objective, climate change objective and ecosystem objectives at a fisheries level	Goal2.2: Deliver wider biological Sustainability. Sub-Goal2: Understand	Not started	Not applicable	None
49	Social	Behavioural incentives	Investigate and trial how to incentivise a move to green operations in terms of blue carbon.	Could	To help understand how to support a move towards greener operations. This is linked to the bycatch objective, climate change objective and ecosystem objectives at a fisheries level	Goal2.2: Deliver wider biological Sustainability. Sub-Goal2: Understand	Not started	Not applicable	None
50	Environment	Climate change	Explore species distribution, centres of population and changes in habitat suitability at the local scale	Should	Understand distribution of species and change in abundance within the FMP area	Goal2.1: Deliver wider biological Sustainability. Sub-Goal2: Where	Not started	Not applicable	None
51	Environment	Climate change	Develop Species Distribution Models for missing species and improve confidence in existing models	Should	Understand distribution fop species and change in abundance within the FMP area	Goal2.1: Deliver wider biological Sustainability. Sub-Goal2: Where	Not started	Not applicable	None
52	Environment	Climate change	Collate or collect further information on phenology to explore any changes in focal species	Should	Monitoring for and assessing the impacts of climate of stocks	Goal2.1: Deliver wider biological Sustainability. Sub-Goal2: Where	Not started	Not applicable	None
53	Environment	Climate change	Incorporation of ongoing research including Seafish and MSPACE project that aims ot support government in designing and	Should	Using best available evidence in decision making	Goal2.1: Deliver wider biological Sustainability. Sub-Goal2: Where	Not started	Not applicable	None
54	Environment	Climate change	Explore FMP level fleet emissions and opportunities for alternative fuels	Could	Understand the contribution of the fisheries in scope of the FMP of greenhouse gas emissions and opportunities for greening the fleet	Goal2.2: Deliver wider biological Sustainability. Sub-Goal2: Understand	Not started	Not applicable	None
55	Environment	Climate change	Research will be undertaken to identify opportunities to implement climate change mitigation and adaptation measures	Could	Climate adaptation and mitigation are aligned with work being delivered externally / nationally.	Goal2.1: Deliver wider biological Sustainability. Sub-Goal2: Where	Not started	Not applicable	None
56	Fisheries management	Fish stocks	Is there a link between increased numbers of blue fin tuna and a decline in squid	Could	During engagement sessions, stakeholders reported conflicting evidence around cuttlefish and squid. In 7e commercial and recreational stakeholders reported an abundance of squid, but voiced concern that	Goal6: Develop the non-quota species evidence base	Not started	Cuttlefishes	
57	Fisheries management	Fish stocks	Turbot (Scophthalmus maximus) Extend NS assessment or implement specific Channel assessment	Should	High value to both sectors and currently unassessed stock status in Channel.	Goal6: Develop the non-quota species evidence base	Not started	Turbot (Scophthalmus maximus)	
58	Fisheries management	Fish stocks	Lemon sole (Microstomus kitt) Understand migratory behaviour, particularly for juveniles.	Could	Will likely require co-management with other FMPs.	Goal5: Better understand the wider non-quota species evidence needs	Not started	Lemon sole (Microstomus kitt)	

Gap ID	Themes	Sub-Themes	Gap	Priority	Rationale	Goal (most relevant)	Status	FMP Focal Species	Comments
59	Fisheries management	Fish stocks	Lemon sole (Microstomus kitt) Understand if dual stock approach is appropriate and revise assessment if required.	Should	Assessment indicates overexploitation in northern stock.	Goal5: Better understand the wider non-quota species evidence needs	Not started	Lemon sole (Microstomus kitt)	
60	Fisheries management	Fish stocks	Lemon sole (Microstomus kitt) Add length based indicator to ICES assessment in 7e in order to evaluate exploitation status.	Should	Given market for juvenile red mullet, there is a significant need to understand impact of exploitation on stock in 7e.	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Lemon sole (Microstomus kitt)	
61	Fisheries management	Fish stocks	Common cuttlefish (Sepia officinalis) Understand life history, recruitment and impacts of environmental/ climactic drivers.	Should	as fundamental to developing assessment and delivering sustainable management.	Goal5: Better understand the wider non-quota species evidence needs	Not started	Common cuttlefish (Sepia officinalis)	
62	Fisheries management	Fish stocks	Common cuttlefish (Sepia officinalis) Develop assessment methodology specific for cuttlefish and other cephalopods	Could	Understanding of recruitment dynamics immediate priority.	Goal5: Better understand the wider non-quota species evidence needs	Not started	Common cuttlefish (Sepia officinalis)	
63	Fisheries management	Fish stocks	Common cuttlefish (Sepia officinalis) Quantify recreational landings	Won't	Recreational landings of cuttlefish are likely to be low	Goal5: Better understand the wider non-quota species evidence needs	Not started	Common cuttlefish (Sepia officinalis)	
64	Fisheries management	Fish stocks	Grey gurnard (Eutrigla gurnardus) - information to support stock assessment	Could	Given bycatch, landings data do not reflect catches (and fishing mortality) well. The quality of the assessment is potentially impacted by the lack of species-specific data, and the fact that discarding data (which is	Goal5: Better understand the wider non-quota species evidence needs	Not started	Grey gurnard (Eutrigla gurnardus)	
65	Fisheries management	Fish stocks	John dory (Zeus faber) - collect information to support stock assessment	Could	ICES assessment is the most viable route given the level of international interest and strong commercial value of the stock. This will require stock definition/delineation, as initial work suggests that a single stock in ICES	Goal5: Better understand the wider non-quota species evidence needs	Not started	John dory (Zeus faber)	
66	Fisheries management	Fish stocks	Lemon sole (Microstomus kitt) - collect evidence to support stock assessment	Could	Assessment in place does not suggest overexploitation but requires improvement. To move to a full analytical assessment, improved data on age and length distributions in landings and discards would be required.	Goal5: Better understand the wider non-quota species evidence needs	Not started	Grey gurnard (Eutrigla gurnardus)	
67	Fisheries management	Fish stocks	Lesser spotted dogfish (Scyliorhinus canicula) - population level mortality related to bycatch	Could	It is unclear on whether catch reporting fully quantifies pot bait landings. Species specific landings data are an issue given historic grouping into general categories, and the overlap of lesser and greater spotted dogfish	Goal5: Better understand the wider non-quota species evidence needs	Not started	Lesser spotted dogfish (Scyliorhinus canicula)	
68	Fisheries management	Fish stocks	Red gurnard (Chelidonichthys cuculus) - species specific landings data	Could	A lack of species-specific landing data, plus a lack of estimated discarding and survivability across various fleets/gears are key issues for the assessment. Additionally, work is required to analyse SW beam trawl	Goal5: Better understand the wider non-quota species evidence needs	Not started	Red gurnard (Chelidonichthys cuculus)	
69	Fisheries management	Fish stocks	Stripped Red mullet (Mullus surmuletus) - collect data to progress towards species specific stock assessment	Could	Initial investigations by Cefas indicate that ICES' dual stock approach may not be appropriate, and that further work is required on stock ID and delineation. ICES make further suggestions on a specific stock basis (see	Goal5: Better understand the wider non-quota species evidence needs	Not started	Striped red mullet / surmullet (Mullus surmuletus)	
70	Fisheries management	Fish stocks	Smoothhound (Mustelus spp.) - collect data to progress towards species specific stock assessment	Could	Species specific landings data, particularly as some countries continue to land smoothhound as 'dogfish and hounds' is a key issue. Additionally, and of particular concern for this FMP, is the unclear level of landings of	Goal5: Better understand the wider non-quota species evidence needs	Not started	Smoothhounds	
71	Fisheries management	Fish stocks	Tub gurnard (Chelidonichthys lucerna) - collect data to progress towards species specific stock assessment	Could	If an assessment is required, stock units would require definition, and the quantity and quality of data would require evaluation. An initial approach would be to utilise applicable survey data (given unreliable catch data),	Goal5: Better understand the wider non-quota species evidence needs	Not started	Tub gurnard (Chelidonichthys lucerna)	
72	Fisheries management	Fish stocks	Turbot (Scophthalmus maximus) - improve at sea observational data	Should	As a high value stock, an improved assessment incorporating the English Channel should be considered. At-sea observer and survey data require improvement to provide temporal fluctuations in stock size. One option	Goal6: Develop the non-quota species evidence base	Not started	Turbot (Scophthalmus maximus)	
73	Fisheries management	Fish stocks	Cuttlefish - biological information for understanding stock assessment and ecosystem impacts	Should	There is a lack of information regarding cuttlefish recruitment, the proportion of cuttlefish that exhibit an annual versus biannual lifespan, as well as how cuttlefish are impacted by environmental/climatic drivers.	Goal5: Better understand the wider non-quota species evidence needs	Not started	Cuttlefishes	
74	Fisheries management	Fish stocks	Elegant cuttlefish (Sepia elegans) - Investigation into the biology to support stock assessments	Should	The ecology of the species is virtually unknown in the English Channel and improved knowledge is required to develop appropriate management strategies at species-level. Further studies of life history, including early	Goal5: Better understand the wider non-quota species evidence needs	Not started	Elegant cuttlefish (Sepia elegans)	
75	Fisheries management	Fish stocks	Curled octopus (Eledone cirrhosa) - collect species specific landings data	Could	Despite a reduced abundance of common octopus, species-specific landing data is non-existent, leading to difficulty in stock identification and landing estimation for either species	Goal5: Better understand the wider non-quota species evidence needs	Not started	Curled octopus (Eledone cirrhosa)	
76	Fisheries management	Fish stocks	Common octopus (Octopus vulgaris) - Species specific landings data	Could	Despite a reduced abundance of common octopus, species-specific landing data is non-existent, leading to difficulty in stock identification and landing estimation for either species	Goal5: Better understand the wider non-quota species evidence needs	Not started	Common octopus (Octopus vulgaris)	
77	Fisheries management	Fish stocks	European common squid (Alloteuthis subulata) - Species-specific catch/landing reports	Could	Species-specific catch/landing reports are required for all species of squid, as is further work to understand the composition of differing species within the Channel. Further work is required to differentiate	Goal5: Better understand the wider non-quota species evidence needs	Not started	European Common squid (Alloteuthis subulata)	
78	Fisheries management	Fish stocks	Veined squid (or long-finned squid) (Loligo forbesii) - further develop species specific landings data	Could	Species-specific catch/landing reports are required for all species of squid, as is further work to understand the composition of differing species within the Channel. Further work is required to differentiate	Goal5: Better understand the wider non-quota species evidence needs	Not started	Veined squid / Long-finned squid (Loligo forbesii)	

Gap ID	Themes	Sub-Themes	Gap	Priority	Rationale	Goal (most relevant)	Status	FMP Focal Species	Comments
79	Fisheries management	Fish stocks	Common squid (or European squid) (Loligo vulgaris) - Species specific data to underpin stock assessment	Should	Species-specific catch/landing reports are required for all species of squid, as is further work to understand the composition of differing species within the Channel. Further work is required to differentiate	Goal5: Better understand the wider non-quota species evidence needs	Not started	Common squid / European squid (Loligo vulgaris)	
80	Fisheries management	Fish stocks	Explore how measures could be implemented within a mixed fishery and how mixed fisheries assessments could be undertaken	Should	Handling of species interactions, mixed fisheries and wider system effects	Goal2.1: Deliver wider biological Sustainability. Sub-Goal2: Where	Not started	Not applicable	
81	Environment	Bycatch and protected species	Assess impact of fishery on protected species	Must	to minimise / eliminate bycatch of PETS to prevent serious harm to the species,in line with legislative instruments and governmental initiatives.	Goal2.2: Deliver wider biological Sustainability. Sub-Goal2: Understand	Not started	Not applicable	
82	Fisheries management	Measures and interventions	days at sea/time spent in area/seasonal closures	Could	To support measures and determine what could reduce the impact on NQS the best.	Goal1: Deliver effective management of demersal non-quota species in the	Not started	All FMP species	
83	Fisheries management	Measures and interventions	Multi-species and mixed fisheries catch limits	Should	insufficient evidence to support an introduction of sustainable catch limits, and the impact of such limits imposed on this mixed fishery are not understood. Evidence is needed to understand if this is appropriate and to	Goal2.1: Deliver wider biological Sustainability. Sub-Goal2: Where	Not started	All FMP species	
84	Fisheries management	Measures and interventions	Cuttlefish - Explore most appropriate minimal landing size by weight	Could	There has been a suggestion of implementing a minimum weight instead of size for cuttlefish given the nature of cuttlefish. This is something that needs more evidence to be determined if this would be more effective	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Cuttlefishes	
85	Implementation	Monitoring	Develop indicators and baselines to support social, economic and ecological monitoring	Should	To monitor FMP outputs	Goal2.1: Deliver wider biological Sustainability. Sub-Goal2: Where	Not started	Not applicable	
86	Environment	Climate change	Undertake research into the impact of climate change on Channel demersal NQS	Should	Adapt the fishery management strategy to align with species sensitivities.	Goal2.1: Deliver wider biological Sustainability. Sub-Goal2: Where	Not started	Not applicable	None
87	Environment	Climate change	Continue work programmes to understanding UK continental shelf carbon stocks and the impacts of trawling disturbance	Could	Better understand impacts to the wider system resulting from prosecuting fisheries in scope of the FMP.	Goal2.2: Deliver wider biological Sustainability. Sub-Goal2: Understand	Not started	All FMP species	None
88	Fisheries management	Fish stocks* stock description	Bib - Stock units would require definition/delineation	Could	The identification of the geographic boundaries of stocks is required before any stock assessment or modelling can be contemplated	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Bib / pouting / pout (Trisopterus luscus)	None
89	Fisheries management	Fish stocks* catch and fishing mortality	Bib - Collect bib specific around commercial and recreational catch data quality. Discard survivability is not quantified for both	Could	Fish removal and mortality data are necessary inputs for robust stock assessment	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Bib / pouting / pout (Trisopterus luscus)	None
90	Fisheries management	Fish stocks* population abundance	Bib evaluation of existing data quality/quantity would be required. Alongside other UK and international surveys, an additional otter trawl	Could	It is necessary to undstand species biomass in space and through time and ideally size and age composition within the population to understand health of stock and underpin stock assessment	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Bib / pouting / pout (Trisopterus luscus)	None
91	Fisheries management	Fish stocks* species biology	Bib otoliths were collected until 2022, analysis has not been undertaken.	Could	Growth rates, age at maturity , natural mortality etc paramaterise stock assessment models	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Bib / pouting / pout (Trisopterus luscus)	None
92	Fisheries management	Fish stocks* stock description	Brill - Undertake additional work on stock delineation and ID, sumounting to improvement of assessment	Should	The identification of the geographic boundaries of stocks is required before any stock assessment or modelling can be contemplated. Assessment in place does suggest initial signs of overexploitation but	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Brill (Scophthalmus rhombus)	None
93	Fisheries management	Fish stocks* catch and fishing mortality	Brill - Improve data collected from at-sea observers, recreational fishers with a focus on collecting information on fish removal and	Should	Fish removal and mortality data are necessary inputs for robust stock assessment	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Brill (Scophthalmus rhombus)	None
94	Fisheries management	Fish stocks* population abundance	Brill - Redesign surveys in the stock area to account for catching brill.	Should	It is necessary to undstand species biomass in space and through time and ideally size and age composition within the population to understand health of stock and underpin stock assessment. A fisheries-independent	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Brill (Scophthalmus rhombus)	None
95	Fisheries management	Fish stocks* species biology	Brill - Close Kin Mark Recapture studies may help to improve assessments in view of limited survey data.	Could	Growth rates, age at maturity , natural mortality etc paramaterise stock assessment models	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Brill (Scophthalmus rhombus)	None
96	Fisheries management	Fish stocks* species biology	Management Scenarios and bioeconomic response: Understanding impact of suggested management on the sustainability and economics of the fishery across a ~10 year timeline for the 4 key species.	Should	Management (MCRS and Mesh Size) will impact both the stock status and economics of the fishery; there is a need to model the response of stock and economics against various management scenarios (i.e. MCRS and mesh size increase combined, or singular measures) to understand responses in both variables and evidence what the best approach would be for both stocks and the fleet.	Goal1: Deliver effective management of demersal non-quota species in the English Channel	Not started	Cuttlefishes, Turbot, Brill, Lemon Sole	Essential piece of work in short term. May be difficult to model cuttlefish stock reponse to management.

Gap ID	Themes	Sub-Themes	Gap	Priority	Rationale	Goal (most relevant)	Status	FMP Focal Species	Comments
97	Environment	Habitat	Describing seabed integrity	Should	To understand extent, unity and functioning (collectively integrity) of seabed ecosystems and its change in time and space. High integrity provides robust and resilient systems. Fishing is a pressure that can impact integrity.	Goal2.1: Deliver wider biological Sustainability. Sub-Goal2: Where possible identify and mitigate pressures on the Channel demersal NQS	Not started	All species	None
98	Fisheries management	Fleet structure	Develop long term trends for fleet structure	Could	This would help us to understand how the fishery has changed, and to better understand questions such as how healthy/depleted are these populations when we take a longer term view? Is this a traditional fishery or a new fishery, or a bit of both? Are the short term declines in profitability part of a longer term pattern, or a recent downturn. We are currently able to go back to 2012; data earlier than 2012 will not be available at FMP resolution so we would need to investigate other options to collect this data.	Goal5: Better understand the wider non-quota species evidence gaps	Not started	All species	None
99	Fisheries management	Economics	Develop long term trends for economics	Could	This would help us to understand how the fishery has changed, and to better understand questions such as how healthy/depleted are these populations when we take a longer term view? Is this a traditional fishery or a new fishery, or a bit of both? Are the short term declines in profitability part of a longer term pattern, or a recent downturn. We are currently able to go back to 2012; data earlier than 2012 will not be available at FMP resolution so we will need to investigate other options to collect this data.	Goal5: Better understand the wider non-quota species evidence gaps	Not started	All species	None
100	Fisheries	Landings	Develop long term trends for landings	Should	This will help us to understand how the fishery has changed, and to better understand questions such as how healthy/depleted are these populations when we take a longer term view? Is this a traditional fishery or a new fishery, or a bit of both? Are the short term declines in profitability part of a longer term pattern, or a recent downturn. We are currently able to go back to 2012; data earlier than 2012 will not be available at FMP resolution so we will need to investigate other options to collect this data.	Goal5: Better understand the wider non-quota species evidence gaps	Not started	All species	None
101	Fisheries	Fish stock seasonality	Lesser spotted dogfish - Investigating seasonality data against other influencing factors for example, trawling activity	Could	Investigate correlation between seasonality and landings data, for example could the seasonality be driven by increased landings by trawlers to allow for a higher 5% bass allowance? Highest catches in May and November - this links with when Bass are being landed.	Goal6: Develop the non-quota species evidence base	Scoping	Lesser spotted dogfish	None
102	Fisheries	Fish stocks	Lesser spotted dogfish - why are most catches focused on ICES rectangle 29E6?	Could	Investigate the landings data to try and understand why this was, for example are there more here or are they targeted more here? Or are they caught as bycatch more here?	Goal5: Better understand the wider non-quota species evidence gaps	Not started	Lesser spotted dogfish	None
103	Environment	Habitat	Identification of fish habitats	Should	Identification of EFH is the precursor to appropriate management and protection to areas that have a disproportionate contribution to the survival of fish and thus contribute to fish stock health and sustainable fisheries.	Goal2.1: Deliver wider biological Sustainability. Sub-Goal2: Where possible identify and mitigate pressures on the Channel demersal NQS	Not started	All FMP species	None
104	Environment	Natural capital	Explore natural capital approaches to FMP iteration and decision making	Could	A natural capital approach to policy and decision making considers the value of the natural environment for people and the economy.	Goal2.2: Deliver wider biological Sustainability. Sub-Goal2: Understand the impact of Channel demersal NQS fisheries on the wider marine environment	Not started	Not appropriate	None
105	Economics	Fuel analysis	Fuel consumption and price analysis	Could	Understanding the fuel consumption and impact of and vulnerability to fuel prices of the fishery is relevant to understanding fishery profitability and climate pressure from emissions.	Goal3: Better understand and optimise social and economic benefits	Not started	Not appropriate	None
106	Environment	Habitat	Management Scenarios and bioeconomic response: Understanding impact of suggested management on the sustainability and	Should	Management (MCRS and Mesh Size) will impact both the stock status and economics of the fishery; there is a need to model the response of stock and economics against various management scenarios (i.e. MCRS	Goal1: Deliver effective management of demersal non-quota species in the	Not started	Cuttlefishes, Turbot, Brill, Lemon Sole	Essential piece of work in short term. May be difficult to model cuttlefish stock reponse to

Department
for Environment
Food & Rural Affairs

Proposed Fisheries Management Plan for Channel Demersal Non-Quota Species

Annex 3: Record of Stakeholder Engagement

Date: July 2023

Version: public consultation

Contents

Summary

The following report presents an overview of stakeholder engagement carried out by the Marine Management Organisation's (MMO) Fisheries Management Plan (FMP) team and of the stakeholder feedback received that supported the development of the Channel demersal non-quota species (NQS) FMP.

The Channel demersal NQS FMP is part of the Department for Environment, Food and Rural Affairs (Defra) 'frontrunner phase' for FMP development in England.

Between June 2022 and May 2023, the MMO's FMP team used a series of engagement methods as part of both formal and informal engagement to:

- Raise awareness about development of the Channel demersal NQS FMP for English waters amongst stakeholders, and;
- Present draft FMP content such as vision, goals, evidence requirements and proposed management interventions to stakeholders in order to gather feedback, alternatives, and additional evidence that should be considered.

Stakeholder identification

One of the first steps before formal stakeholder engagement could begin was to identify relevant stakeholders to be involved in the development of the FMP. To do this, stakeholder analysis was carried out which involved first creating a list of all possible stakeholders relevant to the FMP and then assigning a category to each stakeholder (Collaborate, Consult, or Inform) based on various factors (See Annex 1). The stakeholder list was further developed during south coast engagement in June 2022 and February and March 2023, when the FMP team hosted drop-ins and port visits. This enabled MMO to hear about alternative contacts and fill in the gaps where no obvious contact was known for a particular area and/or group of stakeholders. Those who were deemed to fall under the category of 'collaborate' were approached to be part of the Working Group (WG) (See Annex 2). Detailed information on the criteria for stakeholder analysis can be found in Annex 1. The stakeholder list and associated assigned level of engagement was fluid and therefore changed as the FMP developed.

South Coast Engagement

A series of in-person engagement events was used throughout the development of the FMP to gather views from stakeholders across the English Channel.

South Coast June 2022 engagement

In June 2022, as a critical first step in developing the Channel NQS FMP, MMO's FMP team carried out a series of in-person events on England's south coast with stakeholders. A combination of drop-in sessions and quayside visits at several locations were used to optimise levels of engagement with a variety of stakeholders. The information gathered during this engagement gave MMO an initial steer on what stakeholders across the Channel wanted to see prioritised within the FMP, including species and management measures.

Engagement in ICES area 7e ran for one week from 13-17 June. Stakeholders from the commercial fishing industry were invited to attend engagement events through direct contact, industry groups, social media posts and website blogs. We held sessions in Plymouth, Brixham, Newlyn, Truro, Mevagissey, Exmouth, Axmouth, Lyme Regis, Looe, and Weymouth. Engagement in ICES area 7d ran for one week from 20-24 June and sessions were held in Rye, Hastings, Eastbourne, Selsey, Shoreham, Gosport and Newhaven. The FMP team spoke to individuals such as vessel owners and industry group representatives. Over 40 stakeholders were engaged with during the in-person session.

Stakeholders were introduced to the Channel demersal NQS FMP and asked questions on the species that were most important to them and what potential management measures they would like to see within the FMP. Detailed feedback from this engagement can be found in the 2022 Commercial Feedback Summary Document:

- Minimum Conservation Reference Size (MCRS) for lemon sole, turbot and brill was suggested during this initial engagement. This was deemed as an important measure to be implemented and therefore was taken as a potential management measure to test with stakeholders during our second round of engagement
- Increasing selectivity measures was also suggested as a potential effective management measure for lemon sole and cuttlefish. This was tested with stakeholders during our second round of engagement
- Bib, lemon sole, brill, turbot and smoothhound were species that were highlighted as being important to stakeholders during June 2022 engagement but at that time were not included within the scope of the FMP. Due to the clear stakeholder appetite for these species to be considered, the FMP team agreed with Defra

that they would be included within the Joint Fisheries Statement and were subsequently scoped into the remit of this FMP

South Coast February/ March 2023 engagement

In February and March 2023, the FMP team held a second round of in person engagement events. These events were focused on gathering feedback from stakeholders on the drafted FMP vision, goals and process so far. The team used the lessons learned from the 2022 engagement to target areas and groups of stakeholders who would be impacted by the plan. Again, a combination of drop-in sessions and quayside visits at several locations were carried out across the south coast to optimise engagement. The information gathered during this engagement gave MMO a final steer on what stakeholders across the Channel wanted to see prioritised within the FMP, including species and management measures, and thoughts on the vision and goals.

Stakeholders were provided with background information on the FMP and asked a series of questions on species prioritisation, management measures and if the goals of the FMP were appropriate for stakeholder needs. The team spoke with over 100 recorded stakeholders across the two weeks. Detailed feedback from this engagement can be found in the 2023 Commercial Feedback Summary Document:

- Minimum Conservation Reference Size (MCRS) for lemon sole, turbot, brill, john dory and red mullet that aligns with the local Inshore Fisheries and Conservation Authorities (IFCAs) is required
- MCRS for cuttlefish may be more difficult to implement. It is felt by stakeholders that more data are needed regarding cuttlefish and squid before any management measures for those species are introduced. Size limit restrictions are not as effective at controlling effort as the undersized fish will be discarded
- Standardise mesh size for all vessels to 100mm. This will need to apply to UK and EU vessels (beamers, otter trawls and fly seiners). Take an incremental approach to increasing gear size gradually to avoid putting fishers out of business
- New trawl configurations were suggested. Shorter trawls increase survivability and allow fish to be returned to the sea alive. Increase the cod end mesh size incrementally to 100mm for all towed gear. There would be a short-term reduction of catch quantity and squid landings, but it will reduce small sized catch, dog fish landings, fly seining activity and the need to introduce MCRS for some species
- Look at restrictions to push the larger and less sustainable fishing methods beyond the 12 nm line and limit offshore effort as it leads to a decline in inshore stocks. For example, introducing engine power restrictions for a maximum 250 horsepower (HP) as a management measure to restrict access inside the 6nm limit

- Stakeholders highlighted the difference between the inshore and offshore fleets and want them to be managed differently. Additional management measures should not reduce inshore opportunities as they are vulnerable to other factors such as the weather. There needs to be wider government support with clear goals for future inshore fisheries
- It was suggested the derogation of 40mm cod end for catching squid should be removed for fly seiners (which Defra is looking to take forward)
- It was highlighted that the placement of the square mesh panel is important and there is a need to increase mesh to 90mm for both dogfish and bass
- NQS stocks should be protected from becoming quota species as they are a gateway into the industry for new fishers who cannot access quota – it is very expensive/difficult to get hold of
- More guidance on good handling practice could help to maximise survivability for recreational catches

Online Engagement

Stakeholder Webinars

Alongside the in-person engagement in 2023, the FMP team held three online sessions open to all stakeholders with an interest in the FMP who could not attend the south coast sessions. A total of 18 stakeholders attended the online webinars with attendees from both commercial and recreational fisheries. The feedback from these sessions has been combined with that of the in-person engagement above.

Angling Trust forums

Two Angling Trust forums were held in addition to in person sessions to engage specifically with recreational anglers. The first was held on 17 July 2022 and was focused on raising awareness of the FMP with the recreational angling community and to gather feedback on what they wanted to see prioritised within the FMP. Detailed feedback can be found in the Recreational Feedback Document:

- The recreational stakeholders highlighted that MCRS needs implementing within the Channel demersal NQS FMP
- Recreational stakeholders also emphasised the need for the FMP to not wholly be focused on economic value of the fishery and should also focus on the social and cultural value of species

A second Angling Trust forum was held on 16 March 2023 to ensure that any recreational anglers who could not attend in person events were still able to give their feedback on the drafted vision and goals and raise any other issues/opportunities for the FMP. A total of 17 recreational sea anglers attended the online session. Feedback from the session and how this influenced the development of the FMP is detailed below.

- It was highlighted that the FMP should be using non-traditional sources of data, especially from the recreational angling community
- Attendees highlighted data sources relevant to the FMP such as Marine Biological Association squid data and Catch Wise
- Concerns raised over the use of recreational data due to historic mistrust.
- Attendees wanted to see seabed disturbance included as a consideration for the FMP
- Remote Electronic Monitoring (REM) was suggested as a useful enforcement and data collection tool
- There is a mistrust in data sharing. Need to be transparent in data and how it is used to determine sustainability

Working Group

To assist in the development of the Channel demersal NQS FMP, the FMP team set up a WG. The purpose of the WG was to co-refine the FMP alongside the MMO as the lead delivery partner. In addition, the WG had the function to act as a forum for engagement on the FMP and members were encouraged to seek opportunities to engage the wider fishing industry (commercial and recreational) and other key stakeholders where appropriate to feed their views into the FMP’s development.

The WG membership comprised of individuals who represented different sectors of the fishing industry such as inshore, offshore, recreational and processors as well as Other Government Departments representatives from Defra and Cefas (See Annex 1). These individuals were encouraged to take part in working group meetings that were agreed to be held online due to the large geographic spread of members. Members who could not attend online meetings were encouraged to provide feedback to us via email and one-to-one telephone conversations. Although efforts were made to ensure that there was appropriate attendance at every working group meeting, external factors such as weather, work commitments and technology meant that some working group members were unable to attend meetings.

Annex 3: Record of stakeholder engagement for Channel NQS FMP

During the later stages of FMP development, where the FMP team required input from WG members on elements of the FMP, an independent facilitator was used to ensure there was an unbiased, neutral individual present to encourage conversations and deal with any conflict that may have arisen from differing views.

Throughout the preparation phase of the development of the FMP, MMO sought feedback and input from the group on species prioritisation, drafted elements of the FMP and potential management measures to be proposed in the first iteration. Detailed information on the number of attendees and links to published meeting notes can be found in Table 1.

Table 1: Channel demersal NQS FMP Working Group meeting dates, attendance and links to meeting notes. OGDs stands for Other Governmental Departments. Other includes those attendees from non-governmental organisations, academia or independent facilitators

Date	Purpose of meeting	Attendees							Link to meeting notes
		MMO	Inshore	Offshor	Recreat	OGD's	Other*	Total	
20/09/2022	WG meeting	8	7	3	1	3	1	23	Link
31/10/2022	WG meeting	6	6	4	1	4	1	22	Link
25/11/2022	WG meeting	5	5	2	2	3	0	17	Link
16/01/2023	Goal workshop	3	1	2	1	2	0	9	Link
17/01/2023	Goal workshop	4	1	2	2	1	0	10	Link
18/01/2023	Goal workshop	5	0	3	1	2	0	11	Link
31/01/2023	WG meeting	7	2	3	0	7	0	19	Link

Annex 3: Record of stakeholder engagement for Channel NQS FMP

Date	Purpose of meeting	Attendees							Link to meeting notes
		MMO	Inshore	Offshor	Recreat	OGD's	Other*	Total	
03/04/2023	Workshop on evidence linkages	3	3	1	0	0	0	7	Not available
04/04/2023	Workshop on proposed management measures	3	2	1	0	0	0	7	Not available
17/04/2023	FMP review overview meeting	1	5	3	1	1	0	11	Not available
21/04/2023	Draft FMP chapters 1,2 and 3 review*	4	3	1	1	0	0	9	Not available
25/04/2023	Draft FMP chapters 4,5 and 6 review*	2	3	2	0	2	0	9	Not available
27/04/2023	Draft FMP chapters 7, 8 and 9 review*	3	1	1	0	0	0	5	Not available

*The FMP Chapter numbering has changed since the review workshops were held and no longer reflect the chapter numbering in the final draft FMP.

The WG were given the opportunity to review the full draft FMP and also provided with an additional three online sessions to give their feedback on each of the FMP Chapters (Table 1), as well as follow up phone call conversations with WG members who requested it. Offering several Channels for WG members to provide feedback gave them the chance to provide it in a way that was most appropriate to them. The FMP team received detailed feedback on the draft FMP from many of the WG members. This feedback is summarised in sections 7 and 8 of this document.

Evidence Advisory Group

With the support of the WG, an Evidence Advisory Group (EAG) was set up. The purpose of this group was to provide independent technical and expert advice to support and inform both the working group and MMO's decision-making function regarding the FMP. This included development of goals, evidence requirements (and options to address) and scoping out potential management measures as well as other aspects of the FMP. The EAG also reviewed and provided feedback on the evidence statement, prior to submission to Defra.

The EAG was made up of experts covering species within the remit of the plan, gear types and management. The EAG had members from the inshore and offshore fishing sectors, Arm's Length Bodies such as Cefas and Seafish, and academics (see Annex 1 Table 4 for further details). Recreational experts were identified and invited to sit on the EAG but were unable to attend the meetings. Detailed information on the number of EAG attendees and links to published meeting notes can be found In Table 2.

Table 2: Channel demersal NQS FMP Evidence Advisory Group meeting dates, attendance and links to meeting notes. *Other includes those attendees from non-governmental organisations, academia or independent facilitators

Date	Purpose of Meeting	Attendees						Total	Link to meeting notes
		MMO	Inshore	Offshore	Recreational	OGDs	Other*		
18/10/2022	Initial discussion on evidence plan	6	1	0	0	7	2	16	Link
10/01/2023	Discussion on FMP Vision and Goals	4	1	0	0	9	2	16	Link

Date	Purpose of Meeting	Attendees						Total	Link to meeting notes
		MMO	Inshore	Offshore	Recreational	OGDs	Other*		
29/03/2023	Discussion on drafted Evidence Statement	8	1	1	1	9	2	22	Link

Feedback on Drafted Vision and Goals

FMP Vision

An initial vision for the FMP was drafted internally and then shared with stakeholders during an online meeting in November 2022. The feedback is available here. A second version of the vision was then drafted in line with all comments received via the WG and the EAG. This final drafted vision can be found in the draft FMP. Feedback and how this has been considered in the final vision is summarised below.

- Coastal communities should be included within the wording of the vision
- The vision contains many elements that are more like principles than vision statements

FMP Goals

FMP goals were drafted based on feedback from the WG, EAG, Defra and wider stakeholders. These were then shared with those groups and wider stakeholders to gather feedback for further amends. This feedback, and how it was addressed, is summarised below for each goal theme.

Sustainable Fisheries Goals

- Work is already being done on the impact of fishing in MPAs therefore can the goals be removed/ re-worded to account for work already being done

- More emphasis on the fact that NQS are part of a mixed fishery. Determining the relationship between NQS and quota fish stocks needs to be done in the short-term and not the long-term
- The sustainability of fish stocks is not just down to fishing activity and this needs to be reflected in the goals (~~e.g.~~ for example, impacts of MPAs, aggregate dredging and windfarms)

Social and Economic Goals

- Need to define what we mean by coastal communities. Will be hard to maximise benefits to everyone and different people will want different benefits ~~e.g.~~ for example, ports
- It is difficult to understand the benefits to coastal communities derived from NQS alone as it is a mixed fishery. Work that investigates the value of the fishery to the wider community beyond regular economic and social benefits should be prioritised. Fishing is central to the coastal communities, which seems to be misunderstood and its importance is underestimated
- Need to be clear around the WG’s roles and responsibilities regarding the establishment of the Channel demersal NQS FMP management group
- It should be consistently applied for recreational and commercial fishing to either be separated into different goals or included across all the goals
- Promoting consumption of NQS domestically within the FMP could be out of scope and unrealistic. Promoting NQS could also lead to increased targeting, leading to unintended consequences on the stocks

Evidence Goals

- Concerns over who is going to be responsible for collecting data/ producing new data collection methods
- Concern over the lack of funding that is being made available for these goals to be achieved. Funding needs to be long-term instead of short-term
- Concern over a sub-goal centred around Remote Electronic Monitoring (REM). Other technologies in addition to REM should be explored as well as aiming to support industry with REM on their vessels and promoting its use as a data collection tool, rather than an enforcement tool

General goal feedback

- All goals need to be simplified and think about the language we are using and who the audience is
- Need further understanding of who is responsible for delivering all ~~of~~ the goals

Feedback on proposed management measures

During the development of the proposed management measures, two workshops were held to present the proposed management measures to the working group. The management measures can be split broadly into several themes: flyseining, cuttlefish, MCRS, mesh size increases and engine size restrictions.

Flyseining

- The main feedback for flyseining measures was to adjust the medium- and long-term measures to short-term measures to align with industry concern and the need for something to be done in the short-term
- Feedback also highlighted that the mesh size needed to be standardised to 100mm

Cuttlefish

- The main feedback was the MCRS for cuttle was too short of a time frame due to lack of evidence on how best to measure them
- Other feedback received was that there would be a large impact on all trawlers if seasonal closures were implemented
- Different approaches to management of cuttlefish, such as using old fishing rope for cuttlefish to lay their eggs, were suggested
- Working group members questioned why an MCRS for cuttlefish has been proposed and asked for this to be evidenced within the FMP

Minimum Conservation Reference Size (MCRS*)*

- MCRS for lemon sole, turbot and brill would only be an effective management measure alongside a mesh size increase
- Working group members highlighted that industry use Minimum Landing Size terminology and not MCRS and would therefore like this highlighting in the FMP
- Highlighted that more evidence is needed before implementing MCRS for lemon sole, turbot and brill as MMO are not aware of what the consequences might be on quota stocks

Engine size restrictions

- Need restrictions on engine size to be nuanced and not applied to whole industry or this might disproportionately affect English vessels operating in the 6-12nm

General feedback on measures

- Highlighted the need to be aware of the impact that any measure will have on those in the industry who do not have access to quota and rely on NQS
- Concern raised over the language used when evidencing stakeholder concern for certain species/ gears. Need to make it clear that some concerns are not universal across the industry

Wider Stakeholder Engagement

FMP team presentations to wider stakeholders

Regional Fisheries Groups (RFGs)

The FMP team utilised the existing RFG meetings to update stakeholders on the progress of the FMP's development. The team attended meetings with fishermen from areas 7d and 7efg. Meeting minutes from all he meetings that the FMP team presented at are listed below:

- 12/01/2023 7d
- 20/12/2022 7efg
- 31/05/2023 7d
- 14/06/2022 7efg
- 06/09/2022 7d
- 13/09/2022 7efg

Inshore Fisheries Conservation Authorities (IFCA) meetings

The FMP team utilised the existing IFCA meetings to update stakeholders on the progress of the FMP's development. The team attended meetings for the Southern IFCA, Devon and Severn IFCA and Sussex IFCA and gave several presentations on the progress of the Channel demersal NQS FMP.

Finfish Industry Advisory Group

The FMP team attended regular Finfish Industry Advisory Group (FIAG) meetings to update members on the progress of the FMP. FIAG provides a forum to discuss sustainability and management of UK finfish non-quota species fisheries. Detailed meeting minutes from the meetings that the FMP attended can be found below:

- 18/10/2022
- 29/06/2022

Fisheries Management and Innovation Group

135 stakeholders from the fishing industry attended the Fisheries Management and Innovation Group where the MMO's FMP team gave a presentation on the progress of the Channel demersal NQS FMP to date. The aim of the meeting was to provide stakeholders with information on the 'frontrunner' FMPs. More detail on the group can be found here.

UK Association of Fish Producer Organisation (UKAFPO) meetings

The FMP team attended regular UKAFPO meetings to update the association of fish PO's. The following meetings have been attended by the Channel NQS FMP team:

- 20 October 2022
    - Brief update on progress so far including face to face engagement along South Coast for scoping, first Working Group held in September and minutes will be published online thereafter.
- 19 January 2023
    - Brief update on how set up an evidence advisory group, three working groups, and publishing updates online. Starting to draw goals from the evidence and plan face to face engagement including quay side visits in 7d in February and 7E in March to talk with stakeholders~~.~~
- 20 April 2023
    - Brief update given regarding progress of FMP, including timeline of taking sections to working group and then to Defra in May~~.~~

Minutes were shared after the meeting but not formally published so no direct links are available.

Recreational fishers

In addition to the two Angling Trust Forums outlined above, during the in-person engagement in February and March 2023, the FMP team set up specific meetings with recreational fishers to gather their views. This was done building on feedback from the June 2022 engagement and wanting to ensure recreational stakeholders were given the opportunity to learn more about the FMP and give their feedback. One of the sessions was held with the Professional Boatman's Association ((PBA) and had over 20 attendees.

The FMP team were also invited to attend the PBA Annual General Meeting in Exeter on 21 March 2023, however the team could not attend due to capacity. Future events such as these will be considered for engagement with recreational fishermen in the future.

Environmental Non-government Organisations (eNGOs) meeting

Meetings were held with eNGOs alongside Defra and other FMP delivery leads. There was one held on 16 January 2023 to discuss the FMP programme progress to date.

Business-as-usual engagement

The FMP Team had many business-as-usual meetings with various stakeholders a nd groups relevant to the development of the FMP such as National Federation of Fishermen’s Organisations (NFFO), IFCAs, Natural England, Fishing into the Future (FITF) and Future of Inshore Fisheries (FOIF). These discussions helped to strengthen stakeholder relationships and to provide the FMP team with other Channels of communication to wider stakeholders.

FMP mailbox

During the development of the FMP, there was a dedicated mailbox set up for stakeholders to send in any queries around the FMP or give feedback on the content. This mailbox was monitored daily, and responses were aimed to be given within 10 working days. All comments regarding FMP content have been covered by other meetings and therefore no specific comments are highlighted here.

Communications Overview

The MMO's FMP team and its supporting MMO communications officer developed and maintained core material relevant to this FMP. This material included lines to take and frequently asked questions to ensure consistent messaging went out to all stakeholders and evolved as the project progressed. Where appropriate, the MMO also utilised core material created and managed by the Defra FMP team for the wider FMP programme. These core documents supported the production of communications material used for the following:

- Fishing News
- Angling sector press
- Monthly mail chimp sent out to interested stakeholders with updates on FMP progress and engagement events
- Monthly IFCO/MO FMP update
- Direct communications with groups such as Producer Organisations, Fisherman Associations, Blue Marine Foundation
- Updates to pre-existing networks – Regional Fisheries Groups (RFGs), Shellfish forum, Finfish Industry Advisory Group (FIAG), Future of Inshore Fisheries (FOIF) etc.
- Newsletters (fishers bulletin (fortnightly), Defra stakeholders bulletin (monthly), Stakeholder bulletin (monthly))
- Social Media (Twitter, Facebook, LinkedIn and Instagram to displaying key dates for consultation/engagement workshops etc.) And IFCA social media platforms can be used
- GOV.UK Channel Demersal NQS FMP site
- You Said, We Did documents sent to stakeholders to summarise how their feedback had been taken on board throughout various stages of FMP development; and
- Videos were created to give high level summaries of FMP vision, goals and management measures to try and reach stakeholders who would find reading through a technical document difficult

The MMO aimed to ensure that the information and updates were disseminated in a clear, accessible, and timely manner and that particular attention was paid to ensure that the language used was appropriate to the audience.

Annex 1: Stakeholder Analysis Scoring Criteria

The scores will be given by the FMP team during a workshop and checked by Principle Marine Officers for local expertise. Each stakeholder is given a score for the following:

Influence: (Stakeholders ability to influence the projects' ability to successfully deliver its objectives)

5) Ability to directly stop the FMP process ~~e.g.~~ for example, FMP securing approval. Mostly this score used for government department stakeholders from whom we need sign off ~~e.g.~~ for example, Defra, ALBs and DAs

4) Ability to significantly influence or steer the development of the FMP

3) Moderate ability to influence the FMP (positive or negative)

2) Minimal ability to influence the FMP

1) No influence

Impact: (Stakeholder may be impacted/ affected both negatively and positively by project outcomes

5) Major impact as a consequence of FMP outcomes to stakeholder ~~e.g.~~ for example, stopping incomes

4) Significantly impacted by the consequences of FMP outcomes

3) Moderately impacted by the consequences of FMP outcomes

2) Minimal impact from the consequences of FMP outcomes

1) No impact to stakeholder

Expertise: (May hold academic or practice-based expertise relevant to the project)

5) Up to date in depth knowledge relevant to the project

4) Good knowledge

3) Moderate knowledge

2) Minimal knowledge

1) No knowledge

Interest: (May have expressed an interest in the project/ potential outputs and whose interest we wish to encourage)

5) Significant interest in the FMP

4) Good interest in the FMP

3) Moderate interest in the FMP

2) Minimal interest for the FMP

1) No interest for the FMP

Note: The MMO have assumed that a lack of overt interest does not necessarily equate disinterest within the commercial fishing sector as research states this is instead more likely to be linked to disempowerment, so interest has been assumed as universally high when it comes to the commercial sectors.

Target aspirations for the stakeholder groups

Collaborate: Primary and key stakeholder who will be directly affected both positively and negatively by the FMP outputs. The MMO will work collaboratively with the group, engaging with them regularly to update them on relevant policy, and providing guidance and support through regular meetings and digital contact. Regular and direct engagement will help build a partnership based on trust and collaboration. These stakeholders will be kept fully informed on the FMP programme and project specific details.

High level of influence and impact

Target for expertise = 4 or over

Target for influence = 4 or over

Target for Impact = 4 or over

Target for interest = 4 over

Consult: Secondary and some key stakeholders. This includes people or groups that are indirectly affected, either positively or negatively, by the FMPs output. This includes people who have a strong interest in the effort for academic, philosophical, or political reasons, even though they and their families, friends, and associates are not directly affected by it. The MMO will pursue ‘semi’ pro-active arrangements with them. They will also reach out to seek informal input with them when appropriate. Concerns will be considered, and feedback obtained on issues that affect stakeholders, these concerns can be fed back to the working groups.

Medium to high level of influence and impact

Target for knowledge = 3 or below

Target for influence = 3 or below

Annex 3: Record of stakeholder engagement for Channel NQS FMP

Target for impact = 3 or below

Target for interest = 3

Inform: Secondary stakeholder. This group includes people or groups who have shown some interest but will only be indirectly affected and hold no influence or obvious expertise. These stakeholders are privy to the most passive level of engagement.

Low level of influence and impact

Target for expertise = 2

Target for influence = 2

Target for impact = 2

Target for interest = 2

Annex 2 Channel demersal NQS FMP WG and EAG member lists

Table 3: Channel demersal NQS FMP working group member list

Organisation/Area of interest	Role on Group
Marine Management Organisation FMP team	Chair
Marine Management Organisation FMP team	Secretariat
Department for Environment, Food and Rural Affairs	Policy support
Department for Environment, Food and Rural Affairs	Policy support
Devon & Severn Inshore Fisheries and Conservation Authority	Representation of behalf of all IFCAs
Centre for Environment, Fisheries and Aquaculture Science	Representation on behalf of Cefas
Inshore Kent	WG member
Hastings Fishermen's Protection Society Inshore East Sussex	WG member
Fisherman Inshore East Sussex	WG member
South East Fishermen's Protection Society Inshore West Sussex	WG member
Inshore Eastern Solent	WG member
Weymouth Fishermen's Association Inshore Dorset	WG member

Annex 3: Record of stakeholder engagement for Channel NQS FMP

Organisation/Area of interest	Role on Group
Plymouth Community Interest Company Inshore Devon	WG member
Lyme Bay Community Interest Company Inshore Devon	WG member
Mevagissey Fishermen's Association Inshore Cornwall	WG member
Brixham Trawler Agents	WG member
South Coast Fisherman's Council	WG member
South Western Fish Producer Organisation	WG member
Interfish Producer Organisation	WG member
Cornish Fish Producer Organisation	WG member
Western Fish Producer Organisation	WG member
Chapman's of Rye Processors/merchants	WG member
Angling Trust Recreational Anglers	WG member
Professional Boatman's Association Charter Vessels	WG member

Table 4: Channel demersal NQS FMP Evidence Advisory Group member list

Organisation/Area of interest	Role on Group/specialism
Marine Management Organisation FMP team	Chair
Marine Management Organisation FMP team	Deputy Chair
Marine Management Organisation FMP team	Secretariat
Marine Management Organisation Evidence and Evaluation team	Evidence specialist
Marine Management Organisation Evidence and Evaluation team	Evidence specialist
Marine Management Organisation Evidence and Evaluation team	Fisheries Social Science Expert
Department for Environment, Food and Rural Affairs	NQS policy specialist
Department for Environment, Food and Rural Affairs	NQS evidence lead
Department for Environment, Food and Rural Affairs	NQS evidence specialist
Devon & Severn Inshore Fisheries and Conservation Authority	IFCA evidence and inshore management specialist
Centre for Environment, Fisheries and Aquaculture Science	Principal Fisheries Scientist
Centre for Environment, Fisheries and Aquaculture Science	Elasmobranch specialist

Annex 3: Record of stakeholder engagement for Channel NQS FMP

Organisation/Area of interest	Role on Group/specialism
Centre for Environment, Fisheries and Aquaculture Science	Elasmobranch specialist
Centre for Environment, Fisheries and Aquaculture Science	Senior fisheries scientist
Centre for Environment, Fisheries and Aquaculture Science	Fisheries assessment scientist
Centre for Environment, Fisheries and Aquaculture Science	Recreational evidence specialist
Centre for Environment, Fisheries and Aquaculture Science	Recreational evidence specialist
Centre for Environment, Fisheries and Aquaculture Science	Lead Shellfish advisor
Seafish	Fisheries economist
Seafish	Fisheries expert
University of Normandy	Cuttlefish evidence specialist
Natural England	Ecosystem specialist
Blue Marine Foundation	Cuttlefish expert
Fisherman from Lyme Bay Four Ports Community Interest Company	Inshore fisheries expert
Fisherman from Hastings Fishermen Protection Society	Inshore fisheries expert

Annex 3: Record of stakeholder engagement for Channel NQS FMP

Organisation/Area of interest	Role on Group/specialism
Recreational Angler	Recreational angling expert
Recreational Angler	Recreational angling expert

Department
for Environment
Food & Rural Affairs

Proposed Fisheries Management Plan for Channel Demersal Non-Quota Species

Annex 4: Legislative context, governance, roles and responsibilities

Date: July 2023

Version: public consultation

Contents

Legislative context

The Fisheries Act 2020 sets out the UK's fisheries management legal framework and places a duty on the national fisheries authorities to prepare and publish Fisheries Management Plans (FMPs). The Joint Fisheries Statement (JFS), published in November 2022, sets out how this ambition will be achieved in practice and the detail on how the development of FMPs will deliver the objectives of the Fisheries Act.

The Department for Environment, Food and Rural affairs (Defra) is responsible for UK fisheries policy and governance. Fisheries management is carried out by devolved fisheries administrations: Marine Management Organisation (MMO), Welsh Government; Marine Scotland; and Department of Agriculture, Environment and Rural Affairs (DAERA) in Northern Ireland. Collectively, including Defra, these organisations are known as the UK Fisheries Policy Authorities.

The MMO has the responsibility to manage fisheries and carry out assurance activities in English Exclusive Economic Zone (EEZ) waters from 0-200 nautical miles (nm) and leads on managing fishing activities between 6–200 nm. Within the English Channel 0-6 nm limit, the Inshore Fisheries and Conservation Authorities (IFCAs) deliver additional fisheries conservation, management. and enforcement.

As this FMP only applies to the management of fisheries in International Council for the exploration of Seas (ICES) areas 7d and 7e in English waters, the devolved fisheries administrations and crown dependencies have no formal responsibility for the development of this plan. However, they may have a role in contributing to the delivery of the plan through managing their respective fleets.

The delivery and implementation of this FMP requires a clear governance structure. The MMO was delegated responsibility to develop the FMP by Defra. The Secretary of State and Defra will adopt and publish the FMP. Defra are responsible for consulting on and publishing the FMP at the end of 2023. Defra is responsible for the implementation of the FMP depending on the policy or objectives. The FMP will be reviewed every six years and amended by Defra, whilst the MMO is the responsible fisheries regulator. The FMP proposes a future NQS management group comprising of fishers, scientists, policy makers, other stakeholders and regulators which will take on some responsibility for implementation. This FMP sets out the policies and measures to manage the fishing activity within demersal non-quota species (NQS) fisheries in the English Channel in UK waters. The policies and measures contained within this plan have been prepared by Defra in response to the requirement of section 6(5) of the Fisheries Act 2020.

Key policy linkages and legislation

The list below provides an overview of the key policy linkages between this FMP and broader Government policy. Detail has been given on how these comply with or contribute toward the obligations of existing policy.

Domestic Policy and Statutory Linkages

Fisheries Act (2020) Sections 2(3)(c), 6(2)(b), 6(2)(c), 6(3)(a), 6(3)(b)(ii) of the Act place requirements for the FMPs to consider specific content. Content includes (but is not exhaustive) fish stocks, types of fishing and fishing gears, plan footprint, monitoring and evaluation indicators and how a stock is assessed now, whether data are sufficient for MSY assessment, what is needed to conduct an assessment.

Statutory Instrument 2004 No. 1633: The Environmental Assessment of Plans and Programmes Regulations (2004) FMPs will be subject to an integrated Sustainability Appraisal (SA) and Strategic Environmental Assessment (SEA) in line with Statutory Instrument (SI) requirements.

Marine and Coastal Access Act (2009) The remit of this FMP overlaps with two English marine plans: the South West Marine Plan and the South Marine Plan as well as numerous marine protected areas (MPAs). The FMP also borders the South East Marine Plan. Section 58(3) of the Marine and Coastal Access Act (2009) requires the FMP to have regard to marine plan policies and the marine policy statement. To ensure this FMP is aligned with marine plans the following policies BIO-1, BIO-3 and FISH-3 (SW marine plan) have been considered. JFS section 4.2.10.3 also requests consideration of the relationship between marine spatial planning and fisheries management plans, and how these policies can work in a joined-up way. A key part of aligning policy areas will be to ensure that the FMP will have conducted a marine plan compatibility assessment by the time of publication.

Environment Act (2021) S17(5)(a-e) and S(19)(1) requires ministers in adopting the FMP to have regard to the five environmental principles within the Environment Act: integration, prevention, rectification, polluter pays and precautionary principles.

Equality Act (2010) S149 requires the effect on equality of the FMP and any interventions to be considered. Further the concepts inherent in the Equality Act have significant bearing on social evidence and evidence needs.

Marine Strategy Regulations (2010) (SI 2010/1627) require fishery bodies in the UK to take action to achieve or maintain Good Environmental Status (GES) in all UK waters. The regulations and associated monitoring framework provide further objectives, monitoring indicators and issues that can be considered by and contributed to through the FMP.

Net Zero Strategy: Build Back Greener (2021) Sets legally binding requirements to decarbonise the UK economy by 2050. Fishing vessels are explicitly included under the definition of domestic transport. This is primarily evidence clarifying policy aspirations and exiting actions.

Environment Improvement Plan (2023) The first revision of the 25 Year Environment Plan includes targets for protecting 30% of the sea by 2030, enhanced protections by MPA byelaws in place by the end of 2024 and designate the first Highly Protected Marine Areas. There is also acknowledgement of marine planning and marine spatial prioritisation and to speed up renewables' development with potential displacement effects. FMPs are identified as one of the vehicles to deliver environmental improvement set out in the UK Bycatch Mitigation Initiative, published by the UK Government and devolved administrations in 2021.

Animal Welfare (Sentience) Act 2022 Introduced as part of Government's first of a kind Action Plan for Animal Welfare - Action Plan for Animal Welfare has commissioned research into the sentience of decapod crustaceans and cephalopods, and, in light of the findings, it will consider further protections for these species. This may need to be considered in the future development of the FMP.

International policy legislation and commitments

UK-EU Trade and Cooperation Agreement (2020) (TCA) Principles on Article 494-501 clauses therein and their associated annexes that provide agreed objectives, principles, access rules and opportunities allocation for joint fisheries with EU Member States.

US Marine Mammal Protection Act 1972 The import provisions implement aspects of the Marine Mammal Protection Act that aim to reduce marine mammal bycatch associated with international commercial fishing operations, by requiring nations exporting fish and fish products to the United States to be held to the same standards as US commercial fishing operations. It may be necessary to set objective or collect evidence to ensure compliance and enable export to the US.

FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries UK is a signatory of this internationally agreed instrument dedicated to the small-scale fisheries sector. The guidelines guide dialogue, policy processes and actions at all levels and help the sector to realize its full contribution to food security and poverty eradication. This is primarily an evidence source for consideration during FMP development.

Code of Conduct for Responsible Fisheries A reference tool for the sound management and responsible conduct of fisheries on a national and international basis. It consists of a series of principles, goals and action items.

A number of international commitments exist including UN Convention on the Law of the Sea (UNCLOS), UN Development Goals, the UN Convention on Biological Diversity (CBD), including the Global Biodiversity Framework, the Convention on International Trade in Endangered, Species, and the Convention for the Protection of the Marine Environment of the Northeast Atlantic (OSPAR). Actions dictated by these tend to be included in the statutory measures above.

Non-statutory policy linkages

Non-statutory policy linkages where FMPs have a notable role to deliver and support wider policy objectives:

- International Action Plan on Bycatch;
- NQS policy;
- Defra flyseining consultation in 2022;
- Quota management policy;
- Discards policy;
- REM policy;
- MPA byelaw programme.

Plan development and future delivery

The following section sets out the process used to identify relevant stakeholders and how they have been involved in the development of this FMP.

Roles & responsibilities of interested parties

This section provides information on who has been involved in developing the plan and who may be involved in the implementation of the plan.

This FMP was developed by the MMO's FMP team and refined with the support of the Working Group (WG), Evidence Advisory Group (EAG) and wider stakeholders. The following section presents an overview of stakeholder engagement carried out by the MMO's FMP team to support the development of this FMP.

Between June 2022 and May 2023, the MMO's FMP team used a series of engagement methods as part of both formal and informal engagement to:

- Raise awareness about development of the Channel demersal NQS FMP for English waters amongst stakeholders, and;

- Present draft FMP content – Vision, goals, evidence requirements and proposed management interventions – to stakeholders in order to gather feedback, alternatives, and additional evidence that the MMO should consider.

To identify relevant stakeholders, stakeholder analysis was carried out. This included creating a list of all possible stakeholders relevant to the FMP. The list was then refined during initial south coast engagement in June 2022, when the FMP team hosted drop ins and port visits. This enabled the MMO to hear about alternative contacts and fill in the gaps where no obvious contact was known for a particular area and or group of stakeholders. The FMP team then caried out a stakeholder analysis exercise and assigned an appropriate level of engagement to named stakeholders (collaborate, consult, or inform). The stakeholder analysis process followed is detailed in Annex 3.

Channel demersal NQS Working Group (WG): To assist in the development of the Channel demersal NQS FMP, the MMO set up the Channel demersal NQS WG. The purpose of the WG was to co-refine the FMP alongside the MMO as the lead delivery partner. In addition to developing the FMP, the WG also has the function to act as a forum for engagement on the FMP. Throughout the preparation phase of the development of the FMP, MMO sought feedback and input from the group on species prioritisation, drafted elements of the FMP and potential management measures proposed in the first iteration.

All WG members were encouraged to seek opportunities to engage the wider fishing industry (commercial and recreational) and other key stakeholders where appropriate so that they were able to feed into the FMP’s development prior to public consultation. See Annex 3 Record of Engagement for full list of working group meeting and attendees.

Post-consultation the WG will be reviewed and amalgamated into the proposed management group, see Annex 6 of the FMP for further details.

Evidence Advisory Group: With the support of the WG, an Evidence Advisory group (EAG) was set up in late 2022. The purpose of the EAG was to provide independent technical and expert advice to support and inform both the working group and the MMO’s decision-making function regarding the development of goals, evidence requirements (and options to address) and scoping out potential management measures as well as other aspects of the FMP. EAG members were identified based on their level of expertise on a specific area relevant to the Channel demersal NQS FMP e.g., species or gear type. See Record of Engagement for full list of EAG meetings and attendees.

Post-consultation the EAG will be reviewed and amalgamated into the proposed management group, see Annex 6 of the FMP for further details.

Wider stakeholders: In addition to the WG and EAG involvement in the development of this FMP, further views were sought from a range of wider stakeholders including commercial and recreational fishers, environmental non-government organisations (eNGOs) and academics. Throughout the development of this FMP, the MMO held regular meetings with eNGOs at an FMP programme level to allow them to be kept up to date with progress of all FMPs. At these meetings they were able to share their comments on the plan. The MMO also made use of other teams within the organisation such as the evidence team to help support development of certain aspects of the plan e.g. evidence statement and monitoring indicators. This was done through the evidence team reviewing certain chapters of the FMP. Arm's Length Bodies were brought in to review specific aspects of the plan where relevant. For example, Natural England reviewed the environmental goals and sub-goals focused on MPA’s and bycatch.

Participation, collaboration, and consultation processes

In addition to the formal stakeholder engagement outlined in the previous sections, stakeholders were able to provide further comment and feedback on the FMP through a series of in person and online engagement sessions from June 2022 to March 2023. A full summary of these events is presented in the Annex 3 Record of Stakeholder Engagement.

The purpose of these events was to raise awareness around the development of the FMP and present the draft FMP vision and goals (as developed by the FMP working group) to stakeholders and gather feedback on them. Potential management measures for the species within the remit of the FMP were also discussed.

A total of 35 in-person and five online stakeholder engagement events were held throughout the scoping and preparation stages of FMP development with over 150 recorded stakeholders in attendance. This was done to optimise the number of stakeholders that could have the opportunity to discuss and provide feedback on the draft FMP content. In-person events were held in several locations across the south coast (See Annex 3 record of stakeholder engagement). Engagement locations were selected based on stakeholder feedback and the significance of NQS fisheries. All events were open to any stakeholders with an interest in demersal NQS fisheries and attendance included representation from the catching sector; processing and export sectors; scientists and academics; local fishery managers; and NGOs. Feedback gathered from these engagement events was used to refine draft FMP content which was then reviewed and refined by the FMP working group.

Future stakeholder engagement

Stakeholder engagement post-publication will be taken forward by Defra and the formally established Channel demersal NQS Management Group as outlined in Annex 6 of the FMP – Social and Economic Goals. This group will assist Defra in the review of the FMP and development of future iterations.

Roles and responsibilities related to control and enforcement

Control of fisheries exists with the aim of preserving the long-term sustainable use of fisheries resources whilst minimising any potential negative environmental, social, or economic impacts. In English waters this is managed in line with the Defra 25 Year Environment Plan and associated legislation such as The Fisheries Act 2020 and The Marine and Coastal Access Act 2009. Driven by Government's aim for clean, healthy, safe, productive and biologically diverse ocean and seas, the MMO's purpose, as the regulatory body in England, is to protect and enhance our precious marine environment and support economic growth by enabling sustainable marine activities and development. The objectives of fisheries control contribute to achieving the objective of protecting the marine environment for current and future generations and to ensuring marine businesses are supporting sustainable growth in the economy.

The MMO takes a blended approach to the monitoring and management of fisheries in England. This includes a combination of physical inspections of fishing vessels both at sea and in port, as well as physical inspections of both merchants and transporters of first sale fisheries products. MMO also undertake a wide range of desk-based monitoring of fisheries activities which includes (but is not limited to) the use of vessel monitoring systems (VMS), the monitoring of quota uptake and compliance with fisheries regulations, through data supplied by the fishing industry as well as the assessment of scientific evidence. The MMO have the ability to add additional controls to fishery activity through the implementation of vessel licence conditions, fishery closures as well as introducing byelaws which can be either voluntary or mandatory.

See the MMO's compliance and enforcement strategy:

https://www.gov.uk/government/publications/compliance-and-enforcement-strategy

Existing codes of practice, regulations & rules enforced

Regulations are focused on reducing the main risks for non-compliance in the fishing industry which relate to non or inaccurate reporting, the retention of prohibited or below MCRS organisms, the use of illegal fishing gear and fishing in areas where this activity is restricted. To limit these risks the MMO and local IFCAs conduct at sea and shoreside patrols whereby retained catch and fishing gear is inspected for compliance. The use of Vessel Monitoring Systems (VMS) and in the case of restricted fishing areas, enhanced VMS, can be used as a tool to monitor and encourage higher compliance.

In addition, the MMO apply a fishing vessel licensing regime along with control measures such as the use of logbooks and/or catch record data and sales notes from merchants in order to monitor fishing activity and compliance with national and local regulations.

The FMP will align with current measures and build on or standardise these in order to improve the sustainability of the stocks.

Jurisdictional authorities

No joint management action with Devolved Administrations (DA) is envisioned within the scope of this FMP. Jurisdictional boundaries fall exclusively to English waters. Joint management action with the DAs may be pursued in the future if there is sufficient DA fleet interest in fishing for Channel demersal NQS.

Joint management action will need to be considered alongside the EU Member States. The TCA outlines that the UK and EU may, through the Specialised Committee on Fisheries (SCF), develop multi-year strategies for the conservation and management of shared non-quota stocks.

Research and development of new technology

Future research and development of new technology will be reviewed against current issues associated with monitoring and enforcing compliance of the management measures for this fishery. Where the use of new technology is identified to address these issues, these will be listed in further iterations of this plan. The FMP goals have allowed space for the progression of new technologies to support monitoring and data collection, aligning with measures which encourage their uptake and use.

Scope has been left within the goals and actions to support fishers through gear modification, in line with national programmes and initiatives.

New technology may not be limited to the uses through improving fishing selectivity, output or for use in data collection and monitoring. New technology approaches which look at innovating existing technologies through adaptations and improvements are to be considered in the utility of the FMP. Such an example could be to look into capturing under 10m effort data in electronic logbooks and including fish size in sales notes to support the evidence gathered and provide a broader dataset to link back to assessment of the stock health.

Department
for Environment
Food & Rural Affairs

Proposed Fisheries Management Plan for Channel Demersal Non-Quota Species

Annex 5: Scope and description of the Channel demersal non-quota species fisheries

Date: July 2023

Version: public consultation

Contents

Context

This FMP does not cover all NQS catch in the English Channel. Most of the other NQS caught in the English Channel, such as pelagic finfish, crustaceans, bivalve/gastropod molluscs, pilchards, black sea breams, wrasses and bass are listed in the Joint Fisheries Statement (JFS) for consideration within other FMPs.

Five species, bib, lemon sole, turbot, smoothhound and brill were not initially scoped into the FMP remit under the draft JFS. Upon early stakeholder engagement to develop the FMP, the remit of the FMP was expanded to include these species given the sufficient stakeholder concern surrounding their need for inclusion in management in both International Council for the Exploration of the Sea (ICES) area 7d and 7e. However, it is worth noting, that lemon sole, turbot and brill were also included under the remit southern North Sea flatfish FMP, covering ICES areas 4c and 7d.

The remit of this FMP is to provide management for the important demersal NQS inhabiting and targeted in the English Channel. Future iterations of the FMP may include the potential of scoping in new or scoping out existing species into management as required. The below species list will be revised and updated for each iteration of the FMP, to reflect species currently considered for management.

All species covered in this FMP are transboundary or straddling stocks with the EU until stock boundaries have been defined. FMP stocks are subject to multi-nation or bilateral fisheries management agreements such as the UK/EU trade and cooperation agreement (TCA) and commitments to the development of multi-year strategies for the conservation and management of non-quota stocks.

Some species including turbot, brill, lemon sole, smoothhound, and some cephalopods may migrate to areas covered under the spatial area of other FMPs at certain points of their lifecycle. Other stocks may straddle two or more FMPs on a more permanent basis or require further work to define and delineate their respective stock boundaries, meaning that future iterations of this FMP will need to remain open to changing evidence on the spatial distribution and identification of its stocks. Defining or refining stock boundaries and understanding stock movement and migration are evidence gaps to be further explored through the development of the FMP, and as such these species may overlap with multiple FMP management strategies. Where appropriate, it will be a future requirement of the FMP to harmonise management measures with other FMPS for these shared species.

Species biology

Information regarding a species' biology and life history is paramount to informing management decisions. Table 1 provides an overview of the key biological characteristics of each species covered under the scope of this FMP, as derived from the literature review. Additional, species-specific information is available within Annex 2: Species overview and stock status of the Evidence Statement.

Table 1 Overview of species biological information

Species	Key Biological Information
Finfish and Elasmobranchs	
Bib (*Trisopterus luscus*)	Widely distributed North East (NE) Atlantic stock, abundant within the English Channel, Bristol Channel, and Irish Sea. Maturity reached at 18cm. Spawning season from February-August. Preference for sand and rock habitats, shoaling fish found around reefs and wrecks. Important prey item for higher trophic level predators. Predate mostly on crustaceans, shrimp, small squids and small fish.
Brill (*Scophthalmus rhombus*)	Widely distributed NE Atlantic stock. Maturity reached at 18-25cm in males, and 33-41cm for females, equating to around three years of age. Spawning season from April-July, spawning concentrations do occur off the Danish coast and southwestern North Sea. Specific to sandy habitats.
Grey gurnard (*Eutrigla gurnardus*)	Widely distributed across the NE Atlantic. Unknown growth rates and size at maturity, age at first spawning is 3-4 years. Spawning between December-May, although some may spawn between March and April. Predators unknown. Preys upon demersal crustaceans and small fish. Typically found offshore in depths of 10-340m, with a preference for sandy habitats, although can be found over mud, shell, and rocks in lower abundances.
John dory (*Zeus faber*)	Widely distributed across the east Atlantic, Indian Ocean, and western Pacific. Growth equal across sexes until three years, after which male growth slows. Maturity reached at four years, equating to 25cm within males and 35cm within females. Spawning over summer months, with the Channel area serving as a nursery for juvenile fish. Typically found in depths of 50-150m, with no preference for substrate type

Species	Key Biological Information
Lemon sole (*Microstomus kitt*)	Distributed in the NE Atlantic from Iceland and northern Norway and Iceland southwards to the Bay of Biscay. In English waters lemon sole occur across ICES subareas 4 (North Sea) and 7 (English Channel, Celtic Sea, and Irish Sea). Males and females mature at lengths of about 14cm and 15.5cm, respectively. 50% of males are mature at age three, whereas 50% of females are mature at age five. Most landed fish are up to nine years old, with a maximum reported longevity of 23 years. Spawn from January to November, potential spawning and nursery ground off northeast Scotland, the German Bight, on coarse grounds of the Irish Sea. Typically found in depths of 1-1105m, with a preference for coarser grounds such as gravel or shell beds.
Lesser spotted dogfish (*Scyliorhinus canicula*)	Distributed across the NE Atlantic and commonly distributed around the UK; in English waters it occurs across ICES subareas 4 (North Sea) and 7 (English Channel, Celtic Sea and Irish Sea). It is most abundant in the outer parts of Lyme Bay, Eddystone grounds and parts of the Normano-Breton Gulf and at the southern entrance to St George’s Channel. Juveniles hatch at approximately 10cm in length and grow between 1-8cm a year. 50% of males are mature at 52-57cm, whereas 50% of females are mature at 55-58 cm, both equating to around six years old. Life expectancy is typically 17 years. Mating occurs year-round, peak egg laying occurs in June and July. Segregation by sex and size class. Predated upon by larger finfish and elasmobranchs, prey upon a range of invertebrates and small fish. No habitat preference.
Red gurnard (*Chelidonichthys cuculus*)	Red gurnard is a widely distributed species within the NE Atlantic. The species is abundant in the Channel (7d and 7e), the shelf West of Brittany (7h, 8a), and west of Scotland (6a). It is predominantly caught in divisions 7d, 7e and 7h. Maturity reached at 14cm (3-4 years old). Spawning from December until May in Brittany and between April to August in the English Channel. Common over sand, gravel, and rock seabed habitats on the continental shelf.
Red mullet (*Mullus surmuletus*)	Widely distributed species across the NE Atlantic, in UK waters mostly encountered in the English Channel, southern and western North Sea and northern Celtic Sea. Mature between 1-2 years, equating to 15.5–18.9cm in females and 14.7–17.1cm in males. Spawning occurs in the southern North Sea between May

Species	Key Biological Information
	and July. Preference for rocky, sandy, and muddy ground. Migration through the Channel to the North Sea, leading to distinct differences in population structures in summer and winter months.
Smoothhound (*Mustelus spp.*)	Smoothhound is commonly distributed around the UK; in English waters it occurs across ICES subareas 4 (North Sea) and 7 (English Channel, Celtic Sea and Irish Sea). Pups are born at 24-32cm and grow between 1-8cm a year. Maturity reached at 4-5 years and 70cm for males, six years and 82cm for females. Viviparous and potentially biannual reproductive cycle with litters of 4-20 pups. Mating timings unknown, but parturition (birth) can occur from February to September. Seasonally high abundances of mature distended females and juveniles have been noted in the Bristol Channel, Solent, western Irish Sea, southern North Sea, and Holyhead region, indicating potential pupping areas. Preys primarily on benthic crustaceans, namely crabs. Inhabits most substrates, with a typically demersal lifestyle but can be found in mid-water. Evidence of sex-based dispersal and circannual migration, with fish spending the summer in the southern North Sea and overwintering in the English Channel and Bay of Biscay.
Tub gurnard (*Chelidonichthys lucerna*)	Widely distributed species across the NE Atlantic, the species is abundant in the Channel; the southern North Sea represents a major part of the distribution area and tub gurnard is found entering the area through the English Channel in spring and leaving again in autumn. Maturity reached at three years and 29cm for males, four years and 27cm or females. Spawning during May and June in the Celtic Sea. Preference for mud, muddy-sand and gravel substrate.
Turbot (*Scophthalmus maximus*)	Distributed around the UK; in English waters it occurs across ICES subareas 4 (North Sea) and 7 (English Channel, Celtic Sea and Irish Sea). Maturity is reached at 20cm and 34cm for males and females respectively, corresponding to ages 1-2 for males and 2-3 for females. Spawning occurs from late March to August with a peak in May/June. Spawning occurs over sand and gravel substrates. Spawning migration reported in April to shallower (4-30m) depths from mid-May to end of July. Important spawning grounds in the North Sea include the Aberdeen Bank, the Turbot Bank, around and to the north of the Dogger Bank, off

Species	Key Biological Information
	the Danish coast, in the inner German Bight and in the southern North Sea. Juvenile focus on benthic invertebrates initially but become primarily piscivorous at 20cm in length.
Cephalopods	
Common cuttlefish (*Sepia officinalis*)	Widely distributed across the North-east Atlantic, from the Faroe Bank and the Shetland Islands southwards to north-western Africa. Found in the central and southern North Sea, and in the English Channel. Within the Channel, males begin to mature at 8.1-9.1cm (age 1 year). However, 50% of males are mature at 14.6cm, and all males are mature at 17cm. In females, the smallest sexually mature individuals are 14.2cm mantle length (ML), 50% were mature at 16.4cm, and all females were mature at 23cm. Spawning is intermittent with females dying shortly after. Eggs are attached in clusters to various plants, sessile animals such as tubeworms, or other hard structures (including fishing gear). Important prey for a variety of fish, birds, and mammals. Exhibits seasonal migrations between shallow and deeper water. In the English Channel, spawning season from early spring to summer in shallow areas; from autumn, juveniles migrate from inshore nursery grounds to deeper waters in the west and middle part of the English Channel; from November, juveniles move further west to the offshore deep waters off the north part of the French Atlantic coast, and stay there until March.
Elegant cuttlefish (*Sepia elegans*)	In comparison to common cuttlefish, elegant cuttlefish have a more south-westerly distribution, occurring in UK waters in the Celtic Sea and the western English Channel. Growth is around 2-3mm a month, with maturity reached at 3.5–4.5cm for males and 4.5-6.5cm for females. Life expectancy is 12-18months. Little is known about the seasonal cycle of elegant cuttlefish, or whether the species spawns within UK waters.
Curled octopus (*Eledone cirrhosa*)	Distributed across most of the NE Atlantic, and common in UK waters. Maturity reached at a mantle length of 9.1–10.9cm in males and 10.1-13.5cm in females, equating to a body weight 400–1000g for females and 200g for males. Mate between May and September, females die once eggs hatch. Split across

Species	**Key Biological Information**
	depths dependent on sex, where females predominate from 30 to 80m, and males below 100m depth. Carnivore and scavenger.
Common octopus (*Octopus vulgaris*)	As a result of recent population crashes due to cold winters, now rare in English waters and occurs mainly in the western English Channel where abundance is reported to be increasing. ML at first maturity is about 9.5-9.7cm in males and 13.5-14.4cm in females, equating to a body weight of 1-2.4kg (females). Mate between April and October, females die once eggs hatch. Carnivore and scavenger.
European common squid (*Alloteuthis subulata*)	Found across the Northeast Atlantic and particularly abundant in the English Channel and the North Sea with year-round presence. Maturity is reached by most of the population by summer months at 40-50mm ML for both sexes, although males may mature slightly earlier than females. In the English Channel, there are three spawning groups of females that spawn in spring, summer, and autumn, respectively, with young individuals being recruited to the population twice during the year in spring and summer. Important prey items in the Northeast Atlantic and are predated upon by a diverse range of fish and mammals.
Veined squid (or long-finned squid) (*Loligo forbesii*)	Widely distributed across the Northeast Atlantic, although generally targeted northeast of Scotland. Some bycatch in the English Channel for vessels targeting *L. vulgaris*. Typically, adult body size reaches 100–650mm ML in males (weight range 155–3700g) and 175–350mm ML in females (weight range 200–1150g) throughout the species' range. Wide variation within both sexes, with some males maturing at 120mm long. Spawning in UK waters occurs all year round but peaks between December and February. Reproduction in the Channel itself and southern North Sea is not confirmed, although foraging juveniles are known to visit the Channel.
Common squid (or European squid) (*Loligo vulgaris*)	Distribution across the Northeast Atlantic, but with a lower abundance at higher latitudes in comparison to *L. forbesii*. Key commercial loliginid species within the English Channel. Mature at 120-179mm and 140-181mm for males and females, respectively. Again, males mature at a lower minimum size than females. Spawn annually in the westernmost part of the English Channel in November-December. Migratory movements are mainly related to sexual maturation and spawning with large

Species	Key Biological Information
	adult animals moving towards shallow coastal waters for mating and spawning in the autumn-winter in the English Channel. Important prey items in the NE Atlantic and are predated upon by a diverse range of fish and mammals.

Stock Status

Of the 19 species covered under the scope of this FMP, seven finfish and elasmobranchs have been assessed by ICES within the English Channel, with a further assessment for turbot specific to the North Sea holding some relevance given potential overlaps and an opportunity to spatially extend the assessment. Of those stocks assessed by ICES, four (brill, grey gurnard, red mullet, and turbot) have concerns around sustainability. Red mullet is of particular concern given landings of, and market for, juveniles. Table 2 provides an overview of the stock status, including stock trends and assessment types on a species-by-species basis for those stocks that are assessed. Further information is available in Annex 2 of the Evidence Statement.

Anecdotal reports gathered during stakeholder engagement sessions suggest a general decline in abundance and size of most species. Commercial and recreational stakeholders specifically reported declines in catches of lemon sole, red mullet, all three gurnards, and john dory across both 7d and 7e. Some specific concerns were also voiced around the abundance and decreased size of lesser spotted dogfish across both regions. Commercial stakeholders in 7e reported an abundance of turbot and brill, whereas in 7d both recreational and commercial stakeholders voiced concern around diminished catches for both species.

Cephalopods stocks were not assessed by ICES. However, trial assessments are being undertaken by Centre for Environment, Fisheries and Aquaculture Science (Cefas) for cuttlefish in 7e with the recommendation that assessments in the English Channel should be carried out with ICES to facilitate data exchange between countries, whilst remaining sensitive to the short lifecycle of cuttlefish which may not lend itself to being effectively managed using previous year data to support subsequent year management. Instead, an approach of evaluating in-year recruitment, and then developing agile management in response, may be more appropriate, not only for cuttlefish but for other cephalopod species.

During engagement sessions, stakeholders reported conflicting evidence around cuttlefish and squid. In 7e commercial and recreational stakeholders reported an abundance of squid, but voiced concern that increased numbers of bluefin tuna in the area was attributed to declining squid stocks. In 7d stakeholders reported increasing numbers and sizes of squid, although commercial fishers in the area reported that the inshore squid fishery had collapsed due to the targeting of squid by over 10m vessels.

Cuttlefish were reported to show large interannual variation in 7e but appear to be an important species for both sectors, particularly in the central western area of the Channel, east of Falmouth. In 7d, cuttlefish landings were reported to have declined since 2018, with 2022 considered to be a particularly poor year. Again, the fishery is important to both sectors, particularly for the inshore 7e commercial fleet in the spring and early summer. Across both areas, concerns were expressed around the number of cuttlefish landed by the offshore fleet and EU vessels between the 6nm-12nm limits.

Additionally, in 7e both commercial and recreational stakeholders reported increasing abundance in octopus, providing both an additional fishing opportunity, but also causing concern around octopus eating lesser spotted dogfish eggs and taking crabs and lobsters from pots. No specific octopi species were cited, although reports of Mediterranean octopus suggest that this is attributed to the common octopus (*Octopus vulgaris*).

Table 2 Overview of stock status and trends for each FMP species

Species	ICES Recent Stock Assessment and Stock Status
Finfish and Elasmobranchs	
Bib (*Trisopterus luscus*)	No ICES assessment and time series of abundance indices are available.
Brill (*Scophthalmus rhombus*) ICES Advice	Data category 3 stock with an applied precautionary approach. Some signs of initial overexploitation; the stock size (biomass) index is currently above Maximum Sustainable Yield (MSY) $B_{trigger}$ but has shown significant declines since 2015-2016. Fishing pressure is above MSY proxy. Co-management of brill and turbot through an international combined TAC is not the preferred approach to sustainability.
Grey gurnard (*Eutrigla gurnardus*) **ICES Advice**	Biennially assessed as a data category 3 stock (with precautionary advice provided) by ICES in ICES Subarea 4 (North Sea) and divisions 7d and 3a (eastern English Channel, Skagerrak and Kattegat). The eastern English Channel (Division 7d) is therefore on the edge of the distribution for this stock unit and contributes a relatively small proportion of the catches, as most of the catches

Species	ICES Recent Stock Assessment and Stock Status
	are from the North Sea. Robust, survey derived biomass index above $L_{trigger}$, but significant drop in biomass index from 2017 onwards. Anecdotal evidence from fishers suggests decline.
John dory (*Zeus faber*)	No ICES assessment and time series of abundance indices are available.
Lemon sole (*Microstomus kitt*) ICES Advice	Data category 3 stock with advice provided under a MSY proxy approach in Subarea 4 and divisions 3a and 7d (North Sea, Skagerrak and Kattegat, eastern English Channel). The biomass index shows a high degree of variability but has been above MSY $B_{trigger}$ since 2009. Fishing mortality is below likely proxies for MSY reference points, and there is no sign of overexploitation despite an unknown stock size.
Lesser spotted dogfish (*Scyliorhinus 11ucerne11r*) -ICES Subarea 6 and divisions 7a-c and 7e-j -ICES Subarea 4 and in divisions 3a and 7d	Two data category 3 stocks are relevant to the FMP, both are biennially assessed. Catches across both regions are stable, with a slight (2%) increase in catches in Subarea 6 and divisions 7a–c and 7e–j in 2019-2020 when compared to 2014-2018. Survey generated stock size indicators of the total biomass are utilised in both sets of advice, and again are reported to be stable (0.2% increase in the eastern Channel) since 2016.
Red gurnard (*Chelidonichthys cuculus*) Red gurnard (Chelidonichthys cuculus) in subareas 3–8 (Northeast Atlantic)	ICES provide advice for red gurnard as a data category 3 stock (promoted from data category 6 in 2021) across the NE Atlantic, but state that landings (which may still be mixed gurnard data) and discards data are not reliable enough to provide catch advice. Discarding is understood to be high (14%-94%). However, using survey trend data, the assessment provides a biomass index which is stable and rising. Anecdotal information from fishers suggests some decline in gurnards.
Red mullet (*Mullus surmuletus*) ICES subareas 6 and 8, and divisions 7a–c, 7e–	Two stocks are relevant to the FMP (north and west), with category 5 assessments existing. Evidence exists to suggest that red mullet may migrate between the Channel and southern North Sea, suggesting a mixing of stocks during the summer months.

Species	ICES Recent Stock Assessment and Stock Status
k, and 9a (Western Stock) ICES Subarea 4 and divisions 7d and 3a (North Stock)	For the northern stock, ICES reported that landings declined from 2015 until 2018, at which point 2019 landings increased due to a strong recruitment in 2019. In 2020 and 2021, landings again decreased. A precautionary buffer on advised catches was applied by ICES in 2021. It appears that the stock is truncated and there is significant exploitation of age 0-1 fish. In addition, ICES length-based indicators (LBI) were computed for five years of commercial data. Most of the indicators appeared outside the established references in 2021. This indicated that the stock may be considered not to be exploited sustainably. The main concerns were for the big/old fish that are missing from the population. The LBIs showed that in relation to conservation criteria there was strong evidence of growth overfishing, meaning the fish is caught before it has realised its growth potential. For the western stock, landings have been relatively stable (1500-2000t) since 2012. A precautionary buffer was applied to advised catches in 2020.
Smoothhound (*Mustelus spp.*) ICES Advice	ICES provide biennial advice for *Mustelus* spp. Across the entire Northeast Atlantic as a data category 3 stock at genus level. Catches have remained stable at 3000-4000t since 2005, whilst the survey derived biomass index has overall increased significantly since 2013, although some interannual variability has been observed in recent (2016-2020) years. The ICES advice for 2022 and 2023 was subject to the precautionary buffer, leading to a reduction in catch advice by 4% in comparison to previous advice.
Tub gurnard (*Chelidonichthys 12ucerne*)	No ICES assessment and time series of abundance indices are available. Fishers have expressed concern around a perceived reduction in gurnard stocks.
Turbot (*Scophthalmus maximus*) Turbot in Subarea 4	Turbot stocks are not assessed in the English Channel. However, there is a Category 1 assessment for turbot in the North Sea which provides advice under the MSY approach and may have some applicability to stocks within the Channel. In the North Sea, fishing pressure on the stock is below exploitation rates or fishing mortality (FMSY) and spawning-stock biomass is above MSY

Species	ICES Recent Stock Assessment and Stock Status
	$B_{trigger}$, B_{pa}, and B_{lim}, however, recruitment is variable and advised catches were decreased by 33% for 2022 on 2021 data given a decrease in incoming recruitment. Co-management with brill through combined TAC leads to sustainability concerns.
Cephalopods	
Common cuttlefish (*Sepia officinalis*)	No ICES assessment and time series of abundance indices are available. Test assessments have indicated full exploitation across the English Channel (See Evidence Statement - Annex Three: Species overview and stock status).
Elegant cuttlefish (*Sepia elegans*)	No ICES assessment and time series of abundance indices are available for these species.
Curled octopus (*Eledone cirrhosa*)	
Common octopus (*Octopus vulgaris*)	
European common squid (*Alloteuthis subulata*)	
Veined squid (or long-finned squid) (*Loligo forbesii*)	
Common squid (or European squid) (*Loligo vulgaris*)	

Species evidence gaps

Given that each of the species under this FMP are considered to be data poor, a prioritisation of evidence gaps based on stock status, social and economic value, sustainability concerns and the need to deliver management in the short-term is presented in Table 3. The need to develop and extend the current North Sea assessment for turbot, understand if the current ICES approach to assessing red mullet, and develop assessment methodologies for cuttlefish are high priority. Additional evidence gaps specific to each species are presented in both section 4.3 and Annex 2 of the Evidence Statement.

Table 3 Evidence gaps associated with FMP priority species. All the evidence gaps all meet the evidence and sustainability goals

Species	Evidence Gap	Reasoning /Priority
Turbot (*Scophthalmus maximus*)	Extend North Sea assessment or implement specific Channel assessment	High priority given value to both sectors and currently unassessed stock status in Channel.
	Improve at-sea observational data.	High priority given need to extend/develop assessment in Channel.
Brill (*Scophthalmus rhombus*)	Stock ID and delineation, surmounting to improvement of assessment	Medium priority. Assessment in place does suggest initial signs of overexploitation but requires improvement
Lemon sole (*Microstomus kitt*)	Move to full analytical assessment (i.e., data category 1).	Medium priority. Assessment in place does not suggest overexploitation but requires improvement
	Understand migratory behaviour, particularly for juveniles.	Medium priority. Will likely require co-management with other FMPs.
Red mullet (*Mullus surmuletus*)	Understand if dual stock approach is appropriate and revise assessment if required.	High Priority. Assessment indicates overexploitation in northern stock.
	Add length-based indicator to ICES assessment in 7e to evaluate exploitation status.	High priority. Given market for juvenile red mullet, there is a significant need to understand impact of exploitation on stock in 7e.

Species	Evidence Gap	Reasoning /Priority
Common cuttlefish (*Sepia officinalis*)	Understand life history, recruitment and impacts of environmental/ climactic drivers.	High priority as fundamental to developing assessment and delivering sustainable management.
	Develop assessment methodology specific for cuttlefish and other cephalopods	Medium priority. Understanding of recruitment dynamics immediate priority.
	Quantify recreational landings	Low priority. Recreational landings of cuttlefish are likely to be low

Location

Physical environment

The English Channel, bordered by the UK and France, connects the southern North Sea with the Celtic Sea and wider North Atlantic. There are three distinct regions across the Channel. The eastern Channel is typically shallow, with limited current allowing for the accumulation of mud and fine sand substrates, creating numerous sandbanks. The central Channel is a notably deeper basin dominated by the Hurd Deep, with strong currents and a general substrate of coarse pebbles and large gravel covering boulders and bedrock. Currents decrease in the western Channel, resulting in a gravel dominated offshore substrate, with localised sand and muddy regions found in coastal areas. Moving inshore from central Channel areas will see steeply sloping shores in the western Channel, whilst depth gradients the eastern Channel areas are gradual.

Seabed substrate is generally dependent on both tidal and wind driven mixing, as well as inputs of sediment from rivers. This in turn leads to a variability in benthic habitat and species, which alongside variations in salinity, temperature, depth, human disturbance, and prey availability can influence the distribution of the Channel demersal NQS species focused on within this FMP.

Salinity is relatively constant year-round, decreasing in localised coastal areas from riverine inputs. Sea surface temperature decreases slightly from west to east Channel. Channel sea surface temperature are increasing through time with western and central Channel increasing approximately 0.6°C from 1986-2006, with warming of between 1-4°C predicted by 2100.

Summer months see offshore water column stratification driven by thermoclines, particularly in the western Channel, whilst inshore shallower areas typically remain well-mixed. As a result, offshore primary productivity peaks in spring (April-May) and generally declines through the summer and autumn, whilst inshore primary productivity remains more constant throughout the spring and summer due to enhanced nutrient levels and mixing. Both areas have reduced productivity during winter months due to low light levels.

Cross-FMP interactions

FMPs development and implementation will need to ensure management coherence is considered across differing FMPs. This may be in neighbouring or adjacent FMPs, such as the Southern North Sea Demersal Non-Quota FMP where there is considerable species overlap with this FMP, or in overlapping FMPs like the Celtic Sea and Western Channel Demersal FMP where there is significant spatial overlap with this FMP for vessels operating in a mixed fishery. Coherence will be particularly important for FMPs that overlap both in species and space such as the Southern North Sea and Eastern Channel mixed flatfish FMP that directly overlap in lemon sole, turbot, and brill in ICES 7d, and thus a concern for consistency in how the FMP propose management and harvest strategies.

Likewise, consideration will need to be given to the management implications in neighbouring FMPs, such as the Southern North Sea Demersal Non-Quota FMP where there is considerable species overlap, and the Celtic Sea and Western Channel Demersal Fisheries Management Plan where there is significant spatial overlap for vessels operating in a mixed fishery. Where possible, FMPs should endeavour to harmonise management where overlap and the need for consistency exists.

Black bream is not covered in the FMP but there could potentially be some displacement effects on this species from vessels if the fisheries for other NQS are restricted. There is a black bream FMP which can consider this interaction as it could become vulnerable to over-exploitation in the Channel.

There is also concern that measures introduced for managing the NQS considered in this plan could impact on other FMPs. For example, lesser spotted dogfish and smoothhound are a less desirable catch retained to ensure that caught bass comprise less than 5% the total weight of landings. Protections for lesser spotted dogfish will impact on fishing practices for bass. Landed lesser spotted dogfish, smoothhound, and gurnard species are typically used as pot bait. Management introduction many have implications on whelk and crab and lobster potting fisheries and their respective FMPs. Lesser spotted dogfish and smoothhound are also important recreational species; consequentially their value to sea anglers may be much greater (both socially and economically) than the species' value as bycatch in bass fisheries, or pot bait for crab and whelk fisheries. Recommendations are made in the research plan to initially gather evidence on how to maximise the sustainable use of these stocks.

Marine and coastal areas with designated protections or fisheries restrictions

There are 52 protected area designations including Marine Conservation Zones (MCZ), Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Highly Protected Marine Areas (HPMAs) that overlap the FMP (see Annex 4 of the Evidence Statement for a full list of protected areas) (Figure 1).

Assessment of the impact of fishing activity within marine protected areas (MPAs such as MCZs, SPAs, SACs) has or will be carried out by the Inshore Fisheries and Conservation Authorities (IFCAs) and MMO working closely with stakeholders to mitigate fishing impacts. Therefore, appropriate management should either be in place or introduced soon that ensure any fishing within these sites is compatible with MPA conservation objectives. Current management measures already in place are detailed on the MMO and Association of IFCAs websites.

Statutory nature conservation bodies have screened risks posed by fisheries occurring outside of MPAs on designated features. These are presented in section 6 and Annex 7, as well as Annex 4 of the Evidence Statement.

HPMAs protect all species and habitats and associated ecosystem processes within the site boundary, including the seabed and water column. Dolphin Head pilot HPMA is within the boundaries of this FMP. The government aims to designate the site prior to 6 July 2023 and expect fisheries management measures to be implemented in early 2024. It is anticipated that extractive, destructive and depositional activities will be prohibited within HPMAs which will include commercial and recreational fishing.

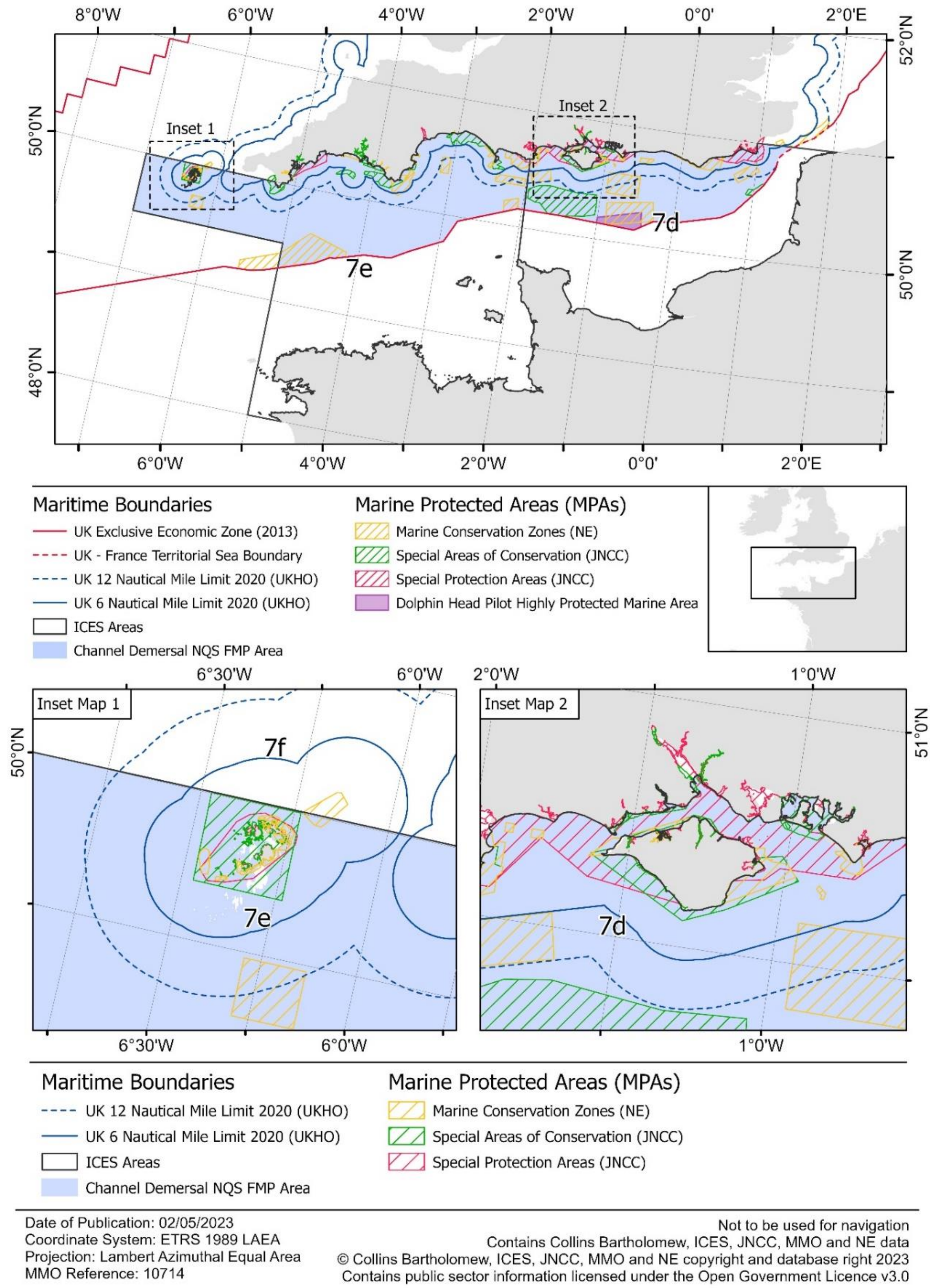

Figure 1 Conservation designations overlapping the FMP including MCZs, HPMAs, SACs, and SPAs around the English Channel

Spatial pressure relating to other sea uses

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.

Description of the fishery

Available fisheries data

NQS have historically not been prioritised for ICES stock assessment over key quota stocks which require scientific evidence to support total allowable catch (TAC) setting. Whilst some stocks are assessed by ICES (Table 2), comparatively little seems to be known about the sustainability of NQS removals versus quota species. Whilst there is scope to consider precautionary measures there is a need to commission scientific analysis subject to species prioritisation and available resource. Specific additional research is undertaken for some species, and where possible is highlighted within each of the species' summaries within Annex 2 of the Evidence Statement.

For each species, national landings data are available and reported on a monthly basis (MMO Statistics), alongside international landings where available. At sea observational data are also available for each species, which includes numbers, length composition data and retention rates for fish caught by various fleets. Market sampling can provide additional length composition data. For some species, additional biological information such as otolith samples are taken, but generally for the species under this FMP it is rarely analysed.

Fisheries independent data are available from several UK surveys, as well as international surveys that operate within the English Channel. Domestically, the UK undertakes the Eastern Channel and southern North Sea beam trawl survey (BTS7D), the western Channel sole and plaice survey (UK-FSP) and the South-west Ecosystem beam trawl survey (Q1SWBEAM). Internationally, France also conducts an ICES otter trawl survey in 7d (FR-CGFS). If a stock's distribution extends beyond the English Channel, other ICES surveys cover the North Sea (NS-IBTS), the Celtic Sea and Bay of Biscay (FR-EVHOE), Irish Sea (NWGFS) and south and west of

Ireland (IE- IGFS), and West of Scotland (SCOWCGFS and SWC-IBTS). Data from these surveys are fed into ICES assessments and given that most of the species within this FMP are captured through these surveys, providing the fundamental requirements to conduct basic assessments.

Fishery overview

MMO undertook an analysis of fishery dependent data collated routinely for management purposes. These included data from published sources such as the annual fisheries statistics published by MMO and by bespoke extractions from MMO data holding including the iFish and Bigfish databases that store UK fishery dependent data. These data are discussed in depth within section 4.2 and Annex 1 of the Evidence Statement.

Landings value and weight data for focal species (2012-2021) were extracted from the UK fisheries statistics and their underpinning data sets whilst the MMO data were used to explore relative importance of landings in a regional and national context, to different administrations and to explore aggregated species trends in landings over recent history. As part of this evidence commission EU data was used to provide weight and value of landings by EU vessels over a comparable time series to the UK landing data. This chapter continues from section 3.3 of the FMP.

Fishing effort across the Channel, catches and landings data

The distribution of fishing activity across the Channel is outlined below at ICES rectangle resolution for UK vessels by dominant gear groups, Figure 2 (a) otter and b) beam trawls, Figure 3 a) gillnets and b) demersal seines, and Figure 4 a) pots and trap and b) all major gear groups). There are a number of areas heavily fished and of commercial importance to the fishery, specifically along the west coast of Cornwall for otter trawls, along the coast and up to the Exclusive Economic Zone (EEZ) limit of Cornwall and Devon for beam trawls, along the whole south coast for gillnets, and offshore in the eastern Channel for demersal seines.

Effort in ICES rectangles that bisects by the median line for the UK-EU EEZ are split proportionally to respective EEZ area. Only UK proportions are mapped but shown across the full rectangle. Coastal rectangles will have a smaller available space for fishing activity, and thus reduced effort.

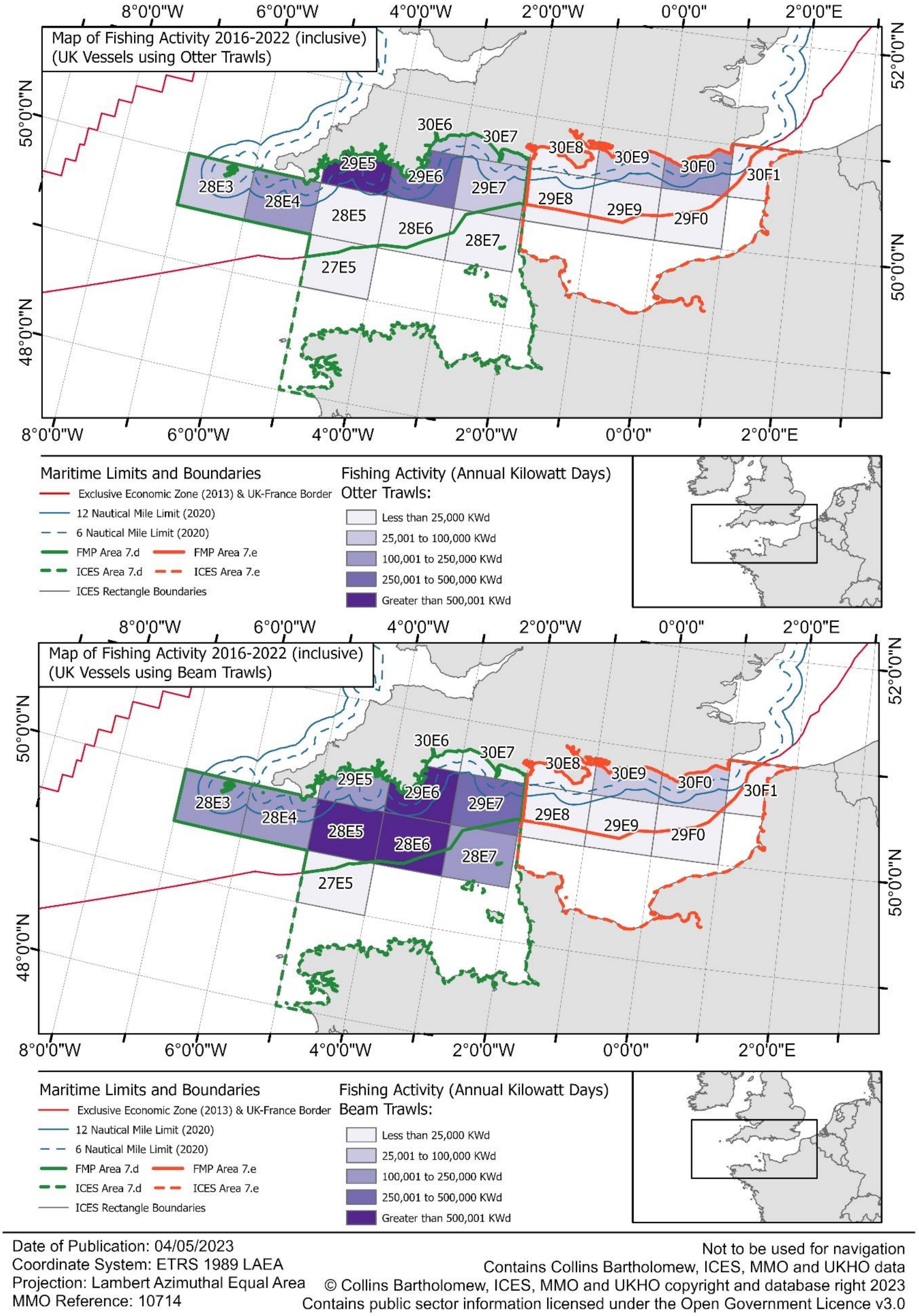

Figure 2 Fishing effort in Kilo-Watt hours (kWh) for otter trawls [top] and beam trawls [bottom]

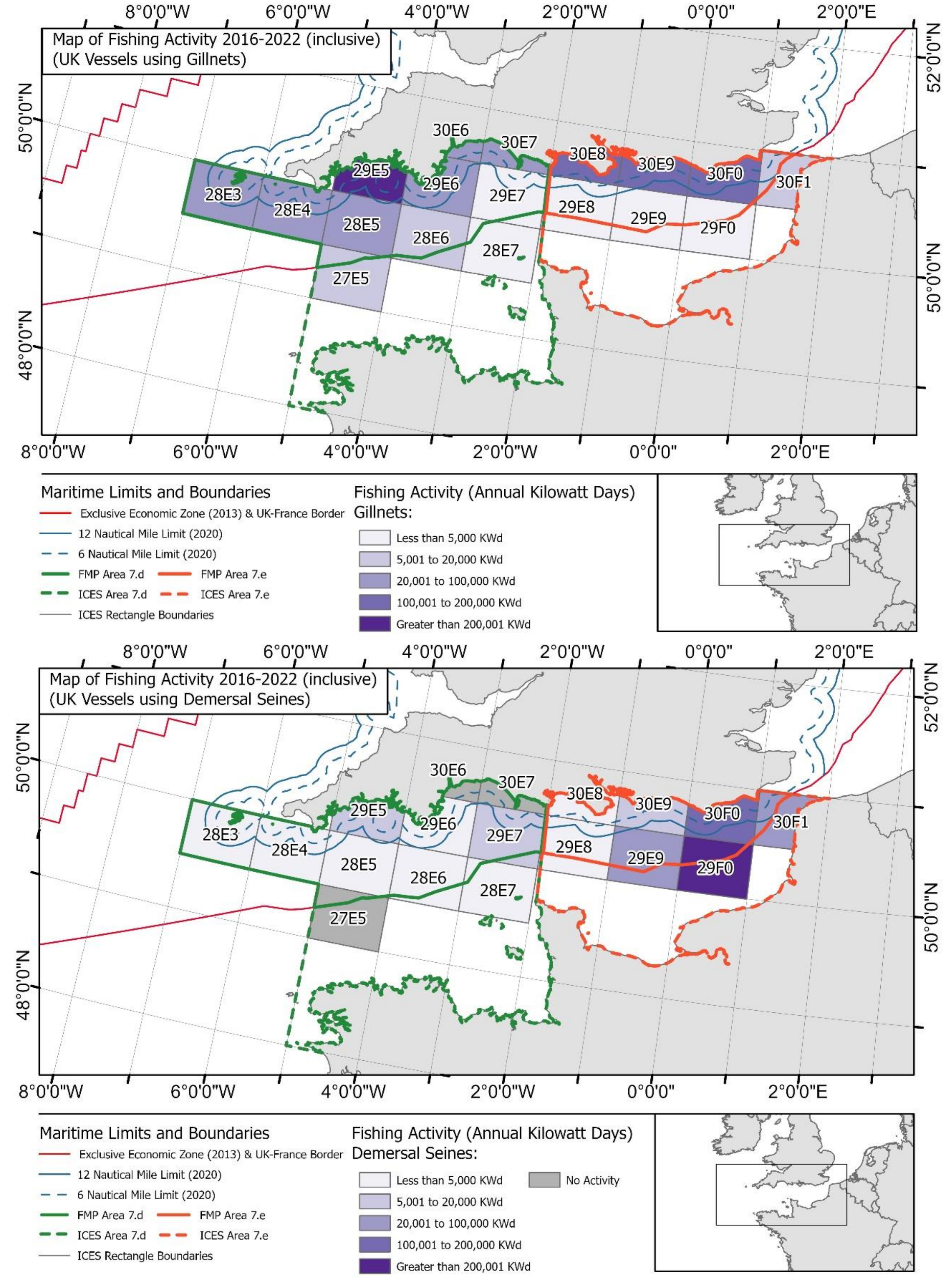

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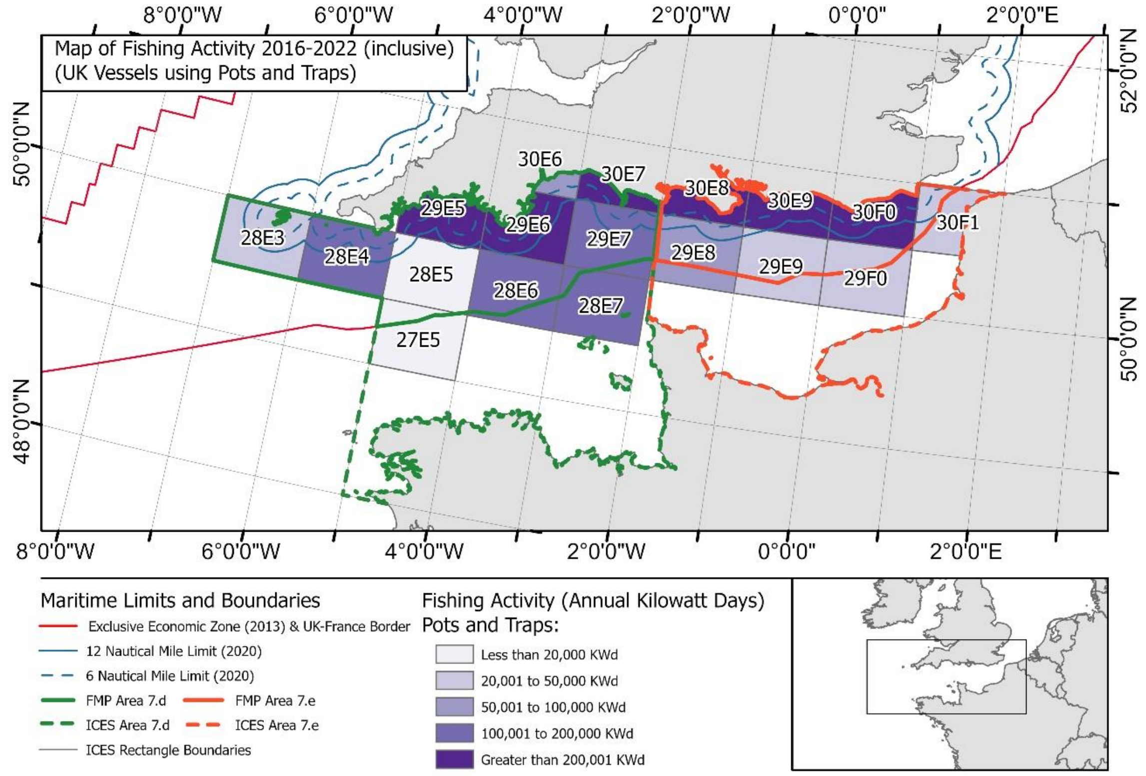
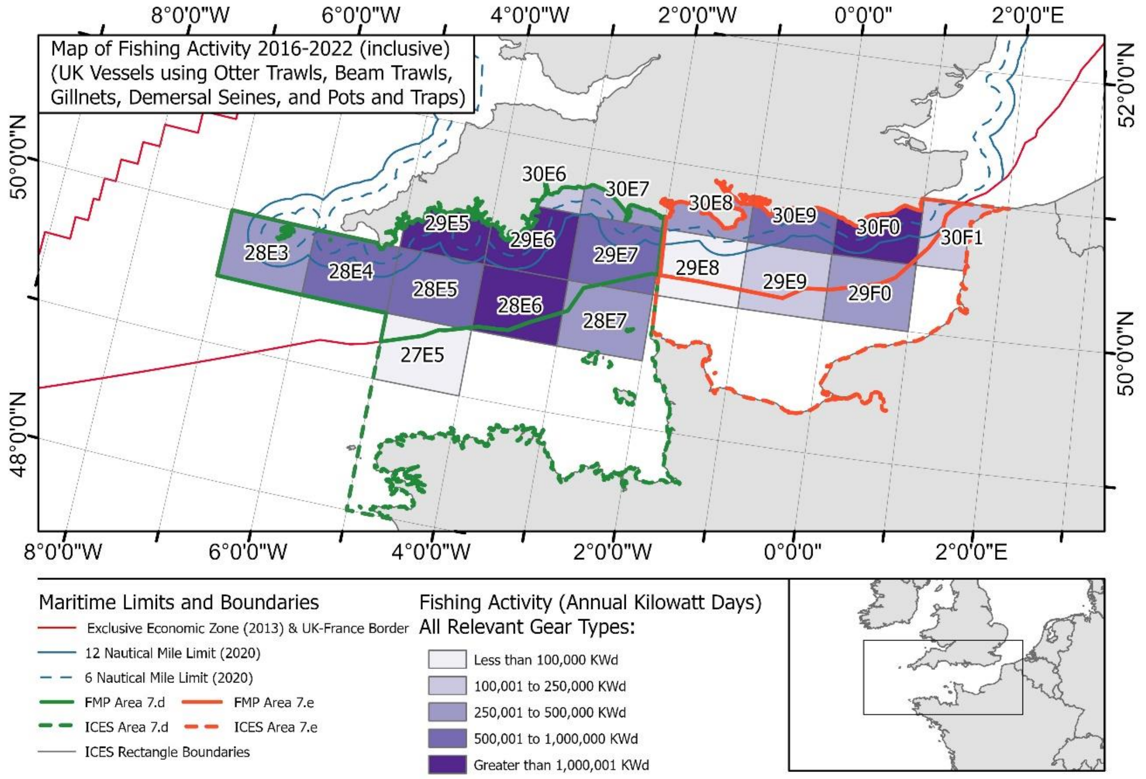
Figure 3 Fishing effort in Kilo-Watt hours (kWh) for and drift and set nets [top] and demersal seines [bottom]

Annex 5: Scope and description of the fisheries in the Channel NQS FMP





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Contains Collins Bartholomew, ICES, MMO and UKHO data

Figure 4 Fishing effort in Kilo-Watt hours (kWh) for pots and traps [top] and all vessels combined

UK vessels

UK catches are split mostly by beam and demersal trawls (see FMP Figure 2). By weight cuttlefishes emerge as the most importance species for UK vessels representing 46% of the annual catch. Lesser spotted dogfish, gurnards (recorded at a family level) and lemon sole emerge as the top 2, 3 and 4 species representing 8.9%, 8.0% and 7.8% of the annual catch respectively. Bib and squid represent 6.5% and 4.8% of the catch weight, whereas, turbot, smoothhound, brill and red mullet represent ~3% of the catch weight each. The remaining species groups represent less than 2% of the catch. See FMP Figure 3.

By value cuttlefishes emerge as the most importance species for UK vessels representing 48% of the annual catch. Lemon sole and turbot emerge as the top 2 and 3 economically important species representing 11.9% and 11.3% of the annual catch value. Squid (8%), brill (6%), john dory (3.7%) and red mullet (3.2%) make notable contributions. The remaining 7 species groups each represent 1% of catch value or less. See FMP Figure 4.

Although not inflation corrected across the years an approximation of value by weight can be derived as £ per tonne (Figure 5). This illustrates a large variation in relative value that informs on the substantial changes in rank importance between weight and value. Value per tonne ranges from a £352 per tonne (lesser spotted dogfish) to up to £10,666 (turbot).

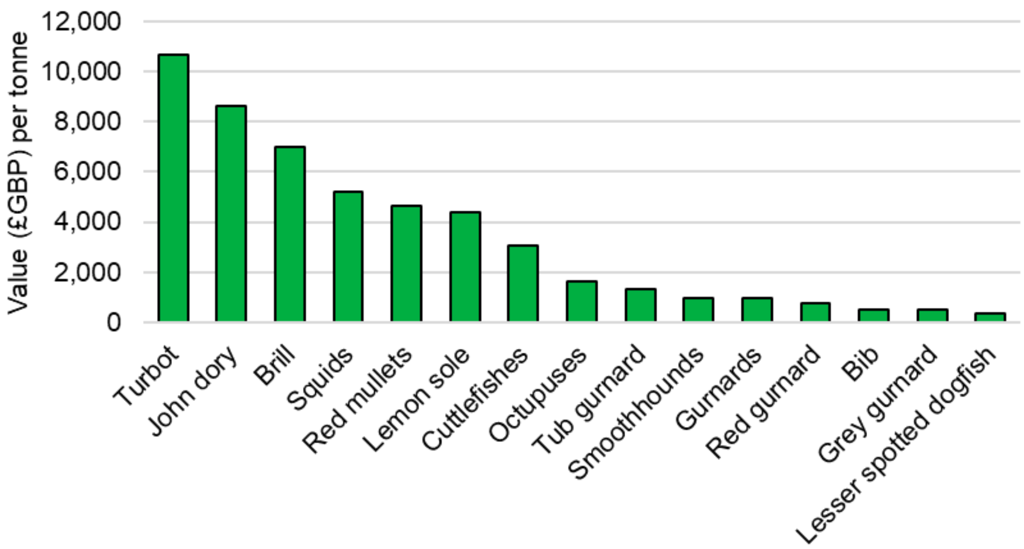

Figure 5 Species value per weight (annual average of 2016-2021)

EU vessels

The EU fleet has a slightly different catch makeup with demersal trawls landing the bulk of non-quota catch followed by beam trawls and demersal seines (commonly referred to as flyseiners). The EU fleet catches are for red mullet, squid, and gurnards are dominated by Scottish seine vessels.

By weight, cuttlefish emerges as the most importance species for EU vessels representing 17.4% of the annual catch. Bib, lesser spotted dogfish, squid, tub, and red gurnard emerge as the top 2-6 species representing 10-14% of the annual catch. Red mullet (7.5%), smoothhound (5.1%), lemon sole (2.7%) and john dory (2.6%) of annual catch weight. The remaining species groups represent 2% of the catch or less. See FMP Figure 3.

By value squids emerges as the most importance species for EU vessels representing 25.5% of the annual catch. Cuttlefishes, red mullet, john dory and turbot emerge as the top 2-5 species representing 20.1%, 14.2%, 9.3% and 7.4% of the annual catch, respectively. Tub gurnard, lemon sole, brill, bib, red gurnard and smoothhounds represent 2-5% of the annual catch value. The remaining 4 species groups represent less than 2% of catch value. See FMP Figure 4.

Vessel breakdown

As of 2021, 717 home nation registered vessels participated in the Channel demersal NQS fishery (Figure 6). Vessel numbers have declined from the 925 vessels since 2017 – however, this may be attributed to increased cuttlefish fishing effort during this peak catching period.

As of 2021, 191 (26.6%) of vessels participating in the fishery obtained 20% or more of their landings value from the fishery although economic dependence is also decreasing. In 2017, 291 (31.5%) obtained 20% or more of their landings value from the fisher.

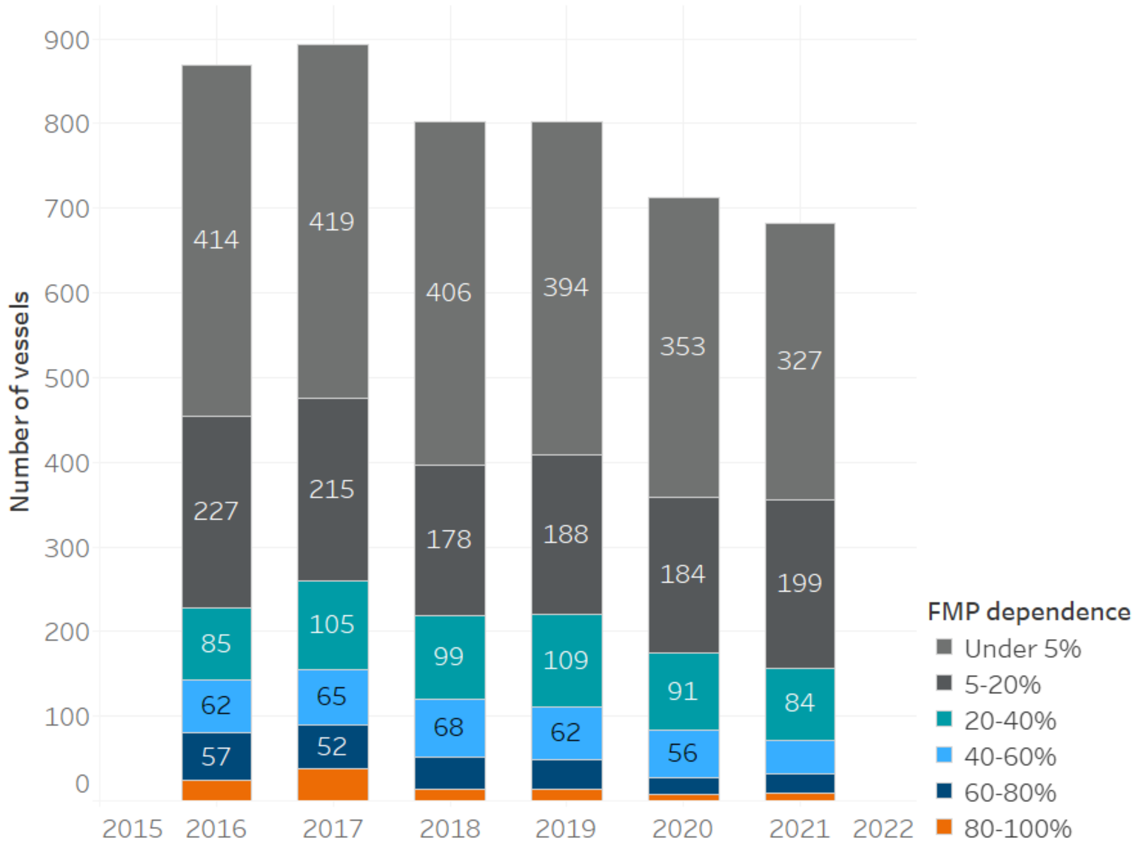

Figure 6 Number of UK vessels involved in the Channel demersal NQS fishery by level of economic dependence

Figure 7 below, shows the number of vessels which rely on Channel demersal NQS for more than 20% of its annual income by vessel size categories. Figure 8 provides this as a proportion of the total number of vessels. Size categories remain relatively consistent from 2016-2021, despite an overall reduction.

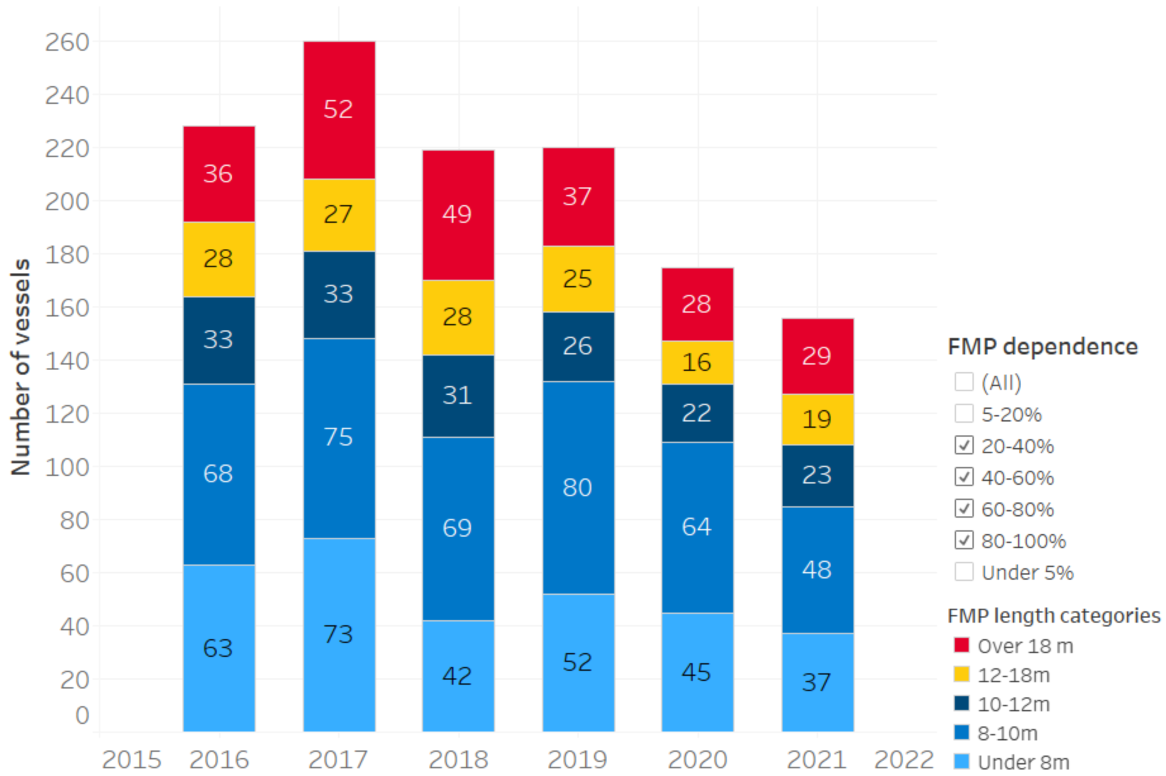

Figure 7 Number of UK vessels by vessel size categories (>20% economically dependent on the FMP)

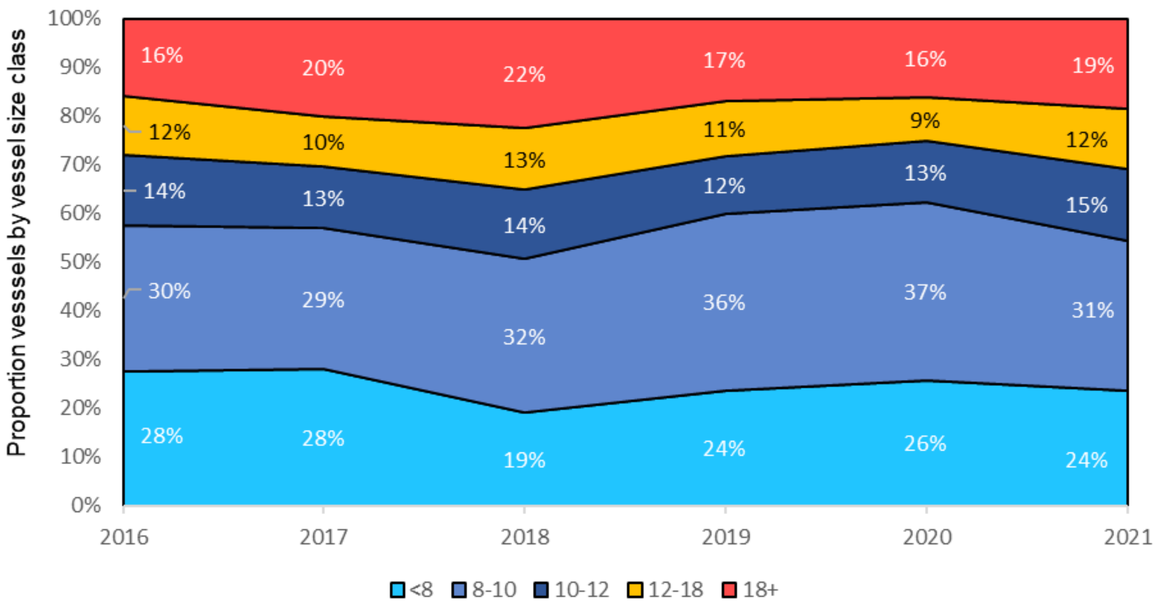

Figure 8 Number of UK vessels by size given as a proportion of size class

Vessels varying in size from under 8m to over 40m length landed focal species from the FMP area. 78.3% of landings were by vessels greater than 12m although size class composition was different between UK and EU27 fleets. The EU27 component was dominated by larger vessels, with 95.4% of EU27 landings from vessels greater than 18m compared to only 61.2% for UK vessels. 13.7% of the UK landings were from under 10m vessels for the EU27, this was only 0.3%.

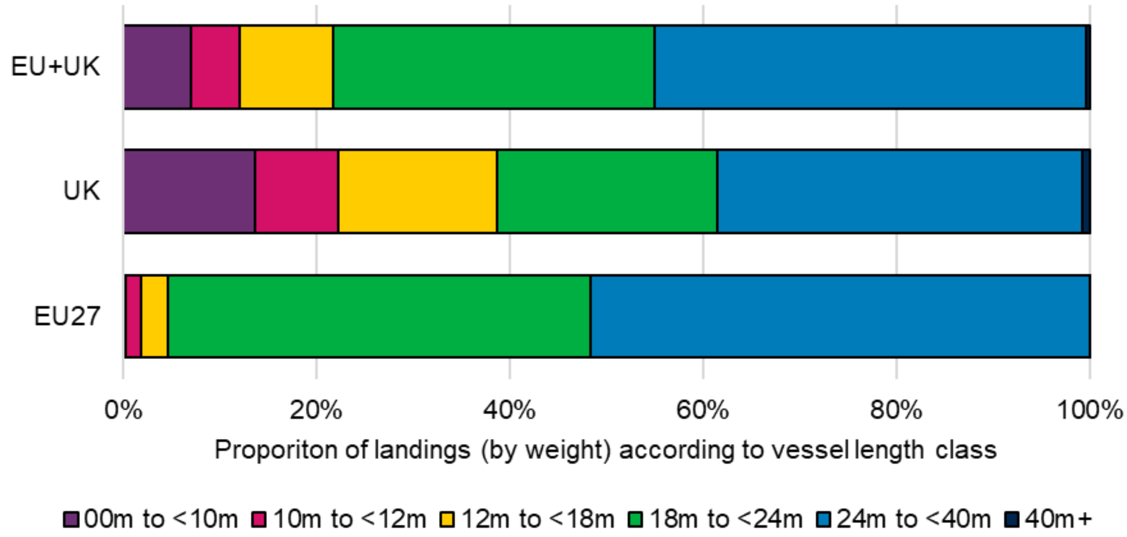

Figure 9 Proportion of landings vessels by size class (2016-2021)

Fishing gear

Demersal NQS are targeted by a range of different gear types within the FMP region. These include beam trawls, otter trawls, demersal seines, drift and fixed nets and pots and traps. Details have been given in section 3.3 of the FMP. More information on the catches weight and value by fishing gear has been provided in Annex 1 of the Evidence Statement.

Considered across all vessels, there has been little change in the rank importance of gears over recent years (Figure 10) although there has been a steady decline in the proportion of landings value from demersal trawl and an increase in landing first from beam trawling and subsequently from demersal seining.

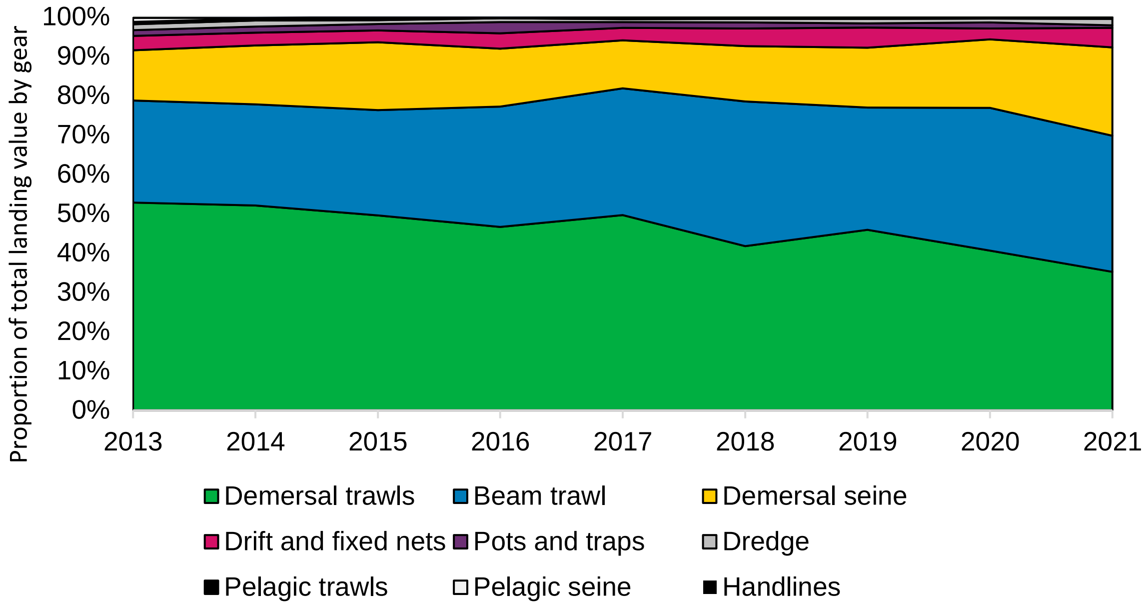

Figure 10 Proportion of landings weight by gear type over time (2013-2021)

Eastern and western Channel

Differences in the composition of the FMP species landings exist between ICES area 7d and 7e. Octopus, john dory, lemon sole, cuttlefish, brill, bib, turbot, lesser spotted dogfish and squid are more prominent in 7e. Grey and tub gurnard, red mullet and squid more prevalent in the landings of 7d. Total landings of FMP species caught in 7e are twice as large compared to 7d by both weight and by value. When looking at UK vessel landings only, the weight of catch in 7e is 5.3 times larger and the value of catch is 7.2 times greater than 7d. EU vessels are closer to a 1:1 relationship on catch weight and value, if marginally greater in 7d.

Over the 2013-2021 period 48% of total landings (90.3% of UK landings) by weight and 52% (91.5% of UK landings) by value were landed at 10 ports (Table 4). The UK landings from the FMP area are received by predominantly three ports with Brixham accounting for a majority (by value - 53.3%) of focal species landings and Plymouth (13.1%) and Newlyn (10.3%) of landings. In the Eastern Channel, Shoreham-by-Sea and Newhaven emerge as the most important UK landing ports, recognising a significant proportion of the Eastern Channel catch is likely landed into the EU with Boulogne and Vlissengen totalling 3.5% of UK vessel landings.

Port of landing for EU vessels is not currently listed in the data source. The EU27 represents approximately 46% of landings by weight and 43% of landings by value (over the period 2013-2021) from the FMP area. It is unlikely that EU27 port landings reflect those of the UK fleet being more likely to land to continental ports, and already observed to have different landings composition and gear and vessel characteristics. EU27 landings to port behaviour should not be extrapolated from UK data and individual port landings will have different error rates from the total fishery when relying only on UK data.

Table 4 Top 10 landings ports for FMP species caught by UK vessels given as weight and value

Port of landing	Annual Weight (t)	Annual Value (£)	% of total weight	% of total value	% of UK weight	% of UK value
Brixham	5,736	15,667,796	28.6	29.8	53.3	52.3
Plymouth	1,300	3,935,018	6.5	7.5	12.1	13.1
Newlyn	986	3,092,777	4.9	5.9	9.2	10.3
Boulogne	526	1,366,264	2.6	2.6	4.9	4.6
Looe	305	1,037,364	1.5	2.0	2.8	3.5
Shoreham	224	471,705	1.1	0.9	2.1	1.6
Newhaven	196	373,045	1.0	0.7	1.8	1.2
Vlissengen	182	525,352	0.9	1.0	1.7	1.8
Mevagissey	164	641,851	0.8	1.2	1.5	2.1
Lyme Regis	110	286,195	0.5	0.5	1.0	1.0
Total			**48.6**	**52.0**	**90.3**	**91.5**

Social and Economic Data

Alongside more traditional information regarding fisheries, such as landings and point of sale value, fishing activity for NQS species can be attributed to a range of social and economic benefits to both coastal communities and the wider UK economy. Under the Fisheries Act 2020 national benefit objective, as well as direct goals developed as part of this FMP, there is a commitment to quantify the direct and indirect social and economic benefits associated with both commercial and recreational fisheries for the species covered by this FMP and then act to support these.

See section 4.6 and 4.7 of the Evidence Statement for highlights of economic and social significance, limitations, and evidence gaps. Further detail on the economic importance of the fishery has been given in Annex 1 of the Evidence Statement.

Commercial fishing

Economic significance of the fishery can be defined by the value of landings, and dependence on the species within the scope of the FMP as a proportion of income viewed at individual, local community, regional and national levels. A number of gaps have emerged through collating this evidence which point to requirements to better understand the importance of these species to local communities, identifying and modelling the drivers behind falling economic performance and the implications of management changes on those most reliant on these stocks for their livelihood. A summary of the economic value of species, gear, vessel size and landings ports has been given in Annex 1 of the Evidence Statement. Further evidence and research will need to be undertaken to determine the whole value of the fishery and the NQS contribution to this along the FMP area. This will look to build on understanding the value of the catch from landing to consumption, including the economic benefits along the length of the supply chain. Cornish Fish Producers Organisation (CFPO) are in the process of developing this work in the Southwest FMP area, this may provide a useful future evidence based and methodology for assessing the full economic value of the Channel demersal NQS fishery.

Analysis of the economic performance evidence shows a decreasing trajectory in fishing income, gross added value (GVA) and operating profits not solely linked to the covid-19 pandemic. Further research will need to be carried out to understand the drivers behind this and predict a future outlook for the fishery. In addition to this, employment figures given as full-time equivalents (FTEs) mirror the above trend in a declining number of fishers and vessels active within the fishery. This is a concerning outlook for the fishery and is a recommended area for the FMP to look to understand and address where possible through its actions and goals.

Employment data has been attributed to fishing for the Channel demersal NQS, these show employment linked to fishing effort driven by cuttlefish catches. Some of trend in declining vessels and FTEs can be attributed to the increase in landings of cuttlefish in 2016, 2017 and 2018, which subsequently has fallen, but more research needs to be undertaken to understand the nuances in changes and developments in what would be defined as the Channel demersal NQS fishery – i.e. vessels that are consistently reliant on these species each year for a proportion of their income. General trends in fishery employment have not been picked up as part of this evidence gathering.

Commercial fishers have raised concerns surrounding the ageing of the fishing population and the absence of younger generations taking up the profession. It was suggested that without support, coastal community dependence on fishing will be detrimentally impacted by the contraction of the fishing population, and therefore community reliance will shift elsewhere. The FMP will need to be adaptable to this change in the fishery, and the potential implications this may carry for opening up fishing take and effort, ensuring the application of management for sustainability is consistent with the needs for the fishery, and look holistically at opportunities for fishers against the needs for sustainability.

Existing fishing restrictions

Management measures and legislation

NQS considered to be within scope of the management plan are subject to a minimum towed gear mesh size of 80mm except for squid for which there is a derogation allowing the use of 40mm trawls in a directed fishery. There is no specific definition of ‘directed fishery’ in the basic regulation (EU 1241/2019 retained in UK law). The species in scope of this FMP do not have a Minimum Conservation Reference Size (MCRS) otherwise known as a ’minimum landing size’ prescribed beyond the 6nm. Some IFCA districts have introduced a MCRS for these species.

Recent technical measures for the Celtic Sea have introduced a larger baseline mesh size for towed gears in 7e except for the 12nm belt where under 12m vessels can continue to fish with 80mm gear.

There is no constraint on the amount of non-quota stocks that can be landed except for the current UK/EU Trade and Cooperation Agreement which places a general cap on the amount that the UK and the EU can take from each other’s waters.

Table 5 below provides a summary of existing fisheries legislation impacting on the FMP species in the scope of this FMP. Legislation indirectly impacting on the FMP species, such as baseline mesh size limits related to a catch composition of over 20% cod, haddock and saithe for demersal trawls, have not been included here.

Table 5 Existing fisheries legislation in the English Channel directly relating to FMP species

Regulation	Amended by	Target fishery	Gear type	Area	Restrictions
Regulation (EU) 2019/1241 Annex VI part B2.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Flatfish and Non-TAC species	Fixed nets	7d	90mm mesh
Regulation (EU) 2019/1241 Annex VI part B2.2	SI 2019/1312		Fixed nets	7e	100mm mesh

Annex 5: Scope and description of the fisheries in the Channel NQS FMP

Regulation	Amended by	Target fishery	Gear type	Area	Restrictions
	Fisheries Act 2020 Schedule 11				
Regulation (EU) 2019/1241 Annex VI part B2.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Red mullet	Fixed nets	7d and 7e	50mm mesh
Regulation (EU) 2019/1241 Annex VI part B1.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Sole and mixed demersal species	Beam Trawls	7d	80mm codend
Regulation (EU) 2019/1241 Annex VI part B1.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Sole and mixed demersal species	Beam Trawls	7e	80mm codend and headline panel with 180mm mesh
Regulation (EU) 2019/1241 Annex VI part B1.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Sole and non-TAC species	Stern Trawls	7d	80mm codend and 80mm square mesh panel
Regulation (EU) 2019/1241 Annex VI part B1.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Whiting, Mackerel, and non-TAC species	Stern Trawls	7d	80mm codend
Regulation (EU) 2019/1241 Annex VI part B1.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Whiting, Mackerel, and non-TAC species	Stern Trawls	12nm in area 7e east of 5°W	80mm codend Max twine thickness – single 6mm, double 4mm Vessels of 12m or less with engine power of 221kW or less

Annex 5: Scope and description of the fisheries in the Channel NQS FMP

Regulation	Amended by	Target fishery	Gear type	Area	Restrictions
Regulation (EU) 2019/1241 Annex VI part B1.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Sole and non-TAC species	Stern Trawls	12nm in area 7e east of 5°W	80mm codend and 80mm square mesh panel. Max twine thickness – single 6mm, double 4mm Vessels of 12m or less with engine power of 221kW or less
Regulation (EU) 2019/1241 Annex VI part B1.2	SI 2019/1312 Fisheries Act 2020 Schedule 11	Squid	Stern Trawls	12nm in area 7e east of 5°W	40mm codend Max twine thickness – single 6mm, double 4mm Vessels of 12m or less with engine power of 221kW or less
Regulation (EU) 2019/1241 Annex VI part A	SI 2019/1312 Fisheries Act 2020 Schedule 11	Octopus	All	Whole Channel	750g MCRS

Further spatial restrictions for towed gear operating in the 6nm have been introduced through IFCA byelaws relating to localised marine protected areas – see Annex 4 of the Evidence Statement for an overview of areas with marine protections. Cornwall and Southern IFCAs have introduced a MCRS for lemon sole (25cm), turbot (30cm), brill (30cm) and red mullet (15cm).

Sussex IFCA are also currently in the process of introducing MCRS for a number of these FMP species. Additional legislation introduced through this process will later be included here in the FMP.

Annex 5: Scope and description of the fisheries in the Channel NQS FMP

There is further detail on IFCA legislation in the Evidence Statement Annex 3 which explores the closed area restrictions and other measures such as fixed engine byelaws and trawl closed areas.

Department
for Environment
Food & Rural Affairs

Proposed Fisheries Management Plan for Channel Demersal Non-Quota Species

Annex 6: FMP Goals, Management Strategy and Monitoring

Date: July 2023

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Contents

FMP Goals

Sustainable fisheries goals

The overarching aim of fisheries management is to preserve the long-term sustainable use of fisheries resources whilst at the same time maximising any potential environmental, social or economic benefits. In English waters this is managed in line with the Defra's 25 Year Environment Plan and associated legislation such as the Fisheries Act 2020 and the Marine and Coastal Access Act 2009. Driven by the Government’s aim for clean, healthy, safe, productive, and biologically diverse oceans, the objectives of fisheries management, as reflected and supported by this Fisheries Management Plan (FMP), is to contribute to achieving the objective of protecting the marine environment for current and future generations and to ensuring marine businesses are supporting sustainable growth in the economy. Further to this, there are numerous domestic and international policy drivers to consider and mitigate for the wider adverse environmental impacts of fishing activity. The Fisheries Act 2020 ecosystem and climate change objectives, as well as supporting provisions under section 5.3.6 of the Joint Fisheries Statement (JFS), give power to those drafting FMPs to extend the scope of the document to address environmental issues.

Under the sustainable fisheries management theme, the FMP has proposed two fisheries level goals. The first, ‘Deliver effective management of demersal non quota species (NQS) in the English Channel’, is focused on stock management and progress toward regulating catches. Subsequently, the FMP has a second goal, ‘Deliver wider biological sustainability’, which has two sub-goals. The first sub-goal is focused on the stock, environmental interactions and non-fishing pressures, and the other sub-goal is focused on environmental management of fishing impacts, with a specific focus on unwanted and protected species bycatch.

Implementing a mixed fishery approach

Given that most of the species within the scope of the FMP are captured as part of mixed fisheries, a key evidence and management gap is the implementation of mixed fishery approaches, which should be considered under future iterations given the current data limited state of the FMP stocks and the requirement to deliver an ecosystem-based approach, for which mixed fishery management is complimentary. To this point, a long-term sub-goal of this FMP, under the wider goal of delivering effective management of demersal non-quota species in the English Channel, is to implement a mixed fishery approach.

As an example of mixed fishery approaches, ICES provides advice on mixed fisheries in the North Sea, Celtic Sea, Bay of Biscay, Iberian Waters, and Irish Sea[1]. Mixed fishery approaches have been developed in recognition of the fact that different fish stocks and species are often caught together in the same fisheries which means that management measures for one stock can also have implications for other stocks. For example, where two of the stocks caught in a fishery (stock A and B) are subject to Total Allowable Catches (TACs), if stock A is depleted, then it may have a low TAC set to protect it and help its recovery. Stock B may have a less restrictive TAC. The likely consequence of this could be that the TAC for stock A may be exhausted part way through the year, but vessels will continue fishing, and thus catching stock A if they still have quota for stock B. This would result in the TAC for the depleted stock being exceeded, making it less effective as a conservation measure. Mixed fishery approaches are intended to quantify these effects and thus permit management measures to be set which minimise these potential mismatches.

The starting point for a mixed fishery approach is understanding the status of the relevant stocks. For each stock this requires some form of stock assessment as well as a set of reference points against which the status of the stock can be evaluated. In addition, the key component of mixed fishery analyses is detailed data on the catch compositions and effort of different fleets. The latter is essential as it provides information on the extent to which different species are caught together in the same fisheries, the so-called technical interactions.

The current ICES mixed fishery modelling approaches, Fcube (Ulrich *et al*., 2011) and FLBEIA (Garcia *et al.* 2017), have been developed specifically for the context of European fisheries where most of the stocks are subject to annual, age-based assessments and where the main management measures are TACs which are set through an annual negotiation process that is informed by the stock assessment outputs, specifically the short-term forecasts. In effect, the mixed fishery models use the fleet catch and effort information to provide additional forecasts which account for the technical interactions rather than treating each stock independently of each other.

As they are data-demanding and specific to TAC-based management, the existing ICES mixed fishery approaches do not immediately lend themselves to use for NQS. However, the broad principles of determining stock status from stock assessments before using additional information on catches by fleet and fishery to inform management decisions would still be relevant.

The nature of any mixed fishery approaches that can be applied in this context will be determined by the form of stock assessments that are in use or under development for the relevant stocks. The form of management measure to be used

1 https://www.ices.dk/advice/Fisheries-overviews/Pages/fisheries-overviews.aspx

will also be important; while existing approaches are focused on setting catch limits in the form of TACs, other measures such as effort limits or spatial/seasonal closures could also be effective ways to manage the trade-offs that arise from fishing multiple species in mixed fisheries. This also points to the need for an effective and transparent decision-making process for implementing management measures based on the results of any mixed fishery analyses.

The steps needed to implement a mixed fishery approach for these fisheries need to consider three separate but linked processes, these being data collection, method development and decision making:

1) **Data collection:** Collection of data on catches, typically broken down by size or age, is a routine part of the stock assessment process. The form of data required is determined by the stock assessment approach in use or under development. To facilitate the development of mixed fishery approaches, data collection will also need to ensure that catch data are also broken down by vessel, gear, and, as much as possible, location of capture.

2) **Method development:** When applying or developing assessment approaches for the relevant fish stocks, consideration should also be given to how these approaches might be used in a mixed fishery context. For instance, some ICES data-limited approaches are used to advise on a percentage change to recent catch levels based on one or more stock or catch indicators. There may be scope for evaluating the impacts of such advice on other stocks caught in the same mixed fishery context using a similar approach to Fcube (Ulrich *et al.,* 2011). Alternatively, it might be worth exploring the application of similar data-limited assessment approaches to multiple stocks simultaneously to look at the possibility of providing advice at a fishery level rather than a stock level. These ideas are preliminary but reflect the need to look at assessments in a wider context and not just at stock level.

3) **Decision making:** In principle, if not in practice, where annual TACs are the main management measure for a given stock, decision making should be straightforward as it should just involve agreement on a single number. This is not the case if mixed fishery considerations are accounted for in setting management measures due to the need to recognise the trade-offs between the different stocks and also to identify and agree on appropriate measures. This increase in complexity of the decision-making process is a consequence of adopting a mixed fisheries approach and it needs to be recognised when governance approaches are developed and implemented for the relevant fisheries.

Overall, there is scope for some form of mixed fishery approach to be developed alongside, and as an extension to, the assessment and advice process for the fish stocks of interest here. Existing ICES approaches are unlikely to be appropriate, given their extensive data requirements, but there is potential for implementing simpler approaches which would be appropriate for the context.

Maximum sustainable yield (MSY) or suitable proxy for stock assessment

The FMP has the ultimate and long-term ambition of progressing evidence gathering of the species in the FMP to the point where each species can be considered against MSY stock or a suitable proxy as a measure for sustainability of harvest. By gathering effort data from fishing vessels on their logs, the evidence will be more accurate as catch per unit effort is a better tool for assessing stocks, catches and any decrease or increase in these.

Climate Change

The FMP has the long-term ambition of progressing evidence gathering of the species in the FMP to the point where the impact of climate change is understood and can be to some degree mitigated to reduce the impacts of the fishery. Recognising that due to warming sea temperatures, there may be a significant shift away from the current composition of species caught and targeted in the Channel. The FMP will also need to be resilient to this change and adapt management for these current and potentially new species in the future.

Anthropogenic impacts on the stocks (non-fishing)

The FMP has the long-term ambition of progressing evidence gathering of the species in the FMP to the point where other non-fishing related pressures are defined and understood. This will enable management considerations to extend beyond fishing impacts for the preservation of the stocks, promoting sustainability and delivery of national ecosystem objectives.

Protected species bycatch

The FMP has the medium-long term ambition of progressing evidence gathering of the fishery impacts on protected species bycatch. Putting in place sufficient mitigative measures to limit fishing pressures on the unwanted and protected species stocks.

Social and economic goals

Government ambition to enable fisheries to continue to deliver social and economic benefit to coastal communities is driven by the Fisheries Act national benefit objective, as well as the Levelling Up Agenda. Fisheries, both commercial and recreational, have direct and indirect economic impacts on local and national economies. Whilst the direct economic impacts are well understood for the commercial sector, and recreational economic information is collected through the Sea Angling Diary, further work is required to fully quantify the indirect economic benefit of fisheries, and then act to support/promote these. The UK Government also continues to further its understanding of the social and cultural benefits of fishing to fishers and coastal communities, which can be significant but again, are not fully understood.

Subsequently, the FMP has goals which fall under the theme of social and economics. Within this theme are two goals: ‘to better understand and optimise social and economic benefits whilst minimising impact to the environment’ and to ‘build capacity for the industry to be able to input into matters effecting NQS fisheries management’. By design, this approach considers the social and economic value of the fishery holistically as a single deliverable, considering the fishing community interests in the development of the FMP. The theme works by (a) understanding that optimising social and economic benefits for coastal communities will ensure that the industry continues to operate for future generations; and (b) giving the fishing community a mechanism to enable meaningful engagement between regulators and industry to ensure transparency and collaborative working. Working collaboratively with stakeholders is key to the success of the FMP, and therefore, also key to enhancing benefits to coastal communities.

There are no easily implementable actions or solutions for improving on the economics and societal benefits of the fishery, recognising that these opportunities will need to be considered alongside a range of trade-offs such as environmental sustainability. An additional nuance is that economic benefit may also be detrimental to societal benefits. As such, the FMP has steered away from commitments on ‘maximising employment opportunities’, ‘increasing net income’ or ‘encouraging a positive investment climate’, and instead has followed an approach of attributing actions which monitor for successes, gather evidence to support development and look to identify opportunities that align all aspects of the FMP. It would be the hope of the FMP, that improving sustainability of the fishery, introducing measures related to improving catch quality and working with the fishing communities to deliver management will contribute to achieving the more direct benefits of ‘maximising employment opportunities’, ‘increasing net income’ or ‘encouraging a positive investment climate’.

Whilst quota stocks are by their nature automatically excluded from the FMP, it is important to take account of the fact that the NQS are largely caught in combination with quota stocks. Therefore, management applied to the FMP stocks may have impact quota stocks. Measures that lead to enhanced sustainability of NQS may, on the one hand, carry benefits for quota stocks and on the other hand, potentially have negative social and economic impacts in relation to overall fishing opportunities. It will be an aim of the FMP to see how management for the FMP species aligns with broader fisheries management and social and economic sustainability.

Optimising economic and social benefits of the fishery

The FMP goal for improving on community fishery benefits propose several actions over the short- to long-term. These include identifying who within the fishing communities are most reliant on the Channel demersal NQS, looking at data which supports an assessment of the direct and indirect social and economic benefits of the fishery on these communities, and producing indicators which will enable changes brought forward through the FMP to be assessed for impact to those communities. In the medium- to long-term, the approach focuses on gathering data to support the above assessments, utilising new or novel methods where this is unavailable, and once the community dependencies have been understood, looking to take steps towards identifying opportunities for optimisation.

Establishing a Channel demersal NQS management group

The FMP has set out a goal for building capacity for the industry to input into FMP management. In aid of this, the FMP proposes the short-term action of creating a Channel demersal NQS management group, comprising of industry, recreational fishers, processers and markets, the regulatory authority, fisheries scientists, policy makers and other interested stakeholders, which will act as a means for addressing management concerns and needs.

The remit of this group in its proposed state will be to act as a forum for engagement and give the group the initiative to set the direction of FMP development. This could include the assessment of evidence in support of requesting and introducing new management regimes and include within its remit the decision-making power to agree to an approach for precautionary management. This management group may also have a future remit to assess the implementation of the FMP, and meeting the FMP vision and goals. The group role could change and expand over time and it will be up to the group to agree a terms of reference when established.

The FMP proposes to focus initially on strengthening cooperative working with stakeholders. It will be the intention to transition the current FMP WG into this new group initially while looking to build and refine the structure in the future. Work to scope out a potential structure, function and governance of a new NQS management group, with stakeholders at the heart of the management decision-making process will be defined on conception.

Evidence goals

The evidence goals provide an approach to evidence gathering which underpins the development of the FMP vision, and goals under the social and economic theme, and the sustainable fisheries theme. As such, it also forms a core component of the evidence statement and future research plan. The FMP proposes two main evidence goals, 'better understand the wider evidence gaps' to build on the evidence statement to consolidate and prioritise evidence gaps; and to 'develop the NQS evidence base', consolidating and streamlining the evidence gathering processes. These goals will support wider Defra ambitions, such as the Data Collection Framework reform work.

Management strategy

Harvest strategy

The FMP harvest strategy, linked to the vision, has primary objectives that 'demersal non-quota species fisheries in the English Channel will be managed sustainably'; and that 'management of these fisheries aims to achieve environmental, social and economic sustainability, benefitting coastal communities and wider society'. Whilst there is no clear indication that any stock is fished at unsustainable levels, other than potentially red mullet in ICES Subarea 4 and divisions 7d and 3a (see Annex 5 of the FMP and Annex 2 of the Evidence Statement for further details), the species within this FMP are data deficient and need to be better understood to fully evaluate each stock's status and implement sustainable management if required. However, in line with obligations to apply the precautionary approach, there are indications of less sustainable fishing practices which will benefit from intervention in the short and medium-term whilst additional evidence is being collected

The harvest strategy devised for this FMP has been left intentionally vague and underdeveloped; allowing for scope to further develop the strategy as new evidence becomes available. The approach in the first instance, is to take into consideration stakeholder concerns surrounding these species, and apply precautionary management where required. This has been outlined in more detail later in this annex, with the introduction of early management interventions on gear mesh sizes and minimum landing sizes.

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 of measures.

In delivering the FMP vision, a harvest strategy goal was developed with the aim of ‘delivering effective management of demersal NQS in the English Channel sits within the theme of sustainable fisheries management’. The approach will primarily(a) assess the effectiveness of the early management interventions’; and (b) consider whether other interventions are required following stakeholder concern or Cefas Harvest Strategy Standard (HSS) recommendations. , where monitoring is required to ensure sufficient evidence is collated to enable the development of stock assessments and the application of Harvest Control Rules. The ultimate long-term ambition of this goal is to progress towards sustainable mixed and multispecies management.

The sections below detail the measures currently intended for application in this FMP - see Table 1. Further detail regarding all measures can be found in section 5 of Annex 1 Evidence Statement including what evidence will be required to implement medium- and long-term measures and monitor short-term measures.

No measures are included in this FMP specific to managing catches of lesser spotted dogfish and smoothhound at this time. However, in aid of improving sustainability for these species, as a recommendation for the Bass FMP consideration should be given to the practice of targeting these species in order to make up catch weight to satisfy the 5% per trip bass rule.

Table 1: Summary of recommended management measures and suggested timescales for implementation

Topic	Measure	Purpose	Timeframe
Flyseining	Propose introducing a 221kW restriction in ICES areas 7d and 7e in UK waters for 0-12nm for flyseiners.	To reduce flyseining pressure within the 12nm. Precautionary measure given concerns surrounding impacts to the stock.	Short-term
	Consider a gross tonnage limitation in ICES areas 7d and 7e for flyseiners.	To limit large capacity flyseining pressure within the English Channel. Precautionary measure given concerns surrounding impacts to the stock.	Short-term
	Propose that all flyseiners use 100mm mesh as standard.	To reduce fishing pressure on juvenile individuals within the English Channel – need to explore compatibility with MCRS for priority species.	Short-term
	Subject to outcome of consultation on REM, propose introducing early adopter scheme that could become mandatory in time.	To support the collection of robust evidence and data on channel demersal NQS species and fill key evidence gaps. Also, to monitor the impact of the proposed measures.	Medium-long term
	Further consider consulting with further details related to introducing a permitting scheme for flyseiners.	To regulate flyseine fishing in the English Channel. Potential to limit impact of flyseiners on the flyseine species.	Medium-long term

Topic	Measure	Purpose	Timeframe
	Consider restrictions on time spent in area restrictions.	To reduce flyseining pressure through reducing fishing time within the English Channel. Precautionary measure given concerns surrounding impacts to the stock.	Medium-long term
	Consider seasonal closure for flyseiners.	To reduce flyseining pressure within the English Channel explore whether seasonal limits or time in area limits prove more effective to the stocks.	Medium-long term
	Consider an overall engine size limitation for flyseiners.	To limit top end flyseining pressure within the English Channel.	Medium-long term
	Further consider potential rope length and diameter restrictions for flyseiners.	To regulate catching potential for these vessels and limit fishing impacts within the English Channel.	Medium-long term
Minimum Conservation Reference Sizes (MCRS)	Consider introducing MCRS for lemon sole (25cm), turbot (30cm), brill (30cm), common cuttlefish (23cm).	To protect pre-spawn juveniles and promote recruitment population. Precautionary measure given concerns surrounding stock health. Alignment with IFCA restrictions while FMP establishes appropriate MCRS for the stock and fishery. Compatibility with gear mesh size is required for successful implementation and will be explored further.	Short-term
	Consider introducing MCRS for flyseine species – red gurnard, red mullet, bib etc.		Medium-long term
Towed gears	Consider gathering evidence on potential viable options for towed gear management measures in ICES areas 7d	To reduce fishing pressure on juvenile individuals within the English Channel explore compatibility with MCRS for priority species.	Medium-long term

Topic	Measure	Purpose	Timeframe
	and 7e, in particular in relation to 0-12nm, that would enhance stock sustainability and deliver social and economic benefits to the whole sector.		
Cuttlefish	Consider introducing codes of practice on cuttlefish trap handling.	To promote recruitment of juvenile cuttlefish and increase egg survival.	Short-medium term
	Investigate the benefits of underwater structures to benefit egg survival.		
	Consider temporary seasonal closures for trawlers.	To provide protection for cuttlefish within the English Channel – seasonal closures could focus to providing protection to the pre-spawn juvenile population or habitats for cuttlefish eggs.	Short-term
Octopus	Propose to monitor catches, create research plan and gather evidence.	To assess a future potential octopus fishery and impacts on other fisheries from population growth.	Short-term
Recreational	Support the recreational sector to consider introducing voluntary guidelines and education on how recreational fishers can fish more sustainably. This could include voluntary MCRS information, guidance on methods and equipment to reduce damage to fish, as	To support evidence gathering, engagement and partnership working with the recreational sector. To encourage the introduction of good practices to improve sustainability of the stocks.	Short-medium term

Topic	Measure	Purpose	Timeframe
	well as information on how anglers can handle and release fish to reduce post-release mortality.		

Flyseining

Flyseining has been identified as a priority fishery for introduction of precautionary management. Sustainability concerns have been identified for Channel demersal NQS, such as gurnards, red mullet and squid specifically associated with flyseine catch. This was confirmed through Defra's "Managing flyseine vessel pressure on demersal Non-Quota Species: Proposals for introducing technical measures in English waters" consultation in 2022 and subsequent stakeholder engagement.

The Government response to the consultation will be published soon, but the responses show strong support for action, with 78% in favour of introducing some form of measure to manage flyseine vessel pressure. Some suggestions were creating designated areas, an outright ban and quota for flyseine species, but there was a mixed response on these specific proposals. Removing the derogation that allows for a 40mm mesh size for a targeted squid fishery received the most and clearest support. Defra will be taking forward a Statutory Instrument (SI) this year to remove that derogation. Other measures require further consideration and are covered in this FMP.

Engine size restrictions

Short-term

- **Measure:** Consider introducing a 221kW restriction in ICES areas 7d and 7e in UK waters 0-12nm for flyseining gear.
- **Purpose**: To reduce flyseining pressure within the 12nm. Precautionary measure given concerns surrounding impacts to the stock.

Medium-long term

- **Measure:** Consider an overall engine size limitation for all flyseiners.
- **Purpose**: To reduce top-end flyseining pressure within FMP waters. Precautionary measure given concerns surrounding impacts to the stock.

Risks

- Does not impose restrictions on new entrants into the fishery. Therefore, does not cap overall effort so long as flyseiners abide by restrictions.
- Complex verification process would need specific inspectors, or a rapid/robust method developed for assessing engine power. Or alternatively, further legislation put in place to support inspections and testing of engine power, for example tamper proof devices or easy testing access.
- Could cause displacement of vessels to outside 12nm.
- May not limit current flyseining activity.

In the consultation there were proposals to introduce engine power restrictions which would help limit effort in combination with other measures. This would apply equally to all flyseiners. During development of this measure, the FMP will need to identify which flyseiners are considered most impactful to the stocks and fishery and tailor the measures accordingly.

There is currently a 221kW beam trawl restriction in place between 0-12nm in UK waters which can be used as a precedent for this measure. In addition to this, a limitation on large capacity flyseiner engine power could be considered for medium-long term management within all waters of the FMP. There is some evidence 600kW would be successful in limiting effort, but more evidence gaps to be collected to determine this from the consultation. In the first instance, it would give time to assess the impact of the 221kW restriction, while building the evidence base on the impact of a total restriction. Further evidence gathering will need to be conducted to determine the appropriate limit for engine power.

Restrictions on engine power limits would need to avoid inadvertently introducing more fishing effort through making kilowatts available to other vessels. For example, when an engine is derated spare kilowatts on the vessels licence, it could be transferred to another vessel. Therefore, careful consideration is required with potential engine restrictions to prevent further effort being brought into the fishery. It could be possible to restrict vessels by engine power as registered at a fixed point in time, to prevent de-rating an engine subsequently leading to an increase in effort through the presence of more vessels.

Additional monitoring or inspections may need to be introduced to determine and assess engine power of the vessels fishing in UK waters in this FMP area.

The detailed steps for gathering evidence and implementing monitoring to support decisions around flyseining are set out in section 5 of Annex 1 Evidence Statement.

Gross tonnage limitation

Short-term

- **Measure:** Further consider an overall gross tonnage limitation for flyseining vessels in all UK waters.
- **Purpose**: To limit top end flyseining pressure within the English Channel. Precautionary measure given concerns surrounding impacts to the stock.

Risks

- Could displace effort into other UK or EU waters.

Introduction of a vessel tonnage restriction was suggested in response to the Defra flyseining consultation, which could work in conjunction with other measures proposed to limit flyseining impact, such as an engine size limitation and rope restrictions. Stakeholders have raised concerns over the Channel wide impact of flyseining and highlighted a need for urgent management intervention applied to all flyseine vessels. The FMP recommends the introduction of a maximum vessel weight as a precautionary measure across FMP waters whilst further evidence is gathered through a monitoring programme.

Permitting scheme

Medium-long term

- **Measure**: Consider consulting further with details on a permitting scheme limitation for flyseining vessels in all UK waters.
- **Purpose**: To regulate flyseine fishing in the English Channel. Provide a mechanism to impose measures on these vessels.

Risks

- Could displace effort into other UK or EU waters.
- Could deny new entrants if based on a track record.
- Track record before increased effort likely better for fish stocks but access and licence issues surround this.

In order to address the issues of potential flyseine expansion in the fishery, another possible option to explore would be the use of permit scheme to limit numbers of vessels by gear type/area. This was a proposal in Defra's consultation in 2022, but without details. The intention would be to prevent more vessels accessing the fishery while the impact of such gears on the FMP stocks are ascertained.

Time spent in area and seasonal closures

Medium-long term

- **Measure:** Consider whether there is evidence for introducing a time spent in area or seasonal closure for flyseiners.
- **Purpose**: To reduce flyseining pressure within the English Channel – need to explore whether seasonal limits or time in area limits prove more effective for protecting stocks.

Risks

- Could cause displacement of vessels into other UK or EU waters.
- Evidence needed to determine level of restrictions on effort would reduce the impact on NQS – in line with determining how much effort the NQS would be able to sustainably support.

A recommendation of the FMP is to consider limits based on time spent in area with gear on board for the flyseiners as a precautionary measure. This would look to understand the impacts of the fishery while controlling effort and future expansion.

The other potential management intervention is to introduce seasonal closures if this is deemed more effective for preserving stocks. This will restrict flyseine fishing effort and is considered measurable, therefore, simpler to enforce. Data could be gathered on how this measure might help reduce any identified unsustainable impacts on Channel demersal NQS and to determine if regulating days at sea or introducing a seasonal closure would be effective at sustainably managing fishing impact.

Gear measures – flyseining

Short-term

- **Measure:** Consider if all flyseiners use a minimum 100 mm mesh as standard.
- **Purpose**: To reduce fishing pressure on juvenile individuals within the English Channel – need to explore compatibility with MCRS for priority species.

Medium-long term

- **Measure:** Consider a potential maximum rope diameter;
- **Measure:** Consider a potential maximum rope length.
- **Purpose**: To regulate catching potential for these vessels and limit fishing impacts within the English Channel.

Risks

- Could displace vessels to outside the Channel and/or to EU waters – not lessening the impact on transboundary stocks.
- Rope restrictions need to be researched to determine effectiveness, further work needs to be done to refine technical measures in line with potential technology creep i.e. using heavier, stronger and thinner rope cores to enable the use of larger net sizes as a way of getting around rope diameter restrictions.
- Both need to be implemented in combination in order to be successful.

100mm mesh

The removal of the 80mm mesh minimum would mean all flyseiners would need to use 100mm mesh regardless of the target species. This measure would help smaller juvenile fish to escape. However, there is an evidence gap in the survivability of the flyseine caught species, and this would be a priority area for monitoring and evidence gathering during consideration and potential implementation of this precautionary measure.

Rope restrictions

Rope restrictions could help to reduce the efficiency of the flyseine fleet. This was a suggestion proposed through the Defra flyseining consultation. Rope length was also suggested as a way of limiting effort. These measures alongside the introduction of engine size limitations will seek to reduce fishing pressure on Channel demersal NQS stocks while further evidence is gathered to fully understand the impact on the stocks and the environment. There is potential to measure rope length via devices on board vessels that record the rope length shot and hauled as well as VMS and automatic identification system (AIS) tracks. Rope diameter is considered less effective as there is concern of technical creep changing from ropes to strengthened cables with a higher loading, but smaller diameter would get around this measure. However, this all needs more evidence to be gathered to determine this.

This links to the goal to deliver effective management of demersal NQS in the English Channel. The Defra consultation on flyseining (to be published soon) highlighted the need to urgently introduce management to flyseining activity, this was supported by stakeholder engagement feedback conducted in the development of this FMP. Rope restrictions combined with other measures such as engine limits, REM and potential closures should promote sustainability the stocks being targeted by flyseiners.

REM for flyseiners

Medium-long term

- **Measure:** Subject to the outcome of the Consultation on Expanding the Use of REM in English Waters, we propose introducing an early adopter scheme that would become mandatory in time.
- **Purpose**: To support the collection of robust evidence and data on channel demersal NQS species and fill key evidence gaps. Also, to monitor the impact of the proposed measures.

Risks

- Potential challenges recruiting voluntary early adopters, especially where data objectives require changes to working practices to ensure successful data collection.
- Approach to data sharing and interoperability will need to be determined where flyseiners are registered to other coastal states.
- Generating robust catch composition data across a range of species may be challenging and resource intensive.
- REM implementation at scale is novel in UK fisheries management; time will be required to build capacity for analysis and ensure data integration.

REM is a catch-all term that refers to integrated on-board systems that may include cameras, gear sensors, video storage, and Global Positioning System (GPS) units. These systems can capture comprehensive videos and are used to monitor fishing activity with associated sensor and positional information. REM delivers robust information and evidence, which has scientific applications, for example feeding into stock assessments, and can also support reforms to fisheries management.

Subject to the outcome of the consultation on REM, the FMP would support the proposed approach to implementing REM, developing clear data objectives that reflect the goals of the FMP. The consultation proposes beginning with specific priority fisheries that come online in stages over the next five years. One of the proposed priority fisheries is Demersal Seines (flyseines) in the English waters of the Southern North Sea and English Channel.

Alongside REM, a sampling programme using onboard fisheries observers could be introduced to provide a more detailed subset of catch biological data.

Minimum conservation reference sizes (MCRS)

The introduction of MCRS measures, also commonly known as a minimum landing size (MLS), is to protect juvenile fish from being landed through prohibition of landings. This in turn makes it undesirable to target that size class of fish. However, without changing mesh sizes to accommodate the introduction of a MCRS, these sized fish may still be caught and discarded, raising concerns for the survivability of discards and the sustainability of fishing practices. To achieve sustainability of these species, the introduction of an MCRS is being considered alongside measures to increase mesh size. Applied in combination, these measures are intended to prevent the juvenile fish from being caught and landed.

The recommendation of these measures has primarily been driven by stakeholder concern surrounding catch of juvenile lemon sole, turbot, brill and cuttlefish. In addition, evidence gathered on these species suggest that brill stocks are exhibiting signs of initial overexploitation and turbot stocks (albeit in the North Sea) have recently exhibited reduction recruitment, leading to a decrease in advised landings of 33% (see Annex 5 of the FMP and Annex 1 the Evidence Statement for further details).

Short-term

- **Measure:** MCRS for common cuttlefish – 23cm
- **Measure:** MCRS for lemon sole – 25cm
- **Measure:** MCRS for turbot – 30cm
- **Measure:** MCRS for brill – 30cm
- **Purpose**: to protect pre-spawn juveniles and promote recruitment population. Precautionary measure given concerns surrounding stock health. Alignment with IFCA restrictions is required while establishing appropriate MCRS for the stock and fishery. Compatibility with gear mesh size is required for successful implementation and will be explored.

Medium-long term

- **Measure:** MCRS for flyseining species – gurnards, red mullet, bib etc.

- **Purpose**: To protect pre-spawn juveniles and promote recruitment population given concerns surrounding stock health. Alignment with IFCA restrictions is required while establishing appropriate MCRS for the stock and fishery. Compatibility with gear mesh size is required for successful implementation.

Risks

- Need to determine how best to measure cuttlefish – mantle length or weight.
- Could lead to further discards of under MCRS fish. Research on survivability needs to be undertaken to determine effectiveness of MCRS.
- Potential issue if the EU legislation does not mirror the FMP MCRS – generates enforcement concerns for assessing fish caught inside or outside of the FMP waters.

Cuttlefish

The common cuttlefish was identified by Government and stakeholders as a critical targeted fishery requiring attention. A recommendation from this FMP is to consider implementing a MCRS of 23 cm mantle length, as during Cefas research it was found that all studied female common cuttlefish were mature at this size. This is a precautionary measure to protect the stock, based on stakeholder concern and evidence from test assessments that indicate full exploitation of cuttlefish across the English Channel. This measure would be monitored for the effectiveness alongside research into the survivability of discards and compatible mesh sizes. There has been a suggestion of implementing a minimum weight instead of length of cuttlefish given the potential difficulty in measuring cuttlefish length. This would require further research to determine if this would be more effective than length.

Lemon sole, turbot and brill

MCRS for lemon sole, turbot and brill was discussed during both rounds of stakeholder engagement and was highlighted as a particular concern by stakeholders. These species are highly economically valuable to the fishery, with turbot also being considered valuable to the recreational sector.

Data for 2022 showed a minimum size of 25 cm for lemon sole and 40 cm for turbot and 35 cm for brill would be required to meet the size at which 50% of the population have reached sexual maturity (see Annex 5 of the FMP and Annex 2 of the evidence statement for further details). Recognising that males for species of turbot and brill mature earlier than females, the measure has been recommended for the size of maturity for females. Fishing below this would create a selection bias potentially removing spawning females from the population and negatively impacting the stock. The ambition will be to explore the introduction of these MCRS through the FMP. Evidence would need to be gathered to understand the impact on the stock and the fishery, therefore, while this is in development, the FMP would recommend aligning to the existing IFCA MCRS for these species. Cornwall and Southern IFCAs have introduced a MCRS for lemon sole (25 cm), turbot (30 cm), and brill (30 cm).

This was deemed a simple measure to implement and will significantly help to promote stock health and therefore fishing opportunities across each sector. This is a precautionary measure as there is insufficient evidence on the discard survivability of these species. This is a clear evidence gap aimed to be closed in the short-term.

Flyseining species

MCRS may complement proposed input measures for flyseining. MCRS is often most effective alongside a mesh size increase which the FMP is proposing for flyseining alongside Defra removing the current 40 mm squid derogation measure. Further evidence is needed to determine what MCRS could be implemented and further evidence to determine if this would be effective at reducing juvenile catches.

These recommended MCRS measures link to the delivery of effective management of demersal NQS in the English Channel, a key goal of this FMP. These measures are intended to be precautionary, to protect juvenile fish stocks and therefore promote population size and recruitment. Unintended consequences of the introduction of these measures may arise due to the lack of underpinning evidence on species survivability. This has been identified as an evidence gap within section 5 of the Evidence Statement. Introduction of this measure in combination with an increase in mesh size to 100 mm, should help to mitigate for these unintended consequences.

The introduction of a MCRS for these species in UK waters of ICES areas 7d and 7e would prohibit landings of specimens below MCRS caught in that area, and any undersized species would need to be discarded. This could lead to discarding fish which needs to be avoided. Cefas stated that the use of any MCRS may have limited benefits unless combined with other technical measures such as improvements in gear selectivity. Therefore, the recommendation from the FMP is to consider implementing a requirement for using a 100mm mesh on flyseiners. However, catches below MCRS taken in EU waters could legitimately be retained on board and marketed. This could mean MCRS is unenforceable on vessels fishing in both EU and UK waters. These issues need to be considered when considering implementing MCRS. A potential solution could be the introduction of catch declarations upon entry and exit when moving between waters, as a means to mitigate this issue in the future.

Towed gear

Medium-long term

- **Measure:** Consider gathering evidence on potential viable options for management measures for towed gears within the English Channel, in particular in relation to 0-12 nm.

- **Purpose**: To reduce fishing pressure on juvenile individuals within the English Channel – need to explore compatibility with MCRS for priority species. Additional time given to weigh impacts of potential measures on inshore fisheries.

Risks

- Need to understand the unintended consequences of potential management measures to other towed gears.

The FMP recommends considering building an evidence base to evaluate viable options for towed gear management measures in ICES area 7d and 7e. This is recommended for implementation in the medium- to long-term. In particular in relation to 0-12nm, which would enhance stock sustainability and deliver social and economic benefits to the whole sector.

Concerns have been raised by stakeholders on the impact of towed gears on the inshore stocks, and the impact this has on the fishers and dependent local communities. Measures to support the inshore stocks by reducing fishing pressure within 12 nm might help mitigate environmental concerns around benthic habitat integrity. However, this would require additional evidence gathering to understand the impact this might have on vessels; on the sustainability of inshore stocks and benthic habitats; and to understand the impact of displacement on the marine environment beyond 12nm. Consideration will also need to be given to the principles outlined in the TCA when considering this measure. This could also link to the Celtic Sea measures and Lyme Bay consultation which are due to be reviewed this year and next.

A recommendation from the FMP is that further management measures for towed gears could be explored through evidence gathering to support the introduction of MCRS measures. These measures could bring potentially support long-term benefits for all species, allowing them to grow to the size of maturity before being caught, and thereby benefiting the fishery through more populous higher value individuals.

Cuttlefish

Short-term

- **Measure:** Consider introducing temporary seasonal closures.
- **Purpose**: To provide protection for cuttlefish within the English Channel – seasonal closures could focus to providing protection to the pre-spawn juvenile population or habitats for cuttlefish eggs.

Short-medium term

- **Measure:** Consider introducing codes of practice on cuttlefish trap handling.
- **Measure:** Consider introducing underwater structures to benefit eggs.

- **Purpose**: To promote recruitment of juvenile cuttlefish and encourage spawning.

Risks

- Evidence needed to determine if closures will have the intended outcomes.
- Need to link to other policies and protections for seagrass habitats for egg protections.
- Could have large economic and social impacts to the fishery.

It is recommended to consider the potential impact of seasonal restrictions to protect juvenile cuttlefish. The short life span of cuttlefish needs to be considered as part of this management strategy to promote stock recruitment and population size. A seasonal measure would aim to protect critical spawning seasons or recruitment pools from high impact fishing gears.

More evidence would need to be collected for this management measure to be effectively implemented over a longer timeframe. As part of this evidence gap, spawning patterns and recruitment evidence would need to be collected, alongside survivability, fishing impacts and fishing effort. This would need to be considered alongside the social and economic impact of such restrictions on the fishery. More detail of the evidence gaps can be found in Annex 1 the Evidence Statement.

This measure links to the FMP goals to deliver effective management of demersal NQS in the English Channel and to deliver wider biological sustainability. It also draws on the subgoal to compile existing evidence and identify evidence gaps.

Further recommended is to consider implementing a code of practice on cuttlefish trap handling to reduce egg mortality. During stakeholder engagement, concerns were raised multiple times around trap handling and the practice of eggs being washed off traps. Research would be needed to develop this code of conduct with help from industry. This is further outlined in Annex 1 the Evidence Statement. Southern IFCA have in place guidelines surrounding this, which can be proposed across the FMP area.

Another recommendation from the FMP is to consider investigating the application of, or protection afforded to, underwater structures to benefit eggs laying for cuttlefish recruitment. Research has shown that man-made structures, such as egg laying ropes, may promote and benefit recruitment. Evidence gathered also points to the value of seagrass for cuttlefish spawning, therefore additional considerations may be given to affording protections to seagrasses, such as through MPAs or IFCA byelaws, to protect the eggs.

This links to the goal to deliver effective management of demersal non-quota species in the English Channel as improving codes of practice and introducing egg laying structures or further protections to seagrasses will help increase the recruitment of the stock.

Octopus

Short term

- **Measure:** Consider monitoring octopus catches and create a research plan together evidence on the octopus fishery.
- **Purpose**: To assess a future potential octopus fishery and impacts on other fisheries from population growth.

A recommendation from the FMP is to consider octopus a priority species to monitor over the next two years.

There was concern from stakeholders that this is an emerging fishery, especially in 7e with an increase in sightings of the species. There were concerns that the stock could be easily overexploited if protections were not introduced. In addition, proliferations of octopus stocks could significantly impact the lobster, whelk, crab and scallop fisheries in the Channel. Therefore, evidence gaps to be gathered to assess stock status and determine if it is likely to become a big fishery. There are international examples to draw learning and experience from if required, such as the management of octopus fisheries in Spain. This is suggested to be an aim in the short to medium-term to monitor octopus catches, create a research plan surrounding the stock and fishery and gather further evidence on the biology of the species and on the international management of octopus that has been undertaken so far.

Recreational measures

Short-to medium-term

- **Measure:** Support the recreational sector to consider providing voluntary guidelines and education on how recreational fishers can fish more sustainably. This could include voluntary MCRS information, guidance on methods and equipment to reduce damage to fish, as well as information on how anglers can handle and release fish to reduce post-release mortality.
- **Purpose**: To support evidence gathering, engagement and partnership working with the recreational sector. To encourage the introduction of good practices to improve sustainability of the stocks.

Guidelines and education provided on a voluntary basis for anglers could promote sustainability across the sector. This could include a voluntary minimum landing size suggested to anglers for each species that does not have a compulsory MCRS applied currently to ensure that only mature fish are kept, and juveniles are released. This could include actions to make these voluntary guidelines, relevant compulsory measures, and IFCA byelaws within 6 nm clear and accessible to all recreational sea anglers, particularly those who are new and unfamiliar with the sport.

Further voluntary measures suggested to recreational sea anglers fishing in English Channel waters will help reduce mortality to fish that are intended for release. This could include education on the use of less damaging gear, such as the use of barbless or circle hooks, as well as guidelines and education on handling and release protocols such as the use of landing nets and procedures to address barotrauma. This is particularly important for species like bib, smoothhound and dogfish which are regularly caught by recreational anglers but are less likely to be retained.

A recommendation from the FMP is to consider involving the Angling Trust to gain traction and understand their existing guidelines and how to support sharing these in the recreational fishing community.

As part of efforts to continue to involve the recreational sector as key data collection partners and continue to build a robust evidence base of recreational data, additional opportunities where recreational fishers can input into evidence gathering needs to be understood.

Stakeholders clearly voiced support for a sea angling licence if funding gathered from the sale of licences were to be used to promote the sector and the stocks/habitats it depends on. The introduction of a sea angling licence is beyond the scope of this FMP, work to evaluate the appropriateness of this measure could be considered as an evidence need. These measures all help to contribute to the sustainability, precautionary, bycatch, ecosystem, and national benefit Fisheries Act objectives.

Proposed management measures contribution to the FMP vision and goals

The FMPs proposed management measures have been recommended on the basis of their merits for improvements to stock sustainability and on the thinking that these will contribute in some way to the overarching FMP vision and goals. An assessment has been carried out to summarise the contribution that each measure will have to the FMP goals to ensure that these and the timeframes for actions under the goals are consistent and harmonious. The output of this exercise has been presented in Table 2.

Table 2 Recommended measures potential contributions to the FMP goals and actions

Theme and Goals	Recommended measures and their potential contributions to the FMP goals and actions
Evidence Theme **Goal: Better understand the wider NQS evidence gaps.** **Goal: Develop NQS evidence base.**	Engine size restrictions and gross tonnage limits for flyseiners • Research opportunities to explore non-traditional or novel data collection methods to assess the effectiveness of these measures, and to support the MMO through vessel inspections. MCRS – cuttlefish, lemon sole, turbot, brill, gurnards, red mullet, bib, squid • Implementation of a MCRS alongside conducting survivability studies may contribute to closing evidence gaps. • Research could be undertaken to establish a methodology for measuring species like cuttlefish. Mesh size and flyseining rope restrictions • Research and monitoring may help to gather evidence on the effectiveness of these measures. • Research into identifying appropriate mesh sizes/configurations to support the harvest of species at the MCRS. Monitoring programmes • May support data collection and data gathering in identifying and meeting wider NQS evidence gaps. • Education and codes of practice.

	• May support identifying wider NQS evidence gaps and closing the gap on these through community engagement, improved data collection, data sharing and partnerships. May support the FMP in delivering on identifying non-traditional or novel data sources.
Social and Economic Theme **Goal: Better understand and optimise economic and social benefits.** **Goal: Build capacity for the industry to be able to input into matters effecting NQS fisheries management.**	Engine size restrictions and gross tonnage limits for flyseiners • Restrictions on fishing effort and gear aim to support the sustainability of the stocks. Future growth in population size and quality may return better catch yield and quality for fishers. MCRS – cuttlefish, lemon sole, turbot, brill, gurnards, red mullet, bib, squid • Restrictions on fishing effort and gear aim to support the sustainability of the stocks. Future growth in population size and quality may return better catch yield and quality for fishers. Mesh size and flyseining rope restrictions • Restrictions on fishing effort and gear aim to support the sustainability of the stocks. Future growth in population size and quality may return better catch yield and quality for fishers. Monitoring programmes • Additional monitoring may help to streamline effectiveness of management measures, opening up opportunities for fishers targeting these stocks in a sustainable manner. • Additional monitoring may help guide the investment into the sustainability of the stocks. Stock health improvements may lead to benefits to fishers. • Greater transparency in the fishery and robustness of the data collection may lead to better marketable value of catch.

	• Better understanding of the fishery and ecosystem aim to move management in the direction of ecosystem-based management and natural capital approaches, which look to expand holistically on benefits and value. Education and codes of practice • Engagement and codes of practice may support fishers in promoting the sustainability of the stocks. Future growth in population size and quality may return better catch yield and quality for fishers.
Sustainable Fisheries Theme **Goal: Deliver effective management of demersal NQS in the English Channel.** **Goal: Deliver wider biological sustainability** **Sub goal: 1) Where possible, identify and mitigate pressures on the Channel demersal NQS.**	Engine size restrictions and gross tonnage limits for flyseiners • Restrictions on fishing effort and gear aim to support the sustainability of the stocks and health of the environment. MCRS – cuttlefish, lemon sole, turbot, brill, gurnards, red mullet, bib, squid • Restrictions on fishing effort and gear aim to support the sustainability of the stocks and health of the environment. Mesh size and flyseining rope restrictions • Restrictions on fishing effort and gear aim to support the sustainability of the stocks and health of the environment. Monitoring programmes • Additional monitoring may help to gather evidence on wider environmental issues, beyond fishing. • Additional monitoring may help understand the fisher and fishery impacts on the stocks and environment, enabling sustainable management to be applied.

Sub goal: 2) Understand the impact of Channel demersal NQS fisheries on the wider marine environment.	• Opens up opportunities for new additional data collection or research into the ecosystem and how to deliver sustainable management. Education and codes of practice • Engagement and codes of practice may support fishers in promoting the sustainability of the stocks and health of the environment.

Harvest Control Rules (HCR)

During this first iteration of the FMP, there is insufficient data to support a stock assessment approach to introducing HCR. Instead, the proposed approach will follow precautionary management where there are concerns for the sustainability of a stock, while monitoring and data gathering take place to enable stock assessments to be performed in the future.

Where data collection for species in the scope of this FMP progresses toward supporting an assessment at MSY or similar proxy in the future, harvest control rules will be devised based around suitable and precautionary reference points assessing fishing impact on stock health. It stands within reason that the introduction of HCR for these species can be implemented between iterations of the FMP, based on annual assessments and a midway review of the FMP, and following recommendation from the FMP Management Group.

Before HCR can be put in place, national fisheries management should implement a more robust system for capturing and displaying data on fishing catch, effort, or mortality. Given that the species within the scope of this FMP are data poor, any attempt to put in place limitative or target reference points will be based on a high degree of uncertainty. Catch management, would therefore be more precautionary in application than potentially necessary, causing undue harm to the social and economic aspects of the fishery.

The FMP envisions that national fisheries data collection and data management, should be advanced to encompass the production of regionally focused dashboards, displaying data which may be integrated into indicators to assess fisheries catches, effort or mortality. This will enable fisheries management to be considered at a local to regional scale, and as part of this FMP, create the framework for faster assessment, flexible and adaptive management controls, whilst providing a mechanism for fishers to capitalise on social and economic opportunities.

One notable limit of the managing species in the scope of this FMP, are that these are transboundary species, which are distributed and for some species are seasonally migratory across UK and EU waters. Therefore, stock assessment units should take into consideration UK and EU catches across the shared Channel area; with a stock assessment regime detailing a Channel wide harvest strategy for implementing HCRs.

Maximum Sustainable Yield (MSY)

A selection of actions have been proposed under the Sustainable Fisheries Theme, to progress stocks towards harvest below MSY. This is initially focused on stocks of particular concern where some MSY assessment already exists, and therefore can be progressed further. These would include lemon sole, turbot, brill and red mullet. Cephalopods species such as cuttlefish are relatively short lived, and therefore are difficult to assess under typical ICES MSY assessment processes. Cuttlefish are a priority species for this FMP and, therefore, management should consider suitable proxies which may be used for the assessment of the stock in order to ensure that harvest is sustainable. Commitments for the long-term should look to close the data gaps on all Channel demersal NQS, in order to conduct an MSY assessment or suitable proxy, and that all species will be fished at or beneath this.

It is envisioned that species within the FMP framework should follow the below process towards the sustainable harvest assessment model shown in Figure 1.

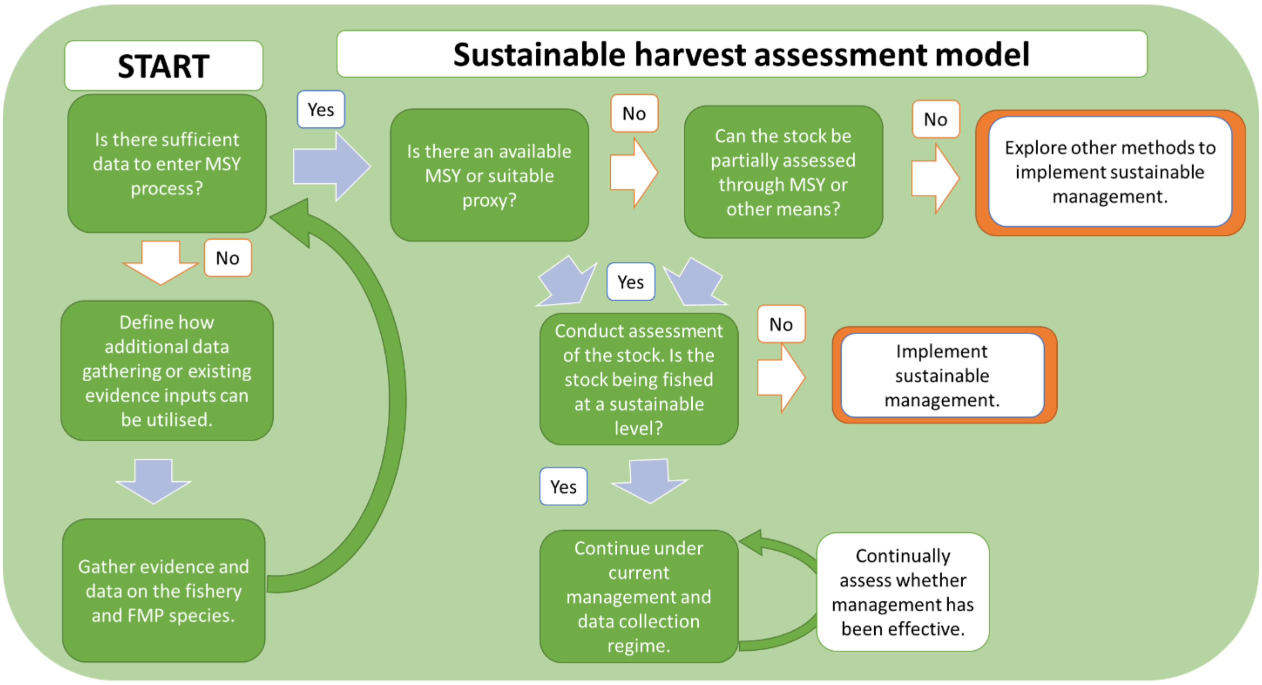

Figure 1 Sustainable harvest assessment model for FMP stocks

The UK Government has committed to increasing the overall number of stocks fished at MSY, consistent with the best available scientific advice and considering the best available evidence on the effects of fishing activity. Recognising that some stocks within this FMP are shared with other coastal States, in the future their management and TAC may be subject to international fisheries negotiations. In line with the Fisheries Act and the JFS, the FMP will follow the principles of international fisheries negotiations, as laid out in section 4.2.1 in the JFS. This will assist in ensuring sustainable exploitation of shared and transboundary stocks through the establishment of appropriate catch limits.

Precautionary approach

The precautionary objective of the Fisheries Act 2020 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 such, the FMP gives consideration to how the precautionary approach should be applied to managing the Channel demersal NQS.

Proposed precautionary measures

At this point in the development of the FMP, no precautionary stock limits or TAC measures are being proposed. The stock health of the species in this FMP are unknown, and there is insufficient evidence to assess if fishing mortality is at sustainable levels.

The lack of data for species in scope directs the FMP to be precautionary in approach to fishery management. Given that it is not possible to determine the state of the stocks, or stock health until more data are collected, the intention is to be precautionary towards concerns surrounding the fishery while data supporting fisheries assessments are collected. Part of this process is already underway in exploring early management interventions for the FMP which will promote sustainability by proposing changes to less sustainable fishing practices.

Targeted management measures are being proposed for stocks where concerns have been raised by the fisheries stakeholders – these cover MCRS for lemon sole, turbot and brill; and measures placed on flyseining activity, in line with the Defra consultation response on flyseining. These targeted measures are being considered alongside the introduction of complementary technical measures on mesh sizes. This proposed approach is precautionary in how it will address the concerns raised by stakeholders and will be looking at monitoring the effectiveness of management interventions.

Link to delivering the FMP goals

To implement the precautionary approach, the first action under the 'Deliver effective management of demersal NQS in the English Channel' goal in the sustainable fisheries theme, is to define the precautionary approach with agreement for application from the FMP management group. The rationale behind this is to deliver a consistent and transparent mechanism for considering and validating stakeholder concerns surrounding the stock, assessing them for their significance, evaluating existing management approaches and whether these need refining, before introducing further management interventions. This will need to consider the likely impacts and unintended consequences of the management on the species in the scope of this FMP, as well as quota species due to species being caught in a predominately mixed fishery. Actions toward defining this process will look to be undertaken pre-publication to support the introduction of precautionary management interventions during FMP implementation. The NQS management group would look to review and refine this process and tailor the application to each intervention required, in future iterations this may be reviewed as required.

This process is intended to define what precautionary management is required, what it is intended to achieve, what is required to reach the end goal, and introduce a mechanism for assessment, either exiting to targeted long-term management or triggering further precautionary management of the fishery. The intention is that this should be considered on a case-by-case basis for each concern raised, and therefore, provide the management group, regulatory authority, and fishing industry the clarity on an agreed approach, identify how this will likely impact them and what further actions are required to address the concern. An early and drafted attempt at defining how the precautionary approach will work has been produced as a process diagram (Figure 2).

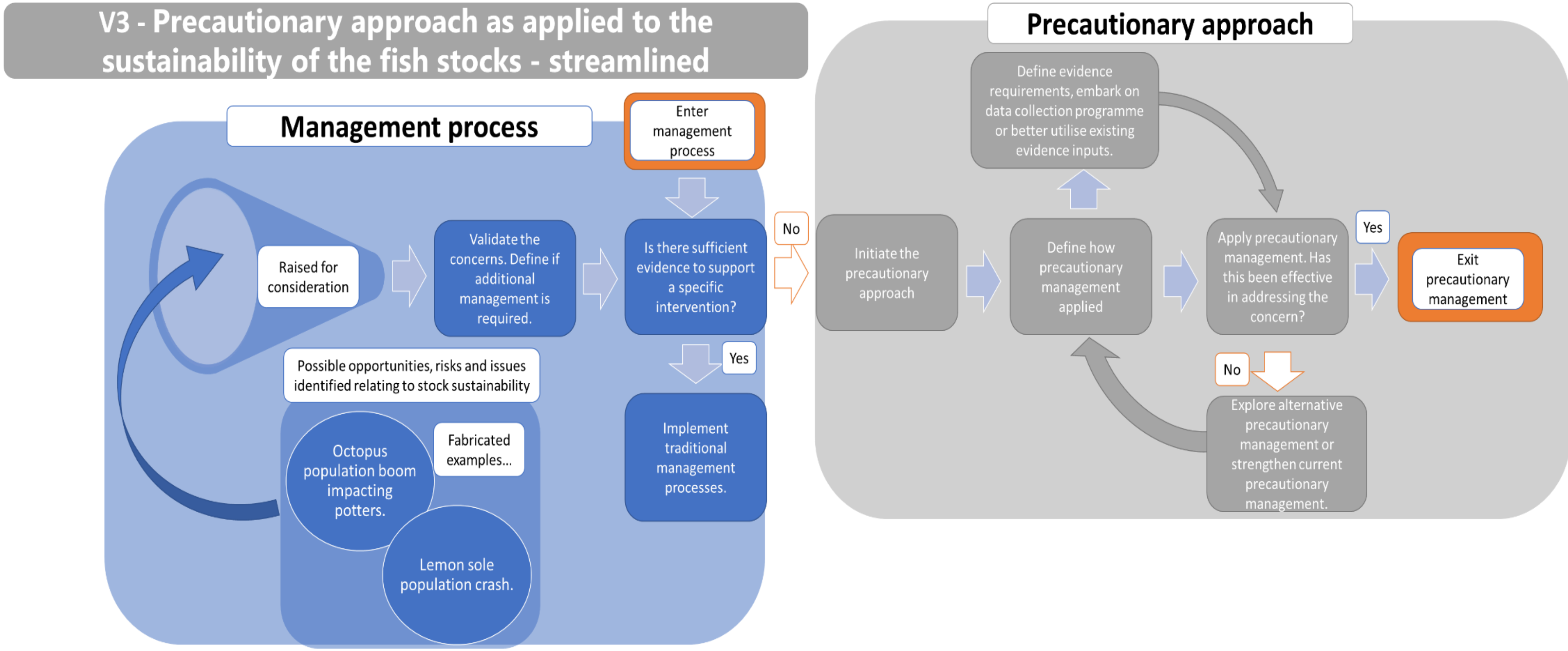

Figure 2 Drafted definition for the application of the precautionary approach to Channel demersal NQS fisheries management

Evidence limitations linked to precautionary management

It is worth noting, a common outcome to resolve precautionary management is to collect new evidence or to initiate evaluation processes. However, there are often many situations where that new evidence (or evaluation of new evidence) will not be forthcoming due to time or resource constraints, such that the mechanism might need to rely on reacting to existing evidence inputs and resources to assess the effectiveness of precautionary management. In section 2 of Annex 1 Evidence Statement, evidence principles are given which detail how the FMP proposes data and evidence are to be gathered and used; included within this are four approaches to take when applying a management intervention in the absence of sufficient evidence.

In summary, these can be described following two pathways: ‘react to the concern first and then gather data second’, or ‘gather data first then react second’ (Figure 3). Each pathway has drawbacks and merits which will need to be considered on a case-by-case basis. For instance, reacting first enables rapid intervention and proposes a more immediate solution to addressing the problem, at the potential expense of generating previously unidentified and unintended consequences to the fishery. Following a ‘gather data first’ pathway mitigates the risk of unintended consequences but will not alleviate the problem in the short-term, which may fall to the detriment of the fishery. The approaches of ‘Produce the evidence needed’ and ‘Develop only minimal essential evidence accepting higher risks to success and less optimal solutions’ follow the evidence first pathway, where taking producing evidence takes a more robust approach to evidence gathering, and seeking minimal evidence encourages action on only optimal evidence. The ‘Learning by doing’ and ‘Precautionary approach and precautionary principles’ approaches follow the ‘react first pathway’, where learn by doing forms an intermediary to management alongside evidence gathering, while precautionary approach and precautionary principles will take a stronger stance of implementing management where there may be ‘threat of serious or irreversible environmental damage’.

The process for defining how the precautionary approach will be applied will need to take into consideration which of these pathways are best suited to addressing concerns brought to the FMP management group, with the recognition and acceptance from all parties on what the intended effect is and undesirable impacts this may have on the fishery.

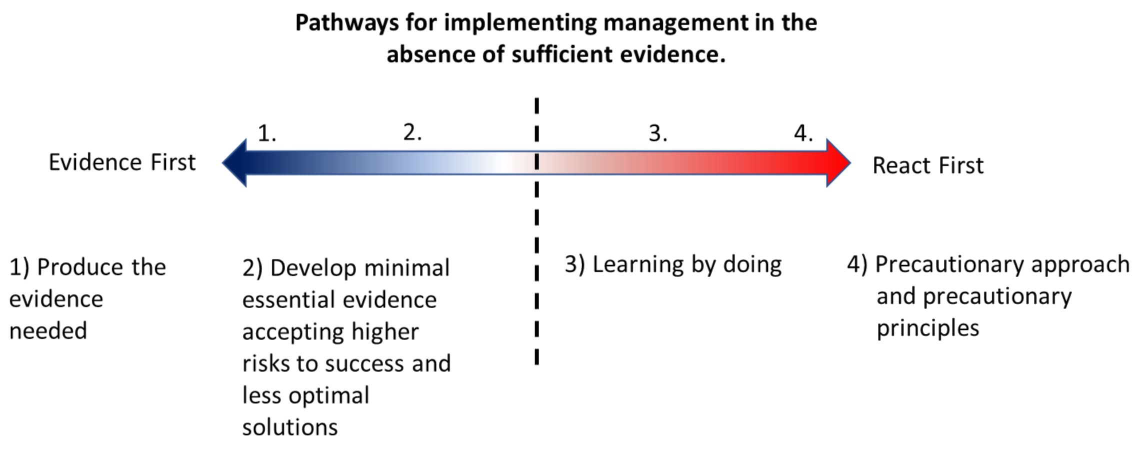

Figure 3 Pathways for implementing precautionary management based on insufficient evidence

Performance indicators and monitoring

Indicators for monitoring effectiveness of plan

Monitoring and periodic reporting on the FMP is a legal requirement under section 11 of the Fisheries Act. Section 11 sets out a duty to report on the extent in which the FMP has been implemented and associated management measures have affected the stock levels of target species no longer than three years after the FMP is adopted. Once prepared, the report will be laid before Parliament by the Secretary of State.

The effectiveness of the FMP will be monitored using a logic model framework. This framework will assess the effectiveness of FMP goals, management measures and contribution towards the Fisheries Act Objectives. Within this framework, the FMP and its associated goals and management measures are classed as interventions and are therefore capable of influencing a change within the fishery and wider marine environment. As defined in the Magenta Book, a logic model describes the process by which this change is delivered, helping to communicate the framework against which progress towards an impact can be monitored. A logic model provides an overview of what the FMP will achieve by:

- clarifying the required inputs and necessary activities to apply a policy or intervention.
- defining a clear and appropriate scope of the monitoring process.
- describing what impacts are expected from a policy or plan (an intervention), and what logical steps are taken which generate impacts.

Logic model terminology in relation to the monitoring approach for the FMP is provided in Table 3 and the logic model itself in Figure 4.

Table 3 Logic model steps and definitions for FMP logic model

Term	Definition	Example
Inputs	Resources required to produce the FMP and the planning process.	Staff time, skills, money etc.
Activities	The activities undertaken.to produce, implement, monitor and review the FMP.	Plan development, consultations, promotional events, training and capacity building events, evidence commissioning etc.
Outputs	FMP products or services.	FMP documents, evidence products, tools, Working Group and Evidence Advisory Group.
Intermediate Outcomes	What recipients do with (process) or receive from (effects) FMP outputs and preceding intermediate outcomes.	Improved evidence base, improved awareness of the FMP, management measures implemented.
Outcomes	Effects that occur from achieving intent of FMP.	Channel demersal NQS managed sustainably, benefits to coastal communities optimised, wider biological sustainability.
Impacts	Contribution to larger scale and or longer term aims or goals that are broader in scope than the FMP.	Contributing to achieving the Fisheries Act Objectives or GES.

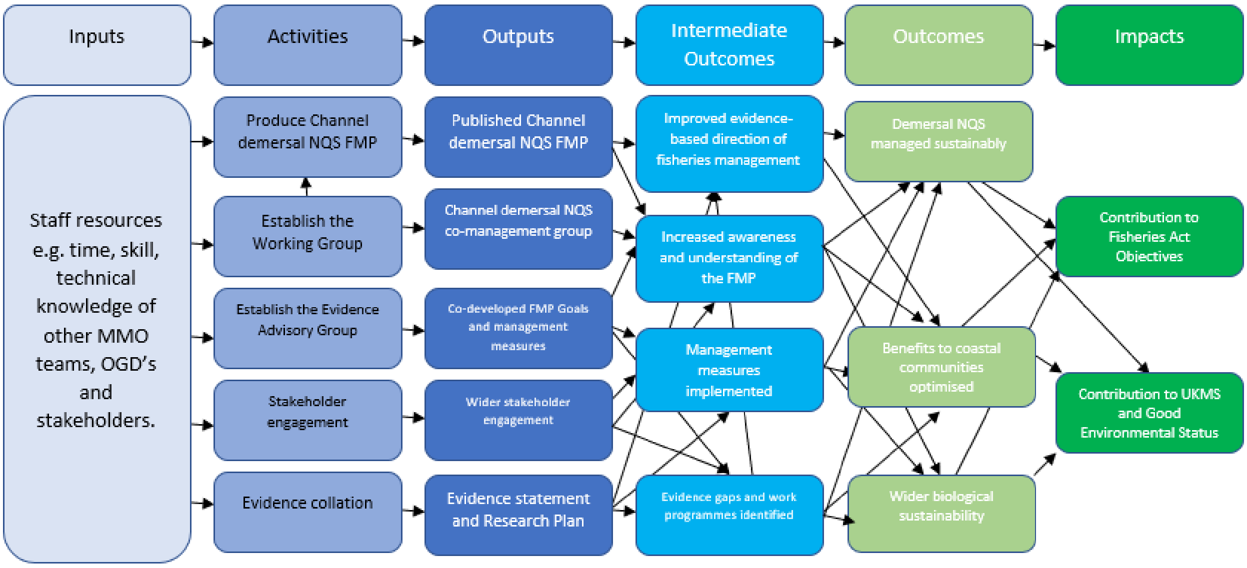

Figure 4 Channel demersal NQS logic model

Identifying FMP Indicators

The following sections outline the indicators that have been identified as being most suitable to use for the monitoring of the FMP. The indicators make use of both quantitative and qualitative data, ensuring extensive use of appropriate existing environmental, social, and economic data collection programmes. Examples include Sea Angling Diaries. Existing monitoring datasets are supplemented with new data collected by the MMO, Cefas and Seafish specific to this FMP.

The indicators have been identified from an online search of several key policy areas including the UK Marine Strategy (UKMS), the 25 Year Environment Plan (YEP) and a literature review of the current available indicators for measuring factors relating to fisheries in the UK, for example, landings data. Data sources identified by stakeholders during engagement events have also been explored for their potential use in monitoring the FMP.

The indicators detailed below are suggestions for Defra to take forward when monitoring the FMP. There will be a need to further develop trial and review monitoring indicators for process, outcome, and impact success.

Indicators to support the monitoring of associated development processes

All indicators will have a target assigned to them. This target is what the effectiveness of goals and management measures will be assessed against and includes the following:

- **Number of stakeholders involved in the development of the FMP:** By identifying the number of stakeholders involved in the process to develop the FMP, it may be possible to understand if the level of engagement has been enough to achieve meaningful outcomes for those involved. However, just looking at the number of stakeholders who were engaged with doesn't highlight what the appropriate level of engagement is. This could be quantified by a percentage of stakeholders in a given area, and therefore further work would be needed to determine this. The record of stakeholder engagement produced by the MMO will outline the number of stakeholders involved in the development of the FMP. The ICF team independent evaluation of the engagement across the FMP programme can also be used for this indicator.
- **Number of different stakeholder groups involved in the development of the FMP:** It is important that the right people were involved in the development of the FMP. This indicator would work to map the different stakeholder groups engaged with throughout the scoping and preparation stages of plan development. This could also help to target engagement going forward and assist in the development of future iterations of the FMP. This will also assist with the formal establishment of the Channel demersal NQS Management Group as outlined in the Social and Economic goals. The record of stakeholder engagement produced by the MMO will give an indication of the groups of stakeholders involved in the development of the FMP.
- **Number of engagement events:** By identifying the number of engagement events hosted by MMO throughout the development of the FMP, it may be possible to understand if the level of engagement has been enough to achieve meaningful outcomes for those involved. However, just looking at the number of engagement events does not highlight what the appropriate level of engagement is. This could be quantified by a percentage of engagement in a given area, and therefore further work would be needed to determine this. This indicator could be supplemented with the two previous indicators to provide an overall picture of levels of engagement. The record of stakeholder engagement produced by the MMO will outline the number of engagement events held by for the development of the FMP.
- **Feedback received on level of engagement:** To understand the levels of stakeholder satisfaction with the FMP development process,several indicators could be used, such as a survey with specific questions around engagement, and looking at the number of complaints received on the level of engagement (FMP mailbox).
- **Feedback received on contents of the FMP:** Feedback summaries produced by the MMO on the vision, goals, evidence, and potential management measures can provide an indication of the level of stakeholder satisfaction with the FMP process.

Indicators for outcomes

All indicators will have a target assigned to them. This will be used to measure the effectiveness of goals and against which the success of management measures will be assessed. This will include (but not be limited to) the following sources:

- **Monitoring Interviews:** Annual monitoring interviews can be effective ways to gather information on the impact that the adopted FMP is having on the fisheries and those who are dependent upon them. These interviews can be conducted with relevant stakeholders with a series of questions focused around ascertaining whether the FMP is having the desired impact. Conducting the interviews annually will allow the relevant authority to get real world examples of FMP attributed impacts and allow them to see change over time before the 3-year reports are due. Questions can be tailored to monitor specific predicted outcomes of the FMP goals.
    - **Target:** An increase in positive changes to the fishery due to FMP interventions.

- **ICES stock assessments (where available):** ICES ecosystem advice is based on assessment results that are presented in stock assessment standard graphs and data tables. Data and plots are available in ICES Stock Assessment Database.
    - **Target:** To have a stock assessment in place for all species within the FMP.

- **MMO** Annual UK Sea Fisheries Statistics: These annual reports provide a comprehensive overview of UK Sea Fisheries by looking at recent trends and long-term historical context. The report is a summary of the UK fishing fleet, its activity at sea, landings, effort, and trade. The data used to crate these reports can be disaggregated to the areas within the remit of this plan (ICES area 7d and 7e) and analysed to give an indication of the state of the fishery for a given year. This indicator would be able to contribute to monitoring how effective the FMP has been at delivering effective management of the stocks within its remit.
    - **Target:** TBD

- **Seafish** Economics of the UK Fishing Fleet Annual reports: These reports present economic estimates at UK, home nation and fleet segment level for the UK fishing fleet. The estimates are calculated based on samples of fishing costs and earnings gathered by Seafish as part of periodic Fleet Economic Surveys. It will be important to be able to manipulate the data within these reports to species and regional level.
    - **Target:** No decrease in the benefits derived from the NQS fisheries that have been identified through the evidence goals.

- **Cefas** Sea Angling in the UK reports: Estimates for recreational sea angling activities are currently generated annually for the whole of the UK. Two separate surveys are combined to achieve this:
    - **Sea Angling Diaries** A nationwide panel of sea anglers is recruited and use a bespoke diary app and online tool to record to complete a diary recording all their sea angling activities and catches during the year, from which the average catch per unit effort is calculated. Participants record data such as where they fished, the method, duration, and catches. Periodically, diarists have also provided details of what they spent on sea angling trips and angling purchases to demonstrate the economic value of the activity, and the impact of sea angling on their mental and physical health and wellbeing. Whilst this indicator may give us an estimate of recreational angling activity within the FMP area, it does not include data for all of the recreational sea anglers as the data are collected on a voluntary basis.
    - **Watersports Participation Survey -** The watersports participation survey is conducted annually by leading marine bodies including British Marine, Royal Yachting Association (RYA), Maritime and Coastguard Agency (MCA), Royal National Lifeboat Institution (RNLI), British Canoeing (BC) and the Centre for Environment, Fisheries and Aquaculture Science (Cefas). It is an existing nationwide survey of UK residents that is used to estimate fishing effort in terms of how many people go recreational sea fishing, and how often they use different methods. Whilst this indicator may give us an estimate of recreational angling activity within the FMP area, it does not include data for all of the recreational sea anglers as the data are collected on a voluntary basis.
    - **Target:** No decrease in the catches of NQS within the remit of the FMP for recreational anglers.

- **Channel demersal NQS FMP Management Group input into fisheries management:** One of the goals of the FMP is to establish a Channel demersal NQS Management Group. This management group will have appropriate representation for stakeholders across the Channel and provide support for industry to feed into management decisions for NQS. This indicator will track the representation through an annual survey and where consultations were responded to and management decisions fed into.
    - **Target:** Building on the current working group, there is a formally established NQS management group with appropriate representation allowing for input into fisheries management.

Indicators for impacts

The impact steps of the logic model will be monitored using existing indicators that have been developed for several national policy areas. Each of the indicators outlined below have their own targets already laid out within the documentation and therefore there are no specific targets highlighted for this FMP in this instance. However, this could be developed in the future.

United Kingdom Marine Strategy: The UK Marine Strategy provides the framework for delivering marine policy at the UK level and sets out how to achieve the vision of clean, healthy, safe, productive, and biologically diverse ocean and seas. The strategy includes several descriptors and associated indicators focussing on biodiversity, non-indigenous species, commercial fish, food webs, eutrophication, sea-floor integrity, hydrographical conditions, contaminants, contaminants in seafood, marine litter, and underwater noise. There are therefore indicators that will be relevant to the monitoring of the impact of the FMP including;

- D1, D4 Cetaceans.
- UKMS D1, D4 Seals.
- UKMS D1, D4 Birds.
- UKMS D1, D6 Benthic habitat.
- UKMS D4 Food webs.
- UKMS D10 Marine litter.

It is worth noting that several of the UKMS indicators are still in development and therefore may not be developed enough to use for the first 3-year monitoring report. Annex 5 of the Evidence Statement provides a detailed insight into how these indicators may be impacted by fishery activity.

The 25-Year Environment Plan Theme C: The 25-year Environment Plan indicator framework provides a comprehensive set of indicators describing environmental change that relates to the 10 goals within the 25 Year Environment Plan. It describes the state of the environment and supports the strengthened framework for monitoring and reporting on environmental improvement. The indicators are split into several themes. Theme C Seas and Estuaries provides indicators most relevant to assess the FMP with including;

- C1 Clean seas: marine litter.
- C2 Seabed subject to high pressure from human activity.
- C3 Diverse seas: status of marine mammals and marine birds.
- C4 Diverse seas: condition of seafloor habitats.
- C6 Diverse seas: status of threatened and declining features.
- C7 Healthy seas: fish and shellfish populations.
- C8 Healthy seas: marine food webs functioning.

- C9 Healthy seas: seafloor habitats functioning.
- C10 Productive seas: fish and shellfish stocks fished sustainably.
- C11 Productive seas: status of sensitive fish and shellfish stocks.

Other factors influencing FMP outcomes and impacts

It is important to recognise that there are a number of other factors influencing change within the remit of the FMP such as changes in wider Government policy and market forces. The level of control the FMP has in the later stages of the logic chain reduces over time as external factor contributions increase (Figure 5). In this context, the FMP is not the only factor able to create change within the fishery and as a result it may be difficult to assess how an outcome, or what portion of an outcome, has been achieved only by the FMP. When reporting, Defra will focus on how the FMP has contributed to an outcome.

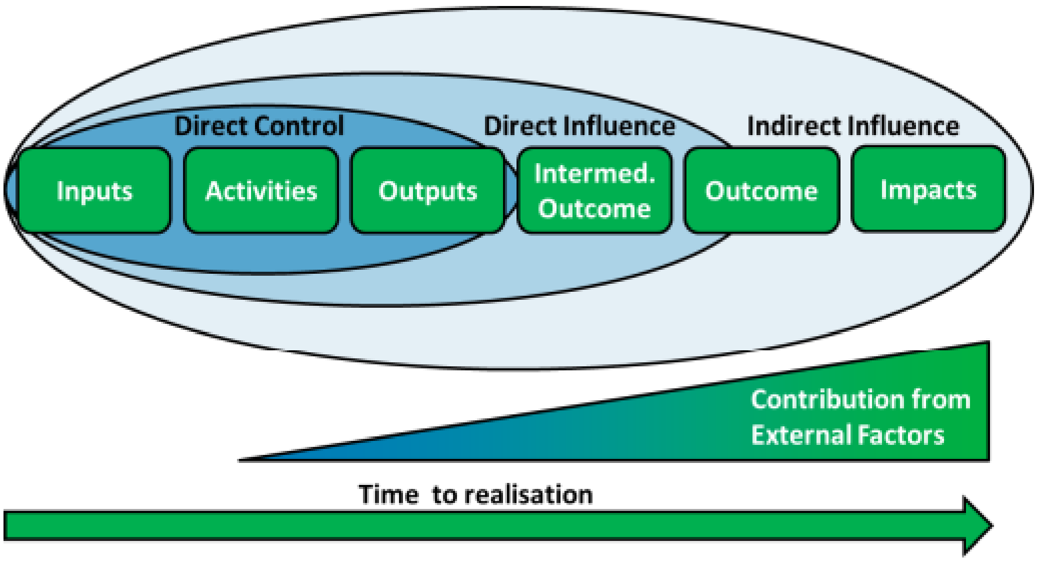

Figure 5 The relationship between inputs and impacts in a logic chain and the increasing influence of external factors over time[2]

2 North East, North West, South East and South West Marine Plans Approach to Monitoring, Marine Management Organisation 2020

Establishing a baseline

Establishing a baseline to measure progress towards achieving the FMP goals against is important. For the purpose of this FMP, the baseline is not intended to describe the status of the fisheries in an ideal state but to provide an assessment of the fisheries prior to FMP adoption. It is acknowledged that baselines would be expected to change over time due to a range of factors. Baseline evidence will be gathered in relation to indicators so that when three-year reports are prepared, change can be better understood. Evidence gathered will be used to explain the change that has been observed since the FMP was adopted which will help to identify what the effect of the FMP has been over a specified time period.

Context monitoring

Throughout the life span of this FMP, there will be a need to monitor new and emerging legislation, and key policy areas that are relevant to this FMP. A change in any of these may require amendments to the published FMP. In addition to this, the development and adoption of other FMPs may impact the information within this FMP and may also trigger a need to amend the FMP. These changes will be picked up within the three-yearly reports and will help Defra / MMO to recommend amends to the FMP that ensure it is up to date with the current legislative context.

Future indicator development

There are some goals and interventions within the FMP that still require further indicator development work, for example the goal around optimising benefits for coastal communities. As new data sets and evidence becomes available to fill the above identified gaps, the FMP and its supporting Evidence Statement will be updated to keep current indicators under review. There are many other developing indicators that should be explored going forward that are listed within section 4.9 of the Evidence Statement.

Evaluation and review process for indicators

As set out in the Fisheries Act 2020, this FMP will be reviewed no longer than every six years. However, further reviews of the FMP could be carried out within the six-year period if the responsible authority feel there is a need to do so based on the evidence and monitoring of effectiveness of the plan.

Monitoring data will be collected on a yearly basis and reported on every three years to re-estimate the indicators if new data becomes available or if there are other external factors that influence the fishery. This data will be important to inform the setting of any future management measures and to assess whether the FMP is on target to achieve its goals.

Department for Environment Food & Rural Affairs

Proposed Fisheries Management Plan for Channel Demersal Non-Quota Species

Annex 7: Environmental Considerations

Date: July 2023

Version: public consultation

Contents

Context

The following section highlights environmental evidence presented as a report (see Annex 4 of the Evidence Statement for the full report) from statutory nature conservation bodies (SNCBs) on Marine Protected Areas (MPAs) and wider seas. There are 52 protected area designations including Marine Conservation Zones (MCZ), Special Protection Areas (SPAs), Special Area of Conservation (SAC) and Highly Protected Marine Areas (HPMAs) that overlap with the Channel Demersal Non-Quota Species (NQS) Fisheries Management Plan (FMP). A map of MPAs in the Channel has been presented in Annex 5. The primary focus is on how fishing activity outside of MPAs may impact habitats and species that are either within MPAs, are mobile designated species of MPAs, or are outside of any spatial protection.

MPAs and Designated Features

Whilst the management of fisheries activity occurring within MPAs is addressed through separate work undertaken by the Marine Management Organisation (MMO) and Inshore Fisheries and Conservation Authorities (IFCAs), there remains the potential for fishing activity occurring outside of an MPA to have impacts on the features protected within an MPA. This can happen when either the pressures exerted by fishing activity can impact protected features beyond its spatial footprint, or when the feature of an MPA is mobile and travels outside the site. An illustrative example of the latter is breeding bird species that fly many miles from the nest and their designated MPA in order to find prey. Additionally, mobile species that are designated features of terrestrial/riverine protected sites, such as migratory fish species (i.e. Atlantic salmon and shad) that are protected under riverine SACs, fall within the scope of this FMP as they can be impacted by fishing activity within the spatial jurisdiction of the FMP.

SNCBs have screened risks posed by fisheries occurring outside MPAs on MPA (or other designated sites) features and have suggested there are two areas of risk that require further thought:

- The risk of bycatch of mobile species (fish) that are designated features of MPAs or other protected sites. For bottom towed gears, this was classified as moderate risk (bycatch is either documented or suspected but may be highly localised due to limited overlap between species and the gear used in this fishery). It was noted that use of static nets may also risk bycatch of birds, fish, and mammals, although their use in this fishery may be limited and further data are required to understand interactions.

- The potential bycatch of important prey species that designated species depend on. This was classified as low risk: a theoretical pathway exists for bycatch, but this may not be occurring at a scale which is of concern.

Wider Seas Evidence: Beyond MPAs

The habitats and species outside of MPAs but within the spatial boundaries of this FMP also have the potential to be negatively impacted by fishing activity associated with demersal NQS. Four key issues have been screened and a rapid assessment of risk has been undertaken against key indicators of Good Environmental Status (GES):

1. The impact of targeted fish removal on stocks. This will also be considered by the FMP Management Group under the precautionary objective. Any management brought in to meet the precautionary objective should also achieve the GES targets for D3 for targeted stocks. As this issue has been covered throughout the FMP, no rapid assessment of risk to GES has been undertaken.
2. Where demersal mobile gear is used, there is a concern around benthic disturbance and the contribution to current failure to meet targets for D6 seafloor integrity. This will also have associated impacts on D1 biodiversity and D4 food webs. The impacts of any demersal mobile gear on seafloor integrity, biodiversity and food webs will need to be considered by the FMP working group. This is considered a high-risk issue as there is a clear link between activity and failure to meet GES indicator targets5.
3. The impact of bycatch of species on D1 biodiversity, D3 commercial stocks and D4 food webs. The risk to both other fish species and bird / mammal / sensitive fish species is currently unclear. A better understanding of the actual risk posed by this fishery will require a closer look at the bycatch associated with this activity. Note that as well as being relevant to GES, the Fisheries Act Ecosystem Objective requires that ‘incidental catches of sensitive species are minimised and, where possible, eliminated’. The risk to commercial fish species is also relevant to the bycatch objective of the Fisheries Act, and management brought in to meet this objective should contribute to achieving GES targets for D3 commercial fish and D4 food webs.
4. The contribution to fishing related litter. Loss of gear such as trawls and nets will add to overall levels of fishing related litter within the sea and can have unintended consequences such as ghost fishing. Consideration of how best to avoid or minimise loss and achieve sustainable end of life disposal is important. This risk is considered moderate.

National approach to D6 seafloor integrity

The UK is committed to reducing the impact of current fishing gear on the seabed and is taking a multi-faceted approach to assess where measures can be best placed to mitigate impacts. In the update to the UK Marine Strategy (UKMS) Part One (2019), commitments were made to assess the feasibility of setting up a partnership working group with key stakeholders to identify solutions for potential fishing impacts on seabed integrity.

Working with stakeholders, Defra will consider the evidence and then develop further recommendations on the potential effects of fishing activities [alongside other activities] on seafloor integrity and the state of benthic habitats, including contributing to the implementation and coordination of the Benthic Impact Working Group. This work will consider the issues at a strategic level and within the context of ongoing changes in marine spatial use and environmental protection to achieve the objective of GES under the UKMS.

National approach to marine litter, including end of life and abandoned, lost and discarded fishing gear

The UK is committed to lead efforts to protect the marine environment from marine litter, including abandoned, lost and otherwise discarded fishing gear, and has been taking a whole life cycle approach to prevent material from becoming a source of litter. Policies have been introduced to eliminate the most problematic plastic items and make producers more responsible for the plastic they produce, including legislation to restrict the supply of certain single-use plastic items and a UK-wide extended producer responsibility scheme for packaging. Defra is closely working with the Devolved Administrations and industry bodies to develop options to move towards a circular economy model for End-of-Life fishing gear.

The UK co-sponsored the proposal to prepare a new international, legally binding plastics treaty on plastic pollution and took an ambitious stance at the Intergovernmental Negotiating Committee (INC1) in November 2022, supporting a treaty that will restrain the production and consumption of plastic to sustainable levels, ensure the design of plastic enables a circular economy and encourage more recycling and re-use of plastic, with the ultimate aim of ending plastic pollution.

Defra is working with other Contracting Parties to the OSPAR Convention to implement the second Regional Action Plan on Marine Litter, which includes action to tackle marine litter from land and sea-based sources, including fishing. Existing monitoring programmes assess seafloor litter, surface litter and beach litter, alongside ongoing research initiatives to support the reuse and repurpose of end-of-life fishing gear back into the fishing industry to support a circular economy and to reduce the impacts generated from fishing waste.

Ongoing Environmental Data Collection

A range of current monitoring and evidence programmes currently gather data to inform on the risks of fishing activity to both MPAs (or mobile designated site features), and the GES descriptors relevant to this FMP. Alongside a list of work undertaken by academia and research institutes (see reference list), the evidence gathered to support decisions made as part of this FMP was sourced from:

- The Bycatch Monitoring Programme;
- Clean Catch UK;
- Protected site monitoring;
- Monitoring undertaken through the English Seabird Conservation and Recovery Plan; and
- JNCC work on extent of physical damage (D1 & D6 seafloor integrity) for OSPAR and UKMS.

However, given the comparative lack of data on the direct impacts of Channel NQS fisheries on the designated features of MPAs, mobile designated features of other protected sites, and the achievement of GES on wider marine environments, a suite of new work is required. As a key goal of the FMP, this should be undertaken in partnership with the fishing industry, the wider research community, eNGOs and government. Up to this point, this FMP was not able to fully quantify the pressures associated with Channel NQS fisheries, and instead provides a high-level risk assessment based on best available evidence.

Climate Change Mitigation/Adaptation

Anthropogenic emissions of carbon dioxide (CO_2) associated with fossil fuel usage drives climate change, leading to increased sea surface temperature, ocean acidification, and fluctuations within large-scale weather and climate patterns that can impact ecological baselines. Under the Fisheries Act climate objective, and Net Zero ambitions, the UK government is committed to reducing CO_2 emissions within the fishing fleet, and to improving resilience to climactic driven impacts across the sector and marine habitats.

The Climate Change Act 2008 (amended in 2019) sets a legally binding target of achieving net-zero greenhouse gas emissions (GHGe) by 2050 across the UK economy, with an ambition of a 78% reduction by 2035. To support these targets, all sectors will need to develop pathways to reduce their GHGe and utilise alternative clean energy. The UK seafood sector will need to consider how they will reduce emissions to contribute to meeting the Net Zero target. These mitigating actions could include technological, managerial, and behavioural changes to increase energy efficiency or transition to alternative fuels and energy sources, and reduce the direct impact that fisheries have on marine carbon stores.

Defra is in the process of investigating the feasibility and potential of existing carbon mitigating solutions, and is collaborating across government, with industry and academic organisations to understand the current evidence gaps and latest innovations to support the development of pathways towards Net Zero for the UK fishing fleet.

The future of climate impacts in the Channel are not very well understood. Further research on the impact of climate change to the environment will be carried out in future iterations of the FMP and is not currently seen as a priority for this first iteration. It is not currently within scope of this iteration of the FMP to directly deliver mitigation strategies against climate change, but it may be within its remit to support the fishery through the national transition to low-carbon fishing.

The Climate Change Objective in the Fisheries Act ensures that future fisheries management policy can, where appropriate, adapt to any future impacts of climate change on the UK fishing industry to support climate adaptive fisheries management. Evidence will be collected to model the potential movement of fish stocks and the impacts this will have on regional fisheries. As stocks move into and out of UK waters, assessments of stock levels will be conducted to adapt allocation of fishing opportunities.

Information provided in Annex 2 of the Evidence Statement demonstrated that most species in the scope of this FMP will move northward, whereas squid, red mullet and bib may move south. For most of the FMP species, warmer UK seas may become a more suitable environment, but for red gurnard, grey gurnard and veined squid, warmer waters may become less suitable. Climate change poses potential knock-on effects for the mixed demersal fishery. However, given the highly adaptable nature of wild capture fisheries, warmer seas may open up new opportunities for fishers and for inclusion of these species in the FMP management.

Further research will be required to predict the scale of impacts to the environment and over what timeframe this will be applicable to the Channel. Climate mitigation and adaptation measures can then be proposed and developed. Direction on climate research and adaptation may be set at a national level. Should this occur, this will trigger the need for amendment to the chapter.

The UK continues to build the evidence base on blue carbon habitats in the UK, including marine sediments. While Defra appreciates the benefits of a precautionary approach, further evidence is required to understand the trade-offs and wider consequences of decisions and ensure a net positive outcome. Defra is continuing to build the evidence base on carbon seabed dynamics, through research on carbon stocks and accumulation rates; emissions or changes in stock/accumulation due to human activities (including vulnerability to fishing activity) and climate change; and seabed recoverability timescales. The Blue Carbon Evidence Partnership is looking to progress the blue carbon evidence base to address uncertainties in this area.

Goal and Measures Contribution to the Ecosystem and Habitat

Commercial fishing practices are one of the most significant pressures preventing the achievement of GES of UK Seas. The physical disruption of the seabed from fishing gear is regarded as the main problem preventing achievement of GES (Defra, 2019[1]). The SNCB advice provided in the Defra evidence commission for FMPs (as presented in Annex 4 of the Evidence Statement) identifies the following GES descriptors as relevant to the FMP scope during its first iteration: D1 biological diversity; D3 commercially exploited fish; D4 food webs; D6 seafloor integrity; and D10 litter. The advice builds on existing evidence-based work on risk to UK MS descriptors by different fishing gears, previously commissioned by Natural England (French *et al*., 2022).

Recognising that the FMP NQS are targeted and predominately caught by towed demersal gears (beam and otter trawl account for 85% of the FMP catch by weight of landings), the fisheries in the scope of the FMP are likely to be a significant actor for achieving GES under descriptor D1 biodiversity and D6 for seafloor integrity in the English Channel. The Defra commissioned report on GES advice for FMPs identified major risks posed by mobile gears to benthic habitats resulting in high levels of disturbance and the failure to reach UK MS targets for benthic biodiversity and seafloor integrity (D1, D6).

Recognising a rise in frequency and potential impact of demersal flyseining in the eastern Channel, in combination with anecdotal evidence of the impacts this may be having on eastern Channel fish stocks and attributed guilds, the FMP has proposed measures to better understand and mitigate for the stressors this places on the ecosystem. Specifically, there is a noted concern of the impact this fishing practice, due to its high efficacy and catching success, will have against the GES descriptor D1 for biological diversity and D4 for food webs. The FMP is looking to address this through recommending measures to limit flyseining impact on FMP stocks in the Channel. In order to better understand the practice and its impacts, the FMP recommends the implementation of a monitoring programme to better assess fishing impact and effectiveness of the proposed measures. The proposed measures to limit

1 [Marine Strategy Part One: UK updated assessment and Good Environmental Status (publishing.service.gov.uk)](https://assets.publishing.service.gov.uk)

flyseining activity in the FMP area of the Channel are in line with the Defra consultation on flyseining and the recommended management measures extracted from the stakeholder response.

Following concerns raised by the fishery stakeholders, early precautionary measures proposed in the development of the first iteration of the FMP have been documented in section 5 and Annex 6 of the FMP. Table 1 provides a high-level summary of the impact of FMP management interventions and their linkage to the GES descriptors. A more detailed and thorough analysis will be required to better predict the unintended consequences of any management action.

Table 1 Precautionary management recommendations. Qualitative assessment of impact against GES descriptors. Green: positive envisioned contribution. Red: No envisioned contribution

	Measure	Time-frame	D1	D3	D4	D6	D10	Expected GES impact
Fly-seining measures – Squid, bib, red mullet, red gurnard, tub gurnard	Propose introducing a 221kW restriction in ICES areas 7d and 7e in UK waters for 0-12nm for flyseiners	Short-term						Extending engine size limits to flyseining gears could reduce fishing pressure within the inshore environment. This could prove beneficial to the inshore ecosystem (therefore marked green) but could displace fishing effort outside of 12nm, potentially to the detriment to the offshore environment.
	Consider a gross tonnage limitation in ICES areas 7d and 7e for flyseiners	Short-term						A gross tonnage limitation would help to limit the large capacity flyseining pressure within the Channel.
	Propose that all flyseiners use 100mm mesh as standard	Short-term						Increasing and standardising the minimum mesh size for flyseiners operating in the Channel should increase the minimum size of all catch. Thereby promoting ecosystem functioning, biodiversity, the stock, and food webs.

	Measure	Time-frame	D 1	D 3	D 4	D 6	D10	Expected GES impact
	Further consider consulting with further details related to introducing a permitting scheme for flyseiners	Medium-long-term						A permitting scheme could help to regulate the flyseine fishing in the Channel and help to limit the impact they are having on flyseine species.
	Subject to the outcome of the consultation on REM, propose introducing an early adopter scheme that could become mandatory in time	Medium – long-term						REM could help to support the collection of robust evidence and fill key evidence gaps. It can help to monitor the impact of the other proposed measures.
	Consider time spent in area restrictions or seasonal closure	Medium-long-term						Reduces fishing pressure on stocks and wider marine environment through effort restrictions.
	Consider seasonal closure for flyseiners	Medium-long term						Seasonal closures allow for stocks to recover.
	MCRS for flyseine caught species i.e., red gurnard, red mullet, bib etc	Medium-long-term						Introducing a MCRS could promote fish growth to the age of maturity beneficial to the recruitment of the stock. This could support local biodiversity and food webs by promoting ecosystem functions

	Measure	Time-frame	D1	D3	D4	D6	D10	Expected GES impact
								through increasing juvenile population size.
	Consider an overall engine size limitation for flyseiners	Medium-long-term						Limiting engine size to flyseiners operating in the full FMP area could reduce fishing pressure on the marine environment.
	Further consider potential rope length and diameter restrictions for flyseiners	Medium-long-term						Restricting rope length and rope diameter for flyseiners operating in the full FMP area could reduce fishing pressure on the marine environment.
	Consider introducing MCRS for lemon sole, turbot and brill	Short-term						Introducing a MCRS could promote fish growth to the age of maturity beneficial to the recruitment of the stock. This could support local biodiversity and food webs by promoting ecosystem functions through increasing juvenile population size.
MCRS for multiple species	Consider introducing MCRS for cuttlefish	Short-term						Introducing a MCRS could promote fish growth to the age of maturity beneficial to the recruitment of the stock. This could support local biodiversity and food webs by promoting ecosystem functions through increasing juvenile population size. Recognising the impacts of increasing juvenile population size are unknown.

	Measure	Time-frame	D 1	D 3	D 4	D 6	D10	Expected GES impact
Towed gears	Gathering evidence on potential viable options for towed gears in ICES areas 7d and 7e, in particular in relation to 0-12nm	Medium-long-term						No measures given. Purpose is to reduce fishing pressure on juvenile individuals within the English Channel – need to explore compatibility with MCRS for priority species. This will have positive benefits to the stocks themselves and the wider ecosystem (biodiversity and food webs).
Cuttlefish	Consider introducing codes of practice for trap handling	Short – medium-term						Protecting cuttle eggs through the introduction of codes of practice could prove beneficial to stock recruitment. Direct ecosystem benefits could follow from the increased availability of eggs and young cuttlefish as prey items. Recognising the impacts of increasing juvenile population size are unknown.
	Investigate the benefits of underwater structures to benefit egg survival	Short – medium-term						Protecting cuttle eggs through protection of existing important egg laying features (such as seagrasses) could prove beneficial to stock recruitment. Direct ecosystem benefits may follow from the increased availability of eggs and young cuttlefish as prey items. Indirect ecosystem benefits may come because of this additional protection to the marine environment. Adding additional underwater structure may be a useful tool but may have negative impacts on D6.

	Measure	Time-frame	D1	D3	D4	D6	D10	Expected GES impact
	Consider temporary seasonal closures for trawlers	Short-term						Furthering the point above, consider if introduction of trawl restrictions to important marine features would carry benefits for the stock and local ecosystem.
Octopus	Monitor catches, create research plan and gather evidence	Short-term						While the collection of data and evidence has no immediate direct benefit on the environment, it will allow for more informed management designed to protect the stock.

	Measure	Time-frame	D1	D3	D4	D6	D10	Expected GES impact
Recreational	Support the recreational sector to consider introducing voluntary guidelines and education on how recreational fishers can fish more sustainably. This could include voluntary MCRS information, guidance on methods and equipment to reduce damage to fish, as well as information on how anglers can handle and release fish to reduce post-release mortality.	Short-term						If guidelines are followed, it should reduce the pressure on stocks from recreational fishers.

The FMP has linked the delivery of its long-term vision to a suite of goals which have been further broken down into short- and medium-long-term actions which take a stepwise approach to delivering each goal. The goals under the sustainable fisheries theme look to make improvements to the sustainability of the stock and the fishery.

Table 2 provides a summary of the FMP sustainable management goals and actions and their linkage to the GES descriptors. It is worth noting that many of the actions planned under the FMP are related to research and improving understanding. This leaves opportunity for the scope of the FMP goals and actions to be adjusted to incorporate regulatory interventions to contribute to GES delivery after defining how this can be achieved.

There is scope within the precautionary approach to act in the absence of evidence, and additional measures or recommendations may be implemented in the future which fall outside of the current suite FMP goals and actions.

The FMP will be actively looking to contribute toward descriptors D1 biological diversity and D4 food webs through investigating key issues and monitoring for unwanted and protected species bycatch within the fishery. This will form part of a strategy for the medium-long-term to have implemented a data collection programme which will look to measure and assess the impacts of fishing for these species. The scope of the monitoring programme will be developed following publication of the FMP.

Furthering actions attributed to descriptors D1 and D6, medium-long-term ambitions of the FMP include actions on identifying and affording appropriate protections consistent with our commitment to adopting an ecosystem-based approach to fisheries management. Defra/MMO will work with IFCAs, ALBs, fishermen, and wider stakeholders to establish an evidence based process to 1) identify the most important areas and seasons for key life stages of relevant species covered in this plan; and 2) consider risks and possible mitigations, important to key life stages of Channel demersal NQS, with the long-term ambition of understanding and regulating non-fishing anthropogenic pressures on the stocks, and in the context of ongoing wider change in the fishery area.

The FMP will actively look at descriptors D6 seafloor integrity through carrying out research to better understand the impact of fishing gear interactions with the marine environment in the Channel demersal NQS fishery. This research to define the demersal gear and benthos interactions is a short-term action (i.e. within 2 years).

Table 2 Fishery sustainable management theme goals and actions. Qualitative assessment of impact against GES descriptors. Green: positive envisioned contribution. Red: No envisioned contribution

Actions	Timeframe	D1	D3	D4	D6	D10	Envisioned assessment
Goal: Deliver effective management of demersal non-quota species in the English Channel							
Scope how to define the precautionary approach in the Channel NQS mixed fisheries. How it will be initiated, implemented, and assessed – in line with data collection and management needs.	Short-term						Precautionary management is intended to act on unsustainable fishing practices based on identified concerns within the fishery. Implementation of a precautionary management approach will seek to contribute to improving benthic biodiversity, commercial fish sustainability and food webs and act on sustainability concerns during the early implementation of the FMP.
Following HSS guidance, progress toward sustainability (MSY or suitable proxy) or implement precautionary management for stocks of particular concern.	Medium-long-term						MSY (or similar) approaches are implemented for stocks with sufficient datasets. For those stocks that have insufficient data to implement MSY approaches but exhibit concerns around sustainability, relevant precautionary management is in place.
For all stocks that are data poor and consequentially unable to be assessed for stock status, at MSY or a suitable proxy, seek to improve datasets to allow for assessment.	Medium-long-term						For data poor stocks, collection of relevant ICES accredited datasets is underway to support MSY implementation at assessment. Move toward HCR for sustainable stock management and beneficial ecosystem impacts.
Deliver a mixed and multi-species management approach in the Channel demersal NQS fishery.	Long-term						Mixed fishery advice is produced and utilised to develop mixed fishery management. Likely to be

Actions	Timeframe	D1	D3	D4	D6	D10	Envisioned assessment
							beneficial to the stocks and wider environment.
Seek to ensure stocks are managed sustainably. Pursue the establishment of MSY, a suitable proxy or other sustainability assessment for these stocks. Seek to manage catches below MSY or a suitable acceptable proxy for a mixed fishery for all stocks in scope of the FMP.	Long-term						All stocks assessed at MSY with relevant biomass indicators suggesting healthy stock status. Fishing mortality below MSY through use of HCR will contribute to sustainable stock management and beneficial environmental impact.
Goal: Deliver wider biological Sustainability **Sub goal: 1) Where possible identify and mitigate pressures on the Channel demersal NQS**							
Seek to scope how to define key interactions between all Channel fisheries and non-quota stocks.	Short-term						As part of mixed fishery and ecosystem-based approaches, research could be considered to begin to understand how NQS are impacted by fishing activity within the English Channel.
Better understand and define the targeting behaviour of the fleet.	Short-term						Research could be considered to identify and capture fishery targeting patterns. This should inform management and feed into mixed fishery approaches.
Manage key interactions to minimise adverse impacts on Channel demersal NQS stocks.	Medium-long-term						Key interactions associated with fishing activity understood and managed effectively to minimise unintended consequences to Channel demersal NQS stocks.

Actions	Timeframe	D1	D3	D4	D6	D10	Envisioned assessment
Identify and afford appropriate protections for essential fish habitats important to key life stages of Channel demersal NQS.	Medium-long-term						Research could be considered to identify essential fish habitat (across multiple life stages) undertaken and utilised to inform spatial based management.
Understand the impact and map species sensitivities to climate change on Channel demersal NQS.	Medium-long-term						Research could be considered on the impact of climate change on Channel demersal NQS. Develop specific FMP climate change mitigation strategy that (a) suggests appropriate management to mitigate for impacts on Channel demersal NQS, and (b) meets objectives of national/international climate change policy.
Identify where climate change mitigation and adaptation measures can be implemented to reduce impacts on the fishery.	Long-term						Outcomes and advice stemming from climate FMP specific climate change strategy developed into a range of mitigation and management measures.
Better understand the impact of anthropogenic non-fishing pressures on Channel demersal NQS stocks.	Long-term						Taking an ecosystem-based perspective, research could be considered to understand anthropogenic non-fishing pressures on Channel demersal NQS stocks. Research and evidence utilised to begin to develop management measures, both specific to NQS, but also wider marine environment and species.

Actions	Timeframe	D1	D3	D4	D6	D10	Envisioned assessment
Goal: Deliver wider biological sustainability **Sub goal: 2) Understand and reduce the impact of Channel demersal NQS fisheries on the wider marine environment**							
Investigate key issues in current unwanted and protected species bycatch within the fishery.	Short-term						Research could be considered to identify and reduce unwanted / protected species bycatch. Evidence utilised to inform management/mitigation measures where required.
Better understand the impact of fishing gear interactions with the marine environment in the Channel demersal NQS fishery.	Short-term						Research could be considered to map and define the environmental impacts of NQS fishing activity, with a specific focus on bycatch issues and demersal gear and benthos interactions. Evidence utilised to inform management/ mitigations measures where required.
Establish data collection requirements to monitor and track key Channel demersal NQS fishing impacts on unwanted/protected species bycatch.	Medium-long-term						Tailored monitoring and data collection programmes could be considered to inform on key bycatch parameters. Enhanced evidence utilised to develop management where required.

Secondary and Dependent Species (Including Bycatch)

The species under the scope of the FMP are predominately caught within a mixed fishery; very few are considered to have a targeted fishery of their own. Research undertaken, along with compilation of anecdotal stakeholder inputs has suggested that unwanted catches of low value and small lemon sole, turbot, brill and cuttlefish are caught in association with smaller gear mesh sizes. The practice of using 80mm mesh size codend has been identified as less sustainable among some fishers, preventing juvenile individuals from reaching spawning maturity and ultimately yielding lower overall value. Therefore, recommendations have been put forward to gather evidence on viable options for management measures to enhance stock sustainability and deliver social and economic benefits across the whole sector.

For clarity, the definition of bycatch included within this section represents the risk of unwanted protected species bycatch which may be caught alongside the FMP species. During the evidence gathering phase of the FMP development, no specific bycatch associations were identified as part of fisheries targeting of the Channel demersal NQS. This is a recognised evidence gap; deliberate actions have been incorporated into the goals for the sustainable fisheries which focus on identifying interactions between the FMP stocks and other fisheries; and undertaking research to identify and address key bycatch issues.

Under the Natural England evidence request commissioned by Defra, six key areas were identified as bycatch risks through FMP fisheries and associated gear types. The FMP's key recommendations, given the current lack of data on bycatch associated with NQS fisheries is to collect additional evidence to understand levels of bycatch associated with static and towed gear use on birds, mammals, and fish, as well as benthic habitat integrity, and then use this evidence to develop robust mitigation strategies. This information should also be used to support the national bycatch mitigation programme. Further information on these can be found in Annex 5 of the Evidence Statement.

A long-term goal is to look at net selectivity and introduce the use of more selective nets. This will overall reduce any bycatch associated with the non-quota fishery. However, due to the nature of the non-quota fishery being a mixed fishery there is not any non-target species as such to consider. No specific bycatch associations were identified as part of fisheries targeting of the Channel demersal NQS. This is an evidence gap and one of the FMP goals sets out to undertake research to identify and address key bycatch issues.

The National Approach to Bycatch and Discards

Bycatch

This identified risk is relevant to the ecosystem objective of the Fisheries Act, which states that "incidental catches of sensitive marine species are minimised and, where possible, eliminated". This includes cetaceans, seals, elasmobranchs, seabirds, turtles, and some sensitive fish species, and is part of a wider effort to ensure the sustainability of our fisheries. There are also legislative drivers in the UKMS to achieve GES which for species includes indicators on bycatch. The Bycatch Mitigation Initiative published in August 2022 sets out in more detail policy objectives and actions that should be taken to achieve the ecosystem objective in the Fisheries Act. Existing monitoring and mitigation programmes, such as the Bycatch Monitoring Programme and Clean Catch UK, aim to improve monitoring, reduce and - where possible - eliminate bycatch of sensitive species. This is delivered by developing and trialling technology to enhance on-the-ground bycatch reporting capabilities, as well as testing bycatch avoidance devices.

Discards

The landing obligation forms part of EU retained law and will continue to be in force in the UK to manage discarding unless it is changed or replaced. Defra is currently considering options to reform the landing obligation in England.