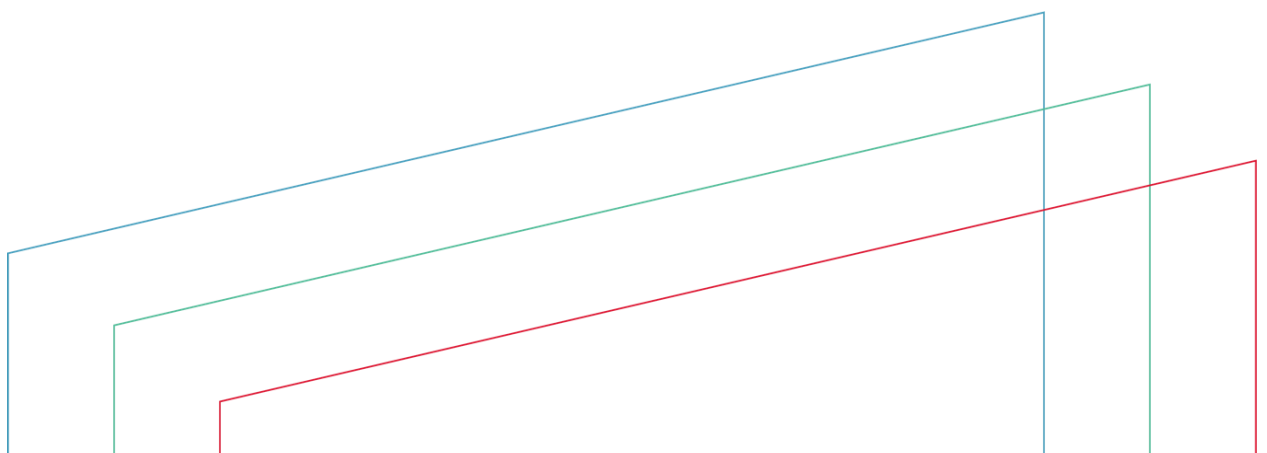




TOWARDS REGIONAL INSHORE FISHERIES MANAGEMENT PLANS – OPPORTUNITIES FOR CHANGE



New Economics Foundation



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EXECUTIVE SUMMARY

Purpose of research

This report examines seven wild capture shellfisheries in the context of the concept of Fisheries Management Plans (FMPs), identifies problems with five of them as well as with the wider management landscape, and makes specific recommendations as to how future management should be designed and resourced. These recommendations may disrupt the status quo, but if implemented, would ultimately be of benefit to the fishing sector.

This research assesses the social, economic and ecological contribution of principal bivalve and crustacean inshore fisheries in England, providing proposals for how they are grouped and prioritised within the new FMP frameworks.

Case studies highlight best (or worst) practice to enable the development of coherent management based on different triple-bottom-line criteria as well as the geographical extent and governance mechanisms to manage the fishery.

Two main groups of fisheries are explored in this assessment:

Regional shellfish fisheries

- Fisheries such as lobster, crab, squid, cuttlefish and scallop (a bivalve mollusc) are predominantly inshore but the stocks are exploited across boundaries and by different fleet segments – this means IFCAs are unable to manage the majority of the effort or mortality on these stocks.

Bivalve mollusc fisheries

- Fisheries for bivalve molluscs such as clam, cockle and mussel are more geographically contained and IFCAs have the potential to manage within a more 'closed circuit' approach for these discreet fisheries.

This project will be critical in ensuring a clear characterisation of principal bivalve and crustacean fisheries using social, economic and ecological criteria and putting forward proposals for how they are grouped and prioritised within the new FMP frameworks. It is also designed to ensure that existing best practice is incorporated into the new framework and that stakeholders are able to influence and support the development process.

Background

Fish and shellfish are a renewable, common-pool resource that can provide endless benefits to society in terms of food, revenue and jobs. Managing common-pool resources such as fisheries is complex and involves trade-offs. Post-Brexit fisheries management is likely to change fundamentally from EU level management under the CFP.

The Fisheries Act (2020) requires that fisheries policy authorities must prepare and publish a Joint Fisheries Statement (JFS) which must contain a list of fisheries management plans (FMP) detailing the stock(s) of sea fish, the type(s) of fishing and the geographical area(s) to which the plan will relate, as well as a timetable for preparation and publication. **The list of FMPs must be prepared by 23rd November 2022.**

At a minimum, **an FMP must set out policies and management designed to achieve sustainable levels of exploitation** – FMPs are now necessary for some of the non-quota

species that have historically been side-lined as the focus on fishing opportunities for shared quota stocks meant more investment in the process and science to support these decisions.

Critical issues of access to fishing opportunities and the ability to input into management decisions through transparent and publicly accountable governance processes are crucial to address in long-term equitable and adaptive fisheries management to enable fisheries to make positive contributions to local economies and food systems, while also meeting global sustainable development objectives.

English non-quota fisheries are diverse in terms of vessel length, power and catching capacity. They are also dynamic in terms of their operations, using a range of fishing methods and gear types to target a variety of species. At a stock level, non-quota species have been neglected in terms of the level of investment in research, data collection and management with many, outside of the inshore area, very lightly regulated with minimal or no stock assessments. **At a national level these non-quota species have been neglected in terms of the level of investment in research, data collection and management with many, outside the IFCA Districts, very lightly regulated with minimal or no stock assessments.**

Findings

We examined five regional and two discreet non-quota fisheries in England and found:






Five regional shellfish fisheries have been recommended to be put forward for FMPs. These are Channel Crab, East Coast Lobster, Channel Whelk, Channel Scallop and Channel Cuttlefish.

All of these fisheries are currently suffering from:

- 1. A lack of coherence in terms of inshore and offshore management which is leading to risks of overfishing;**
- 2. A deficit in terms of management and governance for the offshore component of the fishery outside 6 miles, where a substantial portion of the mortality is taking place but there are fewer (often no) restrictions in place and the management bodies are not applying the precautionary principle, effective effort limits, or any component of ecosystem based management;**
- 3. Data deficits include stock assessments, fishing capacity assessments and wider social and ecological impacts of the fishery; and**
- 4. There are concerns that a two-tier approach to inshore and offshore management is cancelling out any potential and realised benefits of good management practise.**

The two discreet bivalve fisheries (Cockle in the North West and Clam and Cockle in Poole Harbour) are performing well across social, environmental, economic and governance criteria. The unit of management is appropriate and effective and these fisheries management regimes are transparent, equitable and can be considered UK best practise for shellfish management.

SUMMARY TABLE (Economic)

	Price (£/kg)		Landings		Value (£)		Economic multipliers (£)		0-6nm			6-12nm		
Species	Range (as reported by IFCAs)	Average (2016-19 as reported from MMO sea Fisheries data)	Range (as reported by IFCAs)	Tonnes	Landed value (£)	Economic multipliers (Seafish, 2016)	Average landings (tonnes)	Landed value (£)	Type II economic multiplier - induced effect	Average landings (tonnes)	Landed value (£)	Economic multiplier (Seafish, 2016)		
 Crab	1.20 - 2.24	2.63	177,619 - 2,741,810	4,054	£10,662,020	£15,993,030	938	£2,467,043	£3,700,564	628	£1,651,117	£2,476,675		
 Cuttlefish	1.50 - 3.26	3.1	89,946 - 4,017,137	4,479	£13,884,900	£20,827,350	570	£1,766,444	£2,649,665	554	£1,717,112	£2,575,668		
 Lobster	12.50 - 12.96	14.72	363,000 - 550,000	1,207	£17,767,040	£26,650,560	350	£5,154,371	£7,731,556	198	£2,918,459	£4,377,688		
 Scallops	1.88 - 2.23	3.23	26,000 - 2,010,000	5,719	£18,472,370	£27,708,555	1,185	£3,827,042	£5,740,563	1,023	£3,302,999	£4,954,499		
 Whelks	1.00 - 1.21	1.24	1,011,514 - 2,726,602	7,567	£9,383,080	£14,074,620	2,161	£2,679,408	£4,019,113	1,433	£1,776,681	£2,665,022		

Considering a range of criteria that relate to fisheries management, conservation measures, contribution to science, good governance and transparency in decision-making as well as a range of environmental outcomes based on stock health, fishing limits underpinned by stock assessments and the use of ecosystem based management and the precautionary principle, we assessed eight regional fisheries and developed seven details case studies to underpin this assessment.

For the five regional and three discreet non-quota fisheries in England our analysis concluded that:

The five regional shellfish fisheries are recommend to be put forward for FMPs.

These are Channel Crab, East Coast Lobster, Channel Whelk, Channel Scallop and Channel Cuttlefish.









As the summary tables below show, all of these fisheries are currently suffering from:

5. A lack of coherence in terms of inshore and offshore management which is leading to risks of overfishing;
6. A deficit in terms of management and governance for the offshore component of the fishery outside 6 miles, where a substantial portion of the mortality is taking place but there are fewer (often no) restrictions in place and the management bodies are not applying the precautionary principle, effective effort limits, or any component of ecosystem based management;
7. Data deficits include stock assessments, fishing capacity assessments and wider social and ecological impacts of the fishery; and
8. There are concerns that a two-tier approach to inshore and offshore management is cancelling out any potential and realised benefits of good management practise.

These regional shellfish fisheries are performing poorly across a range of environmental, social and governance criteria. Nonetheless their economic contribution is important to coastal economies and could be greatly enhanced through the allocation of fishing opportunities that are allocated using transparent and objective criteria as required by the Fisheries Act and to meet other policy objectives e.g. to reduce the impacts of fishing on the marine environment.









The two discreet bivalve shellfish fisheries (Cockle in the North West and Clam and Cockle in Poole Harbour) are performing well across social, environmental, economic and governance criteria as the summary table below shows. The unit of management is appropriate and effective and these fisheries management regimes are transparent, equitable and can be considered UK best practise for shellfish management.

A summary table is provided on the subsequent pages.

SUMMARY TABLE (Management and Governance)									
MANAGEMENT AND GOVERNANCE		 CRAB CHANNEL	 LOBSTER EAST COAST	 WHELK CHANNEL	 SCALLOP CHANNEL	 CUTTLEFISH CHANNEL	 CLAM & COCKLE (POOLE)	 COCKLE (NW)	 COCKLE (THAMES)
NUMBER OF ACTIVE VESSELS (LANDING >100 KG) IN 2019	< 10m	1,309	1,455	319	157	196	45 permit holders	150 permit holders at present	14 licenses (stable over 5 years)
	> 10m	314	230	114	273	162	n/a	n/a	n/a
MANAGEMENT	0 to 6	Yes, effort management is in place via flexible potting permit byelaws (SxIFCA, D&SIFCA)	Yes, effort management is in place via flexible potting permit byelaws (D&SIFCA, SxIFCA); Ban on landings V notched lobsters, -ban on landing berried hens, mandatory escape hatches.	Yes, whelk management regimes (byelaws) are in place that include pot limits, escape holes, riddle size minimums, and increased MLS compared to the Eu minimum.	Yes, management is in place. IFCA restrictions and MCZ exclusion; min sizes; vessels length / power; SIFCA Scallop byelaw (2019); Solent Dredge permit Byelaw.	Yes, management is in place, pot limits apply	Yes, management is in place, byelaw containing permit conditions: closed areas (seasonal and permanent), daily fishing time, closed season, gear restrictions, catch returns required; Not limit of 45 permits issued per year, daily fishing time and closed season	Yes, management is in place, byelaw containing permit conditions: cockle beds that can be fished, gear type, minimum size, closed season, monthly landings return to IFCA; Not directly, but closed season each year and limit of 10 new permits issued per year	Yes, management is in place. IFCA permit scheme; Stock surveyed annually; Annual Total Allowable Catches (TAC) is calculated and split by the permits applied for. Adaptive management of an intermittent fishery including seasonal closures; License Fee
	6 to 12 (EU grand fathering)	No effort management, min sizes	No effort management, min sizes; no berried hens, Ban on landing V notched lobsters (no schemes of introduction outside 6nm); ban on landing berried hens; voluntary escape hatches.	No effort management, min sizes	Input controls - limiting fishing time, number of vessels and dredges per vessel, no management system to ensure sustainable harvesting levels.	No	n/a	n/a	n/a
	12 to 200	No effort management, min sizes	No effort management, min sizes; no berried hens, Ban on landing V notched lobsters (no schemes of introduction outside 6nm); ban on landing berried hens; voluntary escape hatches.	No effort management, min sizes	Input controls - limiting fishing time, number of vessels and dredges per vessel, no management system to ensure sustainable harvesting levels.	No	n/a	n/a	n/a

OTHER CONSERVATION MEASURES	0 to 6	MC7 assessments for habitat impacts of potting	MC7 assessments for habitat impacts of potting	Pot and bait restrictions (D&SIFCA); min size and riddle changes (K&EIFCA)	Yes; D&SIFCA has closed all areas to scallop fishing (both dredging and diving) during July, August and September in recent years; Southern IFCA code of conduct for scallop dredging in Solent	Pot washing to conserve eggs, leaving pots down after season	The fishery has held MSC sustainability certification since 2018 with annual audits to follow up; Closed season 24th Dec to 24th May	Closed season from mid October until mid June determined by stock assessment and committee	Closed areas following cockle stock assessment surveys and outcomes of the annual cockle licence holder meeting
	6 to 12	KWH	no berried hens	None	None	None	n/a	n/a	n/a
	12 to 200	KWH	no berried hens	None	None	None	n/a	n/a	n/a
MINIMUM SIZES	0 to 6	Applied; majority of both sexes mature at 130-140 mm MCRS	87 mm Minimum Conservation Reference Size for UK waters	IFCA min sizes / 45 mm	110mm; Some increases in minimum sizes in IFCA districts	None	Yes, 35 mm for clams and 23.8 mm for cockles	Yes, 20 mm minimum size for cockles	Yes, 16 mm minimum size for cockles
	6 to 12	Applied; majority of both sexes mature at 130-140 mm MCRS	87 mm Minimum Conservation Reference Size for UK waters	EU min size 45 mm	110 mm	None	n/a	n/a	n/a
	12 to 200	Applied; majority of both sexes mature at 130-140 mm MCRS	87 mm Minimum Conservation Reference Size for UK waters	EU min size 45 mm	110 mm	None	n/a	n/a	n/a
SCIENCE	0 to 6	IFCA science (CIFCA, D&SIFCA, SxIFCA); FIP	IFCA science (NEIFCA, EIFCA, K&EIFCA)	IFCA science (e.g. K&EIFCA whelk potting survey); SxIFCA size at maturity studies	IFCA surveys in Solent and Salcombe estuary; FIP	IFCA level studies (SxIFCA)	IFCA science and Natural England advice Fishers collaborating on sustainability research	IFCA science (surveys and stock composition) and Natural England advice	IFCA science (annual cockle surveys and reports)
	6 to 12	Edible Crab science group IFCA and NFFO; Cefas ongoing; FIP	Cefas ongoing; FIP	Cefas ongoing	ICES scallop working group	None	n/a	n/a	n/a
	12 to 200	Cefas; FIP	Cefas ongoing	Cefas ongoing	ICES scallop working group	None	n/a	n/a	n/a

GOVERNANCE	0 to 6	IFCA committee	IFCA committee	IFCA committee	IFCA committee	IFCA committee	IFCA committee	IFCA committee	IFCA committee
	6 to 12	Industry group	Industry group	Industry group	Industry group / science group	None	n/a	n/a	n/a
	12 to 200	Industry group; Fisheries Technical Committees established under T&CA; ToR in preparation	Industry group; Fisheries Technical Committees established under T&CA; ToR in preparation	Industry group; Fisheries Technical Committees established under T&CA; ToR in preparation	Industry group; Fisheries Technical Committees established under T&CA; ToR in preparation	None	n/a	n/a	n/a
TRANSPARENT DECISIONS, INCLUSIVE, DEMOCRATIC	0 to 6	Members, minutes and interests declared, terms of reference - publicly available	Members, minutes and interests declared, terms of reference - publicly available	Members, minutes and interests declared, terms of reference - publicly available	Members, minutes and interests declared, terms of reference - publicly available	Members, minutes and interests declared, terms of reference - publicly available	Members, minutes and interests declared	Members, minutes and interests declared	Members, minutes and interests declared
	6 to 12	New Group established - currently no chair listed, no details on membership	IFCA science (NEIFCA, EIFCA, K&EIFCA)	IFCA science (e.g. K&EIFCA whelk potting survey); SxIFCA size at maturity studies	IFCA surveys in Solent and Salcombe estuary; FIP	None	n/a	n/a	n/a
	12 to 200	Fisheries Technical Committees established under T&CA	Fisheries Technical Committees established under T&CA	Fisheries Technical Committees established under T&CA	Work with IFREMER Fisheries	None	n/a	n/a	n/a

ENVIRONMENT OUTCOMES		 CRAB CHANNEL	 LOBSTER EAST COAST	 WHELK CHANNEL	 SCALLOP CHANNEL	 CUTTLFISH CHANNEL	 CLAM & COCKLE (POOLE)	 COCKLE (NW)	 COCKLE (THAMES)
NUMBER OF STOCKS IN THE FISHERY		2	2	unknown (potentially multiple local stocks)	5	unknown (potentially 2)	1	1	1
STOCK ASSESSMENT	Stock 1	Stock size unknown EAST	Yes (North)	Stock size unknown EAST	Three in ICES Division 27.7.e (Inshore Cornwall, 27.7.e.I; Lyme Bay, 27.7.e.L; Offshore, 27.7.e.O) WESTERN CHANNEL	Unknown	Yes, comprehensive annual stock assessment on Manila Clam and Common Cockle	Yes, annual stock assessment during HRA	Yes: annual stock surveys conducted by the IFCA
	Stock 2	Yes-assessed (WEST)	Yes - (East Anglia)	Stock size unknown WEST	Two in Division 27.7.d (North, 27.7.d.N; South, 27.7.d.S). EASTERN CHANNEL straddling the border between	Unknown	n/a	n/a	n/a
STOCK AT MSYT	Stock 1	Exploitation rate unknown	Around or below reference point / exploitation rate high	Exploitation rate high	UK and France Three in ICES Division 27.7.e (Inshore Cornwall, 27.7.e.I (HR ABOVE MSY 2020); Lyme Bay, 27.7.e.L (HR WELL ABOVE MSY since 2017); Offshore, 27.7.e.O, WESTERN CHANNEL	Unknown but assumed to be high	Exploitation rate in line with stock assessment and Natural England advice for sustainable exploitation of stocks. MSY not used	Exploitation rate in line with Natural England advice for sustainable exploitation of stocks. MSY not used	Based on annual stock survey and HRA, a TAC is calculated, which in turn determines the bag limit and number of trips. MSY not used
	Stock 2	Moderate; around MSY for females	Stock size low (East Anglia) / exploitation rate high	Exploitation rate high	And two in Division 27.7.d (North, 27.7.d.N; South, 27.7.d.S) (HR at MSY in 2020 for 27.7.d.S); EASTERN CHANNEL straddling the border between UK and France	Unknown but assumed to be high	n/a	n/a	n/a
ECOSYSTEM BASED MANAGEMENT (INDICATION WHETHER ECOSYSTEM IMPACTS CONSIDERED IN MANAGEMENT MEASURES)	0 to 6	Yes; MCZ assessments and byelaws (MPA assessments in K&EIFCA, CIFCA, D&SIFCA showed low impact of crab pots on MPA features)	Yes; Eastern IFCA are taking and adaptive risk based management approach to potting on subtidal chalk in Cromer MCZ; escape hatches, V notching.	Yes; IFCA flexible potting permit byelaws and effort limits (D&SIFCA); adapted minimum sizes for local stocks (D&SIFCA and K&EIFCA); MCZ assessments.	Yes; Seabed impacts of dredging considered by IFCA (D&SIFCA, SIFCA); Not occurring in MPAs in K&EIFCA; SIFCA in process of byelaw development to restrict dredging to permit holders only in the Solent; IFCA level habitat data collection, dredge restrictions and vessel size limits across Channel inside 6 nm.	Yes; IFCA level research (D&SIFCA and SxIFCA) and pot limits 7 management proposals (re gear washing to aid egg survival and recruitment); habitat assessment for spawning.	Yes, all fishing is subject to HRAs and Natural England advice, meaning permits are issued where they would not hinder conservation objectives	Yes, all fishing is subject to HRAs and Natural England advice, so not permitted if damaging the ecosystem	Yes, all fishing is subject to HRAs and Natural England advice, meaning permits are issued where they would not hinder conservation objectives
	6 to 12	No	No	No	No	No	n/a	n/a	n/a
	12 to 200	No	No	No	No	No	n/a	n/a	n/a
PRECAUTIONARY PRINCIPLE	0 to 6	Yes considered at IFCA level but unable to cover whole stock	Yes considered at IFCA level but unable to cover whole stock	Yes considered at IFCA level but unable to cover whole stocks	Yes considered at IFCA level but unable to cover whole stocks	Yes considered at IFCA level but unable to cover whole stock	Yes, precautionary approach applied in the HRAs	Yes, IFCA can close all or part of fishery to allow stocks to recover	Byelaw; permit scheme via flexible permit byelaw; limited entry to fishery;
	6 to 12	No	No	No	No	No	n/a	n/a	n/a
	12 to 200	No	No	No	No	No	n/a	n/a	n/a

The Fisheries Act will require significant changes to the way that IFCA's operate. FMPs will require IFCA's to adapt and commit significant resources to the development, implementation, monitoring and subsequent updating of FMPs.

- The objectives will place different requirements on IFCA's; some of them are already well established (e.g. sustainability, precautionary, scientific evidence) whilst others (e.g. bycatch, ecosystem, climate change) will place new evidence and management

requirements on IFCA as well as requirements for national data collection by the MMO.

- These objectives are not currently being applied outside 6 miles, where a substantial portion of fishing mortality is taking place.
- A core principle of the Ecosystem Approach is that management should be decentralised to the lowest appropriate level to involve all stakeholders and balance local interests with the public interest. The closer and more adaptive the management is to the ecosystem, the greater the responsibility, sense of ownership, accountability, public participation, and use of local knowledge is possible.
 - The ecosystem approach is also not being applied on the management of these regional shellfish fisheries outside six miles.
- Defra's Marine Pioneer programme concluded that governance needs to be at a scale which connects people with the ecosystem functions, and also that co-management (using the IFCA framework and scale of management) was the best solution to operationalise ecosystem-based co-management.
 - Outside six miles there is no publicly available, transparent description of the groups and membership who are currently tasked with determining the management options outside six miles.
 - FMPs need to recognise the varied abilities to be opportunistic / financial challenges encountered by Small Scale Coastal Fisheries (SCFF) (etc) and provide fair / equal opportunities to all parts of the sector. FMPs need to recognise the heterogeneity and power and capital inequalities and set up arrangements to tackle this and empower and engage the inshore fleet. Without this, the failures, inequity and long-term damage to coastal communities that the UK quota system contributed to (privatisation of fishing opportunities via Fixed Quota Allocations (FQAs) based on historic track records) will be replicated in the shellfish effort management regimes.
- **Co-design and co-production require time and resources; without building the capacity of stakeholders to participate and input into management decisions, a move towards co-management outside six miles is impossible.** The recent co-design project for Defra on defining low impact fishing showed it is possible to broaden the participation, build trust and move towards equitable decisions, but without Defra resourcing this work and dialogue, the objectives in the Fisheries Act (transparent, criteria based allocation of fishing opportunities) will not be met.
- **The Fisheries Act requires the transparent and objective use of social, economic and environmental criteria in the allocation of fishing opportunities (section 25 – Annex 2). Applying these criteria to the management regime provides an opportunity to use a range of tools and approaches which can reduce the impacts of fishing on the marine environment (environmental criteria such as habitat impacts, greenhouse gas emissions, impact on spawning or bycatch) or increase the positive impact of sustainable fisheries for coastal communities (e.g. through using equitable effort regimes linked to socio-economic impacts, rather than historic track records).**
- **Funding: IFCA are not adequately funded.**¹ The Local Authorities which fund IFCA received a 50% reduction in the new burdens funding that Defra's own assessment identified as necessary to fund their duties, the effect of inflation since this settlement was reached has reduced the value of this considerably. This reduced

funding as well as their increased duties represents a real challenge for the IFCA's. Whilst IFCA's represent value for money,² they need resources to build upon their co-management structures, to be adequately represented in the development of FMPs, to bring their considerable experience in fisheries management into future FMPs. Imbedding data collection within regional IFCA structures is also key as it helps facilitate long-term community involvement in the management process.

Key recommendation for the development of effort systems to avoid the problems created through the privatisation of quota through FQAs. Defra must ensure:

1. That effort is **allocated as a time bound lease** (not a permanent allocation leading to 'legitimate expectation' as per quotas)
2. That there is a **public return** for the lease of effort (not gifted freely in perpetuity like quotas) to help industry contribute to management costs
3. That the total effort allocation should **be precautionary** and linked to stock assessments
4. That there is a **public register** of effort allocation (including the initial allocations) as is available now via the FQA register <https://www.fqaregister.service.gov.uk/> – to allow public scrutiny
5. **Caps on concentration** to ensure no single entity controls a disproportionate share of the total effort
6. **Allocated transparently and objectively along social, environmental and economic criteria** to reward low impact fishing and highlight dependant localised / inshore fleets and meet fisheries objectives of the Fisheries Act (climate, sustainable, etc) rather than according to historic track record as the only criteria.
7. **Effort allocation should be revocable immediately if vessels are found guilty of IUU of fisheries offences**
8. Any two-tier system of effort (as exists in quotas for the FQAs managed by the sector and the publicly managed MMO Quota pools for the inshore fleet and non-sector) should be **tested and discussed with all stakeholders to ensure equity and good design. This is an opportunity for co-design going forwards.**

INTRODUCTION AND CONTEXT

Inshore Fisheries and Conservation Authorities

Inshore fisheries have been managed by Local Authorities in England for over 100 years. Systems of management, established through the Marine and Coastal Act, 2009 (MACAA)^{3,4} transformed the long-standing Sea Fisheries Comiteees to IFCAs, with an explicit aim to balance the needs of different users and the protection of the marine environment.

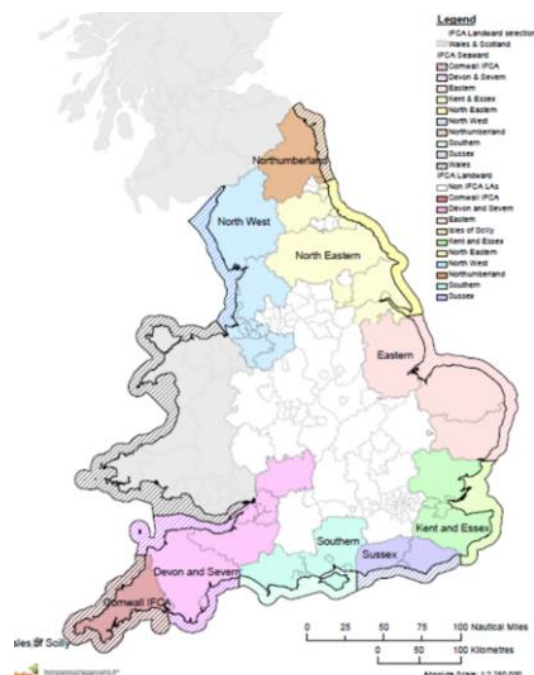
The IFCA vision is: *“To lead, champion and manage a sustainable marine environment and inshore fisheries by successfully securing the right balance between social, environmental and economic benefits to ensure healthy seas, sustainable fisheries and a viable industry.”*

There are ten Inshore Fisheries and Conservation Authorities (IFCAs) in England – shown in Figure 1.⁵

IFCAs are responsible for the management of inshore sea fisheries, balancing the needs of different users, while also managing fisheries to achieve the conservation objectives of Marine Protected Areas. IFCAs are committees or joint committees of local authorities and their membership includes appointed members, selected for their skills, knowledge and experience of the local marine environment, joined by elected members from the Councils that fund the IFCAs which brings local accountability to the IFCA. Statutory bodies also represented, enabling a join up between central policy and local management. Through debate and analysis, the members decide on the local priorities for their Districts.

The inshore fishery in England is the largest in terms of employment and number of vessels (80% of the fleet, or 4,547 under 10m vessels of the 5,783 total vessels in 2020).⁶

Figure 1. The 10 IFCA districts in England



IFCAs have byelaw making powers under MACAA, through which they manage finfish, crustacean and molluscan shellfish. In a number of areas the IFCAs have rights conferred, by

way of the Sea Fisheries Shellfish Act, 1967⁷ for the management of shellfish through Regulating Orders and or Several Orders.⁸

Over the last ten years, IFCAs have established programmes of research to inform management of key inshore stocks and habitats. Management approaches are designed to meet requirements in MACAA to balance economic and environmental needs within the districts. At the same time IFCAs must ensure that they meet requirements under the Marine Strategy⁹ and other relevant national targets and legislation. Measures such as minimum conservation reference sizes, minimum vessel sizes, temporal access restrictions and various gear restrictions are used to ensure that stocks are fished sustainably. In some cases, there is a high level of evidence to underpin the status of the stock, the level of fishing pressure and the effectiveness of the management. In other fisheries there may be a greater level of precautionary management due to uncertainty in either stock status, fishing activity, or both.

As an EU member state the UK was required to manage fisheries in line with the Common Fisheries Policy (CFP). As an independent coastal state, the UK remains a signatory of the UN Convention on the Law of the Sea (UNCLOS)¹⁰. Managing fish stocks sustainably so they are maintained or restored to levels that can produce maximum sustainable yield (MSY) - the most fish you can take from a specific stock for an indefinite period of time without depleting its population¹¹- is a legal requirement of UNCLOS. **An ecosystem-approach to fisheries management (minimising damage to marine ecosystems resulting from fishing) remains UK policy. The precautionary approach should be applied in fisheries management** and the status of commercially exploited shellfish is a descriptor used in the implementation of the Marine Strategy Framework Directive (MSFD) – aiming to reach ‘good environmental status.’¹²

The UK Fisheries Act (2020) – Fisheries Management Plans

Post-Brexit fisheries management has to change fundamentally from EU level management under the CFP. The focus of the CFP Total Allowable Catches (TACs) and technical measures for stock shared between different member states was not prescriptive about non-quota species or inshore management – which has meant that the political focus, investment in research and management has not been applied to all fisheries equally (or according to their value to coastal communities).

The Fisheries Act 2020¹³ requires that fisheries policy authorities must prepare and publish a Joint Fisheries Statement (JFS). The JFS must contain a list of fisheries management plans (FMP) that the fisheries policy authorities propose to prepare and publish detailing the stock(s) of sea fish, the type(s) of fishing and the geographical area(s) to which the plan will relate, as well as a timetable for preparation and publication. This document will be consulted upon in early 2022 and the list of FMPs must be prepared by 23rd November 2022.¹⁴

A FMP must set out policies designed to achieve sustainable levels of exploitation. FMPs are now necessary for some of the non-quota species that have historically been side-lined as the focus on fishing opportunities for shared quota stocks meant more investment in the process and science to support these decisions. The requirement for FMPs raises many questions for IFCAs in terms of how their operations, byelaws and research are undertaken – especially with regards to which FMPs to prioritise.

IFCA's role in the delivery of Fishery Management Plans

Since 2015, IFCAs have had to prioritise their work due to their limited resources and their legal duties, and have in many areas concentrated on implementing management requirements within Marine Protected Areas under the Government's 'revised approach'.¹⁵ **This process, not funded by central government, has demonstrated how IFCAs can respond to new regulatory requirements working within national frameworks, striking a balance between national consistency, local delivery and input from partner authorities.** Importantly however, this approach has revealed inconsistency in the approach to fisheries management between inshore and offshore. This becomes a theme of this report. In the case of MPAs, despite the intention to apply the Government's policy to both inshore and offshore fisheries management, offshore fisheries management bodies have yet to implement the policy¹⁶.

The Fisheries Act still requires further significant changes to the ways in which IFCAs operate. FMPs will require IFCAs to adapt and commit significant resources to the development of new FMPs. The objectives will place different requirements on IFCAs; some of them are already well established (e.g., sustainability, precautionary, scientific evidence) whilst others (e.g., bycatch, ecosystem, climate change) will place new evidence and management requirements on IFCAs.

The high level IFCA objectives fit these new requirements for FMPs:

- IFCAs are recognised and heard, balancing the economic needs of the fishery whilst working in partnership and engaging with stakeholders
- IFCAs implement a fair, effective and proportionate enforcement regime
- IFCAs use evidence based and appropriate measures to manage the sustainable exploitation of sea fisheries resources and deliver marine environmental protection within their districts
- IFCAs have appropriate governance in place and staff are trained and professional
- IFCAs make the best use of evidence to deliver their objectives.¹⁷

*The Fisheries objectives of the Act (2020) are provided in **Annex 1**.*

Ecosystem approach to fisheries management

The Fisheries Act defines an ecosystem approach as “ensur[ing] that the collective pressure of human activities is kept within levels compatible with the achievement of good environmental status...and does not compromise the capacity of marine ecosystems to respond to human-induced changes”. The “ecosystem objective” of the Fisheries Act states that “fish and aquaculture activities are managed using an ecosystem-based approach so as to ensure that their negative impacts on marine ecosystems are minimised and, where possible, reversed, and incidental catches of sensitive species are minimised and, where possible, eliminated”. **Ecosystem Based Fisheries Management is becoming a more specific application of the Ecosystem Approach.**¹⁸

The current definition of an ecosystem-based approach to fisheries management under the CFP is “An integrated approach to managing fisheries within ecologically meaningful boundaries which seeks to manage the use of natural resources, taking account of fishing and other human activities, while preserving both the biological wealth and the biological processes necessary to safeguard the composition, structure and functioning of the habitats

*of the ecosystem affected, by taking into account the knowledge and uncertainties regarding biotic, abiotic and human components of ecosystems”.*¹⁹

A fundamental transition from single species management to ecosystem-based management is required to meet these objectives.²⁰

IFCAs and the Ecosystem Approach

A core principle of the Ecosystem Approach is that management should be decentralised to the lowest appropriate level to involve all stakeholders and balance local interests with the public interest. The closer and more adaptive the management is to the ecosystem, the greater the responsibility, sense of ownership, accountability, public participation, and use of local knowledge is possible.

Defra’s Marine Pioneer programme concluded that governance needs to be at a scale which connects people with the ecosystem functions, and also that **co-management (using the IFCa framework and scale of management) was the best solution to operationalise ecosystem-based co-management.**²¹ It is however observed that a lack of funding, coupled with increased responsibilities, has led to challenges for the IFCAs co-management model.

Marine Protected Areas (MPAs)

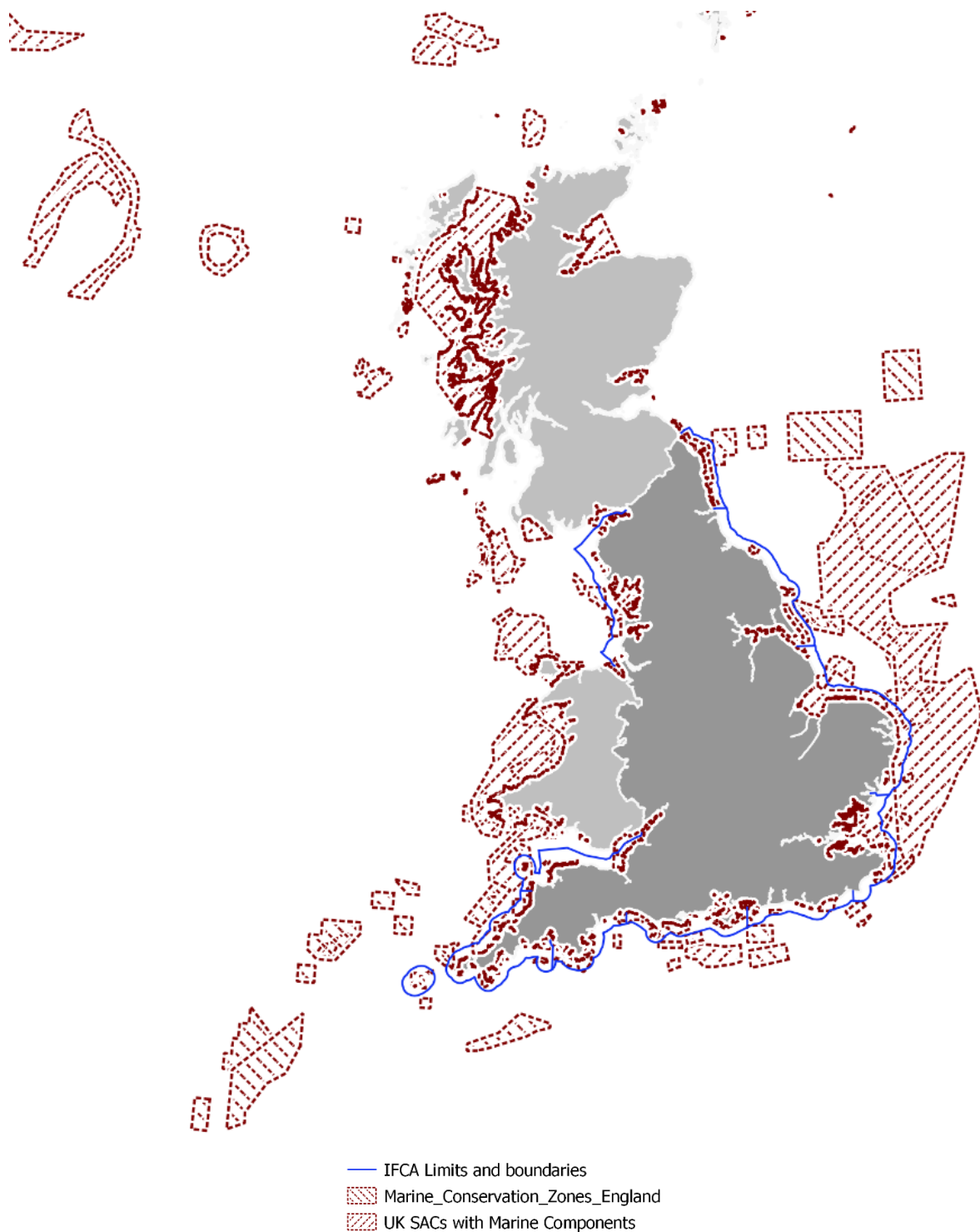
Human activities including climate change, pollution, fishing and aggregate extraction impact marine habitats and species and the healthy functioning of marine ecosystems, impacting human wellbeing.^{22,23,24,25,26,27,28,29,30,31,32} Marine Protected Areas (MPAs) are one policy and management tool which have been introduced globally to help protect the marine environment as a result, by limiting some or all human activity in certain key areas of conservation importance.³³ MPAs involve the protective management of natural areas according to specific management objectives that are designated through creating boundaries, or zones, which allow or restrict certain uses (e.g. fishing using particular fishing gears, or recreational fishing, or all extractive uses) within that boundary.³⁴

Spatial management of fisheries through exclusions for certain gear types in specific habitats is a primary means of limiting the impact of fisheries on the wider marine environment. MPAs are intended to meet major international commitments, including the Convention on Biological Diversity (CBD, e.g. article 10)³⁵ to achieve the Aichi targets³⁶ (e.g. target 11), as well as the UN Sustainable Development Goals (e.g. SDG 14, life below water).³⁷

In the UK, Marine Protected Areas (MPAs) are designated under EU law – the Habitats / Birds Directives³⁸ or in England as Marine Conservation Zones (MCZs) designated under the Marine and Coastal Access Act (2009).³⁹

MPAs in the UK are shown below in figure 2 – **the number of MPAs inside 6nM is worth highlighting as these all require assessments and fisheries management measures in instances where there is likely to be an impact on the features of conservation.**

Figure 2. English and Welsh MPAs (EMS and MCZ) including the 6nM inshore / IFCA boundary (blue).



Sustainable fisheries

Why we need fisheries management

Fish are a renewable, common-pool resource: if well managed they can provide endless benefits to society in terms of food, revenue and jobs. Managing common-pool resources

such as fisheries is complex and involves trade-offs. Most fisheries globally operate under some form of management, whether via local fishing cooperatives, regional or local authorities, or national and international governments. These management regimes vary significantly in scale, organisation, legal standing, and enforcement powers. What most management regimes have in common, however, is an attempt to constrain the amount of fishing that takes place as well as deciding who has the right to fish, i.e., the management of fishing opportunities.

Fish stocks need to be managed in the public interest, which requires governance, regulation and management to avoid the *tragedy of the commons*.⁴⁰ This requires maintaining fish stocks at sustainable levels and giving priority to fishers who deliver higher social, economic and environmental benefits – as outlined in section 25 of the Fisheries Act – Annex 2). There is not one specific solution to the ‘tragedy of the commons’ (rational individuals in an open access context will seek to maximise their gains from the resource) in fisheries management but several distinct approaches, all of which involve some form of collective action. These include common pool management, government management, and privatisation.⁴¹

There are four main approaches to allocation used across European fisheries:

1. *Historical track record*. Fishers are granted a share of the national quota (or effort) depending on their historical landings during a reference period. They receive the same share allocation each year unless their share is transferred.
2. *Capacity-based allocation*. Fishers receive a share of the national quota (or total effort) based on the capacity (gross tonnage or power) of their vessel(s). As long as vessel characteristics stay the same, the share received each year will also remain constant.
3. *Criteria-based allocation*. Quotas (or effort) are allocated based on criteria which may include the above two allocation methods. Other criteria may include socio-economic factors such as employment provision or quota dependency, or environmental criteria (such as gear impacts or fuel use) to determine allocation. (See section 3).
4. *Rationing*. Quotas or effort are allocated based on objectives such as equal distribution or maximising utilisation. This allocation is often differentiated by gear and/or capacity.^{42,43}

Successful fishery management means sustainable stocks, food for consumers, and livelihood for fishers and others in the supply chain.⁴⁴ Sustainable fisheries are fundamental for diverse and resilient marine ecosystems and food security, while also underpinning a profitable viable fishing industry (and recreational opportunities) for the future.⁴⁵

Overfishing not only risks the collapse of the stock, but it also leads to lower yields for fishers. World fisheries fall below their potential earnings by US\$50–80 billion a year in terms of foregone catch due to overfishing, excessive harvest costs, low processing yields, waste, and a failure to reach the highest value markets. This means lost income to fishers and processors, food for consumers, and reduced food and income security for coastal communities.⁴⁶

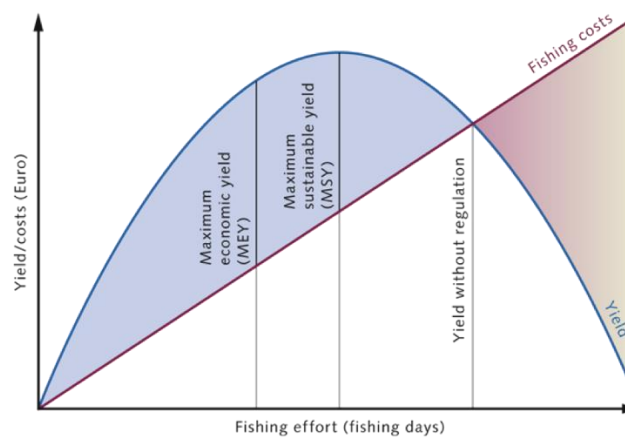
Fishing is a for-profit business and profitability is therefore a key consideration in fishery management decisions. Social and financial outcomes are linked as profitability and

livelihoods are mutually dependent: companies need money to pay fishers for their fish and labour.⁴⁷

The widely accepted aim for sustainable fisheries is MSY, which is defined as *'the maximum catch (in numbers or mass) that can be removed from a population over an indefinite period'*. MSY conceptually relies on the surplus production generated by a population, depleted below its carrying capacity.⁴⁸ To maintain the reproductive capacity of stocks, the spawning stock biomass (SSB) should be at or above that which can produce MSY (i.e. MSY Btrigger).⁴⁹

The amount of fish caught (yield - the blue curve and Y axis) and fishing effort (days at sea - the X axis) intersect at some point, this may be at MSY as shown in figure 3 below, however the yield to cost ratio is highest at maximum economic yield (MEY - the point where economic efficiency is highest in the harvest sector). MEY is however not a formal objective in UK fisheries management (in contrast to MSY).

Figure 3. The MSY-MEY yield curve. Source: University of Washington



Recent research has demonstrated a clear relationship between both fishing pressure and stock abundance, and fisheries management and fishing pressure. Concern about overfishing has resulted in legal and enforcement responses in many countries with stronger management institutions. **In regions where fisheries are intensively managed, stock abundance is generally improving or near target levels.** Understanding what management approaches have worked in particular contexts and identifying and implementing the most appropriate stock assessments, management regimes, and enforcement, is essential to improve the global outlook. **Regions with less-developed fisheries management have higher harvest rates and half the abundance for assessed stocks. Regions without assessments of abundance have little fisheries management, and stocks are depleted.**⁵⁰

Input and output controls on fishing

Government regulation of fisheries usually comes in the form of restricting the number of fishers and setting conditions for eligibility (limited licensing). Governments may also impose other 'input controls' such as limits on the number of allowable days at sea or areas which fishers may access. They may also apply 'output controls' such as setting catch quotas which can be set nationally or for individual vessels. Management can be local (IFCAs),

national (MMO) or international e.g. Regional Fisheries Management Organisations (RFMOs) or the EU CFP.⁵¹

Fishing opportunities are a “*quantified legal entitlement to fish, expressed in terms of catches and/or fishing effort*”. In the UK quota and effort fishing opportunities are both used. For many fisheries, the main fishing opportunity takes the form of limits on the total allowable catch (TAC – generally in tonnes) set at EU level in agreement with third countries.

- **Output - quota** - Quota management refers to all quantitative output controls (through limiting the landings or catches of vessels) and aims to achieve sustainable stock – e.g. allocating 1 tonne of mackerel per month, per <10m vessel, via the MMO quota pool. Figures 4 and 5 above refer to species managed under output (quota) management for shared stocks.
- **Input - effort** - effort management refers to all input controls (controlling fishing mortality indirectly through imposing constraints on the capacity, time, and space) aiming to control fishing mortality indirectly through imposing constraints on the fishing capacity and methods used – e.g. a limit on the number of pots in an IFCA district or a limit on days or hours at sea for a scallop dredger in the Channel. Technical measures are a form of ‘input control’ permitting certain gears, fishing techniques and other technical specifications, aimed at improving the selectivity of fisheries and the reduction ecosystem impacts.⁵²

Limiting fishing pressure through quotas has outperformed other effort-based systems in Europe – particularly when fishing pressure is high and management of fishing is needed.^{53,54} **There is a clear case to expand this management tool to other species that are currently managed through effort and size limitations (mostly shellfish).**

Questions around equity and the public interest regarding allocation of quota in the UK have been raised in recent research,^{55,56,57,58,59} highlighting that quotas need to be enforced and allocated differently to meet triple bottom line fisheries management objectives (including those around fairness or environmental impact).

Fisheries Management Costs

Fisheries management aims for sustainable biological, social, and economic benefits from renewable marine resources. From fisheries data collection and scientific research to tax exemptions, control and enforcement as well as funding port infrastructure, these costs are covered by governments and taxpayers either directly or indirectly. **Defra spent £85 million on their ‘marine and fisheries’ functions in 2016/17 according to the National Audit Office (NAO).**⁶⁰

These management costs are paid for through general taxation but the financial benefits of fisheries management is limited to those within the fishing industry (and to ancillary industries and consumers). The ‘resource rent’ generated from the commercial harvest of fish stocks is further limited by the fact that commercial licensing in UK fisheries is limited (by the MMO). A cap on commercial fishing licences prevents new entry into the fishing industry (and generates economic benefits for those fishers holding licences) by limiting access to the fishing industry. **Despite acknowledgement that fish stocks are a public resource, this limiting licensing is deemed a crucial protection for the sustainability of the resource. In other industries, the existence of profits would induce new entry, but for**

the fishing industry limited licensing sustains these profits for the current fishing fleet.⁶¹

*OECD figures for fisheries support for all countries are available for comparison.*⁶²

Global stock status

The latest 2020 UN Food and Agriculture Organization (FAO) “State of World Fisheries and Aquaculture” (SOFIA) report showed **the proportion of overfished stocks has increased from 27% to 33% since 2000.**⁶³ Overfishing is still a considerable problem globally, risking food security and coastal livelihoods.

The RAM Legacy Stock Assessment Database⁶⁴ contains biomass trends for 49% of the stocks comprising global marine landings reported to the (FAO) between 1990 and 2005. Large, commercially valuable stocks tend to have better data and stock assessments, while many small stocks remain unassessed. RAM showed that the average fishing pressure increased and the biomass declined until 1995, decreasing thereafter. Average biomass had started to increase by 2005. Globally there are immense differences between regions, with those near or above BMSY generally in wealthier economies and regions or where international management bodies have been effective and precautionary. The converse is true in economies with low ability to manage, enforce and collect data.⁶⁵

UK quota stocks

There is an overall a positive trend towards more quota stocks being fished sustainably and within safe biological limits for UK stocks (these are shared stocks managed through the CFP process which includes ICES advice and annual negotiations to set TACs for these fisheries). In the UK, the percentage of fish stocks that are managed under quotas and fished at or below levels capable of producing maximum sustainable yield (FMSY) has increased between 1990 and 2018 from 9% to 51% as shown in Figure 4 below. The percentage of stocks subject to quota management and achieving this goal also increased in that period, from 32% to 61% (shown in Figure 5 below).^{66,1}

¹ The JNCC indicator comprises two measures: 1- the percentage of stocks fished at or below the level capable of producing MSY; and 2- the percentage of stocks with biomass above the level capable of producing MSY.¹

Figure 4. Percentage of marine fish (quota) stocks of UK interest harvested sustainably, 1990 to 2018.⁶⁷

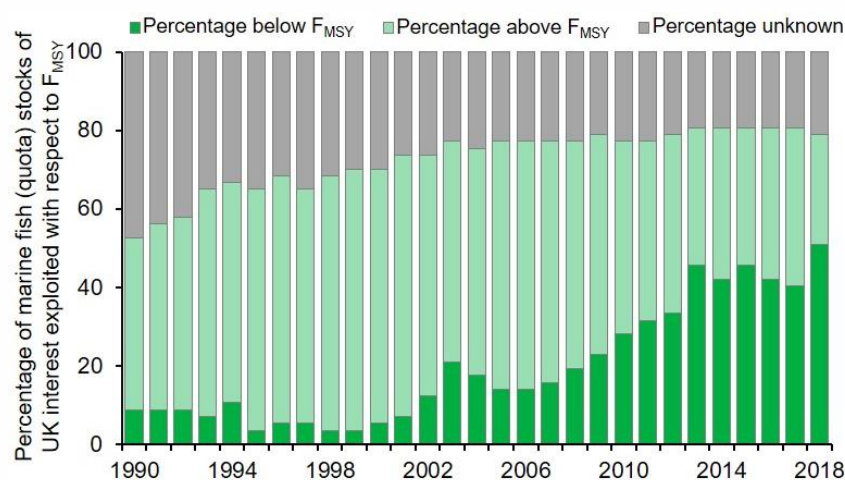
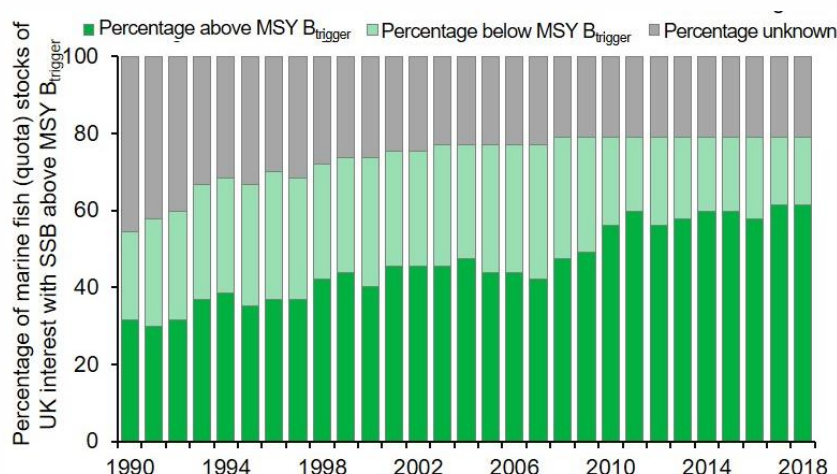


Figure 5. Percentage of marine fish (quota) stocks of UK interest with biomass at levels that maintain full reproductive capacity, 1990 to 2018.⁶⁸



UK inshore stocks – Project Inshore

Project Inshore was an initiative led by Seafish, the Marine Stewardship Council (MSC) and the Shellfish Association of Great Britain (SAGB) which launched in June 2012. The project sought to work towards an environmentally sustainable future for English inshore fisheries in three stages, with the final stage delivering bespoke Strategic Sustainability Reviews for each IFCA to facilitate the movement of fisheries management to a level judged sustainable by the Marine Stewardship Council (MSC) standard, which is used to assess if a fishery is well-managed and sustainable.⁶⁹

Project Inshore used the MSC Standard as a framework by which to review the performance of English fisheries, regardless of whether product certification is seen as an objective for the fishery. The project delivered a comprehensive review of the current status and management within a fishery at the time. Since then, Project UK has been set up as a collaborative continuation and partnership with diverse and expert stakeholders that make up the individual Fisheries Improvement Project (FIP) Steering Groups, independent

observers, and core funders. Project UK is facilitated by the Marine Stewardship Council, as Secretariat, and participants are subject to the Project UK Terms of Reference.⁷⁰

UK inshore fisheries and quota

There are three main groups when it comes to UK fisheries (quota) management.

1. Under ten metre vessels (<10s / inshore fleet) have a share of the 'MMO quota pool' allocated on a monthly basis at the vessel level.
2. 'The sector' are vessels that joined a Producer Organisation (PO) and have their quota pooled and managed by the PO (mainly >10m)
3. The 'Non-sector': vessels over 10m in length who remained outside the PO system as they mainly fish for non-quota species.⁷¹

Inshore vessels are generally considered under-10m in length, not members of a fish producer organisation (PO), and fishing mostly within the 6 nautical mile inshore zone. **These 'under-10s' represent over 76% of the English fishing fleet by number and provide 65% of the direct employment in fishing.** Inshore fishers employ a diverse range of vessel types and fishing methods, and are central to the identity and local economy of many coastal communities. In 2020 the non-sector caught around a third of all shellfish landed by the UK fleet.⁷²

Overall, **under 10m vessels attain higher prices for their landings and shellfish catches from under 10m vessels fetch 20% higher prices per tonne than those by vessels over 24m.**⁷³ Under 10m fishers in particular have difficulties acquiring quota holdings and can either exit the fishery or focus their fishing effort on non-TAC species.⁷⁴ English non-quota fisheries are diverse and dynamic using a range of fishing methods and gear types for a variety of species. The majority of the inshore fleet is polyvalent, using a mixture of gears over the course of a season / year. Non-quota species have become extremely significant inshore, with certain ports and fleets heavily dependent upon them (e.g. Weymouth on bass and crab).⁷⁵ **These non-quota species have neglected in terms of the level of investment in research, data collection and management with many very lightly regulated with minimal or no stock assessments.**⁷⁶

The UK quota system (Fixed Quota Allocation or FQAs, since 1999) was based on historical catch records and UK historic vessel landings data (1994–1996) mainly held by members of the sector (vessels >10m who had a legal obligation to collect this information). **Under 10m vessels had no track record (as they were not obliged to keep log books) and have as a result lost access to their right to fish for quota species when the UK FQA system was introduced.**⁷⁷ Access to quota was a key factor in the regulatory *discarding* of fish, which following a campaign at EU level led to the discard ban or 'landing obligation'.⁷⁸

The UK's fishery is a public asset worth in the region of £1,125 million (at 2018 £) and the free allocation of quota to commercial businesses on the basis of 2 years' track record has been described as a similar process to that permitting a public asset being squatted.⁷⁹ **Previous calls for reform have highlighted that fishing quota is a public asset in the process of being informally transferred to the private sector on uncertain terms, similar a billion pound squatting case.**^{80,81}

The UK's quota distribution is unlike the traditional approach of public asset management (as demonstrated by the operation of the Crown Estate Commissioners in their management of Crown property). The Crown Estate Commissioners licence and lease a wide range of

marine activities from windfarms, aggregates dredging and marinas and their approach is the standard method of legally disposing of public property in the marine sector. The UKAFPO case is a significant milestone in the propertisation of the UK's fishing quota and the establishment of "squatters' rights" over the UK fishery.⁸²

Impact of the UK quota system

Allocation of quota based on their "track record" of catches (usually between 1994-1996) via FQA units has been accompanied by the development of a market in these FQA units, where fishers who need to acquire more quota (through purchase or lease) if they have landed more of a stock than they have been allocated (thereby reducing the need to discard quota species) can access quota. **The continuation of the FQA policy (protected under the Fisheries Act) has over time combined with quota's tradability, resulting in concentration of ownership (and therefore financial, and lobbying power).**⁸³ The system has also given a sense of permanence and proprietary right to what was initially a discretionary policy to gift quota to certain individuals / vessels. When the United Kingdom Association of Fish Producer Organisations⁸⁴ challenged the idea of reallocation of unused quota, a central issue was highlighted: once quota is treated as a possession then the state can normally only reacquire or redistribute a possession if compensation at full market value is paid. Therefore, what started life as a discretionary policy is in danger of hardening into an immutable policy for the benefit of the quota holder at the expense of the public.⁸⁵

The fundamental failure by the UK's fisheries administration to understand the mechanics of the creation of these property rights means that both the administration and the courts have failed to distinguish between the adoption of a discretionary policy and an effectively irreversible creation of a possession without public compensation. A property manager would not consider the UK's FQA system to have been professionally or adequately established.⁸⁶ The UK's fishery is being squatted on criteria that are less favourable than a traditional squatting claim. English inshore fishers have long campaigned through the New Under 10m Fishermen's Association (NUTFA) for a fair share of the UK's fishing opportunities and involvement in inshore fisheries management. An allocation of ~2% of the UK Share of Total Allowable Catch species is inequitable, given that the inshore fleet are contributing 78% of the workforce (in 2018).⁸⁷

While the overall purpose of introducing quotas was to limit fish mortality and thereby increase sustainability, adopting an approach to UK allocation that was akin to privatisation left the majority of the fishing fleet without access to that common resource, which in turn led to the overexploitation of non-quota species (including all shellfish species – with the exception of *Nephrops*).⁸⁸

Inshore fishers in England appear to have diversified into targeting non-quota species as a result, mainly shellfish. Vessels under 10m who are not in POs (the '10m and under pool') land relatively small quantities of demersal and pelagic species and 80% of their catch are shellfish.⁸⁹ Quota shortages for inshore vessels, expanding export markets for shellfish in Europe and Asia and changing species composition as a result of ocean temperature increases have all played a role in this shift. **Under-10m vessels employed more passive gear types (fixed nets, pots and traps) compared to larger vessels, an environmentally favourable form of fishing in terms of benthic impact but also capable of overexploitation if fishing effort and the associated mortality is too high.**⁹⁰

Defra's Fisheries 2027 vision document made clear the **value placed on inshore fisheries was a key factor in ensuring they maintain access to the resource** (even if they are less efficient:

“Access to fisheries continues to be available to small-scale fishing vessels, even if in some cases that is not the most economically efficient way of harvesting the resource. This is because the wider economic, social and environmental benefits of small-scale fishing can outweigh the comparative inefficiency in harvesting the resource and make a significant economic and social contribution to the lives of individuals and coastal communities, for example, by providing jobs, attracting tourists, providing high-quality fresh fish and maintaining the character and cultural identity of small ports throughout England.”⁹¹

Critical issues of access and power are crucial to address in long-term equitable and adaptive fisheries management to enable fisheries to make positive contributions to local economies and food systems, while also meeting global sustainable development objectives.⁹²

Co-management

Co-management is a knowledge partnership, where different levels of organisation, from local to national come together to provide a forum to share knowledge, coordinate tasks and enable co-operation to solve management problems. Co-management groups may support users in accessing resources, bringing together different actors, building trust, resolving conflict, and networking – furthering social learning, which is essential for co-operation and meeting shared goals. **Over time, co-management schemes become adaptive co-management, which is effectively learning by doing. Fishers are empowered when their capacity is developed to shape management decisions. This requires building capacity and ensuring fair representation for a diverse and geographically disparate fleet.**

There are various degrees of co-management, ranging from:

- Instructive (minimal exchange of information between government and users);
- Consultative (mechanisms for consultation but decisions taken by government);
- Cooperative (government and users cooperate as equal partners);
- Advisory (users advise government and government endorses decisions);
- Informative (Government delegates authority to user groups who make decisions and inform government) along a scale of devolved power from Government to Community management.⁹³

Fisheries co-management as a solution to resource use problems and conflicts over access, form part of the solution to achieving socially, economically and ecologically sustainable fisheries. **Co-management requires stakeholder participation (participation of fishers in the management process), empowerment and knowledge sharing as well as the delegation and sharing of power.** Co-management is multi-functional, addressing different knowledge and resource management problems and requires adaptive governance and learning through experimentation. The guiding principles include both the participation and empowerment of fishers and other stakeholders, collaboration and a sharing of responsibility between fishery participants and managers as well as a clear and transparent process to

results based management at the closest level possible to the resource base. **Equity and justice in terms of access to fishing opportunities is fundamental to co-management.**⁹⁴

Co-management success factors

There are some clear success factors for co-management at the community level, these are:

1. Appropriate scale and defined boundaries
2. Membership is clearly defined
3. Group homogeneity
4. Participation by those affected
5. Leadership
6. Empowerment, capacity building, and social preparation
7. Community organisations
8. Long-term support of the local government
9. Property rights over the resource
10. Adequate financial resources/budget
11. Partnerships and partner sense of ownership of the co-management process
12. Accountability
13. Conflict management mechanism
14. Clear objectives from a well-defined set of issues
15. Management rules enforced⁹⁵

Issues of power- and knowledge-sharing need to be addressed through the co-management process, in order to overcome problems of overfishing; lack of resilience; dependence; differing and changing perspectives; negotiation and combining local ecological knowledge and scientific knowledge as well as building sustainable institutions and governance.⁹⁶

Considering the Governments stated policy on the Management of EMS's (Defra's *revised approach*);⁹⁷ this has put considerable strain on the IFCAs, who on the one hand have successfully implemented MPA management inshore, but on the other hand have not been able to fully apply all the aspects required of their co-management capability. This has taken place despite their structure being well aligned to co-management, because the outcomes and the locations of the MPAs are predetermined and outside of the influence of their authority / districts. Their task, to implement central policy in a local context, particularly in the absence of additional resources, has resulted in inevitable tensions with certain of the fishing communities they serve – notably the mobile gear sector. This can be ascribed to the root of some of the tensions revealed in the recent independent report.⁹⁸

Currently no co-management arrangements are in place outside of the IFCA regions (up to 6 miles from the coast). Expanding co-management arrangements needs to consider capacity and equity and is not a substitute for industry-led voluntary approaches.

Brexit and Covid-19

The increase in shellfish landings by the UK fleet is due to diversification into the shellfish sector, where there are fewer restrictions on fishing opportunities compared to quota species. Improved reporting in data collection for the under 10m sector in recent years (including the introduction of mandatory reporting of first sales of fish), may also account for some of the increase in reported landings.

From 2019-2020 the quantity and value of landings from smaller vessels decreased more than that from larger vessels. This is due to the different species targeted by the fleet segments; smaller vessels are more reliant on shellfish (impacted the most by Covid-19 and Brexit). The shellfish sector was affected most severely as they are landed and sold fresh to the hospitality sector in the UK and abroad - this sector was most impacted by lockdowns in the UK and EU.⁹⁹

Context for this research

This research assesses the social, economic and ecological contribution of principal bivalve and crustacean inshore fisheries in England, providing proposals for how they are grouped and prioritised within the new FMP frameworks.

Case studies highlight best (or worst) practice to enable the development of coherent management based on different triple-bottom-line criteria as well as the geographical extent and governance mechanism to manage the fishery.

This project will be critical in ensuring a clear characterisation of principal bivalve and crustacean fisheries using social, economic and ecological criteria and putting forward proposals for how they are grouped and prioritised within the new FMP frameworks. It is also designed to ensure that existing best practice is incorporated into the new framework and that stakeholders are able to influence and support the development process.

SPECIES CONSIDERED IN THIS REPORT

Two main groups of fisheries are explored in this assessment:

Regional shellfish fisheries

- Fisheries such as lobster, crab, squid, cuttlefish and scallop (a bivalve mollusc) are predominantly inshore but the stocks are exploited across boundaries and by different fleet segments – this means IFCAs are unable to manage the majority of the effort or mortality on these stocks.

Bivalve mollusc fisheries

- Fisheries for bivalve molluscs such as clam, cockle and mussel are more geographically contained and IFCAs have the potential to manage within a more 'closed circuit' approach for these discrete fisheries.

Fishery management beyond 6 nautical miles is undertaken by Defra and the MMO and from the coast out to 6 nautical miles is the responsibility of IFCAs.

National overview

According to the MMO, in 2020, 23% (28 thousand tonnes) of the shellfish landed by the UK fleet is from the English Channel. Shellfish landings form a high proportion of landings from enclosed sea areas with large coastal stretches (Irish Sea, Bristol Channel, English Channel and the Southern North Sea).¹⁰⁰

Using MMO data from 2009 to 2019 we have assessed the key trends for each of the species to provide a national overview of changes in landings (both volume and value) for these species over a 10 year period. We purposefully looked to 2019 to avoid the anomalous years resulting from Brexit and Covid-19. The following charts on landings and prices are based on MMO data for landings into English ports (by UK vessels).

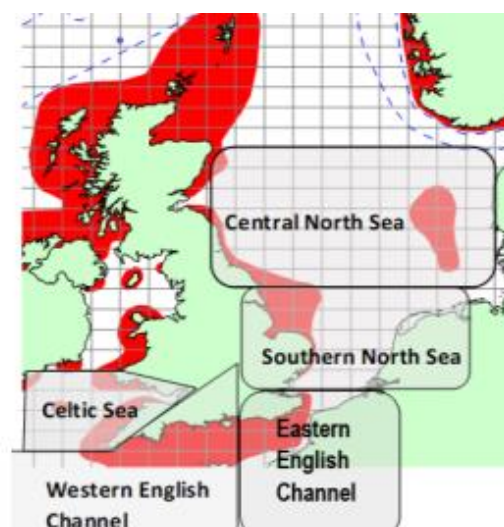
Regional Shellfish Fisheries

Brown / Edible Crab (Cancer Pagurus)

Edible crab is found throughout the Atlantic coast of Europe, however stock boundaries are poorly understood. Once eggs hatch in spring and summer crab larvae undergo a five week planktonic phase, then settle on the seabed. Growth is dependent on moulting frequency and it can take four or five years for a juvenile crab to grow to commercial size.¹⁰¹ Crab shed their shell each time they moult, so Cefas use length-frequency (numbers at length) analysis from one year to the next to determine how many animals at a given size there are in the population.

Crabs are caught in pots and there are five Crab Fishery Units (CFU) in England (shown in Figure 6 below), based upon the understanding of larval distributions and development, hydrographic conditions and distribution of the fisheries.¹⁰² The potting fleet is mainly made up of vessels ≤ 10 m length in the Eastern English Channel stock. A large fishery occurs during late summer to autumn, and the EU Western Waters Regime places a limit upon the number of kilowatt days that the >15 m potting fleet can use within ICES area VII.¹⁰³

Figure 6. Crab Fishery Units in the UK. Source: Cefas



Stock status:

Central North Sea

- Minimum Landing Size: at the MLS, around 99% of males and 86% of females should be sexually mature.
- Discarding: High discard survival assumed to be > 90%.
- Stock size: Approaching target for males and above the target for females.
- Exploitation rate: Moderate, below maximum reference point limit for females, males are at the limit

Southern North Sea

- Minimum Landing Size: at the MLS's applied in this region around 96-99% of males and 60-86% of females should be sexually mature.
- Discarding: High discard survival assumed to be > 90%.
- Stock size: Between minimum reference point limit and target for males and females.
- Exploitation rate: High. Above the maximum reference point limit for males and females.

Eastern Channel

- Minimum Landing Size: at the MLS's applied in this region around 96-99% of males and 60-86% of females should be sexually mature.
- Discarding: High discard survival assumed to be > 90%.
- Stock size: Unknown
- Exploitation: rate Unknown

Western Channel

- Sustainability Status Minimum: Landing Size at the MLS's applied in this region around 96-99% of males and 60- 86% of females should be sexually mature.
- Discarding: High discard survival assumed to be > 90%. Stock size High, around the target level required to achieve MSY for females.
- Exploitation rate: Moderate, around target level required to achieve MSY for females

Celtic Sea

- Minimum Landing Size: At the MLS's used in this region around 100% of males and 94-98% of females should be sexually mature.
- Discarding: High discard survival assumed to be > 90%. Stock size Below Maximum Sustainable Yield level but above minimum reference point limit for Females
- Exploitation rate: Moderate. Close to target level generating Maximum Sustainable Yield.¹⁰⁴

Crab landings in England by volume, value and first sale prices 2009-2019 are shown in figures 7, 8, 9 and 10 below.

Note for figure 7, the volume of landings for the ports do not increase in 5,000 tonne increments beyond 20,000 tonne as there are no landings greater than 22,825. The same maximum is present for all the other species.

Figure 7. Crab landings into English ports (cumulative landings 2009-2019). Source: MMO

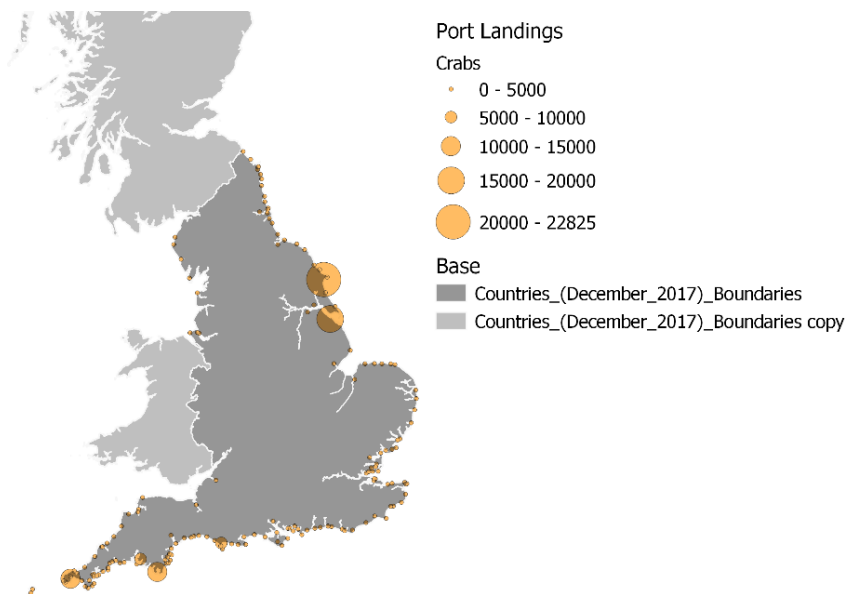


Figure 8. Crab landings into England (tonnes) 2009-2019 by </> 10m vessels. Source: MMO

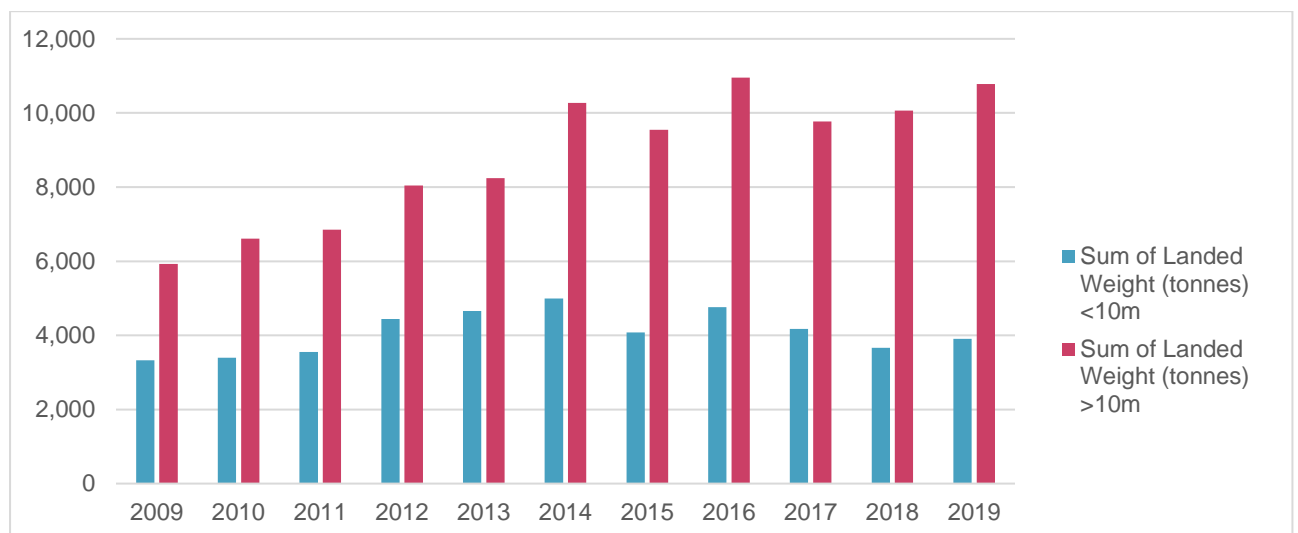


Figure 9. Crab landings into England (£) 2009-2019 by </> 10m vessels. Source: MMO

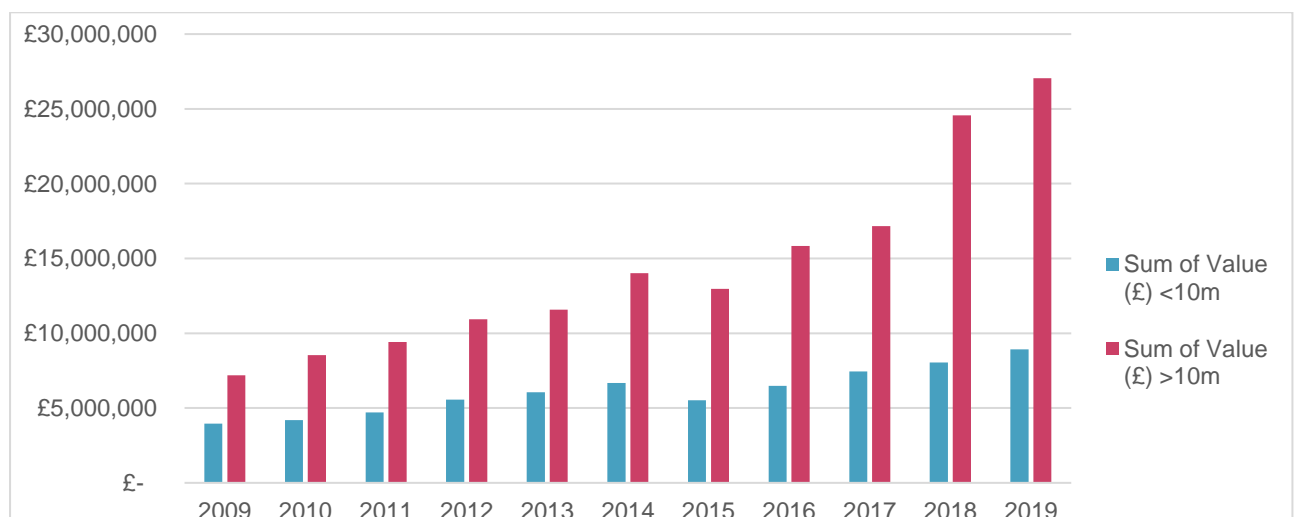
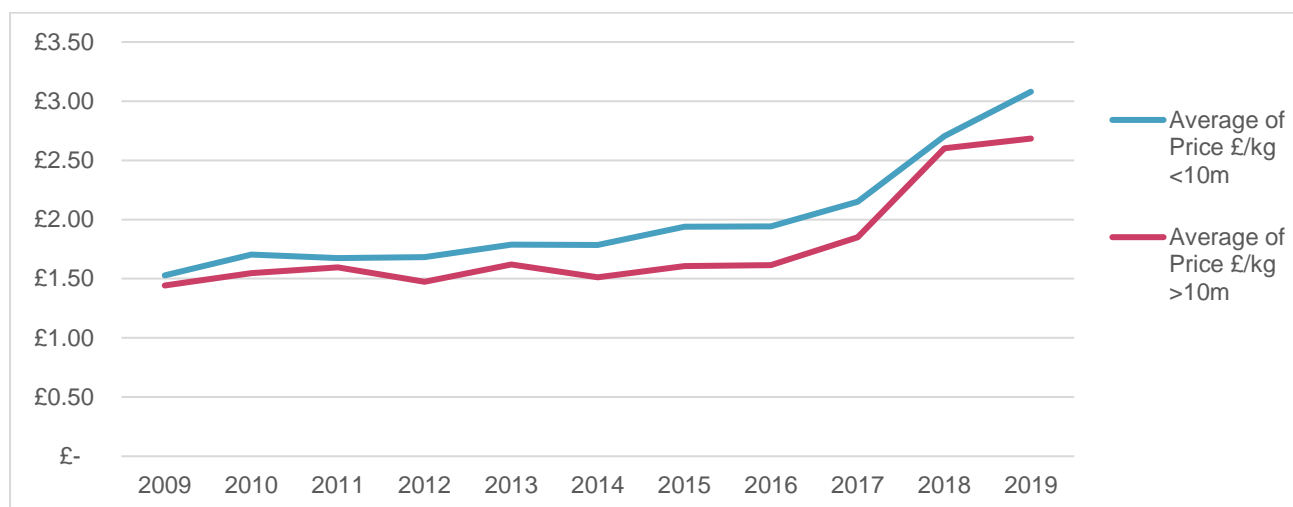


Figure 10. Crab first sale average prices from 2009-2019 into English ports by </> 10m vessels. Source. MMO



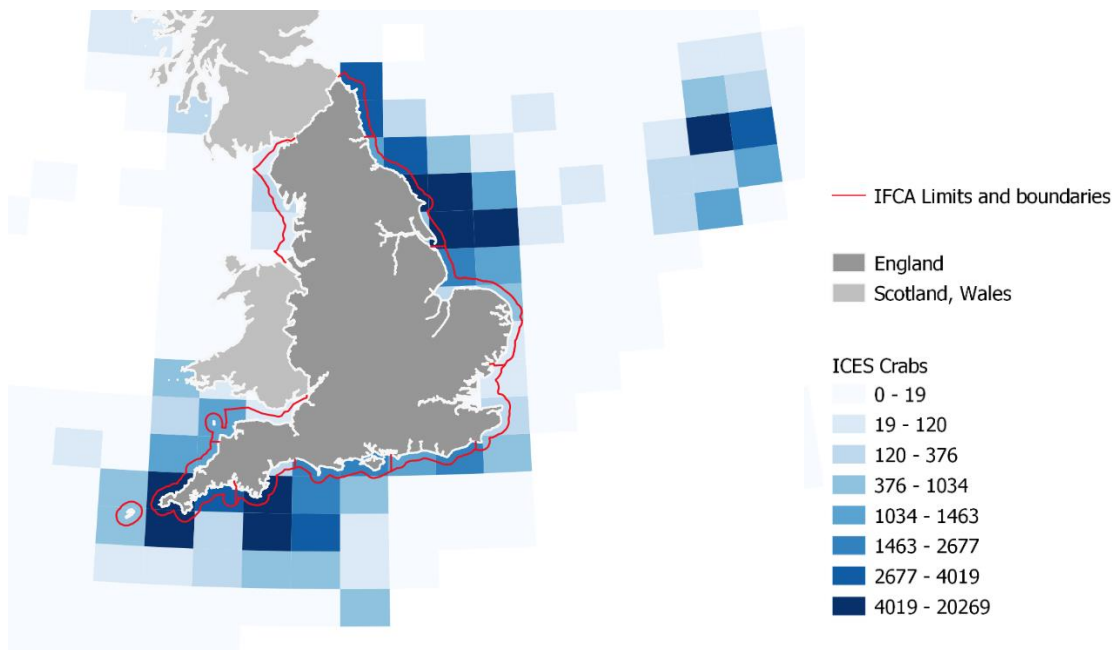
- **Crab landings have nearly doubled since 2009.** As shown in figure 8 this increase has been mainly as a result of effort from over 10m vessels increasing. This is used as a proxy for the offshore fishery, due to how data is collected and split at 10m by the MMO (originally for determining quota access in TAC regulated fisheries). Inshore landings by under 10m vessels remained level over the 2009-2019 period.
- As expected and as shown in figure 9, this increase in effort and landed weight has also meant an increase in value, rising from around £10 million in 2009 to over £35 million in 2019. Again the increase for the offshore fishery has more than trebled.
- Crab prices per kilo are higher for the under 10m (inshore) landings than the offshore (over 10m) first sale prices.
- In 2018 1,327 under 10m vessels and 335 over 10m vessels landed over 100Kg of crab into UK ports.
- In 2019 1,309 under 10m vessels and 314 over 10m vessels landed over 100Kg of crab into UK ports.¹⁰⁵

Management

- The management of Edible Crab in England includes minimum conservation reference sizes (although these differ between IFCAs and ICES regions: Regions 1 and 2: 140 mm; Region 2 (except ICES Divisions VIId, e, f, and ICES Divisions IVb, c) 130 mm; ICES Divisions IVb, c south of 56 oN: 130 mm, except for one area where MCRS is 115 mm; ICES Divisions VIId, e, f: 140 mm; Region 3: 130 mm; Devon, Cornwall and the Scilly Isles male edible crab: 160mm, Cornwall 150 mm female edible crab.¹⁰⁶
- Some IFCAs have flexible permit scheme byelaws for effort restrictions (pot limits) for crab fishing within their districts (0-6nM).
- Outside 6nM there are KWH effort restrictions in place (no pot limits).
- For the Western Waters¹⁰⁷ an international regime of effort control is in place.
- Following the UK departure from the EU, the Trade and Cooperation Agreement¹⁰⁸ (T&CA) sets catches at historic catches for 2014 but no means to manage for UK

- Cefas conducts stock assessments for the defined Crab Fishery Units (CFU) in England.
- The FIP started in 2017 and is at stage 4: 'Improvements in Fishing Practices or Fishery Management'. The FIP is scheduled until April 2022.¹⁰⁹

Figure 11. Main crab catches by ICES sub-rectangle (cumulative 2009-2019). Source: MMO.



Lobster (*Homarus gammarus*)

European lobster are found on rocky substrates across the Atlantic coast of Europe. Moulting occurs annually in summer and mating occurs soon after females have moulted. After hatching the larvae are in the water for 3-4 weeks before settling on the seabed.¹¹⁰

There are six Lobster Fishery Units (LFU) in England, shown in figure 12 below. These units are based upon the distribution of the fisheries, hydrographic conditions and larval distributions and development studies by Cefas.

Cefas conduct stock assessments for Lobster Fishery Units in England,

Figure 12. Lobster Fishery Units in the UK (Cefas)



Stock status

Northumberland & Durham:

- Minimum Landing Size: At the MLS applied in this region around 100% males and 80% of females should be mature
- Discarding: High discard survival assumed to be > 90%
- Stock size: Below the minimum reference point limit for females, just above for males
- Exploitation rate: High, around maximum reference point limit for males, above for females

Yorkshire Humber

- Minimum Landing Size: At the MLS applied in this region around 99% of males and 86% of females should be mature.
- Discarding: High discard survival assumed to be > 90%.
- Stock size: Around minimum reference point for males and females.
- Exploitation rate: High, above the maximum reference point limit for both males and females.
- Since 2010 the fishery has expanded to offshore grounds. An increase in offshore vivier vessels has been seen and a lot of vessels have increased their pot numbers

East Anglia

- Minimum Landing Size: At the MLS's applied in this region between 99-100% of the males and 86- 92% of the females should be mature
- Discarding: High discard survival assumed to be > 90%
- Stock size: Low, below minimum reference point for males and females
- Exploitation rate: High, above minimum reference point for males and females

Southeast South Coast

- Minimum Landing Size: At the MLS's applied in this region between 99-100% of the males and 86- 92% of the females should be mature
- Discarding: High discard survival assumed to be > 90%
- Stock size: Around the minimum reference point limit for males, between limit and target for females.
- Exploitation rate: Moderate. Above rates consistent with MSY but below maximum reference point limit for males and females

Southwest

- Minimum Landing Size: At the MLS's applied in this region between 99-100% of the males and 86-92% of the females should be mature
- Discarding: High discard survival assumed to be > 90%
- Stock size: Above minimum reference point limit but below MSY target for males and females
- Exploitation rate: Moderate. Above rates consistent with MSY but below maximum reference point limit for males and females.¹¹¹

Lobster landings into England are presented in figures 13, 14 and 15 below.

Figure 13. Lobster landings into English ports (cumulative landings 2009-2019). Source: MMO

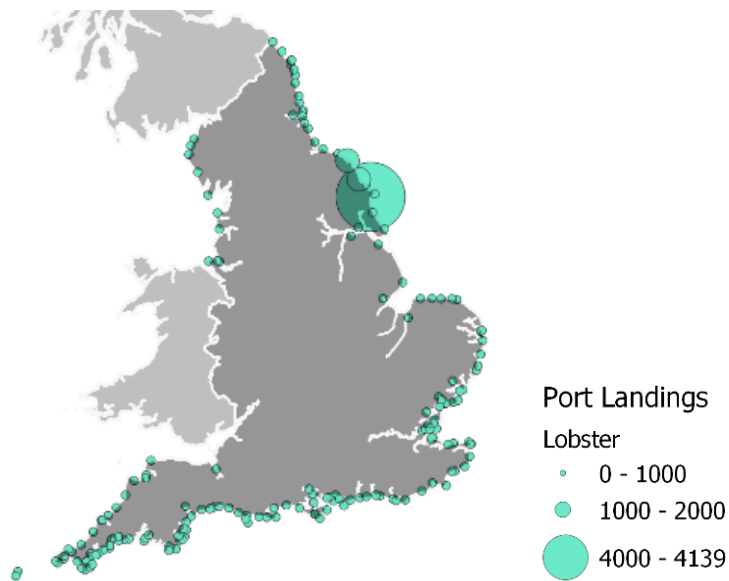


Figure 14. Lobster landings into England (tonnes) 2009-2019 by </> 10m vessels. Source: MMO

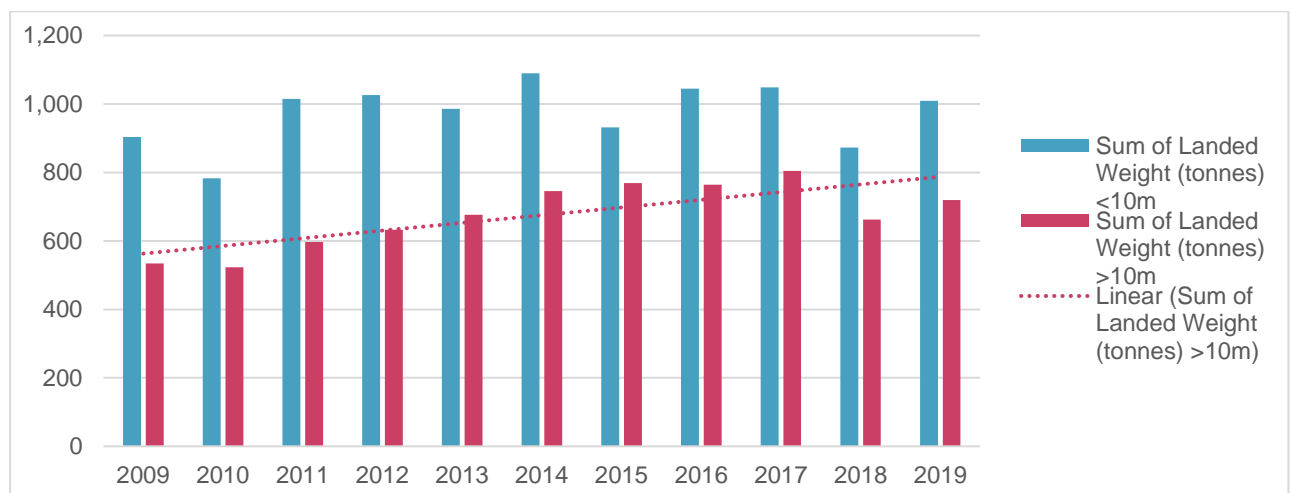


Figure 15. Lobster landings into England (£) 2009-2019 by </> 10m vessels. Source: MMO

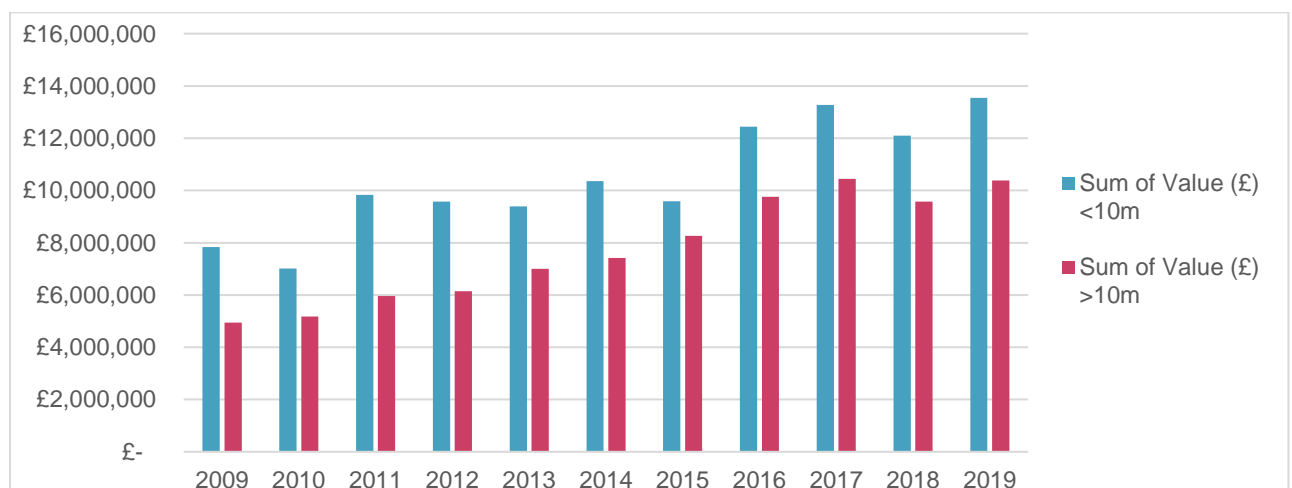
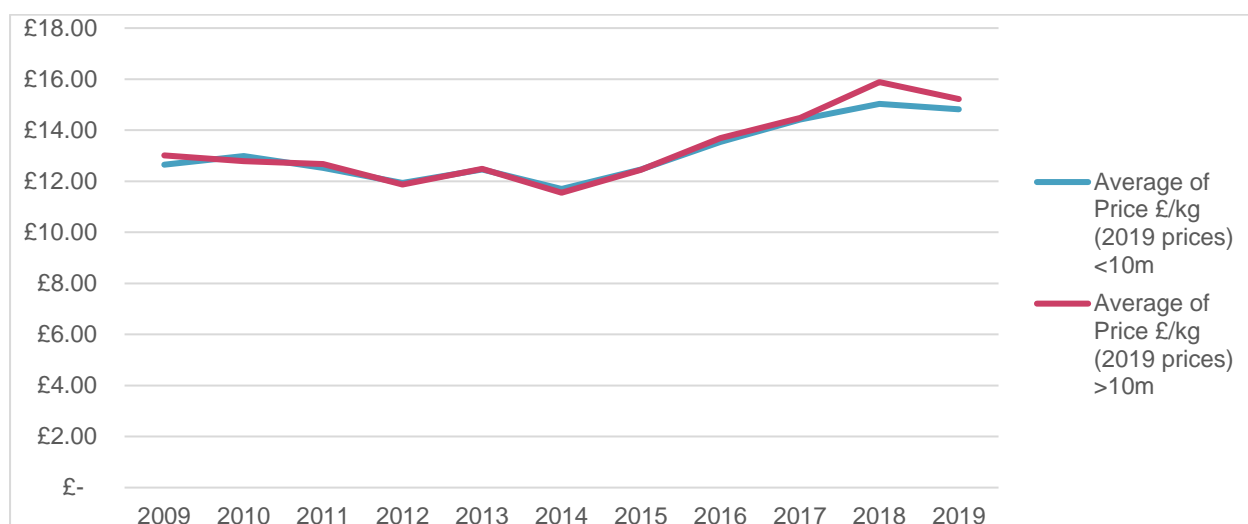


Figure 16. Lobster first sale average prices from 2009-2019 into English ports by </> 10m vessels. Source: MMO



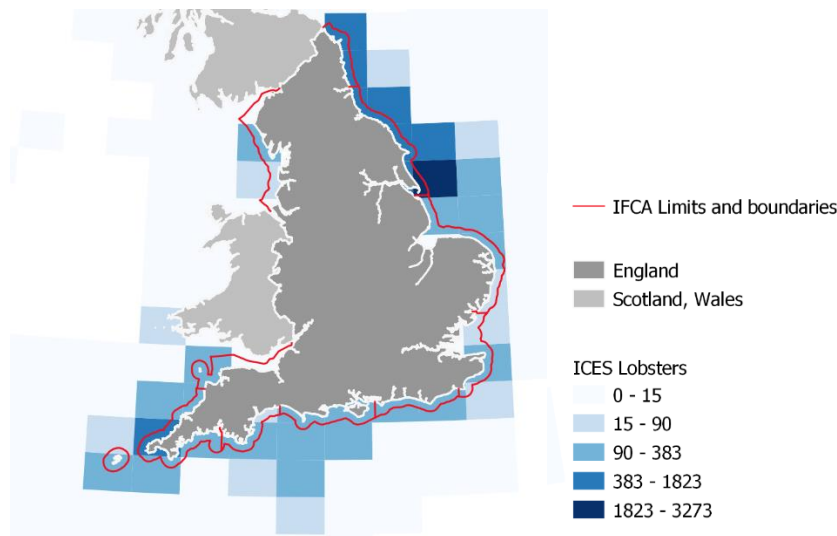
- **Lobster landings have increased over the 2009 to 2019 period.** The inshore under 10m lobster fishery lands around 1,000 tonnes a year, and the larger vessels over 10m in length between 600 and 700 tonnes a year.
- The value of lobster landings has risen from £8 million to nearly £14 million between 2009 and 2019 for under 10m vessels, whereas the over 10m vessel landed value has risen from £4.5 million in 2009 to over £10 million in 2019.
- Lobster prices over time have risen from around £13 on average to over £15 on average - the average first sale price is not significantly different between under and over 10m vessels.
- In 2018 1,432 under 10m vessels and 224 over 10m vessels landed over 100Kg of lobster into UK ports.
- In 2019 1,455 under 10m vessels and 230 over 10m vessels landed over 100Kg of lobster into UK ports.¹¹²

Management

- An 87 mm (carapace length) Minimum Conservation Reference Size for UK waters applies.¹¹³
- IFCA minimum size limits are in place (also 87 and to 90 mm).
- Escape hatches for juvenile lobsters are a requirement in some IFCA districts inside 6nM.
- Escape hatches outside 6nM are not mandatory.
- Variable pot limits have been introduced via flexible byelaws, which may also stipulate bait type at IFCA district level.
- A national ban on landing v-notched lobsters is in place (although no schemes of introduction are in place outside 6nm.)
- Outside 6nm a minimum size is set at EU level; no berried hens are to be landed nationally.
- More local population dynamic information is collected at IFCA level e.g. local CPUE and LPUE (catches and landings per unit effort respectively.)

- The FIP started in 2017 and is at stage 4: 'Improvements in Fishing Practices or Fishery Management'. The FIP is scheduled until April 2022.¹¹⁴

Figure 17. Lobster catches by ICES sub-rectangle (cumulative 2009-2019). Source: MMO



Whelks (*Buccinum undatum*)

Whelk fishing has been increasing throughout England over recent years as figures 18 and 19 below make clear as landings (in particular by over 10m vessels) has been rising. Increasing demand for whelks, particularly from overseas markets (notably in South Korea) have driven this increase.¹¹⁵

Whelks are caught in baited pots and some of the largest whelk fishing vessels may set up to 1,000 pots each day. **Across much of the common whelks range there is a lack of available data and therefore stock status is largely unknown. Whelk have been identified as vulnerable to overfishing due to this recent increase in exploitation and sedentary life history.** There are regional variations in the size at onset of maturity (whelks caught in shallow water mature at a smaller size).¹¹⁶

There is no UK or England-level stock assessment and localised stock assessments are needed to inform management measures and fishing opportunities.

Figures 18-20 shown whelk landings (volume and value) as well as first sale prices in England from 2009-2019.

Figure 18. Whelk landings into English ports (cumulative landings 2009-2019). Source: MMO

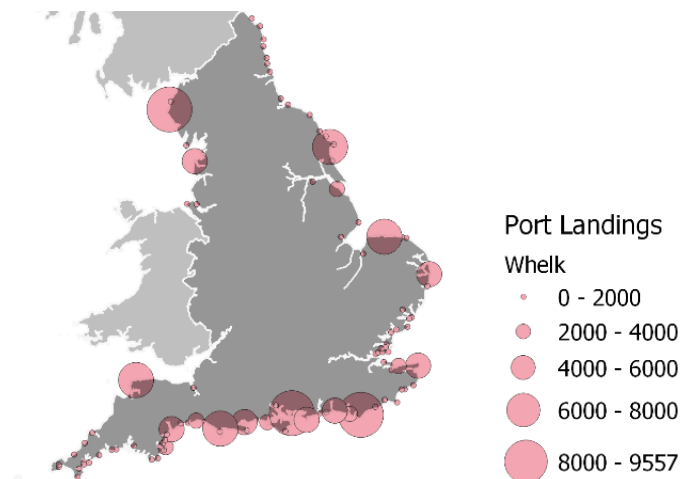


Figure 19. Whelk landings into England (tonnes) 2009-2019 by </> 10m vessels. Source: MMO

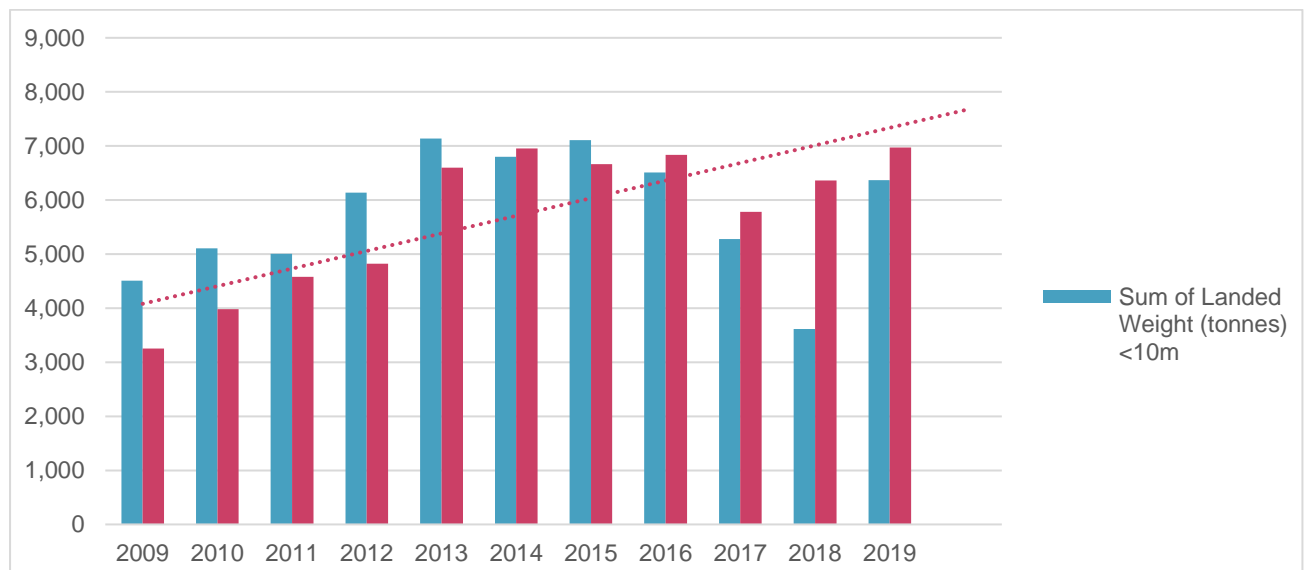


Figure 20. Whelk landings into England (£) 2009-2019 by </> 10m vessels. Source: MMO

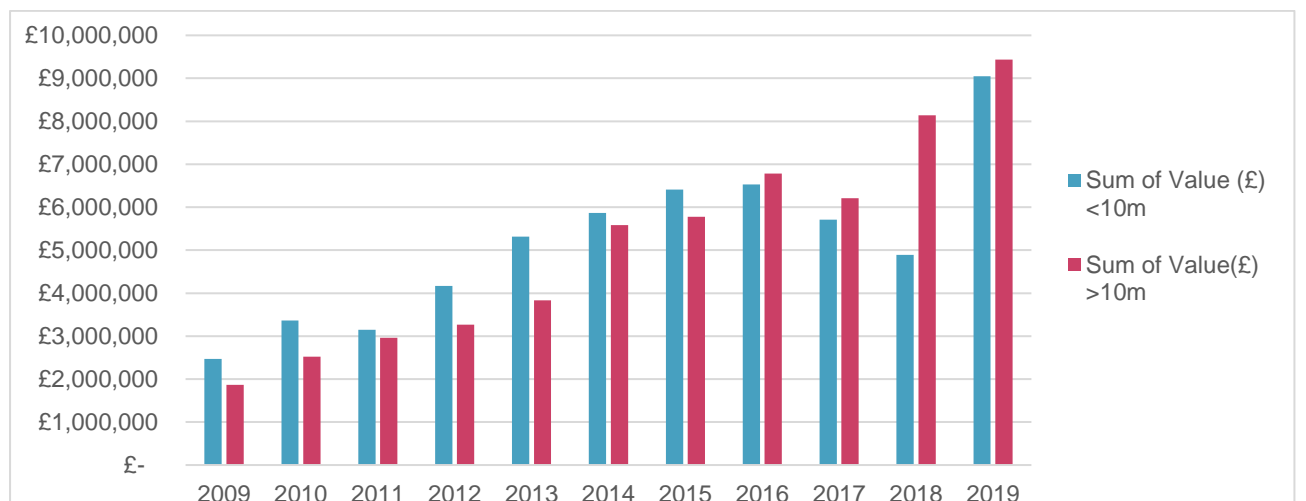
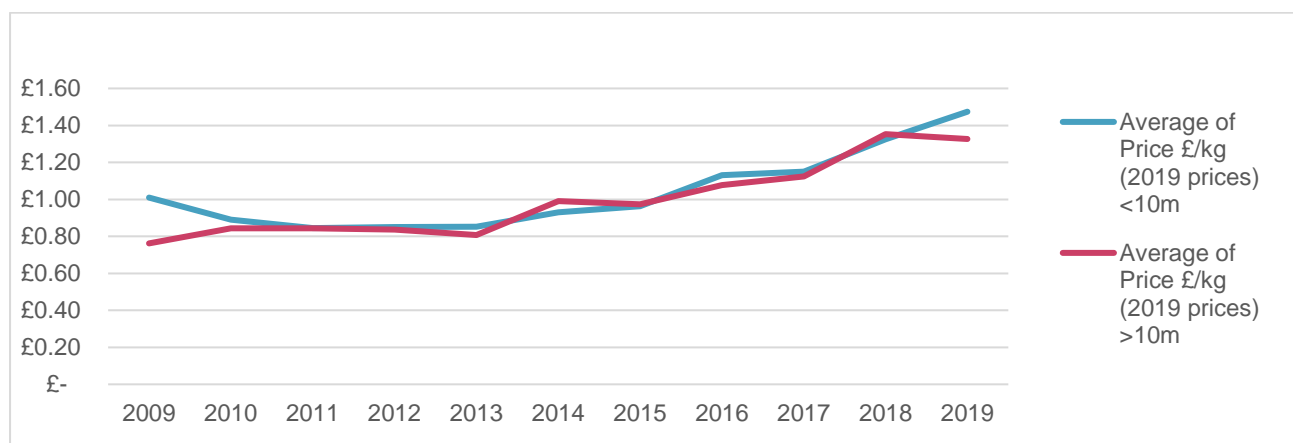


Figure 21. Whelk first sale average prices from 2009-2019 into English ports by </> 10m vessels. Source: MMO

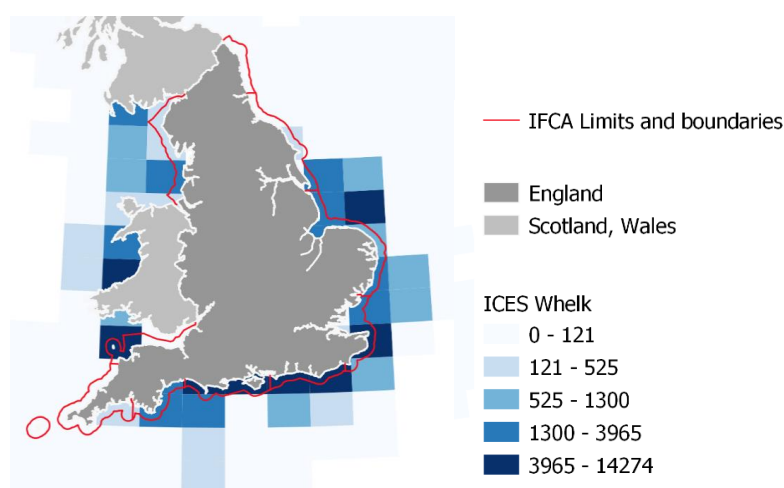


- Whelk landings between 2009 and 2019 for under 10m vessels have varied from around 4,000 tonnes to 7,000 tonnes. In contrast the landings by over 10m vessels have been increasing over the same period, rising from 3,000 tonnes in 2009 to 7,000 tonnes in 2019.
- The value of whelk landings has increased from around £2 million in 2009 to £9 million in 2019 for under 10m landings and from nearly £2 million to over £9 million for the over 10m fleet.
- In the same period, first sale whelk prices have risen by 40% from £1 per Kg to £1.40 as a result of high demand and prices paid by exporters (to South Korea).
- In 2018 303 under 10m vessels and 113 over 10m vessels landed over 100Kg of whelks into UK ports.
- In 2019 319 under 10m vessels and 114 over 10m vessels landed over 100Kg of whelks into UK ports.¹¹⁷

Management

- There is an EU-wide MLS of 45 mm which applies outside 6nM¹¹⁸
- From 0-6nM IFCA's have flexible permit byelaws in place, including minimum size limits and effort restrictions (pot limits).
- Several IFCA's (Kent & Essex, Eastern, and Sussex) have whelk management regimes (byelaws) in place that include pot limits, escape holes, riddle size minimums, and increased MLS compared to the EU minimum.¹¹⁹
- Outside 6nM there are no effort restrictions or other management measures in place.
- D&S IFCA has increased the MCRS for whelks following research undertaken on the size of sexual maturity in D&S IFCA's District to allow individuals to spawn at least once before removal from the fishery, to aid continued recruitment and stock improvement. The increase was from 45mm to 65mm in a phased approach, increasing to 55mm after 2 years and 65mm after a further 2 years.
- The Whelk Management Group (WMG), is an industry-led group that was set up by Seafish to bring together stakeholders from across the whelk supply chain to focus on the management of the UK whelk fishery. The main objectives are to identify and review current measures used to manage whelk fisheries and identify knowledge gaps.¹²⁰

Figure 22. Whelk catches by ICES sub-rectangle (cumulative 2009-2019). Source: MMO



Cuttlefish (*Sepia officinalis*)

Common cuttlefish live for 1 to 2 years and are found from UK waters to North Africa. English Channel cuttlefish spawn from February or March, to July with seasonal aggregations occurring. There are two stocks currently described: Division VIId (Eastern Channel) and Division VIle (Western Channel) for the UK fishery, although there is exchange between the two.

Fisheries taking place in autumn and winter, tend to target immature (pre spawning) cuttlefish offshore with mobile gears such as beam trawls, whereas the spring / early summer fishery in the Channel is undertaken with static gear (cuttle traps).

The offshore fleet account for over 94% of all cuttlefish landings to UK ports which has correlated with a drop in the landings from the inshore pot and trap fisheries landings between 2008 and 2017¹²¹

Cuttlefish landings into English ports from 2009-2019 are shown in figure 23 below, which highlights the number of smaller ports around the country where cuttlefish are landed in a trap (pot) fishery which is regulated by effort at IFCA level and is undertaken at small scale landing under 1000 tonnes per year over the past decade. This is in stark contrast to the landings for Plymouth in Devon and Newlyn in Cornwall where landings have increased dramatically over the same time period as a result of an emergent unregulated beam trawl fishery offshore on pre-spawning cuttlefish.

The high market prices (figure 24) of cuttlefish has led to a 'race to fish' and changes to fishing effort and the start of seasons, putting more pressure on the stock which remains unassessed.

Cuttlefish landings have increased dramatically over recent years as figures 24 and 25 below show. Landings are mainly exported to southern Europe. **The stock is at risk of recruitment over-fishing and no minimum sizes, quota other catch limits, seasonal, spatial or gear restrictions are in place outside 6 miles.¹²² The stock is unassessed and the health of the stock is unknown.**

Figure 23. Cuttlefish landings into English ports (cumulative landings 2009-2019). Source: MMO

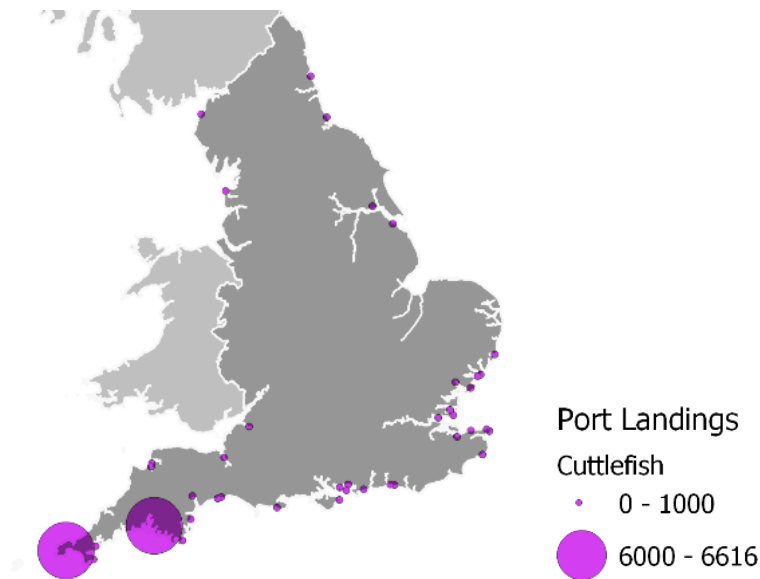


Figure 24. Cuttlefish landings into England (tonnes) 2009-2019 by </> 10m vessels. Source: MMO

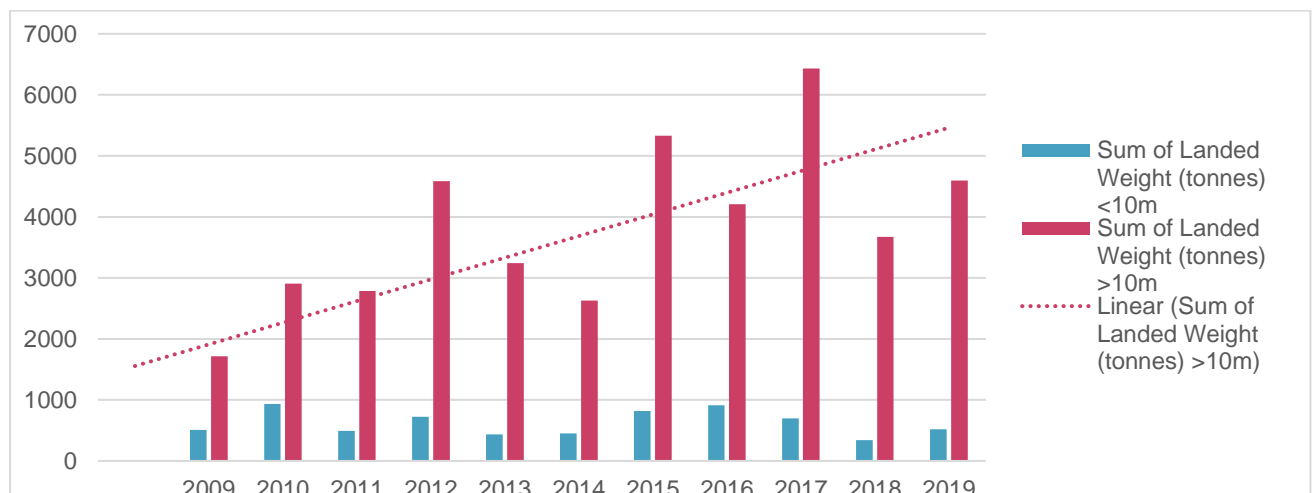


Figure 25. Cuttlefish landings into England (£) 2009-2019 by </> 10m vessels. Source: MMO

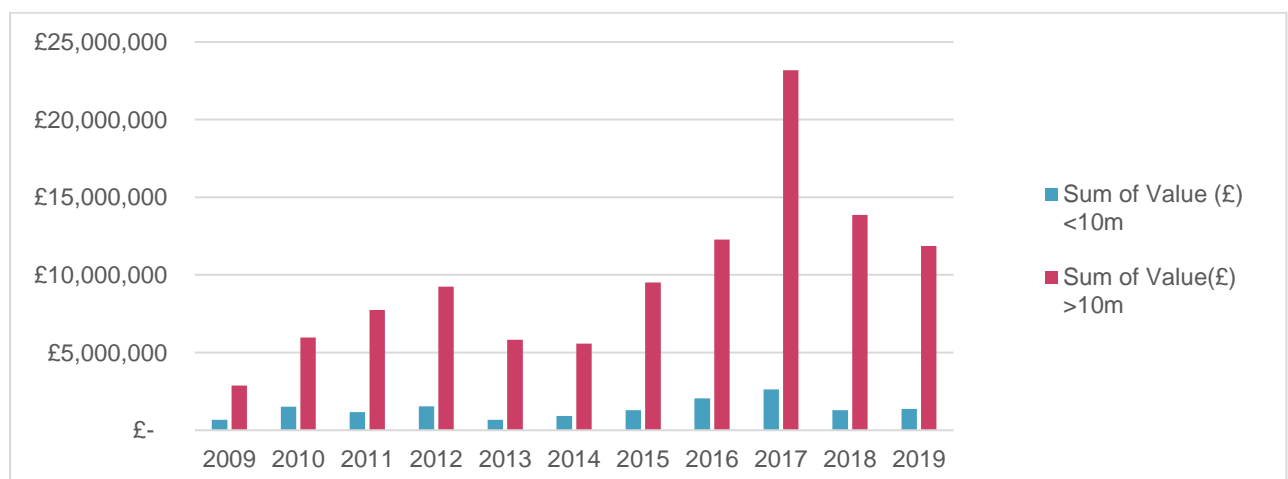
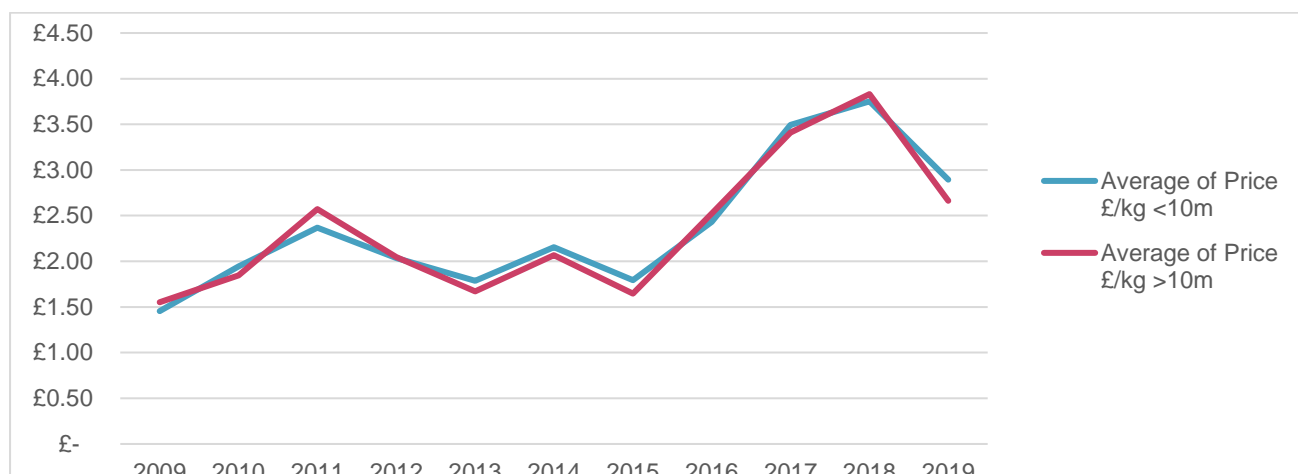


Figure 26. Cuttlefish first sale average prices from 2009-2019 into English ports by </> 10m vessels. Source: MMO

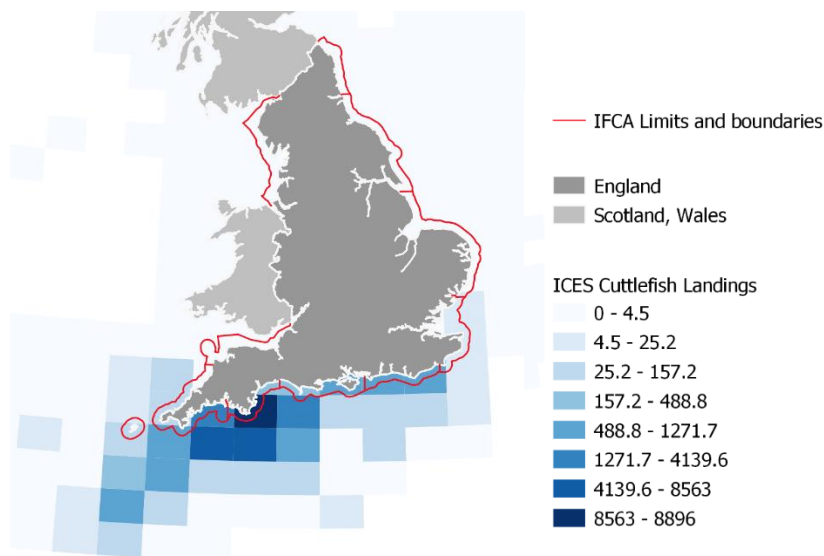


- Cuttlefish landings by under 10m vessels have varied considerably from nearly 1000 tonnes in 2016 to under 400 tonnes in 2018. **While there have been variations between years, cuttlefish landings by the over 10m fleet have risen rapidly from 1,700 to 4500 tonnes (via a 6,400 peak in 2017) as the trend line shown in figure 25 makes clear.**
- The value of cuttlefish landings for the over 10m fleet has increased correspondingly from £2.8 million in 2009 to a 2017 high point of over £23 million (declining to around £11 million in 2019). For under 10m landings the landings value has ranged from £600,000 to £2.6 million.
- Under 10m landings have fluctuated intra-annually but remained under 1,000 tonnes per year throughout the period.
- In the same period, first sale cuttlefish prices rose from £1.50 per Kilo to a high of over £3.50 per Kilo in 2018.
- In 2018 186 under 10m vessels and 165 over 10m vessels landed over 100Kg of cuttlefish into UK ports.
- In 2019 196 under 10m vessels and 162 over 10m vessels landed over 100Kg of cuttlefish into UK ports.¹²³

Management

- Cuttlefish fisheries remain relatively unregulated with no Total Allowable Catch (TAC) in place
- No quota is in place
- No Minimum Conservation Reference Size (MRCs) is attached to the species.¹²⁴
- No restrictions on fishing pre-spawning juveniles is in place.
- IFCA byelaws have been introduced in Sussex, Southern and Devon and Severn to manage fishing effort for the inshore fishery (via pot limits).¹²⁵
- Management introduced by IFCA's to protect sensitive habitats are often co-located with cuttlefish spawning areas.

Figure 27. Cuttlefish catches by ICES sub-rectangle (cumulative 2009-2019). Source: MMO



Bivalve mollusc fisheries

Scallops (Pecten maximus)

The king scallop (*Pecten maximus*) is a large bivalve mollusc found throughout Northwest Europe up to 200m depth on muddy and gravelly seabed habitats. A large scallop may produce 2 million eggs and spawning times vary from spring to autumn. Larvae remain in the plankton for around 30 days settling on the seabed at a size of 1-5 mm.¹²⁶

The stocks are exploited principally by the UK and France, with some Irish, Dutch and Belgian vessels and are outside the EU total allowable catch (TAC) and quota regime, so fishery management measures are largely under national control.

Scallops are the highest value commercial fishery for landings into English ports. Despite this, the scallop fishery remains underdeveloped in terms of sustainable management and science. Management of scallop fishing does not include any catch-limits, and only very specific, localized limits on fishing ‘effort’ applied to part of the fleet.¹²⁷

Scallops are caught by dredging (although some commercial dive fisheries exist e.g. in Lyme Bay) and the fleet is roughly divided into two groups: smaller inshore vessels and larger vessels up to about 30m in length, with the capability to fish offshore grounds and further from their home port (often described as ‘nomadic’).¹²⁸ Scallops are fished on distinct fishing grounds and there is widespread dispersal of larvae regionally. The effects of displacement (e.g. relating to the nomadic fleet being excluded from certain grounds) is a concern. **The MSC pre-assessment (2016) for scallops in the Channel showed the fishery would fail on the healthy stock and management components.**¹²⁹

Currently, there is no comprehensive stock assessment available for the species at a national level. Significant increase in the number of vessels within the fishery are apparent, particularly in the 10-15m category which is unregulated.¹³⁰ Landings and price information are shown in figures 29-31 below. **Landings per unit effort have been declining since a peak in 2012 and these trends indicate the risks to the long-term future of the fleet for a fishery in urgent need of reform** both inshore and offshore, according to a 2019 Scallop

Management Conference. **Evidence suggests the fleet is at overcapacity and fishing effort is too high.** The offshore fishery is nomadic and once the CPUE drops off they move onto other grounds. Increased efficiency in effort based fisheries is known to lead to increased catch levels per unit of effort, leading to increased fishing pressure.¹³¹

Prior to a 2017 initiative the status of many stocks was unknown.¹³² Stocks were not subject to routine monitoring or formal assessment prior to 2017. Cefas have been monitoring stocks in a partnership project with industry since then and seven stocks were monitored in 2018. The stocks of greatest importance to the UK are: Inshore Cornwall, 27.7.e.I; Lyme Bay, 27.7.e.L; Offshore, 27.7.e.O) North, 27.7.d.N; South, 27.7.d.S).¹³³

Some English scallop stocks are being overfishing and as a result, stocks lower and age distribution is lower (4 to 5 years instead of 20), so the fishery is dependent on a couple of years of age classes and as a result each year's recruitment has a big impact on catches and causes fluctuations.

In the Channel, for ICES Division 27.7.e (Inshore Cornwall, 27.7.e.I the Harvest Rate was above MSY 2020; In Lyme Bay, 27.7.e.L the Harvest Rate has been well above MSY since 2017; For Offshore, 27.7.e.O the Harvest Rate was below MSY in 2020; For the Western Channel in Division 27.7.d (North, 27.7.d.N; South, 27.7.d.S) the Harvest Rate was at MSY in 2020 for 27.7.d.N for the Eastern Channel straddling the border between UK and France.¹³⁴

Environmental conditions have favoured scallop spawning, recruitment and survival as sea temperatures have increased – this may be masking the impacts of overfishing.¹³⁵

An MSC-facilitated Project UK Fisheries Improvements (PUKFI) project and steering group have been initiated, with involvement of the Scallop Industry Consultation Group (SICG).

Figure 28. Scallop landings into English ports (cumulative landings 2009-2019). Source: MMO

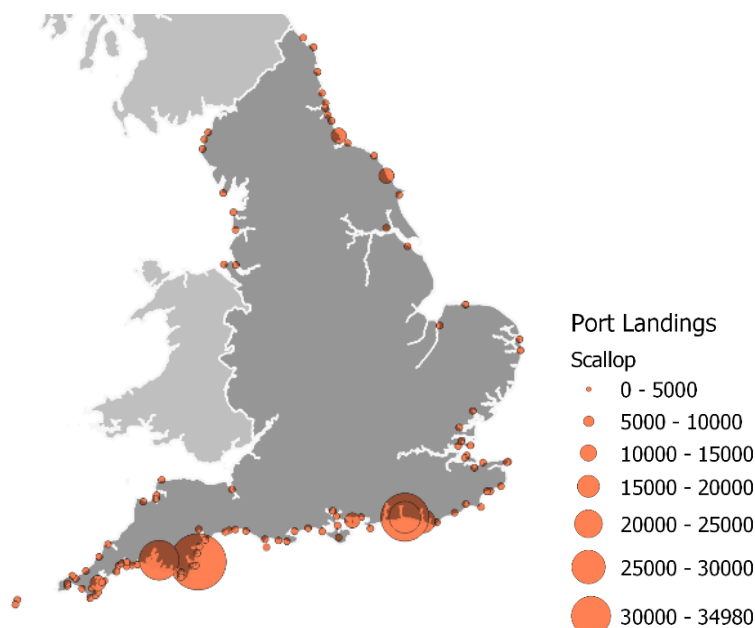


Figure 29. Scallop landings into England (tonnes) 2009-2019 by </> 10m vessels. Source: MMO

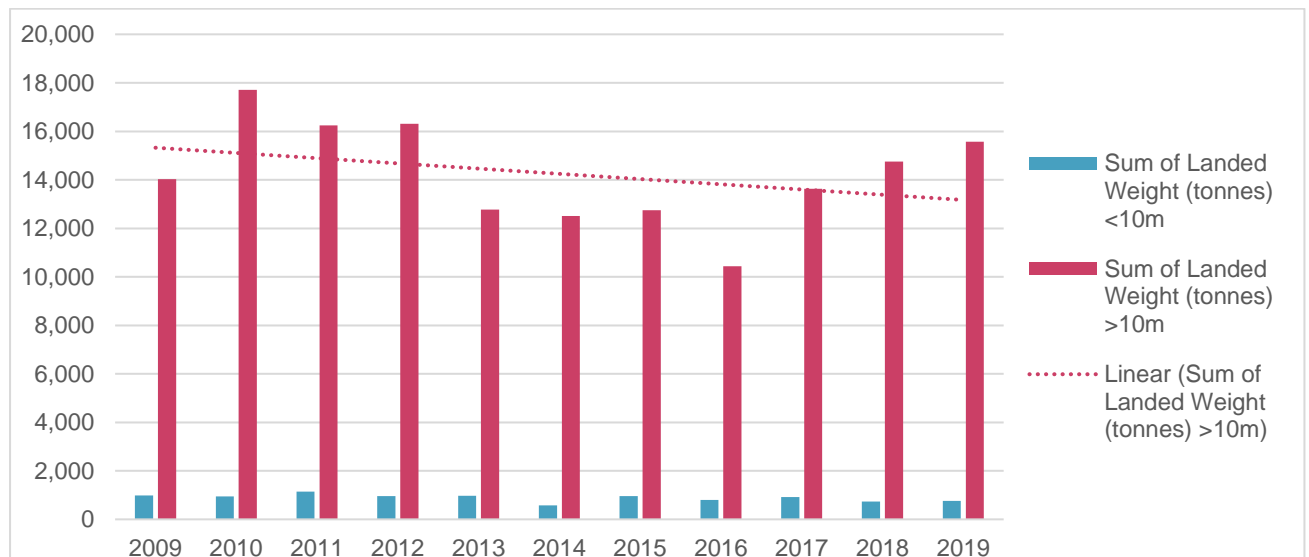


Figure 30. Scallop landings into England (£) 2009-2019 by </> 10m vessels. Source: MMO

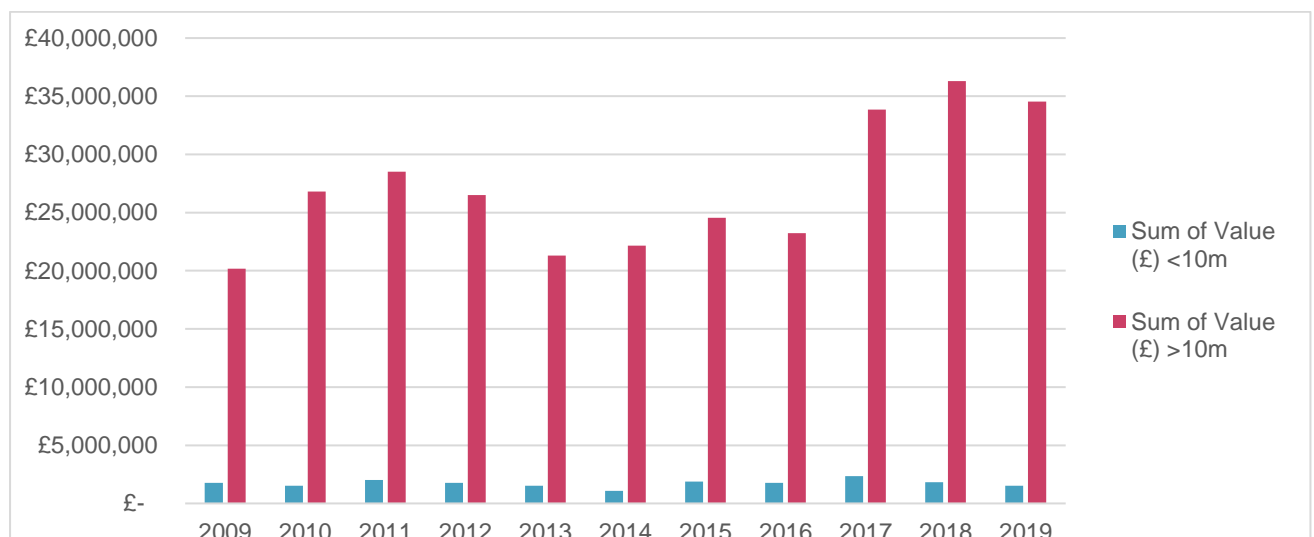
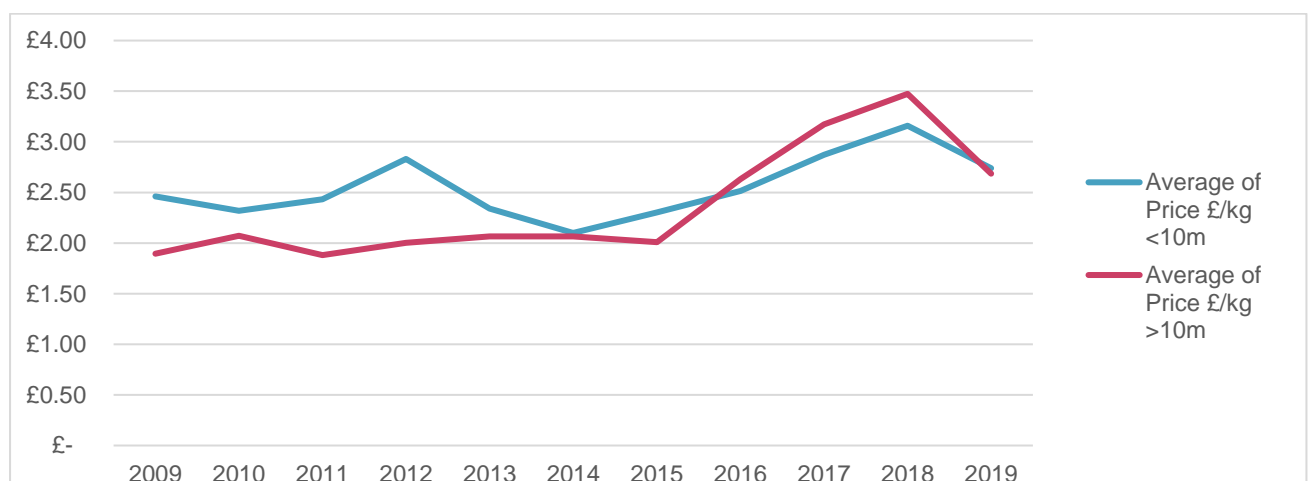


Figure 31. Scallop first sale average prices from 2009-2019 into English ports by </> 10m vessels. Source: MMO

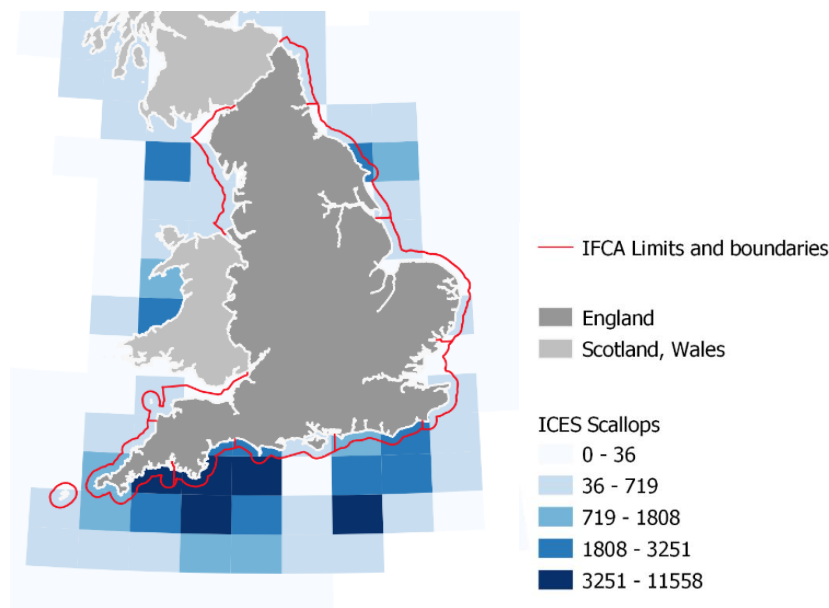


- Scallop landings in England are mainly by over 10m vessels which landed around 14,000 tonnes of scallops in 2009 and nearly 16,000 tonnes 2019. Under 10m landings of scallops have been less than 1,000 tonnes in each year over the same time period.
- The landed value at first sale from scallops increased for the over 10m fleet from £20 million in 2009 to nearly £35 million in 2019. Scallop landings for the under 10m fleet have generally been below £2 million per year over the same time period.
- Scallop prices have increased since 2009 (£2 per Kilo for over 10m vessels and £2.50 for under 10m vessels) to a high in 2018 of £3.50 for over 10m vessels, and £3.16 per Kilo for under 10m vessels.
- In 2018 153 under 10m vessels and 273 over 10m vessels landed over 100Kg of scallops into UK ports.
- In 2019 157 under 10m vessels and 273 over 10m vessels landed over 100Kg of scallops into UK ports.¹³⁶

Management

- A complex picture of input controls - limiting fishing time, number of vessels and dredges per vessel are applied but there is no management system to ensure sustainable harvesting levels.¹³⁷
- **Stock assessments do not impact effort limits.**
- There are no output controls, but 'minimum landing sizes' are applied. Minimum sizes are 100 mm round shell length in the UK, except for the Irish Sea (VIIa north of 52° 30' N and VIId) and the Eastern Channel VIId (where it is 110 mm).¹³⁸
- EU effort caps are also in place via the Western Waters effort regime¹³⁹ limiting the number of kilowatt days / hours fished by over 15m dredge vessels. The effort pool is administered by the MMO. **Effort has not been limited through these measures and is 'swapped in' from France meaning it does not limit fishing activity.**
- The Scallop Fishing (England) Order 2012 restricts the number of dredges used alongside technical measures defining the type of dredges (design and number).¹⁴⁰
- There is IFCA regional management for the South West in place, with notable variation at IFCA level.
- SIFCA Scallop byelaw (2019); Solent Dredge permit Byelaw.¹⁴¹
- No scallop dredging is permitted in UK inshore MPAs but some IFCAs have a permitting system for inshore scallop fisheries.
- Vessel length limits around the UK opportunities for inshore vessels (inside 6nM), e.g. >17m (Kent & Essex); >12m (Southern) or >14m (Sussex).
- A science-industry partnership, covering all English scallop fisheries (excluding the Irish Sea), is underway between Cefas, Defra and scallop fishers

Figure 32. Scallop catches by ICES sub-rectangle (cumulative 2009-2019). Source: MMO



Clam (all species)

Clams are bivalve molluscs that live in muddy substrates around the UK coastline. MMO data on the national picture covers landings of the main species (*mercenaria* and *manilla* clams) although other are also included. Landings reported to the MMO are presented in figures 34 and 35 with first sale prices in figure 36 below.

The American hard-shelled clam, *Mercenaria mercenaria*, originates from the east-coast of North America, are found in bays and estuaries buried in muddy sediments to depths of 15 metres and were purposefully introduced in the UK in 1925 as eel bait.^{142,143} The species grows up to 12 cm in length and were first targeted commercially in the 1970s. The species is both targeted in its own right and is retained as a bycatch species when fishing for Manila clams. The species is targeted in distinct, small spatial areas, where shellfish beds occur using mechanical shellfish dredges. The type of shellfish dredge used can largely vary. Box dredges, typically used to target Manila clam, can be used with larger bar spacing to target American hard-shelled clam. Alternatively, a number of fishers use modified oyster dredges, whereby the 'ladder' of the dredge, parallel bars at the base of the dredge mouth, is replaced by a set of teeth. An oyster dredge typically consists of a metal frame with a ladder at the base of the dredge mouth, a set of skis at both ends of the dredge base and posterior mesh chain-link bag to collect the target species.¹⁴⁴

The manila clam (*Ruditapes philippinarum*)¹⁴⁵ is one of the top five most commercially valuable bivalve species globally. Manila clams are native to Japan and common around American shores with are no natural populations in Britain. However, a population was introduced to Poole Harbour in Dorset in 1980 by the then UK government's Ministry of Agriculture, Fisheries and Food (MAFF, now Defra). It was assumed the species would not naturalise, as a result of water temperatures restricting reproduction, however this proved to be incorrect and naturalised populations are now found in the Solent and other English estuaries.¹⁴⁶ Manila clams are well adapted to estuarine habitats, such as the mudflats and

although they are naturalised and play a significant role in the food chain, they do not appear aggressively invasive.¹⁴⁷

Figure 33. English clam landings (cumulative landings 2009-2019). Source: MMO

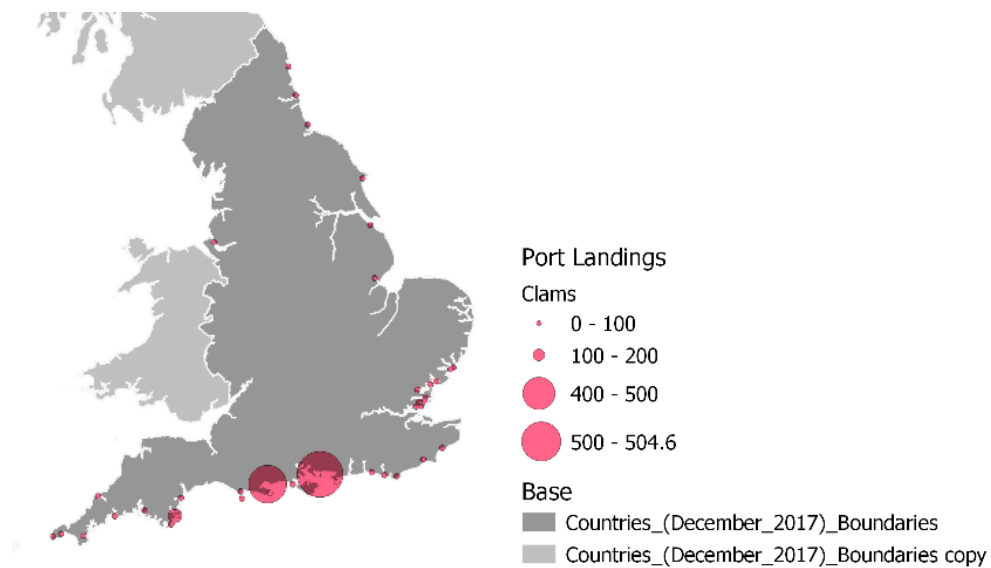


Figure 34. Clam (all species) landings into England (tonnes) 2009-2019 by \leq 10m vessels. Source: MMO

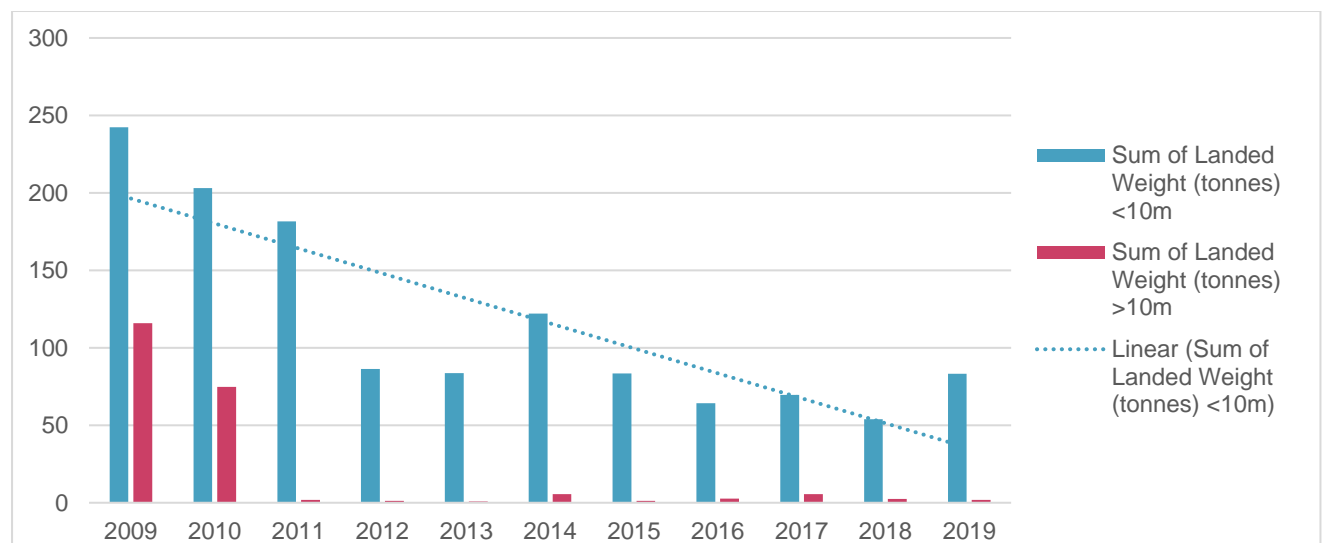


Figure 35. Clam (all species) landings into England (£) 2009-2019 by </> 10m vessels.
Source: MMO

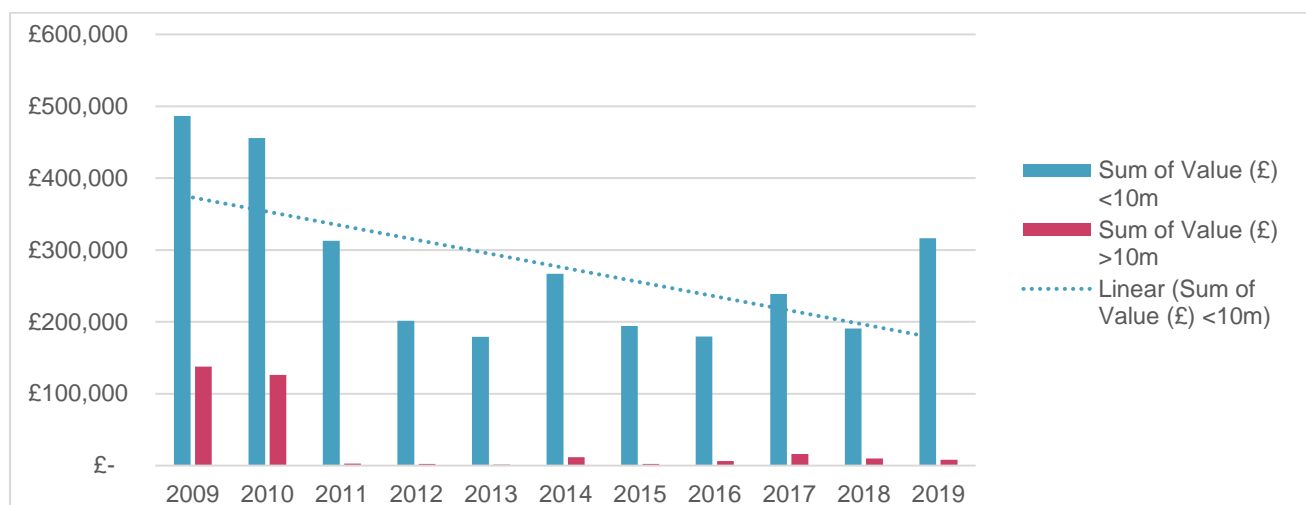
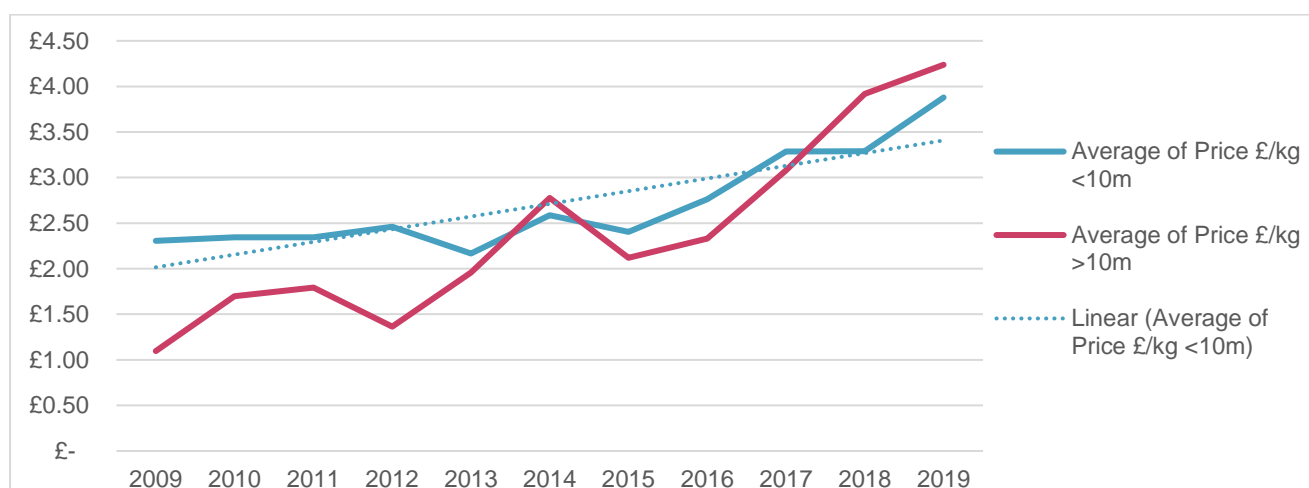


Figure 36. Clam (all species) first sale average prices from 2009-2019 into English ports by </> 10m vessels. Source: MMO



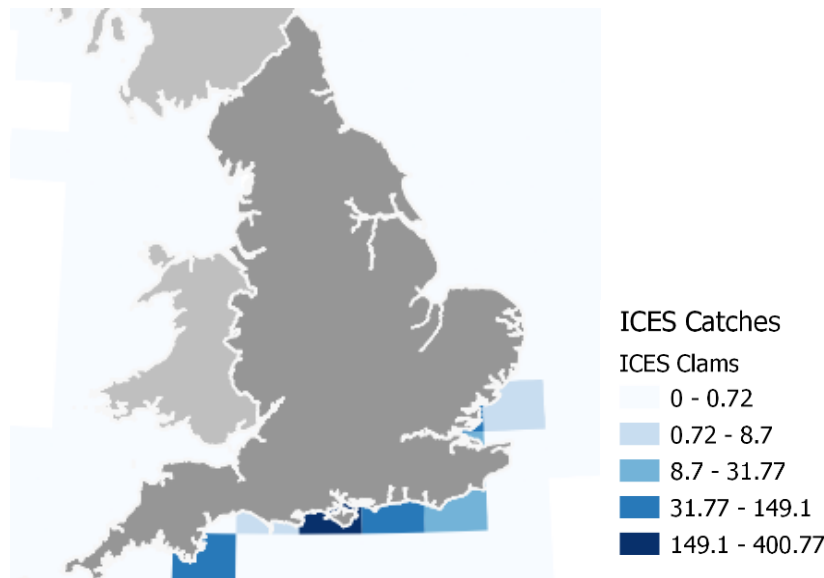
- MMO landings; clam landings are not as well recorded (due to identification of species / gear issues) in national datasets. This is due to a variety of factors including the limited landing sites, misidentification of clam species and the fact they are non-quota species.
- Clam landings data from the MMO suggests a decrease in clam landings overall from 250 tonnes in 2009 to 90 tonnes in 2019 for the under 10m fleet. After 2010 there are hardly any recorded landings in the MMO data for over 10m vessels.
- The value of clams for the under 10m fleet has decreased from nearly £500,000 in 2009 to £300,000 in 2019.
- Clam prices have nearly doubled between 2009 and 2019 according to MMO data.

Management

- An EU minimum size of 35mm is in place for Manilla clams.

- IFCA minimum sizes – e.g. American Hard Shell set by Southern IFCA at 63mm for Manila at 35mm (IFCA byelaw).²
- Some dredge requirements are in place, these are variable by IFCA district
- The clam fisheries are important with regards to MPA management e.g. in the muddy sediments of the Solent and these emergent management issues are being tested currently at IFCA level.¹⁴⁸

Figure 37. Clam catches by ICES sub-rectangle (cumulative 2009-2019). Source: MMO



Cockle (*Cerastoderma edule*)

The common cockle, *Cerastoderma edule* is indigenous to UK waters and widely distributed in estuaries and sandy bays around the coasts of Britain. The species range occurs from the western Barents Sea, Norway and Ireland to Spain and West Africa. Common cockle inhabits the top 5 cm of sediments, including clean sand, muddy sand, mud and muddy gravel, typically in the middle to lower intertidal zone and sometimes sub-tidally.

Cockles dominate landings in mixed fisheries including other bivalve species, namely Manila clam. Cockles are commercially fished in areas such as Morecambe Bay, the Wash, Thames Estuary, Dee Estuary, Outer Hebrides and South Wales. The species is caught using a mechanical shellfish dredge known as a box dredge, typically used to target Manila clam. Cockles are also targeted by hand gatherers at low tide. Cockles of 20-25 mm are taken commercially in the Wash, Thames estuary, Morecambe Bay, Dee estuary, and Ribble estuary in England, the Burry Inlet, South Wales, and the Solway Firth, Scotland. More cockles are landed in the UK than any other mollusc. *Cerastoderma edule* may live for up to 9 years, while 2 -4 years is normal for the species. Traditional hand raking collection methods have been superseded by mechanised methods.¹⁴⁹

² Clam (American Hard-Shell) 630mm; Clam (Manila) 350mm; Clam (Warty Venus) 400mm; Clam (Grooved Carpetshell) 400mm; Clam (Surf) 250mm. [Wheelhouse-Card-2021-FINAL.pdf \(toolkitfiles.co.uk\)](#)

Landings of cockles reported to the MMO from 2009 to 2019 are shown below in figures 39 and 40, with first sale prices over the same period in figure 41.

Note: hand raked cockles in the Wash do not go into the MMO statistics as the cockles are not classed as being 'fished' from a fishing vessel. This significantly skews the numbers for most of the fisheries apart from the Thames and Poole harbour.

In 2008 the Wash cockle fishery suffered significant mortalities (losses of 14,000 tonnes) which continued into 2009 (6,000 tonnes) leading to a closure of the dredge fishery for 2010, 2011 and 2012. KEIFCA responded in 2010 using a precautionary approach to reduce a possible spread by closing cockle beds outside the area of the Regulating Order. Annual reviews were undertaken. In 2013 a regulatory cockle fishery management measures for the area outside the Thames Estuary Cockle Fishery Regulating Order including a Biosecurity Code of Practice was instigated.¹⁵⁰ The impacts on cockle prices during the crash in supply explains the high cockle prices seen in figure 41 for 2009 and explains the lower landings in those years in figures 39 and 40. In the Thames cockle fishery the maximum vessel length for a cockle boat is 14m (as it is in the Wash) therefore the <10m and >10m distinction is now significant for the cockle fishery and the figures reflect that distinction in data collection rather than in terms of the actual fishery.

Figure 38. Cockle landings by English ports (cumulative landings 2009-2019). Source: MMO

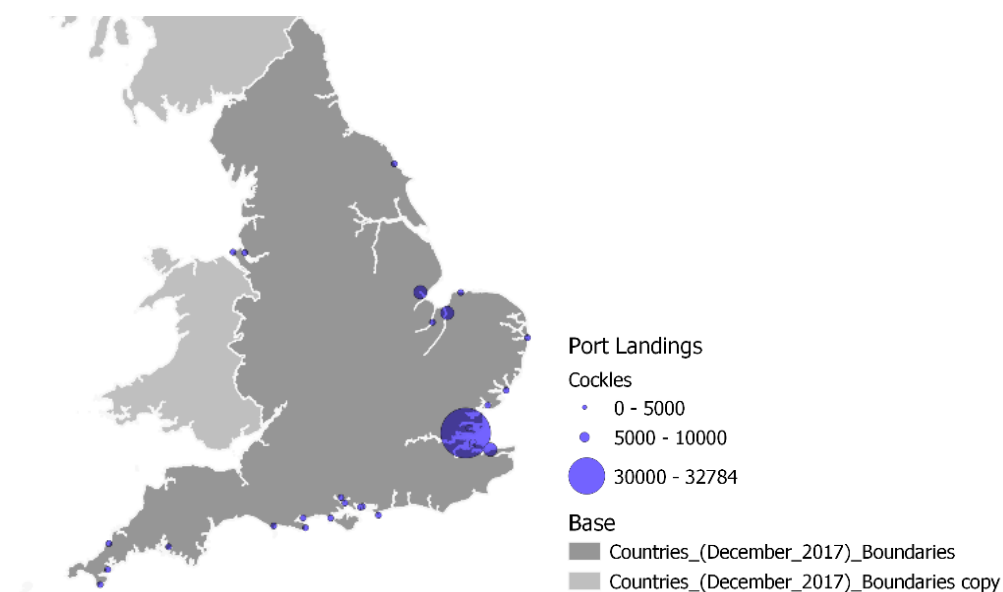


Figure 39. Cockle landings into England (tonnes) 2009-2019 by </> 10m vessels. Source: MMO

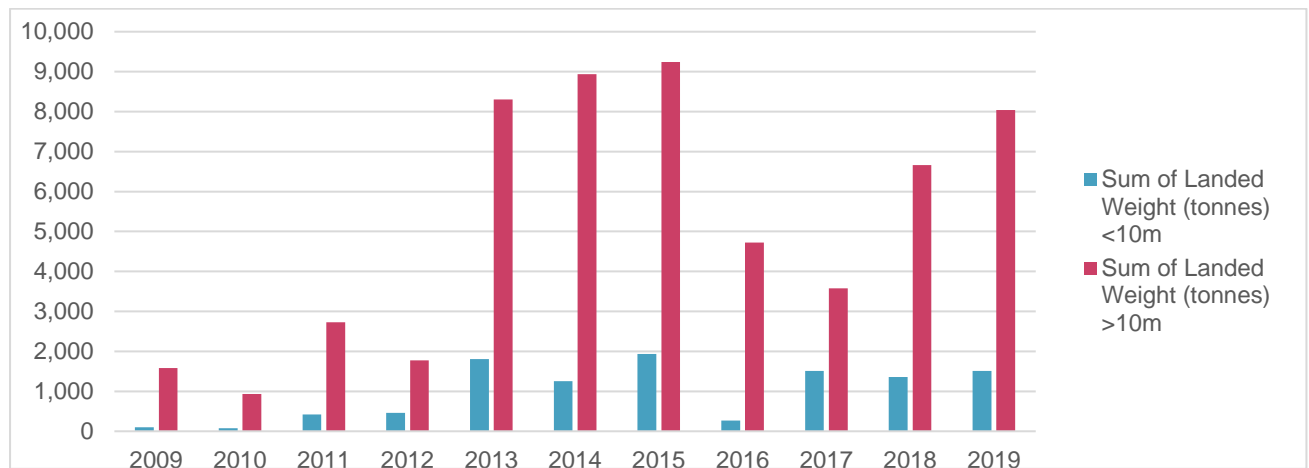


Figure 40. Cockle landings into England (£) 2009-2019 by </> 10m vessels. Source: MMO

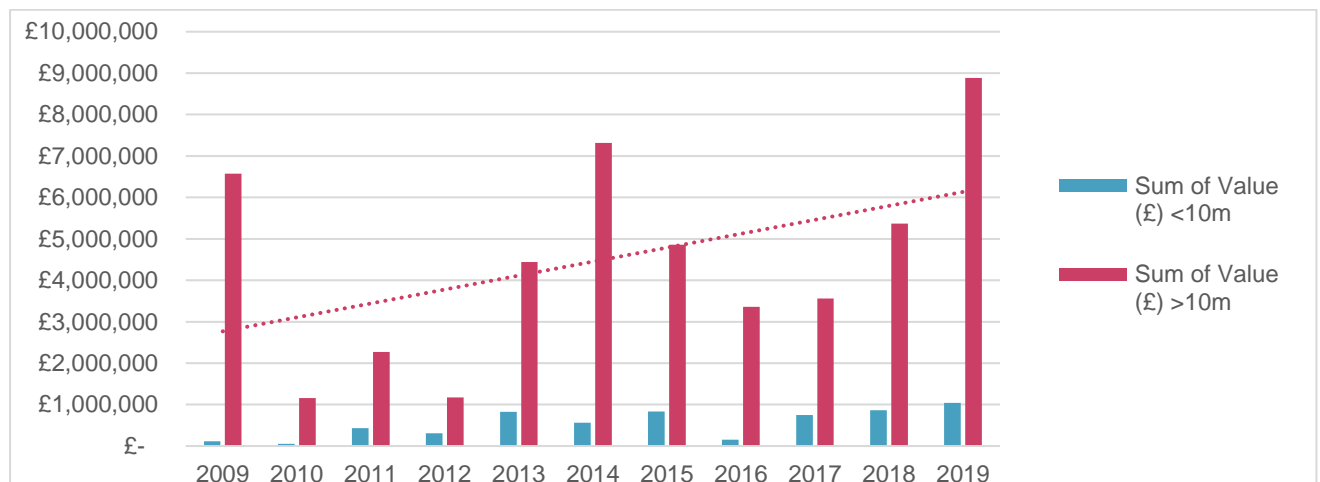
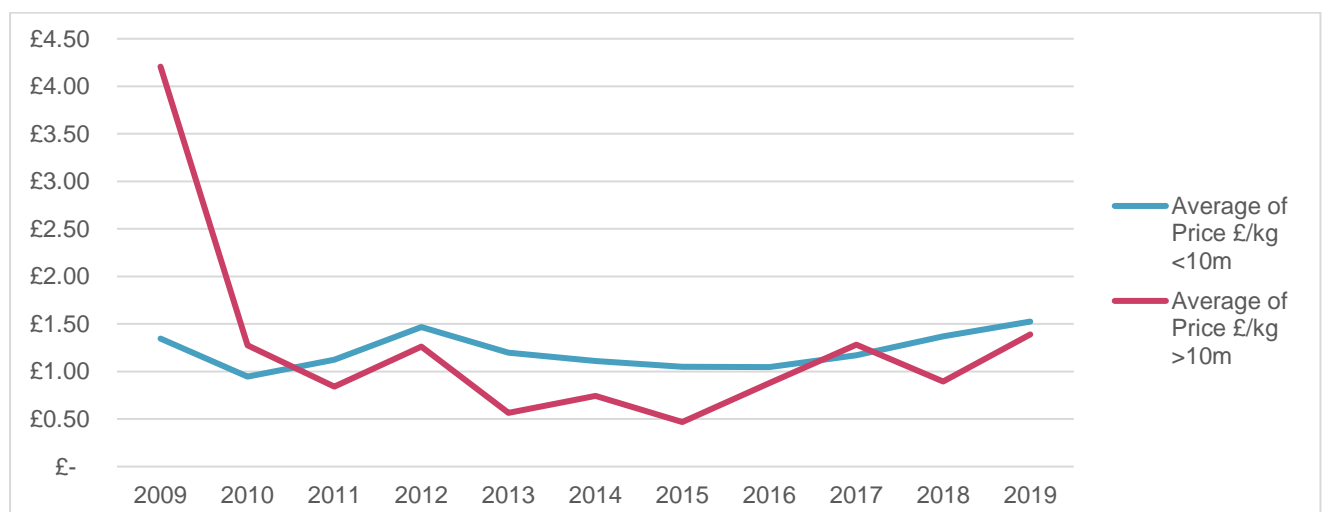


Figure 41. Cockle first sale average prices from 2009-2019 into English ports by </> 10m vessels. Source: MMO



- Cockle landings for the over 10m fleet have increased from under 2,000 tonnes in 2009 to a high of 9,000 tonnes in 2015, which has since declined slightly to 8,000

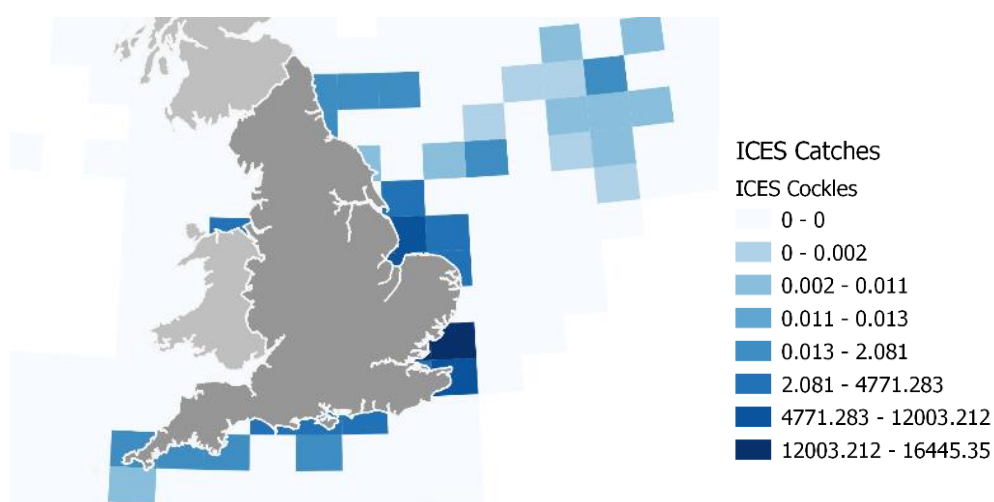
tonnes. During the same time period the under 10m fleet landed under 2,000 tonnes per year, but this has varied considerably.

- **In terms of value, the over 10m fleet first sale value from cockles has increased from £6.5 million in 2009 to almost £9 million in 2019. For the under 10m fleet the value has also increased from £111,000 in 2009 to over £1 million in 2019.**
- Cockle prices for under 10m fleet have oscillated between £1 and £1.50 per kilo, and are closely linked to supply reduction through mass mortality events in the Wash and precautionary management in the Thames (explaining the variation for the over 10m fleet, ranging from £0.50 per Kilo to over £4 per Kilo).

Management

- An advanced, complex management system at IFCA level includes limited licenses and TACs, as well as specific technical measures and precautionary management, often set within the context of regulating orders.
- The cockle fishery in each area has specific gear requirements, which include:
 - Thames IFCA fishery (suction) - Kent and Essex IFCA
 - Wash (hand raked) – Eastern IFCA
 - Morecambe Bay (hand raked) – NW IFCA
 - Poole Harbour (pump scoop) - SIFCA
- All management of cockles is in place at IFCA level e.g. in Southern IFCA a Minimum size for Cockle (gauge size) of 23.8 mm is in place.
- There is currently no national coordination as these are considered discreet, local stocks with the according level of management and data collection, including IFCA stock assessments.
- Impact assessments and annual reviews of management are in place for all of the discreet IFCA-managed cockle fisheries in England.¹⁵¹

Figure 42. Cockle landings by ICES sub-rectangle (cumulative 2009-2019). Source: MMO



FISHING AND MANAGEMENT BOUNDARIES

A coastal state has the sovereign rights over its EEZ for exploiting, conserving and managing fisheries (including the monitoring and enforcement of the EU level TACs / quotas set at EU level and in negotiations with Third Countries). **The EEZ extends to 200nM from a country's coast** with a median line (equidistant from the two countries' coastlines) used to separate EEZs that are closer than 200nM from each other. States may establish a territorial sea up to a limit of 12 nautical miles measured from the baseline. Following the development of UNCLOS and the extension of exclusive economic zones (EEZs) and in order to harmonise competition for the fishing sector at EU level, the EEZs of all Member States were considered a single EU zone or 'EU waters' regulated by the CFP.¹⁵²

EU Member States retained competences to regulate fishing activities in inshore waters (defined as the 0–12nM from the coast). Fishers registered in any Member State enjoy equal access to fishing in the 12–200 nautical miles of the EU zone. **The 0–6nM limit was thereby preserved for domestic fishing with some Member States (such as the UK during EU membership) granting historic rights ('grandfathering') for other countries to fish in the 6–12nM zone.** The London Fisheries Convention (1964) established access rights for vessels from France, Ireland, Belgium, Germany and the Netherlands to UK waters between 6–12nm, and which were subsequently subsumed into the CFP.¹⁵³ The UK withdrew from the London Convention in 2017, but the T&CA maintains the historic access rights for EU vessels.¹⁵⁴

This political decision has fisheries management implications, as **the 6–12 mile zone is currently fished by vessels from other countries, who are lightly managed or inspected by the MMO** (15 EU vessels were inspected inside the 12 mile limit between 1 January and 24 June 2021),¹⁵⁵ **nor is data on their non-quota landings collected by the MMO. This means their impact, together with that of the UK vessels involved in these fisheries outside 6 miles (that are largely unregulated) means that fishing effort and mortality on these stocks is not assessed in a manner that enables sustainable fisheries management, precautionary approaches or evidence-based fisheries policy development.** As data is not available to support a distinction between mortality on these stocks taking place within 6 miles, between 6 and 12 miles and beyond 12 miles, we have used a Freedom of Information (FoI) request to the MMO to develop an indicative proxy assessment of fishing mortality in these zones to highlight the disparity in terms of management in these political and management zones that do not reflect the boundaries of the stocks, ecology or fishing effort.

Table 1 indicates that **for many of these non-quota shellfish fisheries, a significant portion of the mortality (catches) takes place outside 6 miles, where fewer restrictions and management measures are in place.**

Methodology

The MMO do not hold data on where fishing activity takes place below the granularity of ICES rectangles. When estimating UK landings from UK waters (0–200nm), the MMO use an assumption of even distribution of landings over the surface area of reported ICES rectangle landings.¹⁵⁶ An example of this approach is outlined in its UK sea fisheries annual statistics 2020 report.¹⁵⁷

It is this approach we applied in order to estimate landings within 0-6nm and 6-12nm of the English coast. The MMO provided percentage of ICES rectangles that fell in the 0-6nm and 6-12nm zones. We then multiplied these percentages by the reported landings by ICES rectangle for each species and estimated an average percentage of where the species was caught during the period of 2011-19. To estimate catches from 12-200nm, we deducted 0-6nm and 6-12nm percentages from the total. This approach provides a broad indicated of where catches (fishing mortality) took place for each species, however with a very limited accuracy due to how data is reported and collected by the MMO.

It should be noted the MMO advise caution¹⁵⁸ when applying this spatial apportioning method to produce estimates for 0-6nm or 6-12m landings for variety of reasons, including the high amount of apportioning required; a heavy reliance on assumptions; the need to apply a very large range to avoid misinformation; and the fact for the shellfish species discussed, the landings of these species generally fall in an ICES rectangle that is split between multiple zones. Noting these caveats, table 1 and figures 43 and 44 present the results of these calculations.

Table 1: percentage of species caught in each area based on 2009-2019 data.

Source: MMO

Ten year average landings / catches (2009-19)	0-6nm	6-12nm	12-200nm
Whelks	29%	19%	53%
Scallops	21%	18%	61%
Lobsters	29%	16%	55%
Cuttlefish	13%	12%	75%
Crabs	25%	17%	58%

Figure 43: Percentage of landings / catches between 2009-19 attributed to the 0-6nm, 6-12nm and 12-200nm limits. Source: NEF calculations based on MMO FOI informed by reported landings.

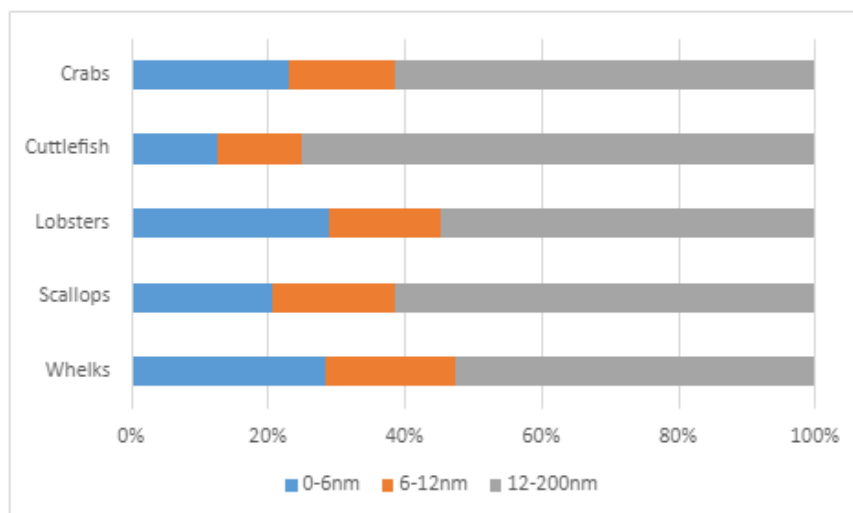
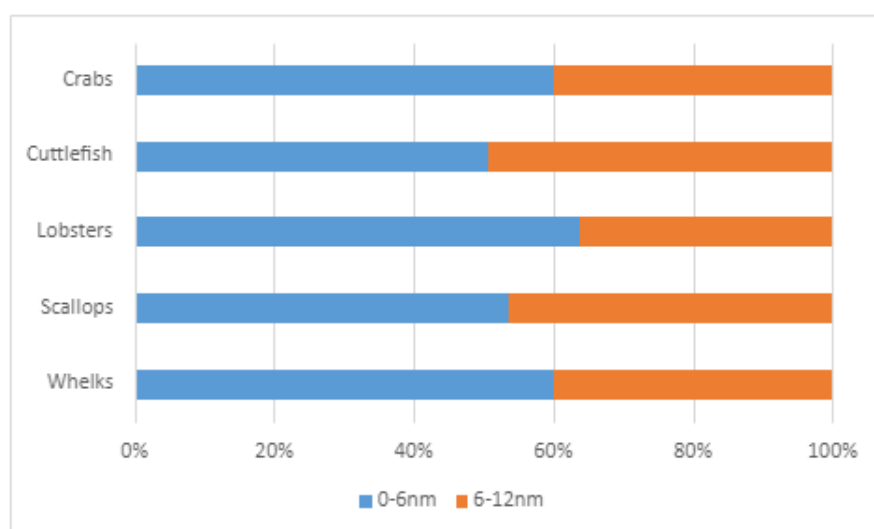


Figure 44: Comparison of landings / catches between 2009-19 from the 0-6nm versus 6-12nm limits as a percentage of the total caught between 0-12nm. Source: NEF calculations based on MMO FOI informed by reported landings.



This work was undertaken to provide ***an indication of the fishing mortality*** for each of these fisheries occurring inside the 6 mile limit; between 6 and 12 miles and between 12 and 200 miles (*noting all the assumptions and caveats presented in the methodology – mainly based on the limits of publicly available data held by the MMO*).

For stocks which move between inshore and offshore, where the inshore management (e.g. effort regimes) does not coincide with where the majority of fishing mortality is taking place, the stock level benefits of that management are not accrued inshore. This results in inequity; to develop sustainable fisheries, inshore management cannot exist in isolation or where there are no limits imposed on the rest of the fishery.

Figure 43 shows that the majority of fishing mortality from all of these regional non-quota shellfish fisheries is taking place outside the area where effort is actually managed.

Figure 44 shows that by splitting the total caught inside 12 miles, the majority is mainly caught inside 6 miles but around 40% of the mortality is taking place outside of that effort regime.

While these are only indicative, they paint a picture of a tiered management system which does not apply the same rules in each of the zones, despite these all being involved in the same fishery (albeit noting differences in terms of vessel length, power and the amount of gear used – and whether or not effort limits are in place).

CASE STUDIES

Case studies from around England were selected based on an IFCA workshop conducted on September 3rd 2021 and followed up with surveys to key IFCA staff.

We chose the following case studies in agreement with the AIFCAs, covering **two discreet fisheries and five regional shellfish fisheries**.

Discrete

- NWIFCA: Cockle
- Southern IFCA: Clam & Cockle

Regional

- East coast lobster fishery
- Channel crab fishery
- Channel scallop fishery
- Channel whelk fishery
- Channel cuttlefish fishery

These Case Studies are presented as separate attachments to be read in conjunction with this report as they are the basis for the regional assessments.

ASSESSMENT FRAMEWORK

Our approach

Criteria developed from peer reviewed literature and previous NEF research were adapted to cover the social, environmental, economic and governance aspects appropriate to the development of fisheries management plans (FMPs).^{159,160,161,162}

There are a multitude of environmental aspects to fishing, as a wide variety of fishing gears are used to catch fish and shellfish and these gears are constantly evolving, with a focus on trying to reduce fuel use, catches of non-target species and any negative impacts on marine habitats. **The impacts of fishing gears on seabed ecosystems are a central component in ecosystem-based fisheries management and the ecosystem approach to fisheries management** (guiding objectives of both the Fisheries White Paper and the 25 Year Environment Plan).¹⁶³

Socio-economic impact of fisheries are varied and complex depending on which parts of the supply chain are being investigated. For the purposes of this research we are looking at the catching sector only, ending at the first sale (rather than the wholesale, processing or transport). It is of fundamental importance to track economic and community outcomes, in addition to the resource status of fisheries. Research on global fisheries performance emphasizes impacts of management on stock and ecological conditions, but high stock levels do not automatically translate into an economically healthy industry that can support employment or community benefits. Sustainable social-ecological systems also need profitable businesses and communities that support those industries and the people involved. Monitoring only ecosystem-related outcomes and performance must be augmented with social outcomes. There is frequently little on wider socio-economic outcomes.¹⁶⁴

Data collection

The data collection process involved:

IFCA level data collection and online workshop

- An inception meeting with the AIFCA

- Preparation of a data sheet for testing with IFCA officers to gather data to inform the social, environmental, economic and governance criteria.
- The project team held an online workshop Sept 3rd for IFCA officers to go through the data sheet
- Follow up meetings were arranged for after the completion of the worksheets.
- Data was analysed and compiled for the case studies.
- Sense checks with the AIFCA and QA within NEF.

National MMO data collection and FoI:

- The data for ports, species and landings 2009-2019 was taken from the publicly available MMO data (annual and monthly datasets).¹⁶⁵
- A Freedom of Information Act 2000 (FOIA) and/or Environmental Information Regulations 2004 (EIRs) was sent to the MMO on October 20th to establish
 - The number of active vessels landing each of the case study species and whether they were under or over 10m in length; and
 - spatial information on where the catches were registered – to determine whether these were 0-6nM, 6-12nM, or 12-200nM from shore.

Assessment framework development

Drawing on available research, available data and sectoral knowledge of the project team and IFCA staff, a set of key socio-economic, environmental and management outcomes were agreed during an online **workshop to answer the question: what makes a sustainable inshore fishery (based on social, economic, environmental and governance criteria)?** Using examples taken from previous research we included the following criteria: ^{166,167,168,169}

- Health of stock
- Harvest control methods; catch or effort limits based on stock and mortality assessments
- Regional and stock level data and data standards
- Ability to manage the fishery through regulations and enforcement; compliance
- Ecological boundaries and management boundaries overlap
- Gear used / wider impacts (externalities of the fishing activity)
- Economic value chain
- Governance / Co-management with resource users
- Transparent decision making and data collection
- Equity and power relations in governance

This included *essential* outcomes required to assess the management of different species and *desirable* outcomes, which covered other important aspects but were expected to be subject to data gaps. To these we added the following: Number of active vessels involved, stock assessments conducted, MSY assessments, Ecosystem Based Management, applying the precautionary principle, Effort management, minimum sizes, spawning seasons, conservation measures, science, governance and transparent / inclusive decision making.

Using this information a **survey was developed and shared with IFCA officers to complete for each of their districts for nine key species: crab, lobster, scallop, whelk, cuttlefish, clam, cockle, mussel and brown shrimp**. The IFCAs completed the survey for each of the species for which they had landings data or research from within their district.

Assessment

Data was returned from nine IFCAs and seven case studies were chosen to maximise coverage of different species and districts within the available data that could be applied as an assessment relating to the development FMPs. **Among these case studies, five were regional fisheries (stocks covering a single species across a number of different IFCAs) and two were discrete fisheries (where the stock falls naturally within a single IFCA district).**

To develop the case studies, we collated the available data across different IFCAs, drawing out findings including common trends affecting several IFCAs, differences in management approach between IFCAs, and key gaps in the data coverage. Primary data from the surveys was supplemented through use of Cefas stock surveys, relevant academic research, IFCA committee documents and IFCA research (especially local stock surveys and Habitat Regulations Assessments).

For each case study we then synthesised the results, reporting in the management approach in place and the triple bottom-line outcomes¹⁷⁰ observed in the relevant IFCAs.

These findings also allowed for comparison between these outcomes as observed in the inshore area which IFCAs manage (0-6nm), and the available evidence for the same outcomes in areas offshore that are under different forms of management and management responsibility (MMO and Defra for 6-12nm and 12-200nm).

Once the data had been compiled for the case studies the information was ranked from 0-5 (with 0 = nothing in place and 5 = best practise) based on available information e.g. for environmental outcomes if a stock was unassessed / unknown it would score 0 and if a detailed stock assessment had been undertaken it would score 5; or for governance if the decision making process on management included publicly available information on membership and interests of the groups, clear terms of reference (ToR) and publicly available minutes, this would score 5; or if there was no information available on the group membership and interests, ToRs or minutes this would score 0.

Results

All seven case studies are attached as annexes and the results section provides an overview of all seven used to provide the overall assessment.

Table 2: Assessment of socio-economic criteria and outcomes for regional and discreet fisheries

SUMMARY TABLE (Economic)














Species	Price (£/kg)		Landings		Value (£)		0-6nm			6-12nm		
	Range (as reported by IFCAs)	Average (2016-19 as reported from MMO sea fisheries data)	Range (as reported by IFCAs)	Tonnes	Landed value (£)	Economic multipliers (Seafish, 2016)	Average landings (tonnes)	Landed value (£)	Type II economic multiplier - induced effect	Average landings (tonnes)	Landed value (£)	Economic multipliers (Seafish, 2016)
 Crab	1.20 - 2.24	2.63	177,619 - 2,741,810	4,054	£10,662,020	£15,993,030	938	£2,467,043	£3,700,564	628	£1,651,117	£2,476,675
 Cuttlefish	1.50 - 3.26	3.1	89,946 - 4,017,137	4,479	£13,884,900	£20,827,350	570	£1,766,444	£2,649,665	554	£1,717,112	£2,575,668
 Lobster	12.50 - 12.96	14.72	363,000 - 550,000	1,207	£17,767,040	£26,650,560	350	£5,154,371	£7,731,556	198	£2,918,459	£4,377,688
 Scallops	1.88 - 2.23	3.23	26,000 - 2,010,000	5,719	£18,472,370	£27,708,555	1,185	£3,827,042	£5,740,563	1,023	£3,302,999	£4,954,499
 Whelks	1.00 - 1.21	1.24	1,011,514 - 2,726,602	7,567	£9,383,080	£14,074,620	2,161	£2,679,408	£4,019,113	1,433	£1,776,681	£2,665,022









Table 3: Assessment of management and governance criteria and outcomes for regional and discrete fisheries

SUMMARY TABLE (Management and Governance)									
MANAGEMENT AND GOVERNANCE		 CRAB CHANNEL	 LOBSTER EAST COAST	 WHELK CHANNEL	 SCALLOP CHANNEL	 CUTTLEFISH CHANNEL	 CLAM & COCKLE (POOLE)	 COCKLE (NW)	 COCKLE (THAMES)
NUMBER OF ACTIVE VESSELS (LANDING >100 KG) IN 2019	< 10m	1,309	1,455	319	157	196	45 permit holders	150 permit holders at present	14 licenses (stable over 5 years)
	> 10m	314	230	114	273	162	n/a	n/a	n/a
MANAGEMENT	0 to 6	Yes, effort management is in place via flexible potting permit byelaws (SxIFCA, D&SIFCA)	Yes, effort management is in place via flexible potting permit byelaws (D&SIFCA, SxIFCA); Ban on landings V notched lobsters, -ban on landing berried hens, mandatory escape hatches.	Yes, whelk management regimes (byelaws) are in place that include pot limits, escape holes, riddle size minimums, and increased MLS compared to the Eu minimum.	Yes, management is in place. IFCA restrictions and MCZ exclusion; min sizes; vessels length / power; SIFCA Scallop byelaw (2019); Solent Dredge permit Byelaw.	Yes, management is in place, pot limits apply	Yes, management is in place, byelaw containing permit conditions: closed areas (seasonal and permanent), daily fishing time, closed season, gear restrictions, catch returns required; Not directly, but limit of 45 permits issued per year, daily fishing time and closed season	Yes, management is in place, byelaw containing permit conditions: cockle beds that can be fished, gear type, minimum size, closed season, monthly landings return to IFCA; Not directly, but closed season each year and limit of 10 new permits issued per year	Yes, management is in place. IFCA permit scheme; Stock surveyed annually; Annual Total Allowable Catches (TAC) is calculated and split by the permits applied for. Adaptive management of an intermittent fishery including seasonal closures; License Fee
	6 to 12 (EU grand fathering)	No effort management, min sizes	No effort management, min sizes; no berried hens, Ban on landing V notched lobsters (no schemes of introduction outside 6nm); ban on landing berried hens; voluntary escape hatches.	No effort management, min sizes	Input controls - limiting fishing time, number of vessels and dredges per vessel, no management system to ensure sustainable harvesting levels.	No	n/a	n/a	n/a
	12 to 200	No effort management, min sizes	No effort management, min sizes; no berried hens, Ban on landing V notched lobsters (no schemes of introduction outside 6nm); ban on landing berried hens; voluntary escape hatches.	No effort management, min sizes	Input controls - limiting fishing time, number of vessels and dredges per vessel, no management system to ensure sustainable harvesting levels.	No	n/a	n/a	n/a

OTHER CONSERVATION MEASURES	0 to 6	MC7 assessments for habitat impacts of potting	MC7 assessments for habitat impacts of potting	Pot and bait restrictions (D&SIFCA); min size and riddle changes (K&EIFCA)	Yes; D&SIFCA has closed all areas to scallop fishing (both dredging and diving) during July, August and September in recent years; Southern IFCA code of conduct for scallop dredging in Solent	Pot washing to conserve eggs, leaving posts down after season	The fishery has held MSC sustainability certification since 2018 with annual audits to follow up; Closed season 24th Dec to 24th May	Closed season from mid October until mid June determined by stock assessment and committee	Closed areas following cockle stock assessment surveys and outcomes of the annual cockle licence holder meeting
	6 to 12	KWH	no berried hens	None	None	None	n/a	n/a	n/a
	12 to 200	KWH	no berried hens	None	None	None	n/a	n/a	n/a
MINIMUM SIZES	0 to 6	Applied; majority of both sexes mature at 130-140 mm MCRS	87 mm Minimum Conservation Reference Size for UK waters	IFCA min sizes / 45 mm	110mm; Some increases in minimum sizes in IFCA districts	None	Yes, 35 mm for clams and 23.8 mm for cockles	Yes, 20 mm minimum size for cockles	Yes, 16 mm minimum size for cockles
	6 to 12	Applied; majority of both sexes mature at 130-140 mm MCRS	87 mm Minimum Conservation Reference Size for UK waters	EU min size 45 mm	110 mm	None	n/a	n/a	n/a
	12 to 200	Applied; majority of both sexes mature at 130-140 mm MCRS	87 mm Minimum Conservation Reference Size for UK waters	EU min size 45 mm	110 mm	None	n/a	n/a	n/a
SCIENCE	0 to 6	IFCA science (CIFCA, D&SIFCA, SxIFCA); FIP	IFCA science (NEIFCA, EIFCA, K&EIFCA)	IFCA science (e.g. K&EIFCA whelk potting survey); SxIFCA size at maturity studies	IFCA surveys in Solent and Salcombe estuary; FIP	IFCA level studies (SxIFCA)	IFCA science and Natural England advice Fishers collaborating on sustainability research	IFCA science (surveys and stock composition) and Natural England advice	IFCA science (annual cockle surveys and reports)
	6 to 12	Edible Crab science group IFCAs and NFFO; Cefas ongoing; FIP	Cefas ongoing; FIP	Cefas ongoing	ICES scallop working group	None	n/a	n/a	n/a
	12 to 200	Cefas; FIP	Cefas ongoing	Cefas ongoing	ICES scallop working group	None	n/a	n/a	n/a

GOVERNANCE	0 to 6	IFCA committee	IFCA committee	IFCA committee	IFCA committee	IFCA committee	IFCA committee	IFCA committee	IFCA committee
	6 to 12	Industry group	Industry group	Industry group	Industry group / science group	None	n/a	n/a	n/a
	12 to 200	Industry group; Fisheries Technical Committees established under T&CA; ToR in preparation	Industry group; Fisheries Technical Committees established under T&CA; ToR in preparation	Industry group; Fisheries Technical Committees established under T&CA; ToR in preparation	Industry group; Fisheries Technical Committees established under T&CA; ToR in preparation	None	n/a	n/a	n/a
TRANSPARENT DECISIONS, INCLUSIVE, DEMOCRATIC	0 to 6	Members, minutes and interests declared, terms of reference - publicly available	Members, minutes and interests declared, terms of reference - publicly available	Members, minutes and interests declared, terms of reference - publicly available	Members, minutes and interests declared, terms of reference - publicly available	Members, minutes and interests declared, terms of reference - publicly available	Members, minutes and interests declared	Members, minutes and interests declared	Members, minutes and interests declared
	6 to 12	New Group established - currently no chair listed, no details on membership	IFCA science (NEIFCA, EIFCA, K&EIFCA)	IFCA science (e.g. K&EIFCA whelk potting survey); SxIFCA size at maturity studies	IFCA surveys in Solent and Salcombe estuary; FIP	None	n/a	n/a	n/a
	12 to 200	Fisheries Technical Committees established under T&CA	Fisheries Technical Committees established under T&CA	Fisheries Technical Committees established under T&CA	Work with IFREMER: Fisheries	None	n/a	n/a	n/a

Table 4: Assessment of environmental criteria and outcomes for regional and discrete fisheries

ENVIRONMENT OUTCOMES		 CRAB CHANNEL	 LOBSTER EAST COAST	 WHELK CHANNEL	 SCALLOP CHANNEL	 CUTTLEFISH CHANNEL	 CLAM & COCKLE (POOLE)	 COCKLE (NW)	 COCKLE (THAMES)
NUMBER OF STOCKS IN THE FISHERY		2	2	unknown (potentially multiple local stocks)	5	unknown (potentially 2)	1	1	1
STOCK ASSESSMENT	Stock 1	Stock size unknown EAST	Yes (North)	Stock size unknown EAST	Three in ICES Division 27.7.e (Inshore Cornwall, 27.7.e.I; Lyme Bay, 27.7.e.L; Offshore, 27.7.e.O) WESTERN CHANNEL	Unknown	Yes, comprehensive annual stock assessment on Manila Clam and Common Cockle	Yes, annual stock assessment during HRA	Yes: annual stock surveys conducted by the IFCA
	Stock 2	Yes-assessed (WEST)	Yes - (East Anglia)	Stock size unknown WEST	Two in Division 27.7.d (North, 27.7.d.N; South, 27.7.d.S). EASTERN CHANNEL straddling the border between	Unknown	n/a	n/a	n/a
STOCK AT MSYT	Stock 1	Exploitation rate unknown	Around or below reference point / exploitation rate high	Exploitation rate high	UK and France Three in ICES Division 27.7.e (Inshore Cornwall, 27.7.e.I (HR ABOVE MSY 2020); Lyme Bay, 27.7.e.L (HR WELL ABOVE MSY since 2017); Offshore, 27.7.e.O. WESTERN CHANNEL	Unknown but assumed to be high	Exploitation rate in line with stock assessment and Natural England advice for sustainable exploitation of stocks. MSY not used	Exploitation rate in line with Natural England advice for sustainable exploitation of stocks. MSY not used	Based on annual stock survey and HRA, a TAC is calculated, which in turn determines the bag limit and number of trips. MSY not used
	Stock 2	Moderate; around MSY for females	Stock size low (East Anglia) / exploitation rate high	Exploitation rate high	And two in Division 27.7.d (North, 27.7.d.N; South, 27.7.d.S.) (HR at MSY in 2020 for 27.7.d.S); EASTERN CHANNEL straddling the border between UK and France	Unknown but assumed to be high	n/a	n/a	n/a

ECOSYSTEM BASED MANA- GEMENT (INDICATION WHETHER ECOSYSTEM IMPACTS CONSIDERED IN MANAGEMENT MEASURES)	0 to 6	Yes; MCZ assessments and byelaws (MPA assessments in K&EIFCA, CIFCA, D&SIFCA showed low impact of crab pots on MPA features)	Yes; Eastern IFCA are taking and adaptive risk based management approach to potting on subtidal chalk in Cromer MCZ; escape hatches, V notching.	Yes; IFCA flexible potting permit byelaws and effort limits (D&SIFCA); adapted minimum sizes for local stocks (D&SIFCA and K&EIFCA); MCZ assessments.	Yes; Seabed impacts of dredging considered by IFCA (D&SIFCA, SIFCA); Not occurring in MPAs in K&EIFCA; SIFCA in process of byelaw development of byelaw to restrict dredging to permit holders only in the Solent; IFCA level habitat data collection, dredge restrictions and vessel size limits across Channel inside 6 nm.	Yes; IFCA level research (D&SIFCA and SxIFCA) and pot limits 7 management proposals (re gear washing to aid egg survival and recruitment); habitat assessment for spawning.	Yes, all fishing is subject to HRAs and Natural England advice, meaning permits are issued where they would not hinder conservation objectives	Yes, all fishing is subject to HRAs and Natural England advice, so not permitted if damaging the ecosystem	Yes, all fishing is subject to HRAs and Natural England advice, meaning permits are issued where they would not hinder conservation objectives
	6 to 12	No	No	No	No	No	n/a	n/a	n/a
	12 to 200	No	No	No	No	No	n/a	n/a	n/a
PRECAUTIONARY PRINCIPLE	0 to 6	Yes considered at IFCA level but unable to cover whole stock	Yes considered at IFCA level but unable to cover whole stock	Yes considered at IFCA level but unable to cover whole stocks	Yes considered at IFCA level but unable to cover whole stocks	Yes considered at IFCA level but unable to cover whole stock	Yes, precautionary approach applied in the HRAs	Yes, IFCA can close all or part of fishery to allow stocks to recover	Byelaw; permit scheme via flexible permit byelaw; limited entry to fishery;
	6 to 12	No	No	No	No	No	n/a	n/a	n/a
	12 to 200	No	No	No	No	No	n/a	n/a	n/a

CONCLUSIONS

From the research and analysis presented above, some clear conclusions can be drawn. Many of these require reforms and substantial changes to meet the requirements of FMPs and how IFCA, MMO and Defra operate, cooperate, regulate and collect data.

The IFCA model

There is a great deal of scope within the Fisheries Act (2021) and MACAA (2009) for how organisations can collaborate, via partnership approaches. The overarching principles should be for organisational effectiveness and cost efficiency to deliver FMPs at the appropriate ecological, political and socio-economic scale. There are still many unknowns and uncertainties for how IFCA engage collaboratively and cohesively with other organisations; how responsibilities for research and the implementation of management should be shared. Equally there are opportunities to input their expertise and experience in the development of management plans, as they have sustainably managed discreet fisheries, using co-management and precautionary principles, as well as demonstrated best practise in terms of governance.

IFCAs have demonstrated the value of working in partnership and working with bodies such as the Environment Agency, MMO, Natural England and sea users (both commercial and recreational) as well as independent committee members appointed by the MMO and Local Authority councillors. Opportunities exist for the IFCA to expand and build these partnerships, and develop shared research to build knowledge to inform management, enforcement, and monitoring – an essential component for ensuring the necessary FMPs for regional shellfish fisheries can be successfully established and managed sustainably.

Regionalised governance and local management solutions, which are co-developed lead to more sustainable and more effective fisheries management. The existing IFCA localised governance structure and decision making model makes stakeholders accountable for management decisions in a transparent and accessible manner making those involved answerable to the local community. Marine fisheries and environmental management benefit from development at appropriate scales, community participation and transparent governance.

The existing governance structures within IFCA, demonstrates the need for proportionate representation by those impacted directly by management decisions (commercial fishers, recreational anglers and charter boats) but also representatives from science and academia as well as conservation groups and NGOs, recreational divers and others who have a stake in the health of the marine environment.

The IFCA model is open and combined with the top down steer from Defra (consultative co-management) and bottom-up stakeholder driven input, where stakeholders can propose management ideas and the IFCA can then in turn focus their research to test the feasibility of these proposals. This evidence base can then be developed and taken to the IFCA committee with all the representatives from different sectors to then determine whether the proposal should be implemented or not and this can then be further refined (if it proceeds) to a byelaw agreed and drafted by the IFCA. Byelaws are made by the individual IFCA

(sometimes with external legal advice) with varying degrees of input from the MMO. The MMO and Defra review the draft byelaw before confirmation by the Secretary of State (SoS).

The current IFCA funding structure supports local accountability and has been shown to be cost-effective to deliver fisheries management, research and enforcement. IFCAs are well-placed to meet their objectives, and understand the environmental and socio-economics context and reality, but this requires appropriate financial support.¹⁷¹

Long term funding for IFCAs is essential to continue inshore fisheries co-management and expand management capacity for the regional shellfish fisheries. IFCAs have also succeeded in generating higher levels of cost-recovery than other regulatory bodies tasked with fisheries management.¹⁷²

The industry-led shellfish management groups for whelk, crab, lobster and scallop do not have the transparent, co-managed, precautionary or data-led approaches of the IFCA managed fisheries. We were unable to establish the interests, terms of reference, responsibility of feedback mechanisms into management for any of these groups. In terms of equity and good governance, these approaches are likely to create unsustainable and inequitable outcomes, based on an abdication of responsibility for public bodies to manage public resources (fisheries).

A recent (2021) review of IFCAs for Defra highlighted some key considerations for the future of IFCAs:

- IFCA-level decision-making is rapid, compared to other marine organisations.
- MMO appointees leaving after their 10 year terms could result in a significant loss of knowledge and experience.
- Conducting partnerships is a key strength of the IFCAs. Demand for these is growing (fishing industry and recreational angling) to build trust. A more joined-up approach with other organisations such as the MMO and Defra and improved relationships with local communities would further facilitate timely and appropriate responses to emerging issues.
- Financial resources for IFCAs are limited. This is a major barrier. Funding constraints are mitigated by risk-based enforcement but resources (funding levels and staff skills and capabilities) should be taken into account when looking at future developments in the role of IFCAs. Lack of adequate funding increases uncertainty.
- IFCAs could expand their remit out to 12nm (but smaller vessels at risk of being subsumed into national management plans for larger vessel fisheries operating further offshore).
- Multiple intra-IFCA collaborations for enforcement; byelaw working; facilitating joint learning; fisheries management and conservation measures have shown IFCAs ability to collaborate effectively.
- The emergency byelaw process was a positive management measure to facilitate emerging fisheries management and the permit byelaw process allowed for adaptive management.
- The permit system allows for improved engagement and data collection activities
- The involvement of local people in the byelaw making process has been critical to their success.

- The ban on mobile gear (BTFG) in MPAs (EMS) is a good example where evidence collection, presentation and balance between precaution and protection have been met.
- The implementation of iVMS for under-12m vessels can enable data collection on inshore fishing patterns to help target enforcement.
- Co-management is central to the IFCA model and presents a clear example of best practise in terms of governance, adaptive management and managing in the public interest.¹⁷³

A multi-tiered management system is creating problems for regional fisheries management

- **As the case studies demonstrate, IFCA strategies are rational, but the wider national lack of management makes effective inshore management impossible for these regional shellfish fisheries.** There is no integrated system of data collection relevant to each of the stocks in the case study (i.e. the stocks assessments do not translate into effort regimes, quotas or other fisheries management that is evidence based or precautionary). A national data collection framework is necessary (and this must include international landings and effort data which is currently not collected or publicly available).
- **Long term fisheries management plans are necessary for all of the regional shellfish fisheries examined in this report.** FMPs need to reflect the desired outcomes, consider highly dependent inshore fisheries who have missed out on quota and are at risk of the consequences of overfishing, privatisation and inadequate management / unaccountable governance structures dominated by vested interests.
- The best practise revealed by the evaluation at IFCA level provide the widest benefits based on the criteria examined. They are integrated and effective, there is equity in allocation (through policy design based on criteria and under HCR) and fishers involvement in working groups. Nonetheless for the regional fisheries, fishing opportunities for low impact, dependant ports and fleets that are engaged in seasonal are necessary and a voice and involvement in decision making is an urgent need for FMPs.¹⁷⁴
- **The discreet stocks are well-managed, have a long-term vision and good governance; stocks are assessed, there are feedback mechanisms to stakeholders, meeting outcomes are minuted and publicly available and the fisheries are assessed in terms of their compatibility with MPAs and conservation objectives.**
- Plans or projects still need to meet legal requirement (i.e. appropriate assessment under the Habitats Regulations):¹⁷⁵ IFCA have demonstrated they can undertake and manage associated impacts, but there is no process for an industry group to do this. A process for managing a public resource and balancing competing interests is needed and the IFCA model provides a template for governance that can build trust and include stakeholders.

Management boundaries do not reflect the ecology, stocks or fishing mortality extent for the regional shellfisheries.

Ecosystems, fish stocks, habitats do not match regulatory boundaries. Except for Discreet stocks within single IFCA districts. Management needs to reflect the right scale and effort regimes need to be harmonised and based on stock assessments.

- Consistent effort regimes between IFCA's where stocks are shared, and consistent measures from 0-6 miles and beyond 6 miles are necessary so that fishing mortality on stocks can be calculated and be reflected in appropriate effort management. CPUE studies would help in this regard.
- Lots of management types e.g. minimum sizes, fishing seasons based on spawning seasons, and other potential technical measures are not being made use of that could be utilised.
- There is no consideration of equity in the allocation of fishing opportunities for these regional stocks, nor is there transparent governance and accountability.
- There is also no consideration of dependence on the fishery at the port or fleet level, nor a focus on applying principles enshrined in the Fisheries Act (e.g. the climate objective).
- Governance needs inshore inclusion for these regional stocks, transparency and a role in allocation according to the Fisheries Act which explicitly requires the use of criteria for fishing opportunity allocation.
- Allocation should be based on criteria as set out in the Fisheries Act (Annex 2) rather than historic track record (which would reward those engaged in overfishing the stock) or based on advice from vested interests in groups with no transparency or terms of reference. ¹⁷⁶

Regional best practise being overshadowed by a lack of management nationally (and specifically outside 6 miles).

Project Inshore showed the key barriers to achieving sustainable fisheries are the absence of offshore stock assessments. Inshore management already comprises international best practise, so FMPs must focus on part of the fishery that are currently unmanaged and that need to be integrated into a coherent stock level management framework.

- Regional groups should be established which reflect all participants in the fishery and advice on management impacts should be provided in a transparent manner. This requires bottom up engagement to inform science and management.
- The case studies assessed show the key characteristics of good management and how these are being undermined for these regional fisheries by the lack of management beyond 6 miles and further offshore.
- Ecosystem based management, applying the precautionary principle, adopting effort regimes and permitting schemes as well as industry involvement in science and management decisions apply to the discreet fisheries examined, but are almost completely absent outside 6 miles. These regional shellfish fisheries are urgent priorities for FMPs, based on an equitable governance arrangement.

Priorities for FMPs

All of the regional case studies for shellfish demonstrate deficits in terms of management and risks in terms of overfishing and equity in terms of participation in decision making.

- Channel Crab
- East Coast Lobster
- Channel Whelk
- Channel Cuttlefish
- Channel Scallops

All of these fisheries span IFCA boundaries, inshore and offshore management levels and international waters. **The current management arrangements are insufficient to support a sustainable flow of benefits from these fisheries to coastal communities.**

In each of the case studies there is a **mismatch between the unit of governance and management and the extent of the stock, the fishery, the fleet segments involved and processes for stakeholders to input.** Furthermore each of **these fisheries do not have the necessary data underpinning management, nor is it clear how data (e.g. stock assessments) are used to inform management or determine effort limits).**

Ecosystem based management, precautionary management and transparent, participatory governance for these fisheries is not in place outside 6 nM, hampering the efforts made at IFCA level to have a positive impact on the fishery and stock as a whole.

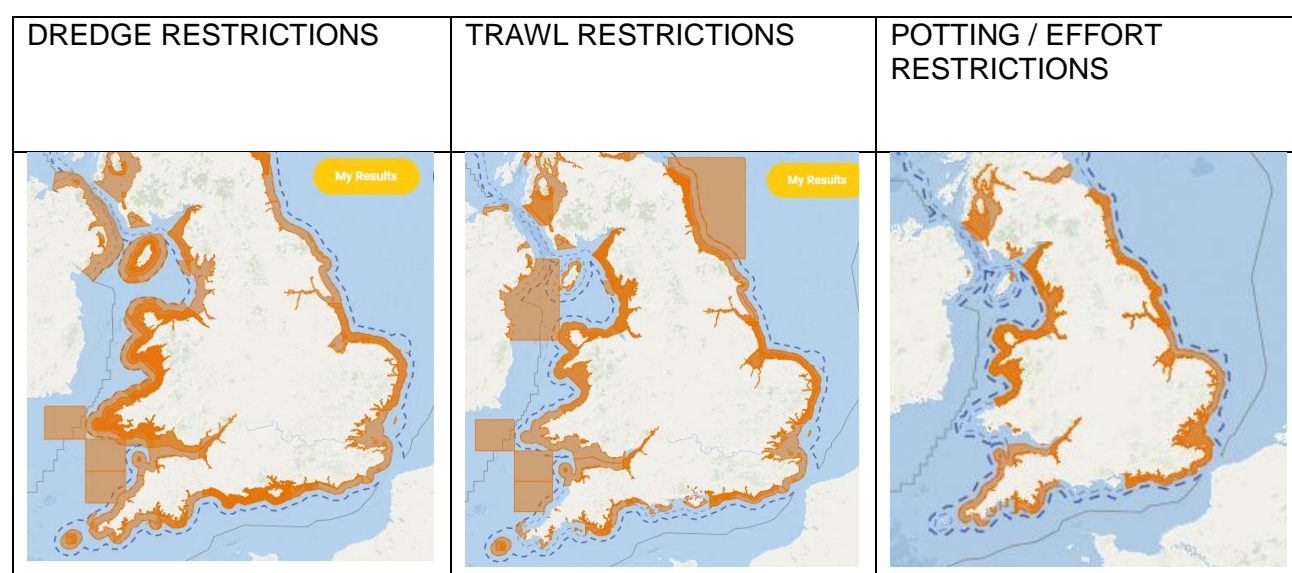
- Inshore fisheries management cannot deliver benefits in isolation. Inshore fisheries are highly regulated, their impacts on MPAs and local economies are better understood and the governance arrangements accounts for wider stakeholders (e.g. recreational fishers and eNGOs).
- All of the regional shellfish fisheries are in urgent need of long term FMPs, underpinned by stock assessments and assessments of fishing mortality, where effort regimes (or other management tools) are employed in a transparent and inclusive way by regulators rather than by unaccountable industry groups dominated by vested interests.

Single interest groups do not reflect all the complexity and interests in the fishery. Engagement and planning for the FMPs needs to be done at community level as there is competition for access to the resources which need to allocate fishing opportunities in accordance with the Fisheries Act.

- If inshore management for the regional fisheries were to deliver benefits to the stock by under fishing, these benefits would accrue to participants in the less regulated offshore fisheries.
- As the evidence for these regional fisheries shows – at the port level the access to the fishery is all along the coast and includes ports and fleets that are highly dependent on these fisheries. Emphasis on engagement at the regional level that reflects the fisheries metiers participation is essential so as to achieve equitable recommendations.

Figure 45 below shows the fisheries management restrictions on dredges, trawls and pots produced by Seafish / Kingfisher (2021).¹⁷⁷ **As can be seen the 0-6nM area has some level of management for each of these all around the coast as a result of IFCA byelaws. The absence of these restrictions from the 6-12nM limit (despite them involving the same fisheries) is notable.** The 6 mile limit is a solid line and the 12 mile limit is a dashed line in the figure.

Figure 45: Fisheries management spatial restrictions (0-6-12-200nM) from the shore in England. Source: Seafish / Kingfisher



Fisheries management inshore has been shown to be considerate of and compatible with conservation management (e.g. MPAs). **FMPs need to be able to reconcile fishing activity with conservation objectives for the stocks and also habitats outside 6 miles.**

Discreet fisheries are already well managed and do not need FMPs. Their attributes are:

- Closed circuit systems that benefit those who are involved
- Closed systems have stock assessments, so inputs (effort and mortality) linked to outputs (social economic value, sustainable fisheries and benefit flows and environmental conservation)

Marine Stewardship Council (MSC) criteria

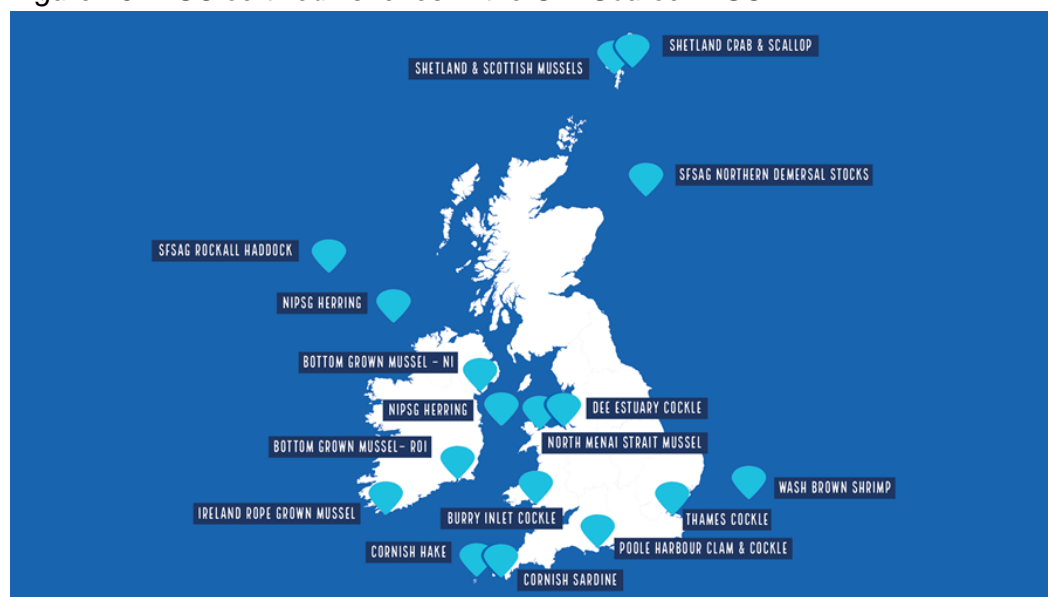
The application of Marine Stewardship Council (MSC) criteria provides one relatively robust means of assessing some components of a sustainable fishery.¹⁷⁸

The UK has a number of MSC certified fisheries, including a number of bivalve mollusc fisheries managed by IFCA as shown in figure 46.

- The **Thames Estuary cockle fishery** was first certified in 2019 making it the sixth MSC certified cockle fishery in the North Atlantic. The fishery is managed by the Leigh Port Partnership.
- In 2018, the **Poole Harbour clam and cockle fishery** was the first fishery in Dorset to receive MSC certification.

- The majority of the certified clam and cockle being harvested is retained in the UK, however some is exported to markets in France and Spain.¹⁷⁹
- Many small-scale fisheries may meet the requirements for MSC certification but often lack the means to undergo costly pre-assessment. The MSC has faced criticism for favouring large fishing operations for certification.¹⁸⁰

Figure 46: MSC certified fisheries in the UK. Source: MSC



Priorities for national level fisheries management, governance and data collection

- **The Fisheries Act s.25 requires (see Annex 2) the use of criteria in allocating fishing opportunities that are not being applied or considered outside of 6 miles and there is no appropriate governance structure to do so.** These need to be transparent, objective and consider the impacts of fishing on the marine environment and criteria of a social, environmental and economics nature.
- There is a growing understanding in England that the allocation of **resource access through a fleet division at under 10m is outdated, reducing the efficacy of management measures and obstructing efforts to ensure sustainable, economically productive fisheries.** The under or over 10m division was seen as an oversimplification that resulted from an attempt by Defra and regulators to make fisheries easier to manage, which came at the expense of effectiveness and practicality.¹⁸¹
- **Ensuring that a diverse range of active fishers, representing all parts of the English fishing fleet are able to participate in future policy development is an important consideration in widening participation and representation.** However, this means more than simply widening the invitation list. Power structures and unfamiliarity with engaging in processes such as this one mean that efforts to increase the ability of stakeholders to meaningfully participate are important. This can include increasing awareness around processes and how to share information in meetings. **The South Coast Fishermen's Council provides a template for similar**

regional engagement and decision-making for a move towards co-management.¹⁸²

- The **IFCA model is participatory and transparent** and presents a tried and tested model over 100 years (as Sea Fisheries Committees) for including fishers views and knowledge in management decisions in an open and equitable manner.
- Enforcement: There is need for a more **joined-up approach towards regulations and enforcement between IFCA and other agencies** (including the MMO, the Environment Agency and Natural England) to achieve greater consistency and efficiency. Enforcement efforts are far greater inshore than offshore, and this has been the source of tensions and concerns about equity.¹⁸³
- A move to **Ecosystem-Based Fisheries Management (EBFM)** rather than purely fisheries management is necessary and IFCA can provide a foundation for how they have applied this approach inshore. As a recent stakeholder survey (2021) also confirmed, management was not based on stock population units but on arbitrary lines between IFCA and MMO districts resulting in those in the 0-6nm zone being fished more sustainably than those outside the 6nm zone.¹⁸⁴ The use of the precautionary principle has sometimes been detrimental to fisheries due to the requirement for more stringent management where data are lacking, but this is a requirement of sustainable fisheries management in the absence of data on stocks and fishing mortality. A wider system of management in offshore waters for what is termed 'straddling stocks' (shellfish stocks spanning inshore and offshore waters) is needed. These stocks are some of the most valuable in England yet national research and management efforts have not prioritised these stocks.
- **MMO data collection:** Vessels historically have not had to report whether their fishing activity took place in the UK 0-6, 6-12 or 12-200nm (reporting is by ICES sub rectangles). Therefore the MMO do not hold reported landings that are zoned – while this report has adopted an approach to provide an indication of the mortality in each zone, collecting data in an appropriate manner would better inform and underpin sustainable fisheries management.¹⁸⁵ **Employment data, dependency data and local value chain data are also not routinely collected. Offshore catch reporting is inadequate for assessing its impact on fishing mortality for non-quota species.** Data on port dependency would also aid a more equitable approach to allocation, giving inshore fishers with lower catches but higher seasonal dependence a fair allocation. Updating multipliers to go beyond first sale based on local contribution for shellfish and whitefish and based on target market would enable better socio-economic assessment of the local contribution of these fisheries to coastal communities.
- **The UK Fisheries Act has a climate objective** (Annex 1) – but no data on fuel use by fleet segment are routinely collected. **The objective of the Act cannot be met without collecting fuel use data. This should be added to routine MMO and IFCA data collection and made publicly available** through the annual MMO sea fisheries statistics publication.
- A lack of trust in IFCA, MMO and Defra is clear and can be addressed through approaches implemented by IFCA if they are replicated by the MMO.¹⁸⁶ As the landings from unregulated fisheries offshore become more significant, track records are being established that are actually part of overcapacity and overfishing. The risk

of locking-in these practises through allocating effort in a market system (like FQAs) is a significant risk to equity and smaller ports along the coast.

Lowering the environmental impact of fishing – assessments of fisheries outside 6nM are needed to underpin Ecosystem Based Management.

Recent research for Defra (NEF, CCRI, MRAG and Cefas, 2019) provided clear recommendations on English fisheries management with regards to lowering the environmental impacts of fishing. Defra and the MMO need to simplify the rules and make them manageable, with fishers suggesting the removal of artificial barriers such as the under or over 10m classifications. A suggestion of license categories being used for management purposes (through gear categories and segmentation) was also made¹⁸⁷

- The principles of ecosystem-based management should underpin future fisheries and marine environmental management but this includes the human dimension which requires staff time and therefore increased funding.
- **The development of FMPs provides a key opportunity for Defra to re-engage the hundreds of fishers who took part in regional workshops as part of the NEF-led co-design project from 2019-2020.**¹⁸⁸

Moving through co-design to co-production for FMPs

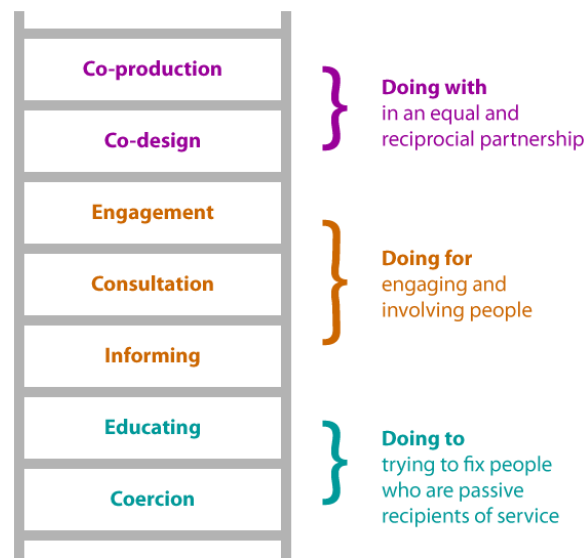
Co-design is a process that involves stakeholders in the early phases of policy development through participatory and consensus-building approaches. Arnstein's 'Ladder of Participation'¹⁸⁹ illustrates different levels of involvement of people and communities and more recently, NEF have adapted this into a 'ladder of co-production'¹⁹⁰ shown in Figure 41. The ladder shows a continuum of participation moving from 'doing to', through to 'doing for' and ultimately 'doing with'. 'Doing with' consists of processes of co-design and co-production, with co-design involving listening to (and valuing) stakeholder views, deliberating in a forum of trust and then acting upon the outcomes of deliberations. This shift in focus of engagement requires valuing people as knowledge providers and legitimators, promoting reciprocity and building social networks based on trust.^{191,192,193}

- **As recent research for Defra on co-designing a definition for low impact fisheries showed, co-design takes time and resources. The project was able to bring hundreds of fishers into the co-design process in regional workshops – alongside Defra.**
- **A lack of trust in fisheries managers and a lack of feedback for stakeholders who contribute to policy discussions is a major problem for English fisheries. Without a co-design approach, building trust and sharing knowledge in an open and transparent manner there is a risk that the Fisheries Act objectives around transparent, criteria based allocated of fishing opportunities will replicate the mistakes of the quota system for effort fisheries.**
- The lack of transparency in the national shellfish management groups is a major concern for the development of FMPs as participation is narrow and is centered around the national federation with few inshore fishers as members (who make up the vast majority – over 50%- of the workforce), those who have the highest level of

dependence on these non-quota fisheries, generate the most value per tonne and are the most tightly regulated and MPA conservation objective compatible.

- **Defra have stated co-design will be their focus for policy development but there is no evidence of this to date beyond commissioning studies that have not fed-back to participants or been used in the development of a low impact definition, further eroding trust.**

Figure 41: The ladder of co-production (adapted from Arnstein 1969 in NEF, 2014)



Success factors for co-management at the community level: these are best met for discreet fisheries at the IFCA level, but are not being met for the regional fisheries

1. Appropriate scale and defined boundaries
2. Membership is clearly defined
3. Group homogeneity
4. Participation by those affected
5. Leadership
6. Empowerment, capacity building, and social preparation
7. Community organisations
8. Long-term support of the local government
9. Property rights over the resource
10. Adequate financial resources/budget
11. Partnerships and partner sense of ownership of the co-management process
12. Accountability
13. Conflict management mechanism
14. Clear objectives from a well-defined set of issues
15. Management rules enforced ¹⁹⁴

Co-management is seen by many in the fishing industry and Government as the solution to the ongoing failure to regulate these regional shellfish fisheries. However the success factors for co-management that are being met at IFCA level are not being met outside 6 nm.

By confusing co-management with deregulation, privatisation or abdication of public responsibility, Defra risks long-term consequences of overfishing of these key regional shellfish fisheries and the capture of limited fishing opportunities by sectors of the UK fishing industry who are unaccountable and are representing their own interests to the detriment of coastal communities and inshore fishers across these fisheries and regions.

Co-management requires knowledge sharing, transparency and equity as well as clear accountability. None of these are being met by the current industry led approach as the case studies and assessment clearly show.

RECOMMENDATIONS

To consider in FMPs

- **Defra must ensure that all FMPs which are set up should have transparent membership, clear terms of reference (ToR), roles and responsibilities and a clear accountability and feedback processes.**
- Members of the industry led shellfish management groups should declare their interests and minutes of the meetings should be publicly available.
- Participation should include capacity building for inshore fishers to take part in this process as they are most impacted by it and are already more highly regulated when it comes to their fishing activity.
- All FMPs should undertake annual reviews and in-depth reviews every five years to check on the progress, ensure the stocks and data are improving and that objectives around equity and transparency are being met.

The following recommendations apply for each of the regional shellfish fisheries assessed in this research –nationally and regionally:

Crab

- Seeking to harmonise management inside and outside 6 nm and applying best practice, effort limits and other conservation measures offshore is urgently necessary.
- Working towards harmonising minimum conservation reference sizes (or clearly articulating the reasons for the regional differences) across the Western (CIFCA <> SIFCA) and Eastern (SIFCA<>KEIFCA) stocks provides an opportunity to integrate inshore and offshore management covering the full extent of the stocks.
- Incorporate offshore fishery into all current inshore management regimes and establish regional governance framework to include industry from all ports with crab landings and active vessels identified in this report.
- IFCA participation on the crab / lobster FIP¹⁹⁵ is necessary and new data resulting from the FIP should be made available to managers and incorporated in the FMP.

- The Seafish Crab group should publish membership, terms of reference, minutes of meetings and be included in regional working groups led by IFCA and the MMO that aim to deliver the FMP.

Lobster

- Lobster escape hatches should be made mandatory outside 6nm.
- The national ban on landing v-notched lobsters requires a scheme of introduction outside 6nm.
- Maintain and enforce the national berried hen ban
- IFCA management should follow best practice across inshore fisheries and Lobster Units (two northern Lobster Fisheries Units and the Southern 3-4 units should follow best practice inside 6 miles and outside 6 miles as well as between IFCA districts).
- IFCA participation on the crab / lobster FIP¹⁹⁶ is necessary and new data resulting from the FIP should be made available to managers and incorporated in the FMP.
- The Seafish lobster group should publish membership, terms of reference, minutes of meetings and be included in regional working groups led by IFCA and the MMO that aim to deliver the FMP.

Whelk

- Assessing whelk biomass within UK inshore waters is important for establishing the stock status and setting sustainable TACs in the future. There is currently no general consensus on the most appropriate and effective system for assessing population densities. This must be a priority data gap to fill to inform the FMP.
- Cefas suggest regional whelk management, however if this is effort based, given the large number of participants in the fishery and the heavy reliance of inshore fisheries on whelks this may be hard to enforce and less effective than a technical measure e.g. standardised and harmonised riddles.
- More local management within regional plans (based on allocation criteria) is recommended.
- Size at maturity studies across the Channel and East coast are needed to inform technical measures and MCRS.
- Compulsory sorting based on defined length-width relationships,
- Gear and effort limits offshore (e.g. limits on pot size and quantity)
- Closed seasons during important reproductive periods.
- An increase to the current MCRS has been suggested¹⁹⁷
- At IFCA level, harmonised best practise riddle sizes and designs are needed.
- The whelk management group should publish membership, terms of reference, minutes of meetings and be included in regional working groups led by IFCA and the MMO that aim to deliver the FMP.

Cuttlefish

- Cuttlefish are at risk of overfishing, there is no precautionary management or consideration of gear impacts or impacts on the pre-spawning stock. The risks to this fishery are not well understood as it is data deficient. A stock assessment is urgently needed to inform catch or effort limits.

- Cuttlefish could be a low impact sustainable trap fishery as these species are short lived and die after spawning, they are however currently mainly caught offshore pre-spawning and this is putting the future of the fishery at risk.
- The mortality, profits and landings are all focussed in the highest impact fishery where there is no management of effort or mortality (pre spawning), but the low impact pot / trap fishery effort is being regulated (via pot limits) and fishers are paying for tags etc
- A closed season for pre-spawning cuttlefish should be observed as a precautionary measure until Cefas have published their report. Any form of limit to protect the inshore fishery and spawning stock is urgently needed.
- Real time closures¹⁹⁸ should be used to avoid excess mortality of cuttlefish in the mixed mobile gear fishery.
- Seasons or quota or trip limits could also be applied for the offshore fishery.
- The inshore trap fishery should continue to be regulated by effort, but these should be adapted as the science improves and pot design and fishing / washing practises should be harmonised for the highest conservation (egg survival) benefit.
- MCRS for cuttlefish should be in place inshore, however a MCRS for cuttlefish would not work for the beam trawl fishery as the cuttlefish may already be dead before they can be measured.

Scallops

- Inshore effort and TAC-based management that are underpinned and informed by stock assessments are necessary. This is the most valuable fishery in England and at risk of overfishing, the current lack of management is being masked by changing climatic conditions that are favourable for recruitment, but these conditions can change leaving the fishery at risk.
- Rotational harvest and capping of the fleet were highlighted as desirable management measures in a recent industry and research scallop management conference.¹⁹⁹ Spatial management is also necessary and this is being developed by IFCA's.
- Offshore a TAC-based management regime was the clear preference by stakeholders, with rotational harvest and mandatory closed areas used as effective tools to deliver improved sustainability.²⁰⁰ This is the most valuable fishery in England and at risk of overfishing, the current lack of management is being masked by changing climatic conditions that are favourable for recruitment, but these conditions can change leaving the fishery at risk.
- Partnership working is necessary to develop effective output limits – such as TACs and quotas as well as spatial management measures
- A TAC would need to be divided by areas, and matched closely to the local resources on scallop grounds.
- Co-management of the fishery using a detailed stock assessment (that consider larval distribution), output controls and regulation of the nomadic fleet are necessary.
- The ICES Scallop Working Group revealed concerns regarding allocating future fishing rights based on a previous fishing track record due to the risk of 'over consolidation'

- The industry should contribute towards the cost of scientific surveys and management.
- The MMO and Seafish should collect fuel use data to track against the Climate Objective of the Fisheries Act.
- HCRs should be put in place following a precautionary approach in the period before adequate stock assessments are made, where some potential catch is sacrificed in the short term for greater business security.
- A collaborative approach across the Channel is needed with French managers and industry.

Recommendations for IFCA's:

- IFCA's need a more consistent approach to science, management and enforcement.
- A joined-up approach covering regulations and enforcement between IFCA's and other agencies could provide more uniformity between IFCA's, structures and operations.
- It is vital to ensure that the IFCA's are adequately resourced if they are expected to extend their remit to 12 nm effectively and be responsible for implementing or informing FMPs.
- Additional resources to support IFCA's and inter-agency peer-peer learning can help highlight and adopt best practises. Whether in terms of building trust or specific surveying and habitat mapping techniques. Structures are in place, such as the IFCA TAG, NIMEG and training, but they are not resources adequately to provide the level of support needed.

Recommendations to Defra on the role and support of IFCA's:

- **IFCA's are not adequately funded²⁰¹** and the 50% reduction in the necessary new burdens funding continues to present a real challenge for the IFCA's. IFCA's are delivering best practise fisheries management in the UK for fisheries that are within their districts and ability to manage and are able to do this providing value for money.²⁰²
- **The opportunity to build upon their co-management structures and represent inshore fishers (over 50% of working fishers in England) and be represented in the development of FMPs, is clear. It is of paramount importance that Defra recognise this and does not ignore the evidence of good management outcomes attributable to IFCA's in favour of an 'opt out' where power is unaccountably delegated to industry groups with narrow interests, no accountability or evidence of membership as this is politically easier for Defra. This is simply put an abdication of their responsibility to the public – and puts the future of these shellfish fisheries and working fishers along England's coast at risk.**
- IFCA's partnership working is based on considerable experience in fisheries co-management that has an important role to play in the future of FMPs, whether through imbedding data collection within regional IFCA structures or **long-term community involvement in the management process**, ignoring best practise in favour of a model which has failed coastal communities in England through the quota system will not meet the objectives of the new Fisheries Act.

Fishing opportunities – Defra, MMO and IFCA should make use of a wider range of fisheries management tools in the development of FMPs and learn lessons for the failures of the quota system:

As described above, fishing opportunities can be grouped into quota management and effort management – there are however multiple options available (as well as combinations – as shown in **Annex 3**) to fisheries managers and **the Fisheries Act requires the transparent and objective use of social, economic and environmental criteria in the allocation of fishing opportunities (section 25 – Annex 2).**

- **Applying these criteria to the management regime provides an opportunity to use a range of tools and approaches which can reduce the impacts of fishing on the marine environment (environmental criteria such as habitat impacts, greenhouse gas emissions, impact on spawning or bycatch) or increase the positive impact of sustainable fisheries for coastal communities (e.g. through using equitable effort regimes linked to socio-economic impacts, rather than historic track records).**
- With such a diversity of transparent, accountable and equitable fisheries management options available and shown in the best practise identified inshore for the discreet fisheries, the clear need for **a wider inclusion of fishery participants and other stakeholders.**
- The need for FMPs is clear and **the risks of business as usual are obvious. Without an approach that puts equity and transparency at the heart of the development of FMPs and considering science and knowledge as building blocks for co-management then the future effort management of these regional shellfish fisheries risks the same pitfalls of the FQA/ quota system which have impacted inshore fishers for over 20 years.**
- **The Fisheries Act requires allocation based on social, environmental and economic criteria. Adopting an approach based on historic track record, without these criteria being publicly considered, will not fulfil the allocation objectives of the Act.**
- **The allocation of fishing opportunities cannot be not based on lobbying in working groups that are set up without clear terms of reference and declared interests and membership; instead it needs to be based on criteria to deliver public value from a public resource and triple bottom line outcomes.**
- **Without an immediate change of approach and inclusion of those impacted regionally and at all scale of the fishing industry spectrum, the objectives in the Fisheries Act and the objectives within it will not be met for current of future generations of fishers, regulators or the public alike.**

Key recommendation for the development of effort systems to avoid the problems created through the privatisation of quota through FQAs. Defra must ensure:

1. That effort is **allocated as a time bound lease** (not a permanent allocation leading to 'legitimate expectation' as per quotas)
2. That there is a **public return** for the lease of effort (not gifted freely in perpetuity like quotas) to help industry contribute to management costs
3. That the total effort allocation should **be precautionary** and linked to stock assessments

4. That there is a **public register** of effort allocation (including the initial allocations) as is available now via the FQA register <https://www.fqaregister.service.gov.uk/> – to allow public scrutiny
5. **Caps on concentration** to ensure no single entity controls a disproportionate share of the total effort
6. **Allocated transparently and objectively along social, environmental and economic criteria** to reward low impact fishing and highlight dependant localised / inshore fleets and meet fisheries objectives of the Fisheries Act (climate, sustainable, etc) rather than according to historic track record as the only criteria.
7. **Effort allocation should be revocable if vessels are found guilty of IUU of fisheries offences**
8. Any two-tier system of effort (as exists in quotas for the FQAs managed by the sector and the publicly managed MMO Quota pools for the inshore fleet and non-sector) should be **tested and discussed with all stakeholders to ensure equity and good design. This is an opportunity for co-design going forwards.**

ANNEX 1 Fisheries objectives

(1) The fisheries objectives are—

- (a) the sustainability objective,
- (b) the precautionary objective,
- (c) the ecosystem objective,
- (d) the scientific evidence objective,
- (e) the bycatch objective,
- (f) the equal access objective,
- (g) the national benefit objective, and
- (h) the climate change objective.

(2) The “sustainability objective” is that—

- (a) fish and aquaculture activities are—
 - (i) environmentally sustainable in the long term, and
 - (ii) managed so as to achieve economic, social and employment benefits and contribute to the availability of food supplies, and
- (b) the fishing capacity of fleets is such that fleets are economically viable but do not overexploit marine stocks.

(3) The “precautionary objective” is that—

- (a) the precautionary approach to fisheries management is applied, and
- (b) exploitation of marine stocks restores and maintains populations of harvested species above biomass levels capable of producing maximum sustainable yield.

(4) The “ecosystem objective” is that—

- (a) fish and aquaculture activities are managed using an ecosystem-based approach so as to ensure that their negative impacts on marine ecosystems are minimised and, where possible, reversed, and
- (b) incidental catches of sensitive species are minimised and, where possible, eliminated.

(5) The “scientific evidence objective” is that—

- (a) scientific data relevant to the management of fish and aquaculture activities is collected,

(b) where appropriate, the fisheries policy authorities work together on the collection of, and share, such scientific data, and

(c) the management of fish and aquaculture activities is based on the best available scientific advice.

(6) The “bycatch objective” is that—

(a) the catching of fish that are below minimum conservation reference size, and other bycatch, is avoided or reduced,

(b) catches are recorded and accounted for, and

(c) bycatch that is fish is landed, but only where this is appropriate and (in particular) does not create an incentive to catch fish that are below minimum conservation reference size.

(7) The “equal access objective” is that the access of UK fishing boats to any area within British fishery limits is not affected by—

(a) the location of the fishing boat’s home port, or

(b) any other connection of the fishing boat, or any of its owners, to any place in the United Kingdom.

(8) The “national benefit objective” is that fishing activities of UK fishing boats bring social or economic benefits to the United Kingdom or any part of the United Kingdom.

(9) The “climate change objective” is that—

(a) the adverse effect of fish and aquaculture activities on climate change is minimised, and

(b) fish and aquaculture activities adapt to climate change.

(10) In this section—

“ecosystem-based approach” means an approach which—

ensures that the collective pressure of human activities is kept within levels compatible with the achievement of good environmental status (within the meaning of the Marine Strategy Regulations 2010 ([S.I. 2010/1627](#))), and does not compromise the capacity of marine ecosystems to respond to human-induced changes;

“precautionary approach to fisheries management” means 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.

ANNEX 2 - Section 25 Distribution of fishing opportunities

(1) When distributing catch quotas and effort quotas for use by fishing boats, the national fisheries authorities must use criteria that—

- (a) are transparent and objective, and
- (b) include criteria relating to environmental, social and economic factors.

(2) The criteria may in particular relate to—

- (a) the impact of fishing on the environment;
- (b) the history of compliance with regulatory requirements relating to fishing;
- (c) the contribution of fishing to the local economy;
- (d) historic catch levels.

(3) When distributing catch quotas and effort quotas for use by fishing boats, the national fisheries authorities must seek to incentivise—

- (a) the use of selective fishing gear, and
- (b) the use of fishing techniques that have a reduced impact on the environment (for example that use less energy or cause less damage to habitats).

(4) In this section “the national fisheries authorities” means—

- (a) the Secretary of State,
- (b) the Marine Management Organisation,
- (c) the Scottish Ministers,
- (d) the Welsh Ministers, and
- (e) the Northern Ireland department.²⁰³

ANNEX 3 - Management tools include:

Quota management:

- **NATIONAL QUOTAS:** applied to the whole fleet and not allocated to individual fishers. Open fishing is permitted until the national quota is depleted and the fishery is closed. This type of quota is often used for fish stocks in low-demand as a method of increasing quota utilisation. National quotas are often used in the management of particular fleet segments such as the small-scale fleet. In some cases, a national quota is divided into regional quotas. Since the quota is neither secure nor exclusive, national quotas cannot be considered a form of RBM. Sometimes national quotas are

referred to as the 'national pool' of quotas - as is the case with the UK under 10m pool.

- **RATIONED QUOTAS:** Rationing quotas involve centrally determined quota allocations being granted to fishers, often based on the principle of equal access. Most commonly, fishers are grouped into classes depending on vessel size, capacity or gear type. Within each class, vessels receive the same individual catch limit. Rationing usually involves many in-year allocations and the catch limits are short-term (weekly or monthly). Since rationed quotas are not a long-term, secure share they cannot be considered as a form of RBM, despite being exclusive.
- **INDIVIDUAL QUOTAS:** Quota allocations are made to individual vessels based on their quota shares. Allocation is normally based on the vessel/licence historical track record of landings that confers an exclusive long-term quota share. Quotas are not directly transferable but in most systems quotas can be transferred with vessel sale. In-year swapping of quotas is usually permitted and in some cases these quotas may be pooled by a producer organisation (PO).
- **INDIVIDUAL TRANSFERABLE QUOTAS (ITQ):** ITQs are similar to Individual Quotas with the added feature that the quota share is transferable and leasable. Initial allocation of ITQs are usually based on historical track records, but as ITQs are transferrable quota shares can change holders. In ITQ systems there are often regulations in place to limit the concentration of quota shares and/or to control the eligibility of quota holders.
- **COMMUNITY QUOTA** systems are similar to individual quotas but are allocated to a collective unit such as a fisheries association, a producer organisation or a port. It is up to the community organisation to determine how the quota is used by its membership. The organisation is responsible for ensuring quota compliance. Community quotas are sometimes referred to as 'pooled quotas'.

Effort management:

- **INDIVIDUAL EFFORT QUOTA** systems grant fishers an allowance for effort (e.g. kilowatt days at sea), usually specified by gear type. Although most effort controls are not considered to be RBM, when fishers receive a secure and exclusive effort share they can be considered a form of RBM. In some cases, these permits may be transferable (ITEQ).
- **TERRITORIAL USE RIGHTS FOR FISHERIES (TURF):** In TURFs, use rights come in the form of a defined territory. Fishers managed through a TURF have exclusive access to harvesting fish in the designated area. TURFs are usually managed by membership organisations that limit entry and impose catch or effort controls on members. TURFs are regarded as RBM because a defined group of fishers receive exclusive and secure access rights.
- **LIMITED LICENSING** controls fishing effort by limiting the number of vessels (capacity) in the fishery. Usually accompanied by other EM measures that specify vessel capacity, permissible gears, spatial limits and target stocks as licence conditions. In some cases, licences are transferable. Some recreational licences may also include catch limits such as bag limits.
- **SPATIAL MANAGEMENT** involves imposing restrictions on where vessels may fish. These are usually put in place to protect biologically sensitive/valuable areas or to prevent gear conflict. Restrictions are often based on gear type or vessel size and

may also have a temporal component. Marine Protected Areas (MPAs) and fishery restricted areas can also be considered a form of spatial management.

- **FISHING SEASONS** determine the times of year when a fishery is open. In many cases, fishing seasons are combined with quotas – thus restricting the period in which a catch limit applies. They are usually applied to match migratory patterns and avoid fishing during the sensitive spawning season for a species.
- **DAYS AT SEA (DAS)**: Individual vessels can be granted a ‘days at sea’ (DAS) quota. This effort quota may be allocated based on historical track records, capacity, or rationed equally. A fisher’s catch is therefore limited by the amount they can fish within their DAS allowance. DAS may also act as supplementary measures to catch quotas.
- **FISHERY CLOSURES** ban all or specified gear classes from fishing a particular stock/area for a specified time. They are most commonly used in fisheries without quota limits when biological indicators suggest that overfishing could threaten spawning stocks or identify other ecological reasons. Fishery closures are also put in place once quotas have been exhausted or significantly depleted. ²⁰⁴

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