Appendix B: Fisheries Desk Review

This Appendix is provided in support to the following report:

Marine Planning Consultants Ltd. (2014). Lyme Bay Fisheries and Conservation Reserve: Integrated Fisheries Management Plan. A report produced for the Lyme Bay Fisheries and Conservation Reserve Working Group, UK.

The report, submitted 18/09/2014, addresses comments made by the wider Lyme Bay Fisheries and conservation Reserve Working Group at a Workshop 09/09/2014.

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Acronyms and Abbreviations

AOI	Area of Interest
BLUE	Blue Marine Foundation
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CFP	Common Fisheries Policy
CL	Carapace Length
CW	Carapace Width
cSAC	Candidate Special Area of Conservation
DEFRA	Department for Environment, Food and Rural Affairs
DSIFCA	Devon and Severn
EMS	European Marine Sites
ETP	Endangered, Threatened and Protected
EU	European Union
FAO	Food and Agriculture Organisation
FPO	Fish Producers Organisation
ICES	International Council for the Exploration of the Sea
IFCA	Inshore Fisheries and Conservation Authorities
IUCN	International Union for Conservation of Nature
iVMS	Inshore Vessel Monitoring System
LOA	Length Overall
LPUE	Landing per Unit Effort
MCZ	Marine Conservation Zones
MLS	Minimum Landing Size
MMO	Marine Management Organisation
MoU	Memorandum of Understanding
MSAR	Monthly Shellfish Activity Return
MSC	Marine Stewardship Council
MSFD	Marine Strategy Directive Framework
MSY	Maximum Sustainable Yield
NE	Natural England
NM	Nautical Mile
OJEU	Official Journal of the European Community
PML	Plymouth Marine Laboratory
SAC	Special Area of Conservation
SIFCA	Southern Inshore Fisheries and Conservation Authorities
SSFC	Southern Sea Fisheries Committee
VMS	Vessel Monitoring Systems
WG	Working Group
WGCRAN	ICES Working Group on Crangon fisheries and life history

Overview

Context

According to the Food and Agriculture Organisation (FAO) and Marine Stewardship Council (MSC), a fishery is *"a unit determined by an authority or other entity that is engaged in raising and/or harvesting fish. Typically, the unit is defined in terms of some or all of the following: people involved species or type of fish, area of water or seabed, method of fishing, class of boats and purpose of the activities; including economic, management, biological/ environmental and technological viewpoints[1]"*.

Commercial fishing within the wider Lyme Bay region (i.e. including and beyond the project Area of Interest) is considered to be a very diverse operation in terms of fishing vessels and target species. Fishing vessels range in total length or length overall (LOA) from approximately 3 metres to 75 metres, with corresponding vessel engine power ranging from 3 horse-powers to 8000 kilowatt. Vessels might be crewed single-handedly or by as many as five men depending on the fishing method utilised. Fishing gear types vary from demersal beam and otter trawling, scallop dredging, shellfish and cuttlefish potting, set netting, and hand capture by diving.

Typically over 38 different species of fish and shellfish are caught, with availability of each species varying according to season. Catch aboard fishing vessels might be stored in boxes or dry-hold (un-iced, chilled, ice), and refrigerated seawater. In addition, crustacean shellfish catch might be retained in keep-pens for live trade. Catch is sold to traders and retailers with varying levels of post-harvest processing, packing and value-adding locally, and nationally within the United Kingdom, as well as to European countries such as France and Spain. Some Lyme Bay shellfish, such as Whelks, might be sold to markets as far away as Asia after being traded and processed in the UK.

Fishermen might be organised into Fish Producers Organisations (FPO), Fishermen Associations, independent individuals, or non-sector groups. For instance, South Western FPO Ltd, Cornish FPO Ltd, and Inter-fish operate among independent individuals, non-sector groups, members of the Lyme Bay working group, and recreational fishers. In addition, stakeholder fishers might be based locally - fishing from home ports of the Lyme Bay area, or visiting nomadic fleets which hold appropriate fishing licence to operate in the relevant areas.

A strong level of interest is put forward for conservation of the marine biodiversity of the Lyme Bay fishery by the Blue Marine Foundation (BLUE), the Devon Wildlife Trust, local coastal community groups, and others such as European conservation action groups. Close-

[1] http://firms.fao.org/firms/concepts/en and http://www.msc.org/track-a-fishery/what-is-a-fishery

working relationships and collaboration between the Blue Marine Foundation and the the Lyme Bay Fisheries and Conservation Reserve, including scientists at Plymouth University, and local fishermen, has produced a Code of Conduct (CoC) and Memorandum of Understanding (MoU), based on a framework of sustainability which is intended to offer protection to sensitive biodiversity while allowing some scale of fishing within the Lyme Bay areas (http://www.bluemarinefoundation.com/).

The funding framework for the Lyme Bay fisheries and conservation reserves is currently provided from private and public sources. For instance: Marks and Spencer, Defra, and different charities have made contributions. The longer term intention is for the reserve to be self-sustaining with a management structure which is able to respond to its needs.

On-going sustainability management initiatives within the Lyme Bay fisheries are provided by public and private scientific research organisations. For instance, CEFAS (Centre for Environment, Fisheries and Aquaculture Science) provide real-time adaptive advice for fish stocks which are not managed under the European Union international quota schemes (ICES). Furthermore, relevant fisheries, biodiversity, and socio-economic research are occasionally provided by Public-Private Institution such as PML (Plymouth Marine Laboratory).

Management, monitoring, surveillance, and control of the Lyme Bay fishery are provided by the Devon and Severn IFCA, and the Southern IFCA for waters within 6 nm boundaries. The MMO under regulatory protocols of the EU Common Fisheries Policy (CFP) provides fishery management beyond 6 nm and out towards the territorial waters and the UK continental shelf[2].

The Lyme Bay fisheries are exploited within the Western English Channel of the United Kingdom. These waters fall within area 27 of the FAO (Food and Agriculture Organisation) major fishing areas, as well as ICES (International Council for Exploration of the Sea) sub-area (VIIe) 7e[3].

[2] http://www.marinemanagement.org.uk/about/where/fisheries.htm
[3] http://www.fao.org/fishery/area/Area27/en

About this document

This document reports on the first stage of the project. It provides a summary of the current evidence and understanding with regards to:

- The nature and geographical extent of commercial fisheries operating in the area
- The location of core fishing grounds
- Issues facing the local fishing communities

In addition, components of this review will demonstrate connections with:

- Other uses of the marine environment, which interact with fishing and conservation efforts
- The location and nature of conservation features in the area
- The ecological status of the natural environment / wildlife resources
- The extent and nature of local Tourism
- Issues facing local communities

This is a working document and is based on a desk review of existing information. It will be used as a basis to identify gaps in evidence and knowledge and to inform discussions within the working group.

As the project develops, other project outputs will include fisheries sustainability pre-assessment reports on the Lyme Bay specific fishers group (with limited circulation among fisherman given the commercial confidentiality). The wider project will also provide a summary of activities that pose a risk to Lyme Bay Habitats and information on socio-economic issues.

Throughout this document we have endeavoured to present the best available data and information. All spatial data used to generate figures and charts which are presented within this report are appropriately referenced as source within the figures themselves. Where possible, details of how the data can be obtained are also provided in footnotes.

With regards to exploratory research, the Lyme Bay area is considered to be a very well-studied and surveyed area on matters such as: fishing co-existing with marine conservation (Rees, et al 2013a; and Rees, et al 2013b); fishermen contribution to decision making (Garret et al 2012); fishery stock dynamics (Dunn 1999); as well as fishery statistics and monitoring (MMO[4]).

All relevant data and sources that were identified during this desk review are provided in the report, with relevant details of the data source, owners, and contact information should readers wish to obtain or use the data for their purposes.

[4]Marine Management Organisation (MMO) http://www.marinemanagement.org.uk/search_results.htm?cx=006753055670391988215%3Aq9zo0xcdsm8&cof=FORID%3A9&ie=UTF-8&q=Lyme+Bay&sa=Search

The nature of commercial fisheries

Commercial fisheries within Lyme Bay and the surrounding area are diverse across a number of species and fishing methods. The Project Inshore Stage 1 report (Nimmo and Southall 2012) provides a characterisation of commercial inshore fishing and includes analysis of MMO data at a sub-regional level, based on IFCA District boundaries. Within the Project Inshore report, there is relevant information for the Lyme Bay area included in the Devon & Severn and Southern IFCA analyses, but for the purposes of this Desk Review a more local focus was sought.

MMO data was made available for twenty of the vessels participating in the Lyme Bay Working Group MOU, following signed consent from their owners. This represents one third of the inshore fleet operating within the Lyme Bay Reserve. The data includes landings and sales information, and logbook records. Where possible it has been used to support the characterisation of fisheries species, gear and activity.

The MMO data for the consenting vessels covered a period of 11 and 5 years for landings and sales data respectively. Not all vessels had been under the same ownership throughout the time covered by the data request; some vessels only yield a few years' data, whereas others' records span the entire period.

The data covers a representative proportion of vessels 10m length and under, but for this sector the requirements for reporting detailed declarations of activity and landings are limited. This means that logbook and landings data is predominantly generated from sales records and estimates from MMO Officers. Additionally, (first) sales of less than 25kg do not require a sales note to be generated, so any such information goes uncaptured.

Lastly, the provenance of the fish landed is not directly linked to the sales data, so it was not possible to separate out landings or sales information by ICES rectangle. However, logbook records do include the estimated area fished (based, again on MMO Officer understanding of that vessel's normal activity). A majority of activity (6792 of 7342, or over 92% records) is estimated to have taken place within ICES rectangles 30 E6 and E7, which correspond closely to Lyme Bay and the 6nm IFCA Districts.

These caveats aside, the selected data provide a more local view of fishing activity, building on the regional characterisation in Project Inshore.

Species groups

The Lyme Bay fishery is diverse, with approximately 50 species recorded in the MMO records. These include pelagic and demersal finfish, elasmobranchs (sharks, skates and rays), and shellfish including crustaceans, molluscs and cephalopods (cuttlefish and squid). Shellfish comprise a majority of landings, making up 92% and 85% of landings by weight and value respectively.

Finfish

Pelagic fish

These fish live in the pelagic zone – that is, in the water column rather than on or near the bottom. They are caught by mobile gear such as midwater trawls, or alternatively by static gear including set nets and handlines. Pelagic fish include bass, herring, mackerel, horse mackerel, shad and sprat.

Demersal fish

These fish live near or on the seabed and are targeted using bottom trawls, otter trawls, and set nets. This group includes flatfish (brill, dab, flounder, lemon sole, plaice, sole and turbot) and demersal roundfish (cod, haddock, whiting, ling, pollack, bib, John Dory, mullets, breams, wrasses, gurnard and monkfish).

Elasmobranchs

This group includes sharks, skates and rays and can be described as bentho-pelagic or demersal, tending to stay relatively close to the seabed. They differ from other fish as they lack a swim bladder, and are slower-growing species. Like other demersal finfish, they are targeted by bottom trawl and set nets; many shark or dogfish species can also be taken by line. Species caught within the Lyme Bay fishery include Lesser Spotted dogfish, Smoothhound, Tope, spurdog, Blonde ray, Spotted ray, Small-eyed ray and Thornback ray. Many of the landings records are categorised under generic rather than species group.

Shellfish

Crustaceans

These shellfish are bottom-dwelling arthropods, with segmented bodies. Larger crustacean species such as brown crab, spider crab, velvet crab and lobster are mostly caught with baited pots and traps of various construction. In contrast, smaller species (brown and pink shrimp, common prawn) are targeted by beam trawl.

Molluscan shellfish

Include bivalves (scallop) and whelks, which are a type of gastropod. These species are also associated with the seabed, living on or beneath the surface. They are usually targeted by towed dredges that are often particular to one species. Whelks are also collected using pots, and king scallops may be hand-gathered by divers.

Cephalopods

Strictly speaking, cephalopods (which in the Lyme Bay fishery include cuttlefish and squid) are also molluscs, although they are mobile, and so tend to be targeted differently. They are caught using towed demersal gear (outside of the cSAC / Designated Area) or alternatively using pots or traps.

Species groups summary

Figures B1 and **B2** show the proportion of landings by value and weight broken down by each of these species groups.

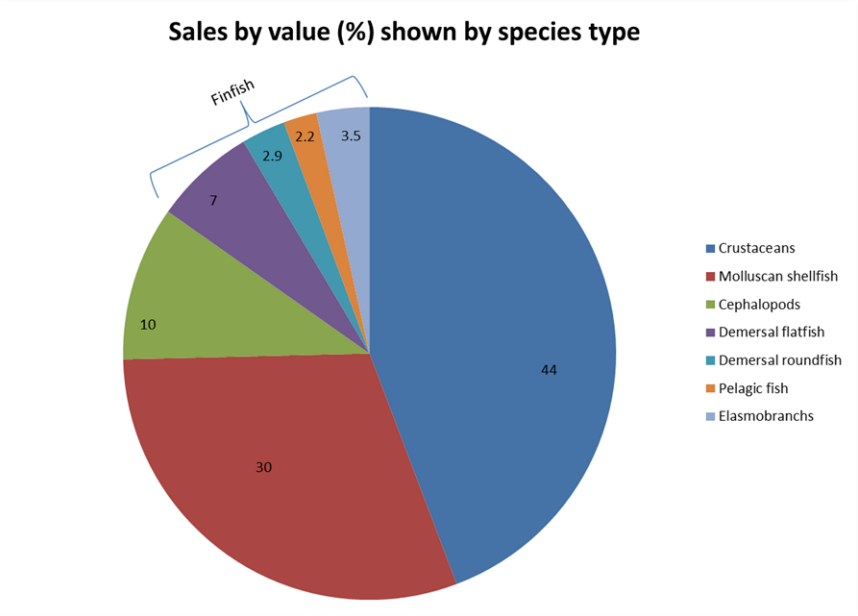


Figure B1: Species composition of Lyme Bay inshore fishery by % sales

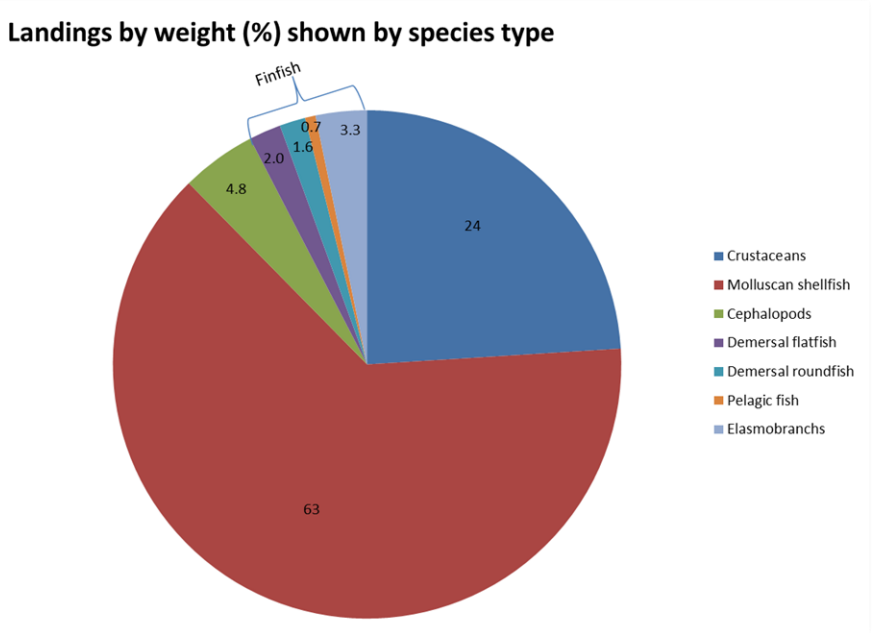


Figure B2: Species composition of Lyme Bay inshore fishery by % landed weight

These charts illustrate that although the fishery in Lyme Bay is diverse, the majority of the landings – whether considered by weight or by sale value – are dominated by shellfish. When looking at the contribution of each species individually, the dominance of certain key species and their importance within the fishery is clear.

Figure B3 shows the landings figures (2002-2013) broken down by species. Whelks can be seen to form a significant proportion of fish landed by the Lyme Bay inshore vessels over this period.

Similarly, **Figure B4** shows a breakdown of sales by species for all vessels (2009-2013) from MMO data. Once again, key species are evident, although the importance of whelks is less significant, given higher relative value for other species including some finfish which form an important part of sales revenue despite not being landed in great quantities.

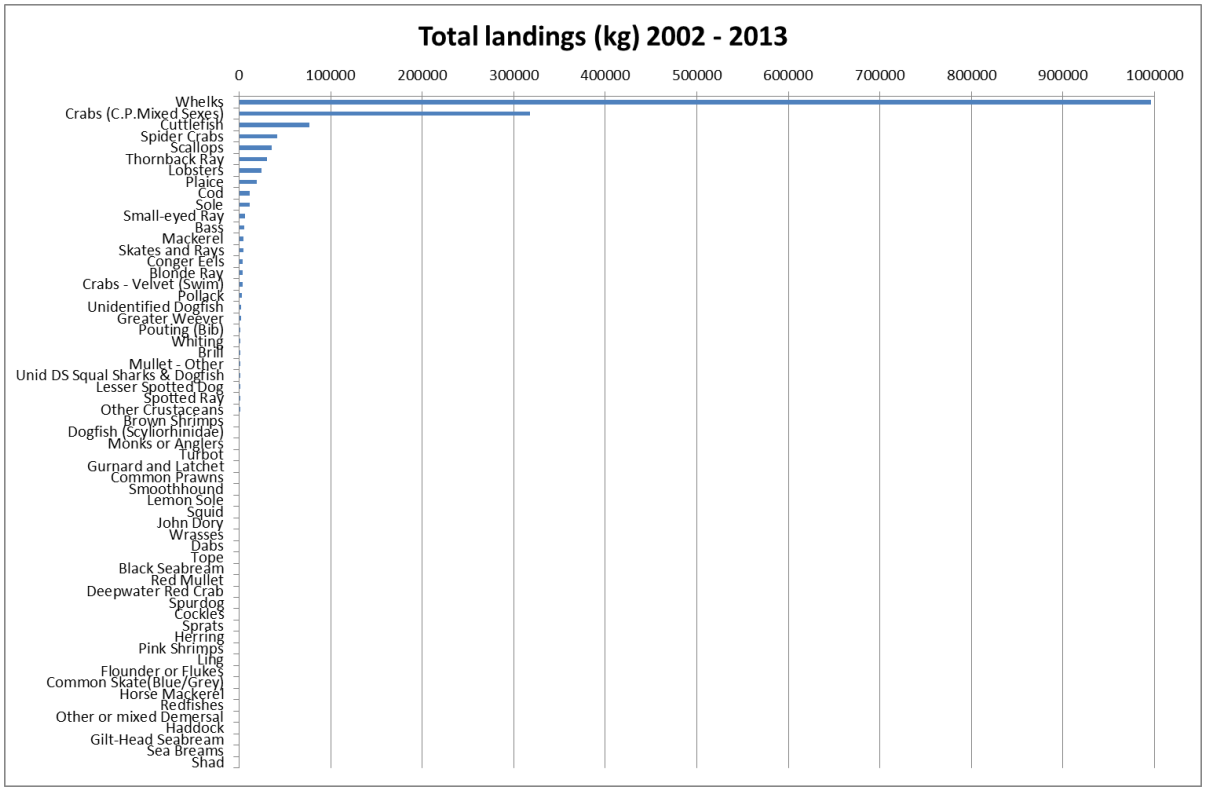


Figure B3: Total landed weight (kg) by species from the Lyme Bay inshore fishery

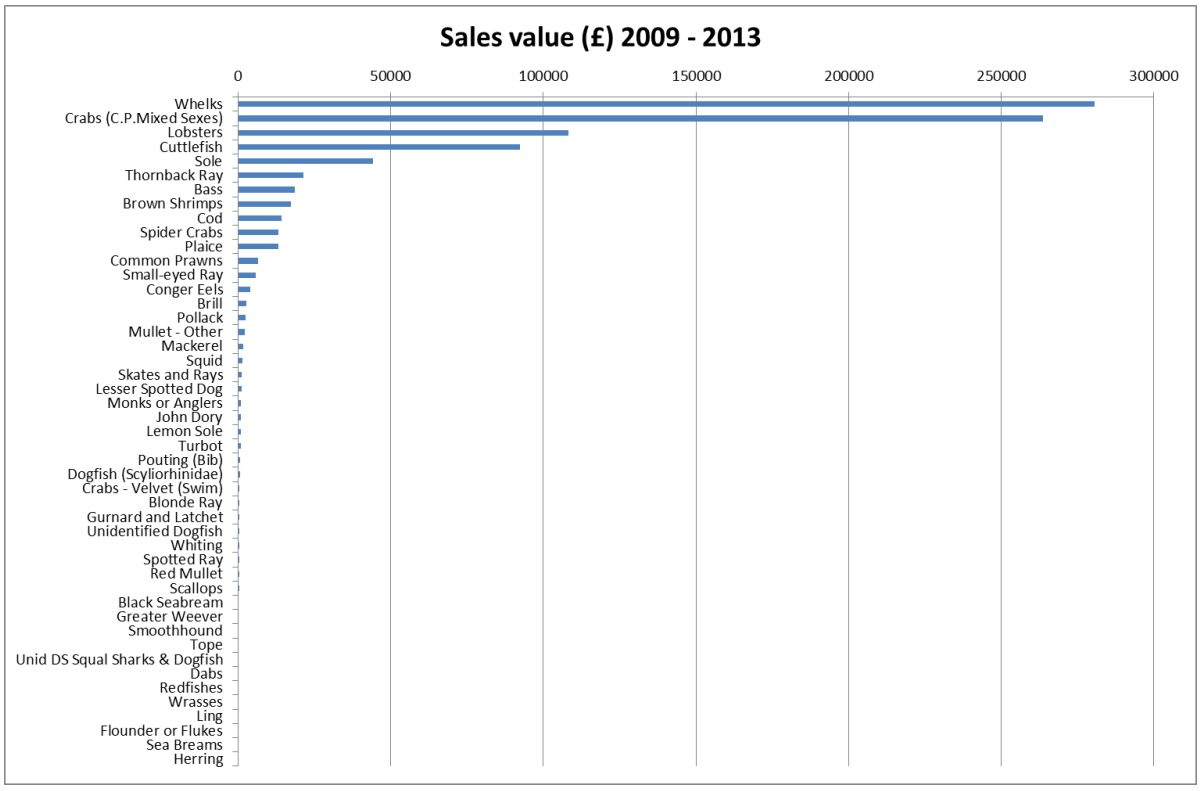


Figure B4: Total sales value (£) by species from the Lyme Bay inshore fishery

Key species

The twelve key commercial species caught in the fishery are shown in **Table B1**. On the available evidence, these species are noted to collectively represent over 95% of landings by weight or sales value. The table provides a summary of key information for each species, including common and latin name, contribution to landings by weight and value, and vulnerability to fishing.

Click on the common name to read a short description of the fishery for that species, including further information about stock and conservation status (where applicable). Alternatively, clicking on the vulnerability score[5] links to the FishBase or SeaLifeBase page for the species.

Note that detail on fishing gear relating to each species is covered separately in the following section 'methods of capture'.

Table B1: Key commercial species of the Lyme Bay fishery

Common name	Species name	% catch by weight[6]	% catch by value[7]	Vulnerability (out of 100)[8]
Bass	*Dicentrarchus labrax*	<1	2	High (57)
Brown shrimp	*Crangon crangon*	<1	2	Low (10)
Crab	*Cancer pagurus*	20	28	Low (10)
Cod	*Gadus Morhua*	1	2	High to Very High (67)
Cuttlefish	*Sepia officianalis*	5	10	Low to Moderate (30)
Lobster	*Homarus gammarus*	2	12	Moderate to High (46)
Plaice	*Pleuronectes platessa*	1	1	High to Very High (71)
Scallop	*Pecten maximus*	2	<1	Low to Moderate (26)
Sole	*Solea solea*	1	5	Low to Moderate (35)
Spider Crab	*Maja squinado*	3	1	Low (12)
Thornback ray	*Raja clavata*	2	2	Very High (76)
Whelk	*Buccinum undatum*	61	30	Low (0)

[5] Vulnerability refers to how susceptible the species is to overfishing, given its biology and behaviour
[6] Based on available MMO landings data for the 20 vessels 2002-2013
[7] Based on MMO sales data for the 20 vessels 2009-2013
[8] Froese and Pauly, 2014; Palomares and Pauly 2014.

Bass (*Dicentrarchus labrax*)

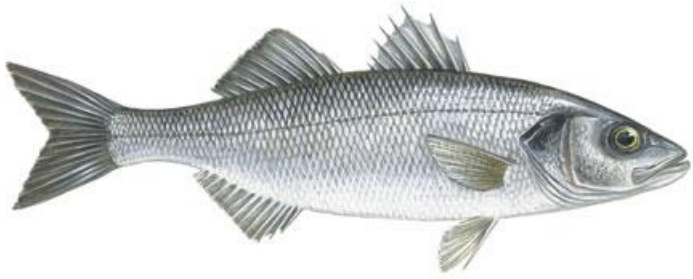


Image credit: EC Europa

Bass are relatively slow-growing and late to mature, which, along with their tendency to aggregate whilst spawning, makes them susceptible to local overfishing, although there is not any evidence of this within Lyme Bay.

Bass are a seasonally important component of the catch in a mixed inshore commercial fishery, taken by various gear including set nets, drift nets, longlines and demersal trawls. Additionally, the species is important to the Recreational Sea Angling sector. There is a European-wide minimum landing size of 36cm; within the Lyme Bay Designated Area, the prohibition of demersal towed gear means that catches of bass are restricted to static gear only.

The Devon & Severn and Southern IFCA Districts have seen the highest landings of bass recently (Nimmo, 2012) with over £1.6m and £1.4m landed value in 2010 respectively; 80% of catches were taken by otter trawl, gillnets and hook and lines. Lyme Bay data do not apparently account for a high proportion of these landings, although it is possible that many of the individual sales are below 25 kg, and therefore unrecorded within the MMO's Buyers and Sellers data.

Stock assessment is undertaken by ICES, and Lyme Bay is part of a large stock unit encompassing the Irish Sea, Celtic Sea, English Channel and southern North Sea. Reference points are not defined, and data is limited. Fishing mortality is estimated to be >Fmsy for stocks in English Channel, with ICES advice to reduce catches (Seafish, 2013).

Conservation status: IUCN Least Concern

Brown shrimp (*Crangon crangon*)

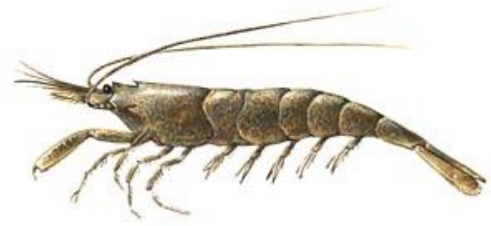


Image credit: Scandinavian Fishing Yearbook

Brown shrimp are a quick growing species, with a short lifespan and high seasonal and environmental variability. As such, abundance has little bearing on recruitment and MSY (Maximum Sustainable Yield) based stock assessments are not suitable.

There is ongoing development of stock assessment methods for Brown shrimp by the ICES Crangon Working Group. Currently, landing per unit effort (LPUE) based catch control measures are recommended as a possible management measure, but are only likely to be needed in areas of high exploitation; the regional population is not seen to be at risk (WGCRAN, 2013)

Nationally, landings of brown shrimp from inshore fisheries have increased in recent years (Nimmo, 2012), although locally they form only a minor part of the catch (<2% by value). Brown shrimp are caught by demersal beam trawl.

Conservation status: Not assessed.

Brown crab (*Cancer pagurus*)

Image credit: Jose A. G. Martinez/Wikimedia Commons

Brown crab is an important commercial species both nationally, and within Lyme Bay, where it accounts for approximately 28% of landed value from the inshore fishery.

The hard carapace gives the animal resilience to handling so that survival of undersized crab returned to the fishery is high. If minimum landing size is set appropriately in relation to size at maturity, it can therefore be an effective management measure.

Size at maturity varies geographically, and this is reflected in legislation. Minimum landing size is set at a European level and is currently 140 mm CW (carapace width); within the Devon & Severn IFCA District, this is increased 160 mm for male crabs only under Byelaw 11. A new Devon & Severn IFCA Potting Permit Byelaw currently in development would increase the female crab minimum landing size to 150mm CW. There may be boundary issues for enforcement of this due to the variation between IFCAs.

Brown crab are mostly taken using baited pots and traps of various construction, including traditional smaller pots and large steel parlour pots. A small percentage of catches are from set nets and towed gear, where crab are caught as incidental bycatch to another target fishery (Nimmo, 2012).

Nationally, CEFAS undertake stock assessments for brown crab. The most recent assessments for the western English Channel indicate that crab are inside safe biological limits, around levels that produce MSY (Seafish, 2013a, Cefas, 2011).

Conservation status: Not assessed.

Cod (*Gadhus morhua*)

The popularity of cod both domestically and overseas has led to high exploitation rates historically, which has put pressure on stocks. As a result, management and stock

Image credit: Fisheries.No

assessment for the species is particularly rigorous.

Cod is managed through quotas set at a European level, informed by regional stock assessment. Lyme Bay falls within ICES Area VIIe, which in ICES' March 2013 assessment was judged to be within safe biological limits, Spawning Stock biomass having increased and fishing mortality dropped in recent years to around Fmsy (Seafish, 2013b).

The species is caught as part of a mixed fishery using a wide range of gear, from demersal trawls to set and drift nets, longlines and even pots (Nimmo, 2012). Nationally there has been a trend of increased landings from inshore vessels, in particular under 10s. In Lyme Bay, recorded landings form a relatively modest proportion of all catches, but may not reflect total landings as it is likely that regular sales of less than 25 kg go unrecorded.

Conservation status: IUCN Vulnerable.

Cuttlefish (*Sepia officianalis*)

Image credit: Marine Biological Association

Cuttlefish are relatively fast-growing and short-lived, with an average lifespan of two years. They migrate to shallow coastal waters of the English Channel – including Lyme Bay in the spring and summer, where they spawn once before dying. Due to this aggregation – which is exploited by fisheries – spawning frequently interacts with the fishery directly; cuttlefish eggs are often attached to pots, and may be damaged as they are hauled (Nimmo, 2012).

A range of gear is used to target cuttlefish; further offshore, beam trawls are the primary method, but inshore fisheries including Lyme Bay take cuttlefish by mixed methods including demersal trawls, nets and traps (Seafish, 2014). Beam and otter trawls remain the largest contributors, although within Lyme Bay this activity is prohibited within the Designated Area. Peak landings are during the autumn, between August and December (Nimmo, 2012). Landings from the Devon & Severn and Southern IFCA Districts have formed the majority of the English inshore fishery in recent years (Nimmo, 2012).

There is currently no formal stock assessment for the region; previous estimates suggest that the West English Channel fishery may be fully exploited, and yield has been stable although there are no management measures in place and effort has increased in recent years (Seafish, 2014; Royer et. al, 2006). Southern IFCA has a Code of Practice which highlights steps that can be taken to limit damage to cuttlefish eggs, in particular[9].

Conservation status: *IUCN Least Concern*

[9] Available at: http://www.southern-ifca.gov.uk/wp-content/uploads/2014/05/Cuttlefish-Trap-CoP.pdf

Lobster (*Homarus gammarus*)

The European Lobster is one of the most high-value commercial species. In Lyme Bay, it comprises a little under 2% of landings by weight, but represents around 12% of sales value.

Image credit: Fisheries.No

Lobsters are relatively slow-growing and long-lived, recruiting to the fishery at between four to eight years of age (Nimmo, 2012). Like crabs, lobsters grow incrementally through successive moults, and their hard carapace provides good protection from predators, as well as contributing to low bycatch mortality for juvenile lobsters caught in the fishery (Seafish, 2013a).

Pots are the dominant gear used to target lobsters; they can be selectively targeted in preference to crabs but tend to form part of a mixed fishery alongside brown and occasionally velvet crabs. Lobsters are subject to an EU minimum landing size of 87 mm CL (carapace length), in addition to byelaw protection for egg-bearing females (in both IFCA Districts) and voluntary v-notching. Within the Devon & Severn IFCA District, the minimum landing size is increased to 90mm CL.

Recent CEFAS assessments for the region indicate that lobsterare inside safe biological limits within the Devon & Severn IFCA District, although spawning stock biomass is declining (Seafish, 2013a) and the stock in the Southern IFCA District is below biological limits (Southall *et. al*, 2013).

Conservation status: IUCN Least Concern

Plaice (*Pleuronectes platessa*)

Image credit: Hans Hillewaert /Wikimedia Commons

The European Plaice is a demersal flatfish which lives in shallow waters on sandy, muddy or gravel sediments. The highest landings from inshore fisheries are from within the Devon & Severn District (Nimmo, 2012). Although landings and sales of plaice from the Lyme Bay area are a relatively modest part of total recorded values, it is possible that many sales fall outside the minimum 25 kg requirements which would generate a record for MMO purposes.

Plaice are targeted year-round, although landings peak in the late summer and autumn (July-October); while static gear including gill and trammel nets are used, the bulk of the plaice fishery is caught using towed demersal gear (Nimmo, 2012). As such, within Lyme Bay the fishery predominantly takes place outside the Designated Area.

Recent ICES assessments (Seafish, 2013c) suggest that regional stocks are within safe biological limits, due to strong recent recruitment, although fishing mortality remains above Fmsy.

Conservation status: IUCN Least Concern

King Scallop (*Pecten maximus*)

Image credit: Keith Hiscock/MarLIN

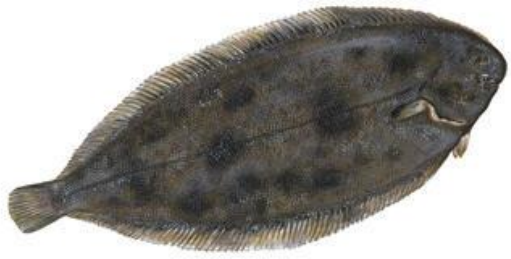
Scallops are one of the most commercially important species at both a national and local level. A large proportion of English inshore scallop landings originate from the Devon & Severn IFCA District (Nimmo, 2012), and the Lyme Bay fishery is an important part of this.

The majority of landings, both nationally and locally, are caught by mechanical (scallop) dredge, with minimal contribution from other methods including demersal trawls and hand gathering (the latter is the only method permitted within the Designated Area).

There are currently no national or regional stock assessments for scallops, and the nature of their distribution – and how this informs fishing practice – mean that a combination of methods is needed, including cohort analysis and study of catch rates. CEFAS and local managers are developing assessment protocols for scallop (Seafish, 2013f).

Conservation status: Not assessed

Dover sole (*Solea solea*)



The Dover or Common sole is a demersal flatfish found in coastal waters, associated with muddy and sandy seabed.

It is targeted alongside other demersal species, within mixed fisheries (Seafish, 2013d). Demersal beam and otter trawls take the majority of inshore landings, with static gillnets and trammel nets contributing just under 20%.

Although not a significant component of landings from Lyme Bay (<1%), the relatively high value of sole means that it forms about 5% of sales by value. It is also possible that a lot of sales are not captured by current MMO records, being less than the threshold of 25 kg.

Based on recent ICES assessments, sole is believed to be within safe biological limits, due in part to effort reduction and management in recent years, and stable spawning stock (Seafish, 2013d). The Lyme Bay fishery falls within the Western Channel multi-annual management plan for sole, under EC Regulation No 509/2007 (OJEU, 2007).

Conservation status: Not assessed

Spider crab (*Maja squinado*)

Spider crabs are found in shallow intertidal and coastal waters on coarse and mixed sediment. Most English inshore landings are from the Cornwall IFCA District, but a reasonable proportion originates from Devon & Severn and Southern IFCAs, and spider crab forms a modest part of Lyme Bay landings.

There has been an apparent increase in landings of spider crab in recent years, specifically from the under-10m sector (Nimmo, 2012). Spider crab is caught in the potting fisheries (alongside other crustacean species) and trammel nets; peak catches occur in late spring-early summer. The national minimum landing size (MLS) is 120mm carapace width (CW) for females, and 130mm CW for males. Devon & Severn IFCA are intending to increase the female MLS to 130mm CW under a planned Potting Permit Byelaw currently in development.

Whilst there are landing records and some biological data for spider crab, there are currently no stock assessments in place in England and Wales (ICES, 2012).

Conservation status: Not assessed

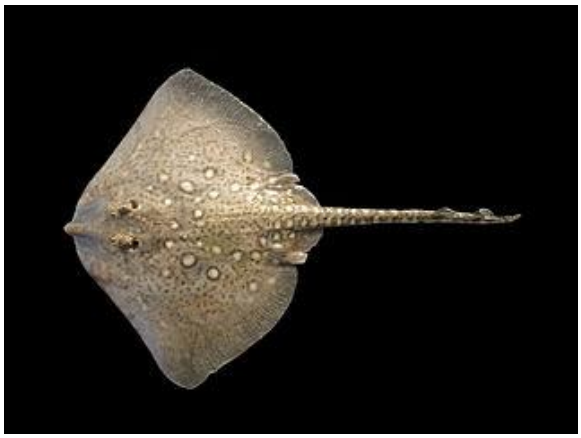


Image credit: Hans Hillewaert/Wikimedia Commons

Thornback ray (*Raja clavata*)

Thornback ray is relatively abundant in UK inshore waters, and as such it is an important commercial species. It is usually marketed as "skate" in fishmongers' (Nimmo, 2012). It is a relatively slow-growing, long-lived species.

It is only recently (since 2009) that Skates and Rays started to routinely be recorded at a

species level rather than in a generic group. This means that species-specific information and trends for Thornback ray within MMO data are limited.

Thornbacks are mostly taken as bycatch within demersal trawl fisheries (otter trawls account for 68% of landings), but they also form part of the mixed fishery taken by gillnets (Nimmo, 2012) and trawling (SIFCA pers. comms.).

Stock assessments are not currently available, but the most recent ICES advice for this area is that stocks are stable, and abundance has increased; it is suggested that catches might be safely increased by up to 20% (Seafish, 2013e).

Conservation status: IUCN Near Threatened

Whelk (*Buccinum undatum*)

Whelks are an extremely important part of the Lyme Bay fishery, as MMO data suggests that they comprise over 60% by weight of landings, and over 30% by value of sales.

Image credit: Hans Hillewaert/Wikimedia Commons

Devon & Severn and Southern IFCA District landings are among the highest in English inshore waters, with the majority (97%) of whelks taken as a target species using pots and a small minority as bycatch within demersal trawls (Nimmo, 2012).

There are no current formal stock assessments for whelk. Landings nationally have increased in recent years. There are questions over sustainability as the current MLS (45mm) is below estimates of mean size at maturity. A recent Cefas study (Lawler, 2013), to which Southern IFCA and others contributed, found that size at maturity varies between whelk populations in different locations. Estimates from whelks landed at Exmouth suggest that 50% of the population are sexually mature at 72mm shell length (females) and 69mm length (males); at Weymouth, the whelks sampled matured at a smaller size (54mm, 59mm length for females and males respectively). This study and similar research undertaken by Devon and Severn IFCA indicates that the national MLS is not effective as a measure to conserve spawning stock.

Conservation status: Not assessed

Methods of capture

Project Inshore (Nimmo and Southall, 2012) provides a good overview of different gear types used in inshore fisheries; a brief summary is included here. A list of sources for more detailed information on gear is included at the end of this section.

Static gear

Static or passive fishing methods are those where gear is placed in the water, and later collected. Often, bait is used to attract fish to the hook, pot, trap or net. In general, the use of static gear is seen as less destructive than towed fishing methods, as it presents a low risk of physical damage to the seabed.

Pots, Creels, and Traps

A variety of pots are used locally. They are the dominant gear type, used to target shellfish including crabs, whelks, lobsters, and cuttlefish – although occasionally cod may also be caught. The construction and use varies depending on the target species.

Bait also varies: fish carcasses are often used to attract lobster and crab, whereas female cuttlefish or lures are used as bait to trap male cuttlefish, and whelk bait includes fish and crab. Pots are deployed either singly or (more commonly) in strings or shanks, which may number between 10 and 24. Anchors at each and of the string keep it in place, while marker buoys aid retrieval and help to avoid gear conflict between fishers.

"Soak time", between deployment and hauling, may be 24-48 hours or more, depending on weather. Most vessels are equipped with a hydraulic pot hauler. Within the Lyme Bay Reserve, the Voluntary Code of Conduct sets a maximum pot limit on 250 per vessel. There are IFCA Byelaws concerning the construction of pots, including the use of escape hatches where "soft entrances" are used[10]. This allows undersized fish and smaller non-target species to escape, whilst sizeable animals are retained.

Netting

A number of nets are used in Lyme Bay, predominantly targeting sole, bass, plaice, skates and rays, and other demersal fish including cod. Gill nets are the main type used, although the records are generic and do not specify much detail. These are single nets, buoyed at the top and weighted at the bottom to keep them afloat in the water, and kept in place with an anchor at either end. Depending on the target species, the height of the net in the water column may be adjusted (for example, to favour demersal fish).

There are Devon & Severn IFCA Byelaws relating to net construction, including mesh size (Byelaw 17). The Code of Conduct includes a voluntary cap on the length of nets deployed by each vessel (not more than 3200 yards, with no individual length longer than 800 yards) within the Reserve.

[10] The use of escape gaps is compulsory (under Byelaw 22) within the Devon & Severn IFCA District, and voluntary (encouraged by the provision of funding) within the Southern IFCA District.

Line

Methods include hook & line, handlines and longlining. MMO data show that most line caught fish in Lyme Bay are taken by handline and poleline, or “hand fishing”. Although these methods account for very little of recorded sales, they are selective and relatively labour intensive, yielding relatively small quantities at a time compared to netters and trawlers, which means that many sales may not require recording under Buyers & Sellers guidelines.

Key target species include mackerel, pollack and bass.

Hand diving for scallop

Whilst not practiced by many local fishermen, some hand collection of scallop (*Pecten maximus*) by divers occurs on a commercial basis and allows stocks within the Designated Area – off limits to scallop dredgers – to be targeted. This is an increasingly popular activity (SIFCA pers. comms.)

Towed gear

In contrast to passive or static fishing, towed methods are those where gear such as trawls and dredges is propelled through the water or across the seabed. Although demersal towed gear (which targets benthic species and comes into contact with the seabed) is not permitted within the Lyme Bay Designated Area and cSAC, it is used outside the boundary and many finfish species are caught using towed fishing gear.

Demersal Trawl

Outside the Designated Area, beam and otter trawls are responsible for catches of cuttlefish, sole, lemon sole, whiting, skates and rays, monkfish, gurnard, squid, plaice, haddock, cod, pouting, bass, brown shrimp and dogfish. Cuttlefish are a particularly important component locally, and one of the main target species. They are also outside of the AOI in the mid Channel.

While both beam and otter trawls target fish which are associated with the seabed, they work slightly differently. Beam trawls comes in contact with the seabed along the length of the beams, which weight the net down and keep it open whilst under tow; Otter trawls use “otter boards” to maintain the net opening.

There are specifications for mesh size and construction for most trawls, depending on the target species and the area fished. Selectivity varies, and modification can be made to avoid non-target bycatch. Vessels using mobile gear are often subject to spatial restrictions depending on registered length, engine power or a combination of both.

Pelagic Trawling

Pelagic or midwater trawls target species including sprat, herring, and mackerel; and may also include bass and bream (SIFCA pers. comms.). They are subject to similar restrictions

with regards to net construction, to increase specificity - although activity is less subject to spatial restrictions due to the lack of contact with, and impact on, the seabed. There are conservation issues regarding bycatch of ETP (Endangered, Threatened and Protected) species, although mitigation measures are available. However, pelagic trawl activity within the Lyme Bay area is limited, according to available MMO data.

Dredging

Mechanical dredges are generally used to target shellfish, and tend to be designed around the target species. In the project AOI outside of the Designated Area / cSAC, the principal gear used is the scallop dredge. A series of dredges is attached to beams deployed either side of the vessel, lowered to the seabed. Spring loaded “teeth” at the dredge mouths make contact with the seabed, disturbing the scallops and scaring them up into the bag.

There have been concerns locally over the impact of scallop dredging on sensitive seabed habitats, and much of the protection of Lyme Bay (both the Designated Area, and the cSAC) exists to protect certain core areas of reef from the potential of physical damage from fishing. Spatial management allows dredge fisheries elsewhere in Lyme Bay, by directing them to less vulnerable areas. Scallop dredge fisheries are subject to seasonal closures and fishing must take place between 0700 – 1900 in accordance with IFCA byelaws.

Further sources of information

Detailed explanations and illustrations of fishing methods, gear configuration, and their likely interaction with the marine environment are available within the following documents:

- Seafish Basic Fishing Methods – Seafish (2005)
- Definition and classification of fishing gear categories - Nédélec, C. and Prado, J. (1990)
- Project Inshore Stage 1 report – Nimmo and Southall (2012)
- An Introduction to Commercial Fishing Gear and Methods Used in Scotland - Galbraith, R.D. and Rice, A. and Strange, E.S. (2004)

Fishing effort by gear type

Figure B5, below, illustrates the proportion of fishing effort using different gear types within Lyme Bay, based on the MMO data provided.

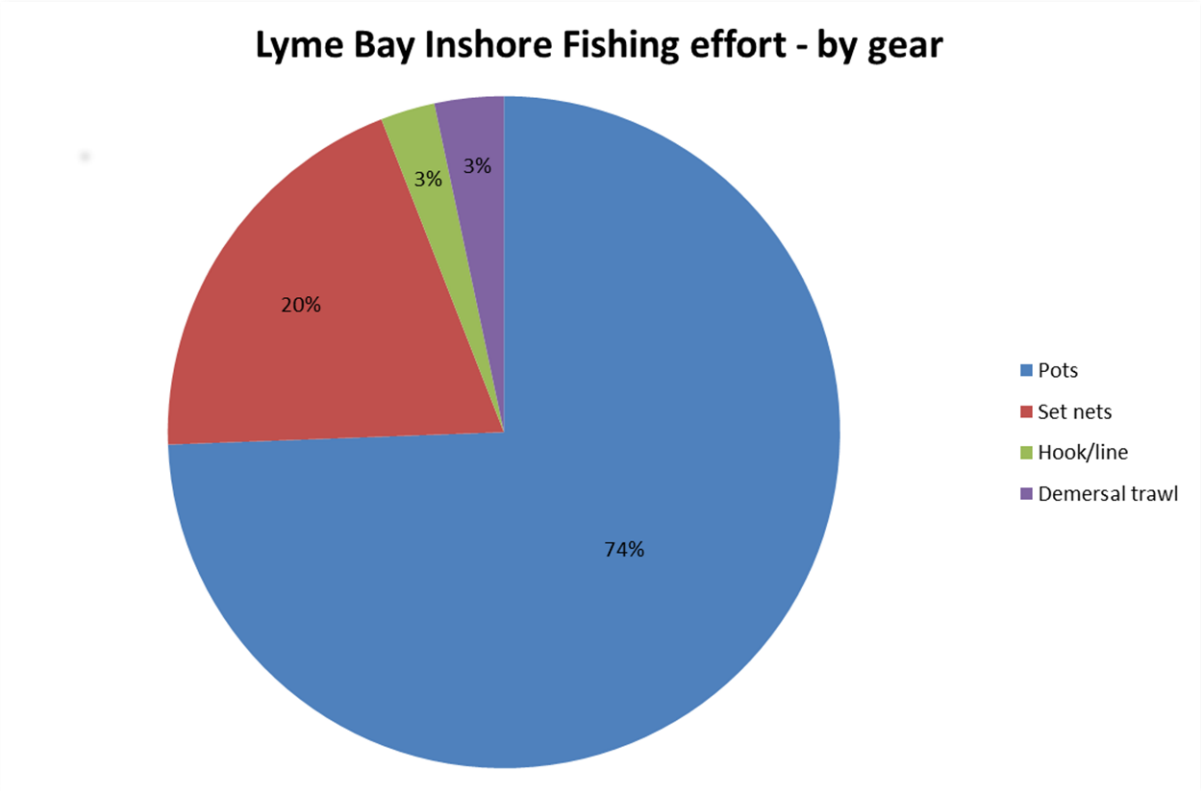


Figure B5: A breakdown of inshore fishing effort by gear type

Static gear accounts for 97% of effort within ICES Rectangles 30 E6 and E7, which corresponds to the inshore part of Lyme Bay, within 6nm from baselines. Nearly three quarters of logbook entries relate to potting activity alone. This reflects the prohibition of demersal towed gear within the Designated Area, which covers a large proportion of inshore Lyme Bay, but it is also a function of the key fishery species; whelk, crab and lobster form the bulk of landings, and are targeted using pots and traps.

One of the challenges for sustainability evaluation, or indeed a review of management, is a lack of effort data on the level of individual fishery species. Within inshore fisheries such as Lyme Bay, operations are usually diverse, seasonal, and not fully documented; while effort data and species data are collected, these data are not collected together, so they can only be compared by inferring key relationships (for example, between potting and crab, lobster and whelk).

This does not stop an assessment being made, but where a risk based approach is used (including within the MSC Framework, or for the purposes of EMS or MCZ risk assessment), a lack of data tends to mean a higher level of precaution.

Improvements in information gathering in the inshore shellfish sector in Lyme Bay might be gained by tying in Monthly Shellfish Activity Return (MSAR 1), which record details of trips made alongside catch information at a species level. This is assigned to a broad ICES sub-rectangle, but if teamed with spatial data from inshore VMS it could provide detailed spatial effort at a species level. However, there are implications for management (in terms of time required to manage and combine datasets) as well as fishermen, who would have to consent to commercially sensitive data being released, even if the eventual output could be anonymised effectively. This is being explored under the Lyme Bay Fully Documented Fisheries Project for the Working Group.

The Geography of commercial fisheries in Lyme Bay

This section aims to characterise fishing effort using logbook data, as well as looking at spatial patterns of fishing and the availability of supporting information. It is worth reiterating that the MMO logbook data, which is the main source used here, is based partly on estimates and local knowledge on behalf of MMO Officers, which is used in combination with sales records (where available) to generate records relating to trips.

Activity by port

Available MMO data show that the three key ports targeting the local area are Beer, Lyme Regis and West Bay, which collectively were the home ports for over 80% of the trips recorded in the logbook. Detailed analysis by port cannot be shown here due to a need to preserve the anonymity of the local vessels that provided data (some of the ports represent only one vessel, so commercial confidentiality may be compromised).

Although vessels from a number of ports outside Lyme Bay prosecute fisheries within the inshore grounds, the majority of activity appears to originate from within the Bay itself. However, this may be related to the origin of the data, given that it those providing consent are signatories to the Lyme Bay MOU. Industry membership skews towards local, smaller inshore boats, which is likely to be strongly reflected in the data obtained. This limits the confidence with which we can draw any conclusions from the data, particularly where the size of vessels and their origin is an important factor.

Nevertheless, the MMO data provides an idea of potential differences within this local inshore sector. **Figure B6**, over, shows a breakdown of effort for each port based on gear for the combined logbook entries.

While potting is the dominant gear used at many ports to target the Lyme Bay fisheries, and the exclusive method at some, at others, netting or the use of hook/line methods is also relatively important. For the three ports responsible for the majority of local effort (Beer, Lyme Regis and West Bay), there is a similar composition, with approximately 75% of effort associated with potting, netting accounting for ~10% and a small amount of lining and minimal demersal trawling.

Figure B7 shows a breakdown of effort for the same ports, but rather than using the subset of data from Working Group vessels, the most recent (2012) data from the wider MMO dataset is used. While Beer has a similar profile, towed demersal gear is shown to be more important to landings from Lyme Bay fisheries into Lyme Regis and West Bay than the dataset from Working Group vessels suggests.

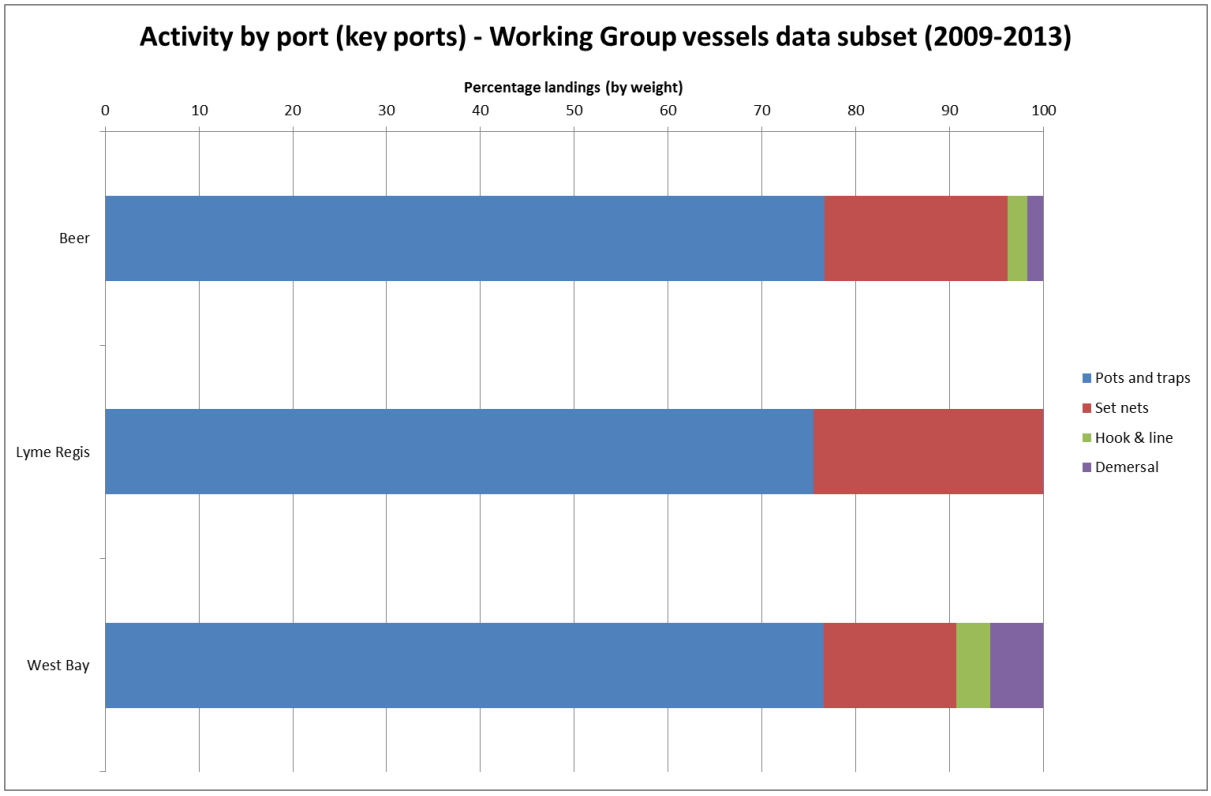


Figure B6: a breakdown of landings for the three main ports by gear type (subset from WG vessels)

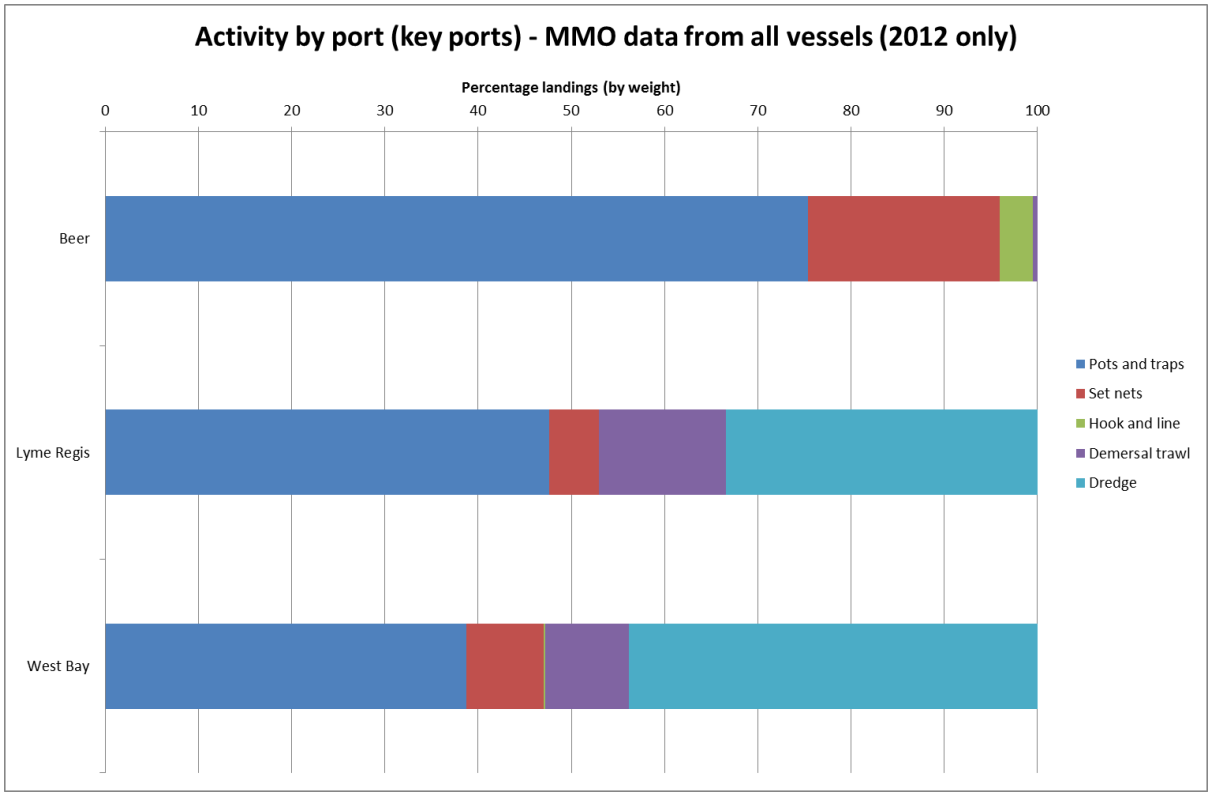


Figure B7: A breakdown of landings for the three main ports by gear type (all vessels)

Towed demersal gear is now prohibited from much of Lyme Bay, and more current data – not available at the time of writing - may reflect a reduction in landings from demersal and dredge fisheries within the same ICES statistical rectangles. However, the comparison of the Working Group data subset with the full MMO dataset suggests that bottom towed gear is used - albeit outside these prohibited areas - within Lyme Bay.

Vessel Monitoring Systems (VMS) data

Vessel monitoring data provides some indication of the geographical extent of the fishery in the wider Lyme Bay region, showing activity of larger (over 15m registered length) vessels using both static (passive) and mobile gear.

Figures B8 and **B9** show the cumulative fishing effort by passive and mobile gear respectively in Lyme Bay, generated from VMS data. In both cases, there is an apparent absence of activity within the Lyme Bay Designated Area itself, and in the inshore 3nm corridor between Torbay and Weymouth in general. This area includes the main home ports for the local fleet, such as Axmouth, Beer, Lyme Regis and West Bay.

This pattern is misleading - an artefact of the VMS data, which, for the period shown (2007-2010) comprises activity data from vessels greater than or equal to 15m registered length. Much of the local fleet did not have VMS recorders fitted at this time; moreover, larger vessels of over 12m or 15m registered length are not allowed within the Southern IFCA and Devon & Severn IFCA Districts, respectively.

However, recent changes have brought vessels over 12m online with VMS nationally, and there is currently a trial of inshore VMS (iVMS) in Lyme Bay under a partnership agreement between the MMO, Natural England and South West Inshore Fishermen's Association (SWIFA). The Fully Documented Fishery Project being carried out by the Working Group has the potential to produce a comprehensive and valuable data set.

These new sources of spatial data are likely to provide much more meaningful information on the spatial extent and patterns of activity of key fisheries within Lyme Bay, and at a resolution more appropriate to management within the Lyme Bay Designated Area.

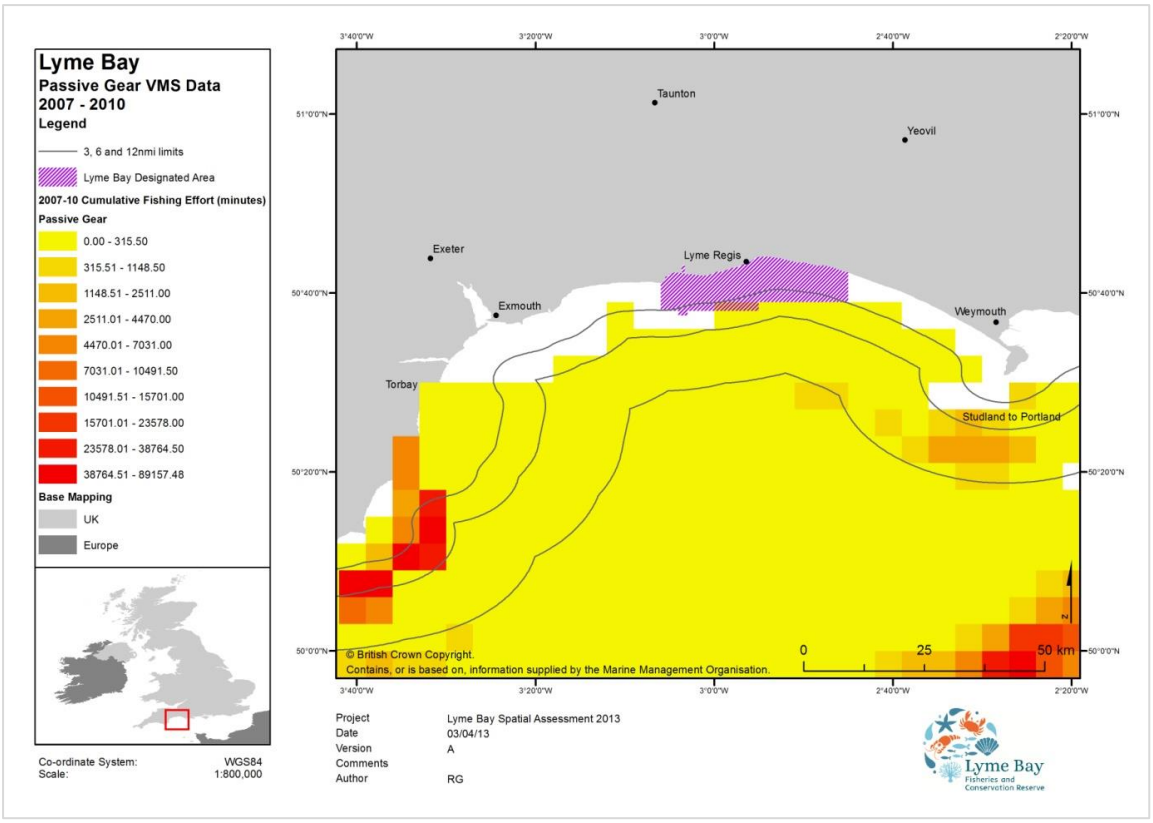


Figure B8: Passive gear – relative cumulative effort from VMS data (2010)

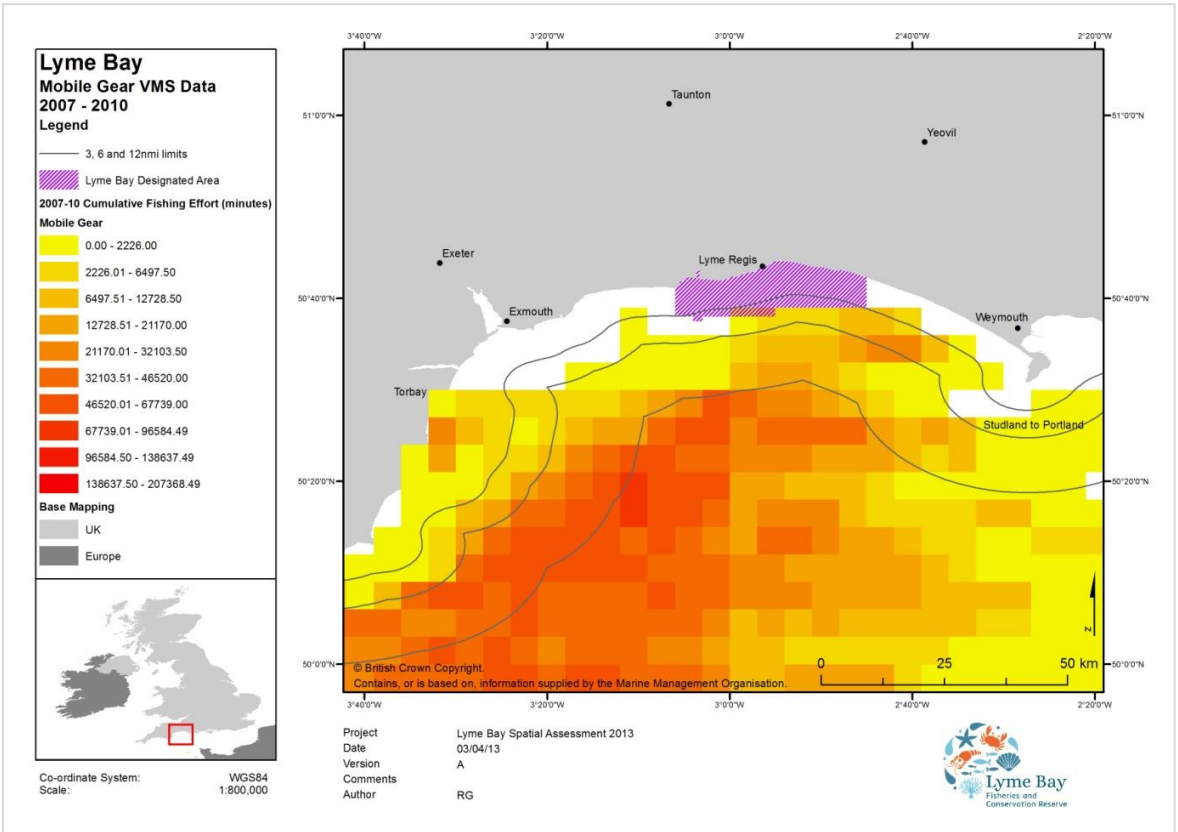


Figure B9: Mobile gear – relative cumulative effort from VMS data (2010)

MMO and IFCA Sightings data

The MMO and both Southern and Devon & Severn IFCA collect spatial information in the form of boardings and sightings data. This consists of point observations taken during routine patrols, is not limited to larger vessels, and as such is more useful in this context. However, the frequency of data collection is relatively low, so although it can be combined to show patterns of activity, it is not suitable for illustrating relative effort. Additionally, the sightings do correlate to patrol effort – it is possible to correct for this by calculating sightings per unit effort (Vanstaen & Silva 2010), and this should be done if quantitative analysis is required.

Combined sightings data show that fishing activity within the Designated Area is limited to static gear, including potting, gill netting, nets and lines; scallop dredging and other demersal towed gear are all excluded. This is in keeping with the various restrictions on demersal gear within the Designated Area. Potting, including the use of whelk pots, is by far the most frequently sighted activity within the Area.

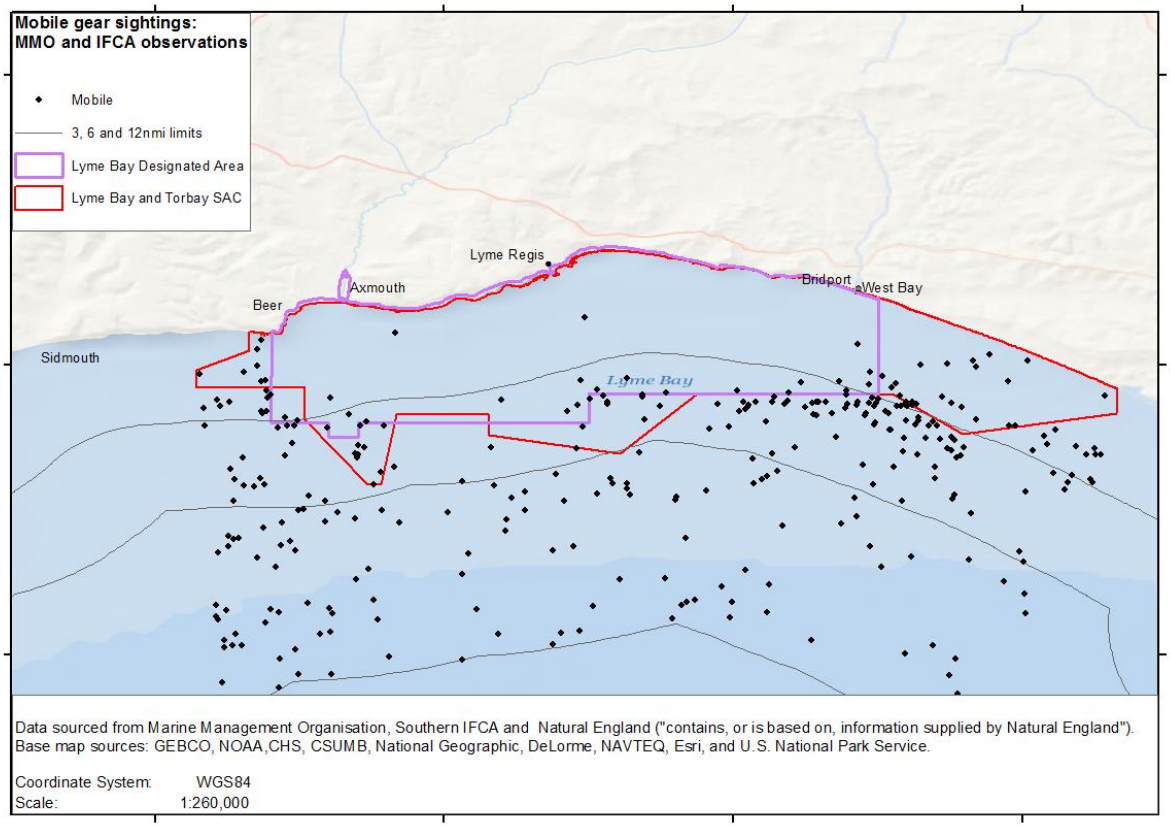


Figure B10: Mobile gear sightings from combined MMO and IFCA data

Figure B10 shows sightings of fishing activity where mobile gear types were in use. This includes demersal trawling, some pelagic trawling and dredging. Categorisation of gear type differs between IFCA and MMO records, and some of the categories are ambiguous as to whether gear is demersal or pelagic, so the level of detail is fairly generic. It can be used as

an indication of activity, but not in a quantitative analysis of effort as there has been no adjustment or accounting for patrol or sightings effort.

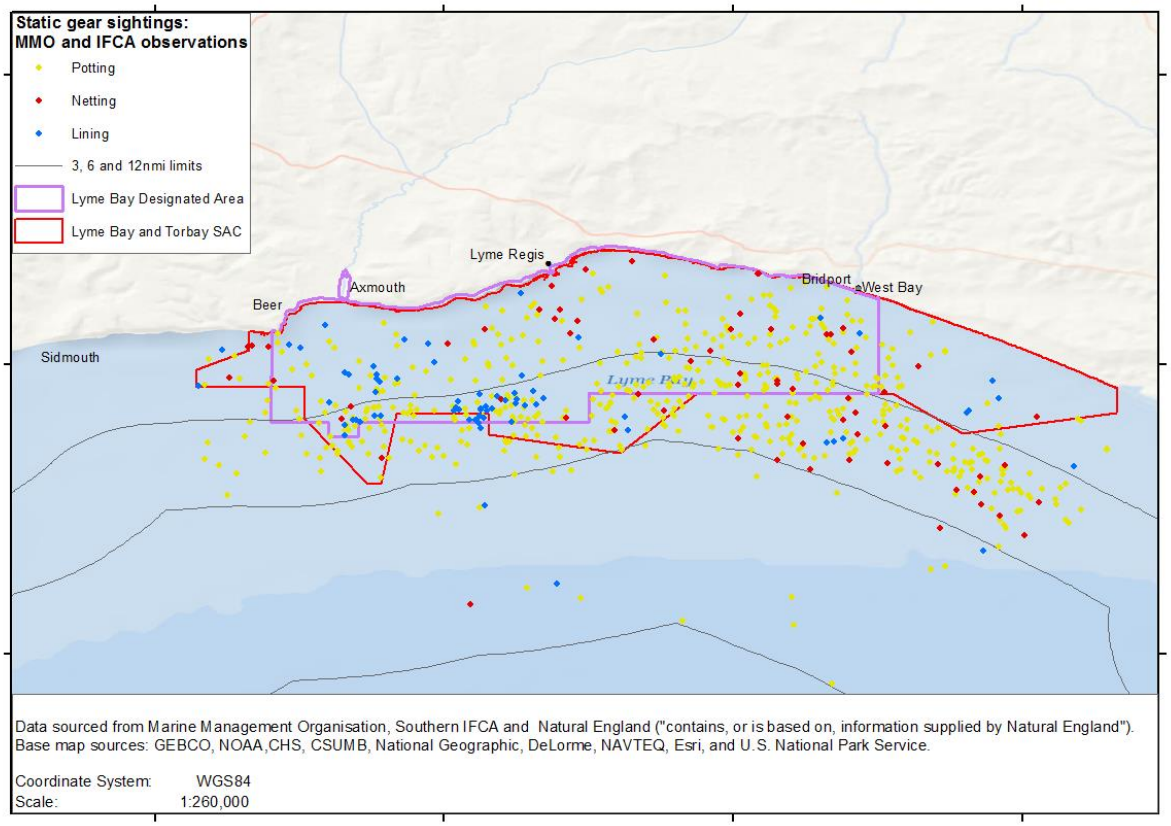


Figure B11: Static gear sightings from combined MMO and IFCA data

Figure B11 shows sightings of static gear from the same sources. Incidences of potting, netting and lining activity were discernable from the gear categories, although similar issues with ambiguities over gear type are present. This is likely in part due to different methods of data collection – while boardings give a level of detail on gear type and activity, sightings will always, by definition be "remote" and less specific. Equally, MMO overflight data cannot distinguish between different net types or how they are being used (pelagic, demersal).

The footprint of static gear use is relatively close to the inshore (6 nm) limit, with few sightings beyond this. Lining (which in includes commercial and potentially recreational rod and line use) appears to be clustered in certain parts of the Designated Area, such as to the south west – although, as previously noted, the data as shown here has not been adjusted for effort. Given the seasonality of certain activities, multiple sightings over one or two patrols can create "clusters" that are more reflective of patrol effort than wider fishing effort.

Cefas inshore fisheries maps

Cefas were contracted by Defra to reconcile the more comprehensive VMS coverage with available inshore data, which focussed largely on sightings and boardings data collected by the then Sea Fisheries Committees (now IFCAs), with additional data from the Environment Agency and the MMO. The purpose of the project was to fill in the "gap" in the inshore zone, with a view of providing information to inform marine management and in particular the new MCZs (Vanstaen and Silva, 2010).

The resulting data layer accounts for patrol effort, and shows a measure of relative effort for different gear types – again, this is at a relatively generic level, split into static (all, netting, potting, lining) and mobile (all, dredging, trawling). Additionally, confidence layers give an indication of the relative quality of the data used and the strength of any assumptions made in its interpretation.

Currently, the National Inshore Data Layer is not publicly available in digital format, so a local-level view is not possible, although charts showing the effort maps at a national scale are available in the project report, which is online[11].

Location of core fishing grounds

The broadscale, regional nature of the data currently available means that any definition of "core" fishing grounds is impractical. In general terms, the self-declared core fishing grounds of members within the Lyme Bay working group (based on confidential interviews) are mostly within the 6 nm zone, although some potting and set netting is conducted out to 12 nm when the weather and tide allows.

In the future, improvements in spatial data collection are likely to be tied to the adoption of iVMS as a management tool and by the success of the Fully Documented Fishery project, and how that is taken forward and tied into other available (or new) sources of data. This may be as much in the interests of fishermen as of fisheries and conservation managers, as a better understanding of the spatial footprint of fisheries and how they correspond to conservation features can allow pragmatic, flexible decisions on aspects such as closed areas. This can be used directly within an adaptive management setup – through the implementation of flexible byelaws, for example. Devon & Severn IFCA has brought in a permitting byelaw for management of mobile fishing, which makes use of spatial measures tied to VMS. The IFCA is developing similar management for the potting and diving sectors, due to be in place by the end of 2014. Further activities, including netting, are to be considered in 2015.

[11] The report (Integrated inshore and offshore fishing activities data layer in aggregate producing REC areas) was produced for the funding body, Marine Aggregate Levy Sustainability Fund) and can be downloaded from a link at the project portal: http://www.cefas.defra.gov.uk/alsf/projects/socio-economic-issues/09p116.aspx.

Fisheries management and relevant legislation

Most fishery stocks for the Lyme Bay area are managed nationally by the MMO, under the protocols of the European Common Fisheries Policy (CFP) and European Directives. Relevant EU and primary legislation is listed below. Where available, a link is provided to the legislation or a source of further information.

National Fisheries legislation

At a national level, this includes a range of primary legislation (such as the recent Marine & Coastal Access Act) in addition to secondary legislation (such as Statutory Instruments, which transpose EC Directives and enact them in the UK).

The Blue Book is a collection of all fisheries legislation, and can be accessed via the MMO website[12]. The page is kept up to date with variations and is the same resource used by MMO Fishery Officers (and IFCOs).

The legislation relating to the Technical conservation of fisheries resources (EC 850/98)[13] is one of the key sources of management measures relating to gear, minimum landing sizes.

Traceability and labelling

- Registration of Buyers and Sellers[14] – this is administered by the MMO, and requires first sales of fish and shellfish to be reported (subject to certain exceptions).
- Food Labelling Regulations (1996)[15] – these apply to sellers of all food products (covering final sales to the consumer), including fish
- Fish Labelling Regulations (2013)[16] – includes direction on traceability and provenance of product, which is relevant to eco-labelling and origin branding for fish and shellfish

Hygiene

Seafish has guidance for producers on the various hygiene legislation and requirements as they apply to fish and shellfish. This can be accessed from the Seafish website[17].

National management and enforcement

The MMO are responsible for fisheries management through licensing and quota allocation at a national level. Much of the inshore fleet falls outside some of these mechanisms which

[12] http://www.marinemanagement.org.uk/fisheries/monitoring/regulations_bluebook.htm
[13] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1998R0850:20130101:EN:PDF
[14] http://www.legislation.gov.uk/uksi/2005/1605/contents/made
[15] http://www.legislation.gov.uk/uksi/1996/1499/contents/made
[16] http://www.legislation.gov.uk/uksi/2013/1768/contents/made
[17] http://www.seafish.org/industry-support/legislation/hygien

predominantly manage larger, offshore vessels, but MMO local Officers still have regular contact with local vessels and conduct inspections at sea and at ports. Much of the data from smaller inshore vessels comes from estimates of local MMO Officers in conjunction with sales records where available.

Enforcement and surveillance activity includes boardings at sea, inspection of landed catch, and aerial sightings, although Vessel Monitoring Systems have come to play a more prominent role since their introduction, and enable more effective real-time monitoring of effort and, where fitted, catches through electronic logbooks.

Local management

Within the boundaries of the 6 nm limit, fisheries management is provided by the local offices of the Devon and Severn IFCA, as well as by the Southern IFCA. A summary of key Byelaws relevant to the main Lyme Bay fisheries is included below.

Byelaws

- D&S IFCA Byelaw 3 – Scallops: restricts fishing times (0700-1900) and season (prohibited July-September inclusive)
- D&S IFCA Byelaw 4 – relating to gear used in scallop fisheries
- D&S IFCA Byelaw 11 – increasing the MLS for male crab to 160mm CW
- D&S IFCA Byelaw 18 – restricting access for vessels over 15.24m LOA, with some exceptions
- D&S IFCA Byelaw 22 – relating to the construction of pots for crustacean fisheries (including reference to escape gaps)
- D&S IFCA Byelaw 26 – protecting V-notched lobsters
- D&S IFCA Byelaw 27 – providing additional protection for lobsters, by prohibiting the removal of berried lobsters from the fishery, and increasing the MLS above the national limit, to 90mm CL.
- D&S IFCA Mobile Fishing Permit Byelaw – requires all vessels operating mobile gear (particularly dredging and bottom towed) to have a permit in the District, to which conditions stipulate area and period of operation & construction (and can be adapted)
- Southern IFCA Byelaw 1 – closes the part of the District within 3nm to towed nets (trawls) between 1st May and 31st August inclusive, where the fishing vessel is powered mechanically (i.e. by any sort of engine)
- Southern IFCA Byelaw 17(2) – relating to the use of set nets in Lyme Bay (regarding the distance for the headline below the surface; this can mitigate for impact on non-target species including those designated for conservation purposes)
- Southern IFCA Byelaw 18 – restrictions on vessel sizes within inshore fisheries
- Southern IFCA Byelaw 27 – specifying gear for scallop dredging, and restricting fishing time (0700-1900)

- Southern IFCA Byelaw 28 – Protection of egg-bearing lobsters, preventing their removal from the fishery.
- Southern IFCA Bottom Towed Fishing Gear Byelaw – spatial management prohibiting the use of bottom towed fishing gear within specified areas, including part of Lyme Bay (Area 29). Aimed at protecting sensitive seabed habitat.

Devon and Severn IFCA is currently consulting on permitting for pot and diving fisheries, which would allow similar management measures and flexibility as their recently-introduced Mobile Fishing Byelaw. Southern IFCA is undergoing a review of "legacy" byelaws to ensure they are fit for purpose under the requirements of their new IFCA duties.

In addition to enforcing IFCA Byelaws, Officers have powers under the Marine & Coastal Access Act to enforce national legislation on British registered vessels fishing within their District. Both IFCAs maintain a seagoing capacity, and undertake enforcement activity including boardings and sightings as well as shore-based regulation.

The IFCAs also have a conservation and research role, and in addition to collaborating with other organisations (Natural England, Universities and Cefas) undertake their own research and stock assessments. A large part of the IFCAs' current workload is reviewing fishery interaction with designated habitat features within European Marine Sites and Marine Conservation Zones in their Districts.

Partner organisations

In addition, management input is provided by statutory conservation authority Natural England; Cefas, who provide scientific advice to the IFCA in addition to conducting their own research; NGOs including BLUE, through its facilitation of the Lyme Bay Reserve, and the Devon Wildlife Trust. Partnerships also exist with universities, including the University of Plymouth for whom a PhD candidate is currently undertaking research into Lyme Bay potting fisheries.

Fishermen have input to fisheries management both through representation on the IFCA committees as MMO appointees, and through the Lyme Bay Working Group as well as via Fishermen's Associations. In Lyme Bay, the South West Inshore Fishermen's Association has partnered with the MMO and NE along with the IFCAs and other parties under a MOU to trial inshore VMS for all boats fishing in the Lyme Bay cSAC.

Recreational interests including sea angling and diving have varying degrees of representation at IFCA level and through participation with the activities of the BLUE Working Group.

Management regime

Fisheries management in Lyme Bay, and within the Reserve in particular, broadly follows an adaptive co-management approach, with partnership working between key stakeholders at several levels.

Figure B12: The fisheries management spectrum (from Woolmer, 2012)

Within the Common Fisheries Policy (CFP) and Marine Strategy Framework Directive (MSFD) at a European level, there is a mandate for fisheries to be managed under an ecosystem based approach, within the context of environmental conservation and sustainable development – this means balancing the social and economic uses of Lyme Bay with the preservation of the biology and environment of the site. While this approach can be seen in the activities of different partners at their own level, the challenge for fisheries management in Lyme Bay is to work smoothly across all administrative boundaries.

Key dates in the management of Lyme Bay

1998	Devon Wildlife Trust initiates Lyme Bay Reefs Project, involving local fishermen in project steering group.
2000 – 2001	Southern Sea Fisheries Committee investigates feasibility of byelaw to protect reef features. In face of opposition, SSFC conclude voluntary approach more likely to succeed.
2001	Voluntary agreement to close two small areas at Lanes Ground and Saw Tooth Ledges to bottom trawling and scallop dredging between Devon Wildlife Trust and local fishermen
2005	Voluntary agreement discontinued due to rising fuel prices, higher prices for scallops and West Bay harbour development lead to scallop boats rising from 9 to 20
2006	Voluntary agreement increased to 4 small closures 12 nm^2, now also including East Tennents and Beer Home Ground
August 2006	Legal closure of 41.2km^2 of reef, agreed between Secretary of State and South West Inshore Scallopers Association
July 2008	Implementation of Lyme Bay Designated Area (Fishing Restriction) Order 2008 which prohibits dredging for shellfish and demersal trawling in 206km^2 (60nm^2) to protect marine biodiversity (and voluntary closed areas removed)
August 2010	Submitted by DEFRA to European Commission as a candidate Special Area of Conservation (cSAC)

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