

# NORTH DEVON MARINE PIONEER PROJECT – OUTPUT 1

## CONTEXT: FISHERIES BASELINE AND WHAT'S POSSIBLE FOR THE PIONEER

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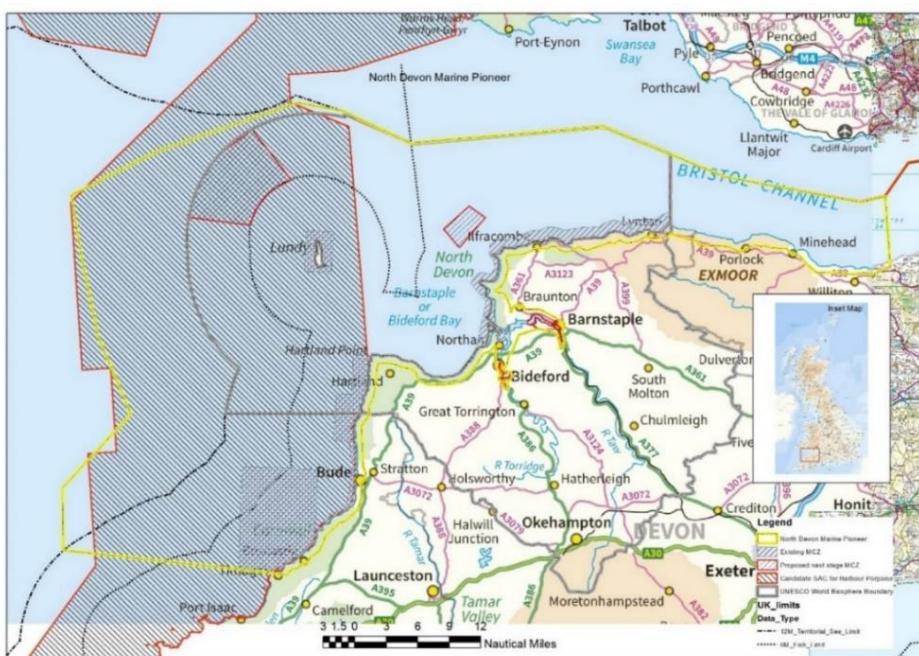
## 1. Context

The North Devon Marine Pioneer (NDMP) is based within the North Devon UNESCO Biosphere Reserve (shown below in section 2) and is one of four pioneers aiming to test innovative ideas for environmental governance informing the 25 Year Environment Plan<sup>1</sup>. The NDMP aims to explore how marine natural capital can be best managed to deliver triple bottom line (social, environmental and economic) benefits locally. To meet the objectives of the NDMP, specifically regarding the development of pioneering fisheries management, it is necessary to understand the current extent of the fishery and opportunities for changes in management.

North Devon's commercial fisheries are mixed, very weather and tide dependant, traditionally diverse and seasonal. Fishing gears are varied, with species targeted by trawls (skate, ray, squid, sole, cod, dogfish and bass), pots (whelks, crabs, lobster), nets and rod & line (bass, herring). Aquaculture for oysters and harvested wild mussels are also undertaken within the NDMP area.

The following sections provide an overview of the four ports within the NDMP, numbers of vessels, volume and value (first sale) of landings as well as the key target species and the state of their stocks. Using this baseline the report shows where there are opportunities for more localised management, while also indicating where the stocks are wider ranging (even trans-national) and therefore require management at a higher (national / EU) level.

## 2. The NDMP Area



The NDMP boundary is shown in yellow and includes both inshore (0-6nM) and offshore (6-12nM) components.

Source: NDMP website

The NDMP covers 5500km<sup>2</sup> of the Bristol Channel and Celtic Sea, including the offshore island of Lundy with land boundaries in Devon, Cornwall and Somerset as well as the Taw Torridge estuary. The NDMP includes marine protected areas (MPA) designated under EU (European Marine Sites -EMS) and UK (Marine Conservation Zones –MCZs) legislation.<sup>2</sup>

### 3. Ports and fishing vessels in the NDMP area

The NDMP area includes four ports with commercial fishing vessels registered and recorded commercial landings: Ilfracombe, Appledore, Bideford and Clovelly. There are also fishermen fishing out of Minehead who do not use boats but fish for herring using traditional set nets from shore. There are vessels that fish within the NDMP area but come from elsewhere e.g. Padstow and Port Isaac. There are also commercial fishing vessel based at smaller ports that fish the NDMP waters.



Source: GoogleMaps

The Marine Management Organisation (MMO) vessel register for April 2019 shows 21 active vessels in the four fishing ports within the NDMP area. However, beyond those listed in the MMO vessel register there are other vessels identified through the Devon and Severn IFCA permit scheme. The actual number of vessels (and therefore landings into NDMP ports) is therefore higher than the figures available through the MMO. This

is a significant issue for data (and therefore management) so an accurate baseline of vessels active in the NDMP area is a key step for the project to determine.

According to the MMO database there are six over 10m vessels in the NDMP area (there are nine according the D&SIFCA permits), with an average length of 12.2m (10.9m according to D&SIFCA data). Three are based in Ilfracombe (one is under 15m the other two under 12m), one is based in Appledore and two are based in Bideford. Four of the six have shellfish entitlements and none have scallop licenses.<sup>3</sup>

There are 15 under 10m vessels in the NDMP area (33 according to D&SIFCA permits – a noteworthy and significant difference which needs to be resolved), with an average length of 6.2m (6m according to D&SIFCA data). Three are based at Ilfracombe, two at Clovelly, seven at Bideford and three at Appledore. None have a scallop licence and seven have shellfish entitlements.

The estimated employment for under/over 10m vessels combined in 2019 is 35 (single-handed under 10m vessels and skipper plus crew for the over 10m vessels).<sup>4</sup> Using the same assumptions and the April 2019 vessel register would imply 27 active fishers.

The North Devon Fishermen's Association (NDFA) is a non-profit organisation formed in 2006 following from the Bideford Trawlersmen's Association. The NDFA seeks to provide a voice for local fishermen and according to the website, the NDFA represents around 60 fishermen and 650 people from the fish processing and retail sector<sup>5</sup>.

Membership includes fishermen from the ports of Appledore, Bideford, Clovelly, Ilfracombe, and Padstow (Cornwall). The fleet includes vessels from under 10m and up to 15.95m, catching white fish and shellfish, using a range of fishing methods, such as, trawling, potting and netting. The NDFA work in partnership to raise the public profile of fishing in North Devon.<sup>6</sup>

## **4. Fisheries baseline**

As noted in the section above, the MMO data on vessels registered in the four NDMP ports represents only half of the fleet (when compared to the D&SIFCA permits). While landings data for the MMO are recorded at the port level, there is nonetheless a risk that these landings may not reflect the actual total. In 2018, 788.5 tonnes were landed into NDMP ports, with a first sale value of £1.58 million according to MMO data.

**Table 1: Overview of volume of landings in NDMP ports, 2016 to 2018 (rounded).**

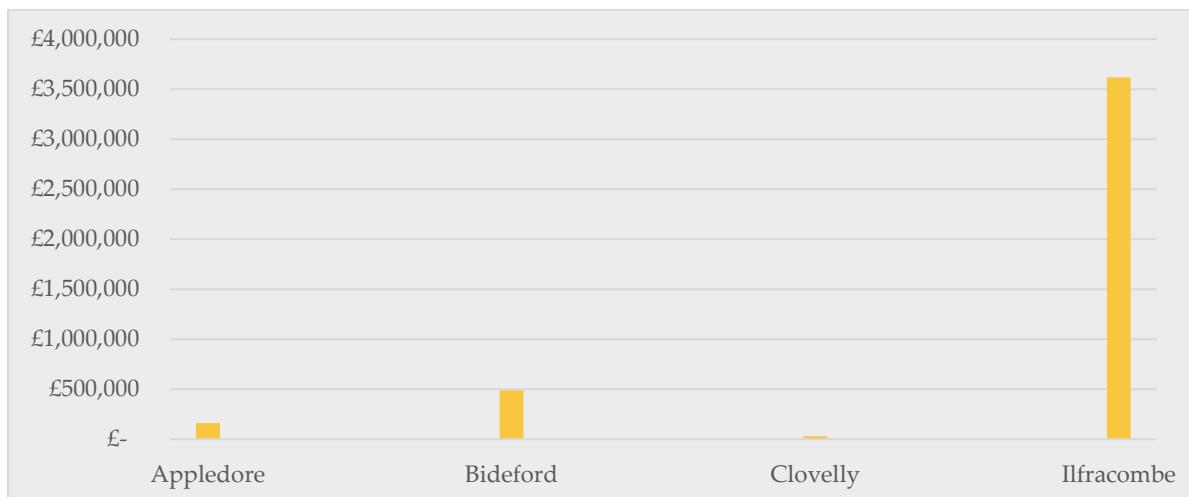
Source: MMO data.

<u>PORT</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>
Appledore	10 tonnes	38 tonnes	23 tonnes
Bideford	110 tonnes	38 tonnes	41 tonnes
Clovelly	2 tonnes	1 tonne	1 tonne
Ilfracombe	823 tonnes	545 tonnes	724 tonnes

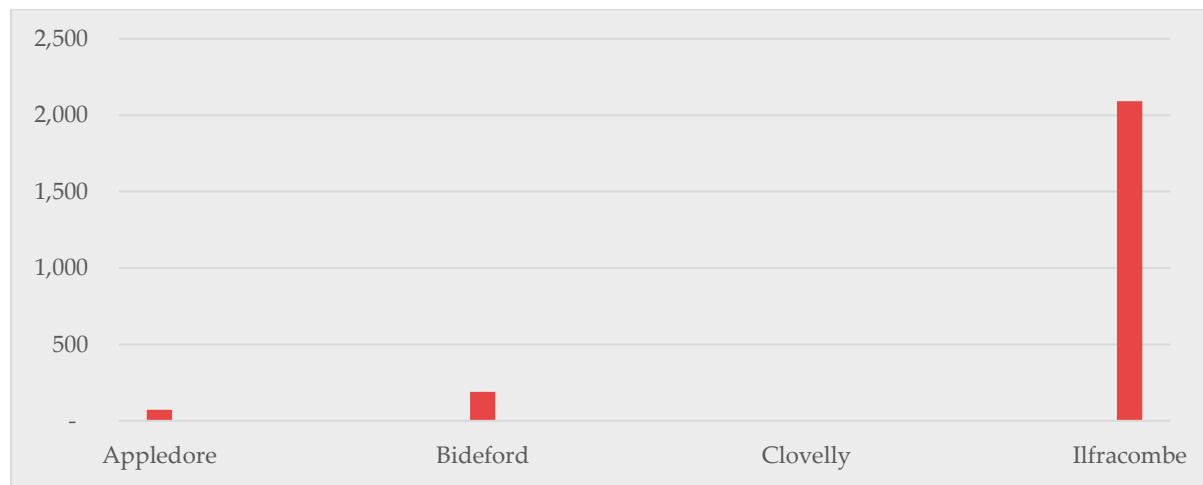
Overview of landings in NDMP (first sale value, £) 2016 to 2018 (rounded). Source: MMO data.

<u>PORT</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>
Appledore	£19,000	£92,000	£50,000
Bideford	£231,000	£104,000	£153,000
Clovelly	£13,000	£6,000	£11,000
Ilfracombe	£1,312,000	£940,000	£1,367,000

As figures 1 and 2 below make clear, Ilfracombe is by far the most significant port in terms of landings within the NDMP area and Clovelly and Appledore have very low landings. The fishery in the NDMP area is diverse, with landings of 28 species recorded in 2018 for Ilfracombe.

**Figure 1: A comparison of the four NDMP ports in term of the cumulative Value (£) landed from 2016-18.** Source: MMO data.

**Figure 2:** A comparison of the four NDMP ports in term of the cumulative Volume (tonnes) landed from 2016-18. Source: MMO data.

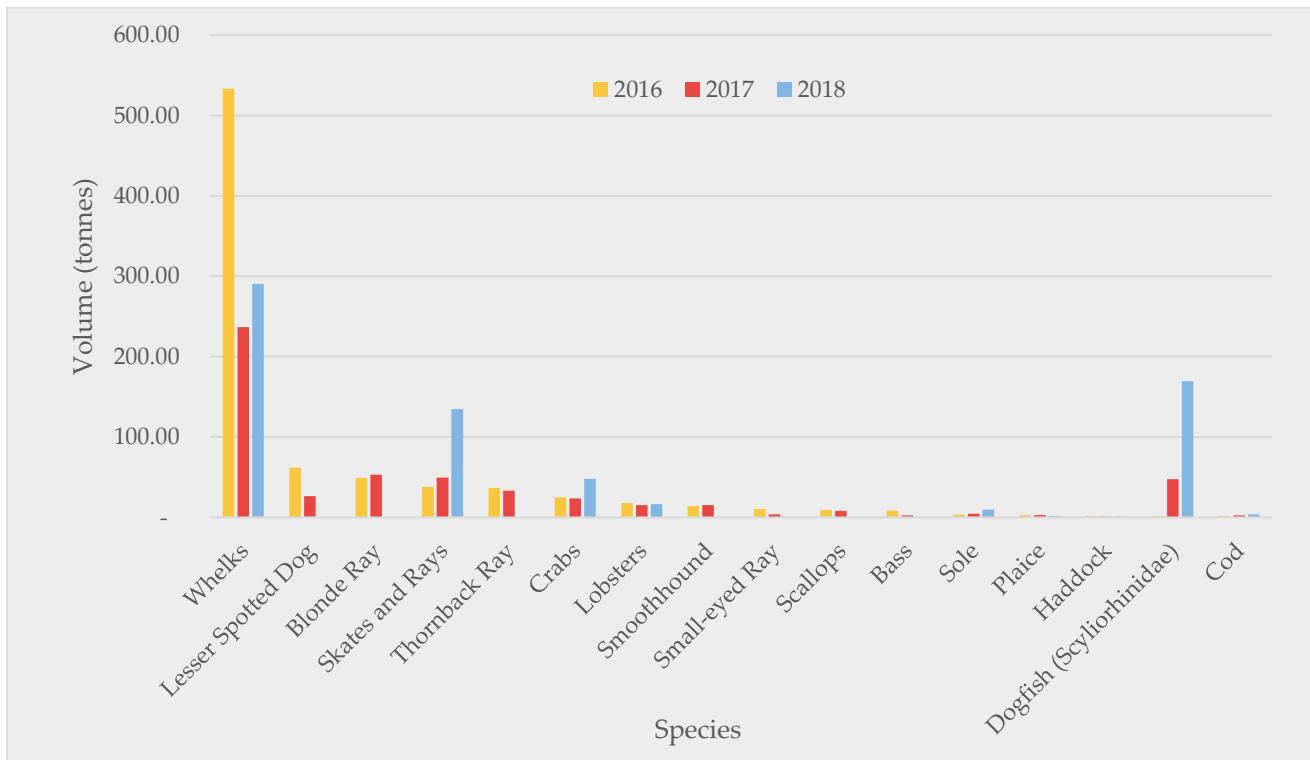


The following tables and figures provide some more detail on each of the ports and are presented in order of size: from largest to smallest.

**Table 2:** Ilfracombe top ten species in 2018 by volume and value (2018 landings, Source: MMO data).

Species	Volume (tonnes)	Species	Value (£)
1. Whelks	290.54	1. Skates and Rays	442,854
2. Dogfish	169.35	2. Whelks	363,054
3. Skates and Rays	134.74	3. Lobsters	213,921
4. Crabs	47.77	4. Sole	106,996
5. Lobsters	16.60	5. Crabs	84,100
6. Sole	9.66	6. Dogfish	74,907
7. Cod	3.79	7. Squid	23,906
8. Squid	3.60	8. Cod	13,050
9. Plaice	1.76	9. Turbot	8,139
10. Haddock	0.88	10. Bass	5,577

**Figure 3:** Volume (tonnes) landed in Ilfracombe 2016-2018 for selected species. Source: MMO data



*It is worth noting changes to MMO species classifications (in particular 'crab' and 'skates and rays', which make exact comparisons difficult as the recorded species names are not identical in the data).*

**Figure 4:** Value (£) landed in Ilfracombe 2016-2018 for selected species. Source: MMO data

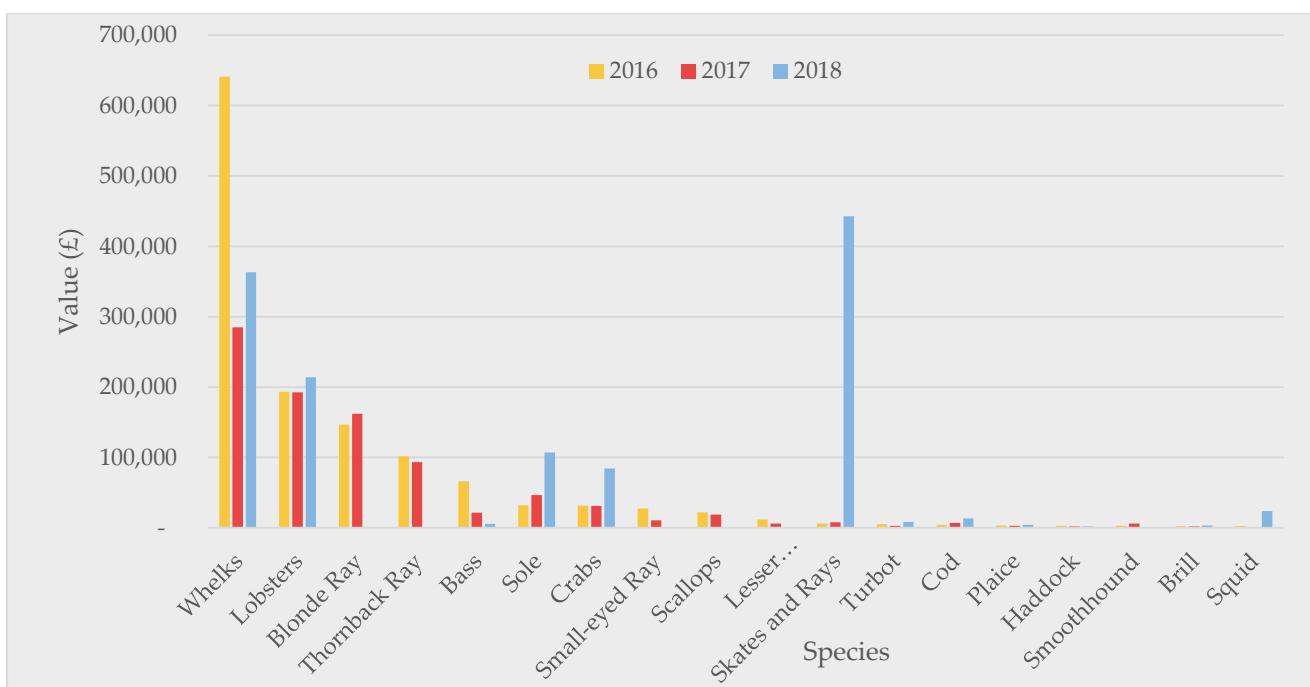
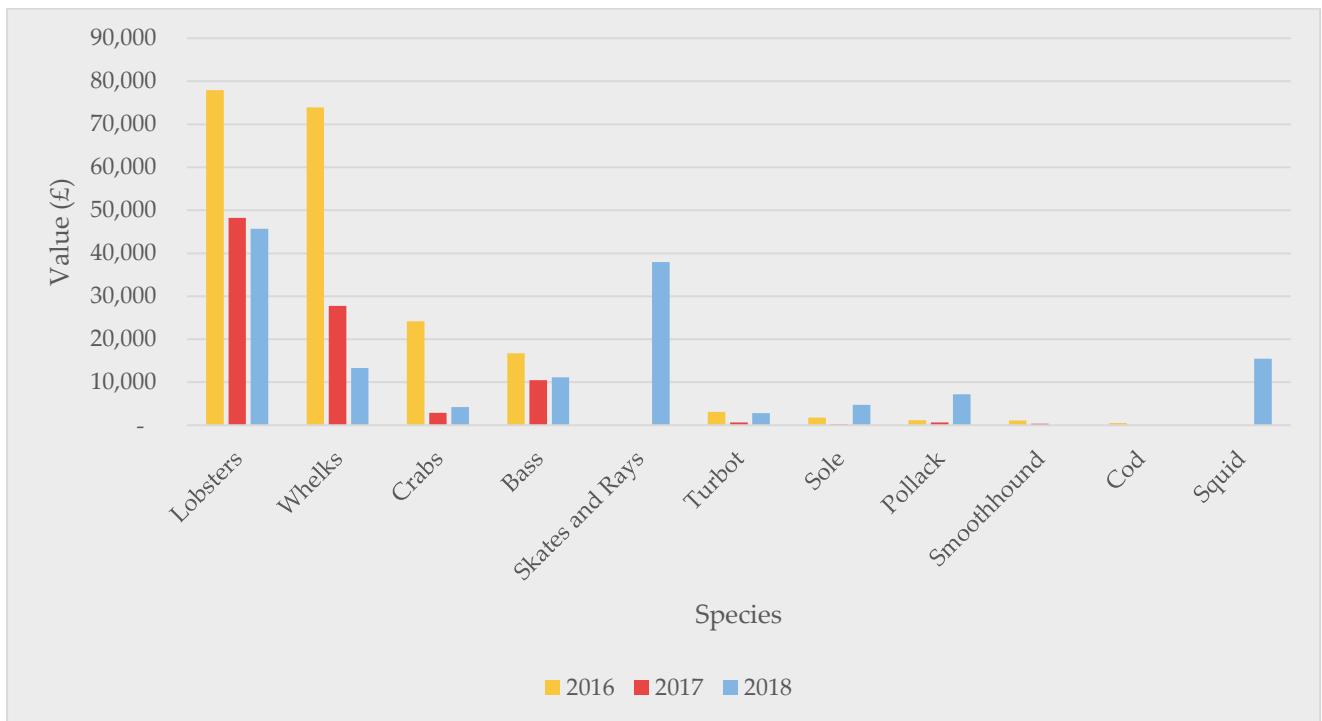


Table 3: Bideford 2018 top ten species by volume and value. Source: MMO data

Species	Volume (tonnes)	Species	Value (£)
1. Skates and Rays	12	1. Lobsters	45,675
2. Whelks	10	2. Skates and Rays	37,971
3. Lobsters	4	3. Squid	15,470
4. Pollack (Lythe)	2	4. Whelks	13,326
5. Squid	2	5. Bass	11,181
6. Crabs	2	6. Pollack (Lythe)	7,190
7. Bass	1	7. Sole	4,733
8. Dogfish	1	8. Crabs	4,239
9. Plaice	1	9. Turbot	2,786
10. Saithe	1	10. Dogfish	2,019

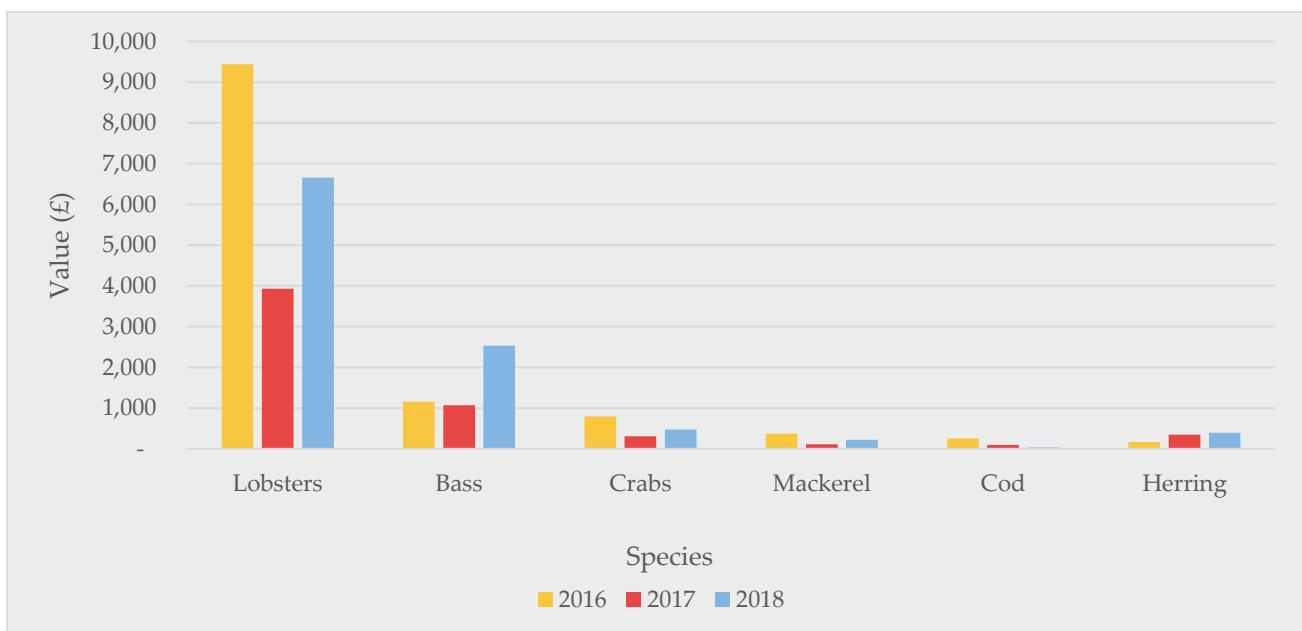
Figure 5: Bideford landed value (£), selected species (2016-2018) Source: MMO data.



**Table 4:** Clovelly top ten species in 2018 by volume and value (2018 landings, Source: MMO data).

Species	Volume (tonnes)	Species	Value (£)
1. Lobsters	0.49	1. Lobsters	6,661
2. Crabs	0.25	2. Bass	2,533
3. Bass	0.22	3. Crabs	473
4. Herring	0.11	4. Herring	398
5. Scallops	0.07	5. Mackerel	221
6. Mackerel	0.05	6. Scallops	137
7. Mullet	0.03	7. Mullet	98
8. Skates and Rays	0.02	8. Skates and Rays	80
9. Pollack (Lythe)	0.02	9. Sole	70
10. Plaice	0.01	10. Pollack (Lythe)	64

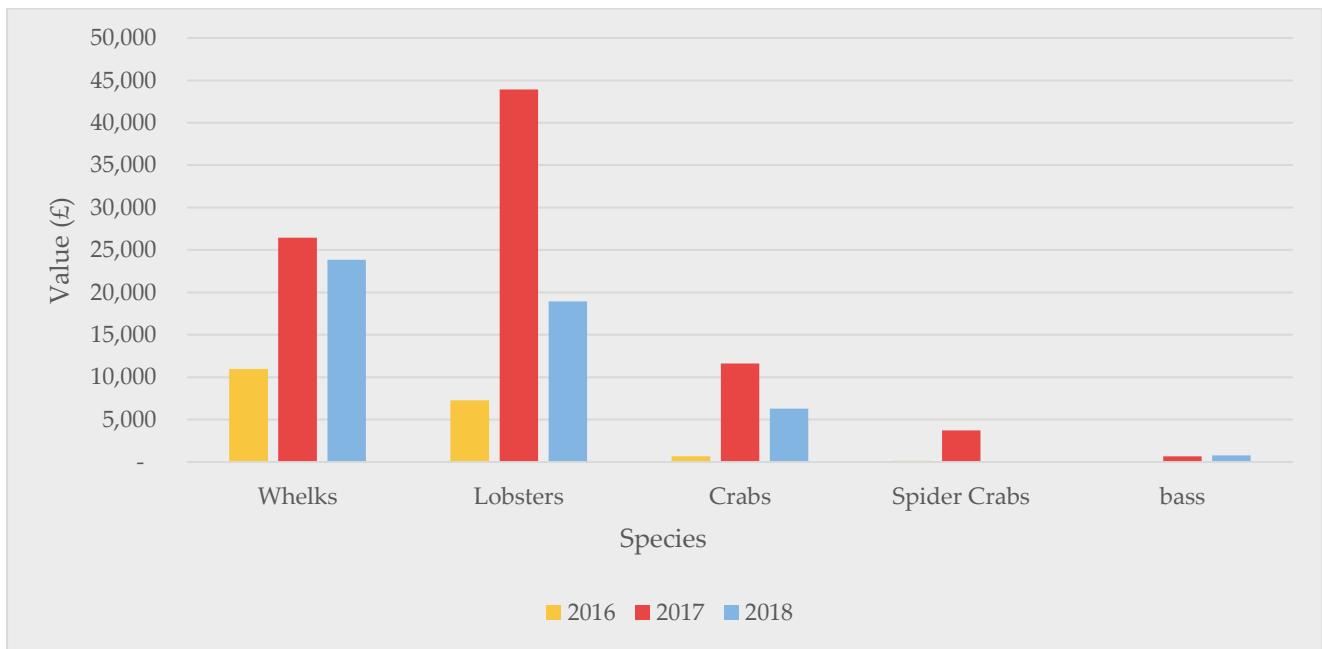
**Figure 6:** Clovelly landings by value (£) 2016–2018 for selected species. Source: MMO data



**Table 5: Appledore top five species in 2018 by volume and value (2018 landings, Source: MMO data).**

Species	Volume (tonnes)	Species	Value (£)
Whelks	18	Whelks	23,846
Crabs	2.8	Lobsters	18,956
Lobsters	1.3	Crabs	6,296
Bass	0.1	Bass	767
Pollack (Lythe)	0.01	Pollack (Lythe)	47

**Figure 7: Appledore landings by value (£) 2016-2018 for selected species. Source: MMO data**



As this section demonstrates the fishery, landings and ports have different characteristics.

Landings are low at Clovelly (e.g. 1 tonne in 2018), slightly higher at Appledore (at around 23 tonnes) but have declined notably at Bideford from 110 tonnes in 2016 to 41 tonnes in 2018. Ilfracombe dominates the landings for the NDMP area, landing 724 of the 789 tonnes landed in 2018 (representing 92% of the NDMP total that year).

Ilfracombe has fluctuated over the past three years but remains the largest port in terms of volume and value landing 724 tonnes worth £1.3 million in 2018.

The target species and focal point for the fishery as a whole are shellfish (Whelks, Lobster and Crab) with the finfish focus on Skates and Rays, Bass and Pollock.

These and other species are presented in the subsequent section in terms of their biology, management type and stock health to support discussions in the final section on opportunities going forwards.

## **5. Celtic Seas Ecoregion – Fisheries management and state of stocks**

The Celtic Seas ecoregion (CSE) includes the Malin shelf; the Celtic Sea and west of Ireland; and the Irish Sea including the north-western shelf of the EU and areas of the deeper eastern Atlantic making it heavily influenced by oceanic inputs. The species richness is higher in the Celtic Sea than in the rest of the ecoregion.<sup>7</sup> The five most important pressures in the Celtic Seas ecoregion are selective extraction of species, abrasion, smothering, substrate loss, and nutrient and organic enrichment.<sup>8</sup>

Environmentally, phytoplankton shows long-term declines over the past 50 years. The abundance of breeding seabirds has also been declining over the last 20 years. Grey seal populations have been increasing over the past 30 years. The abundance of cetaceans and harbour seals are not known.<sup>9</sup>

The CSE includes parts of the Exclusive Economic Zones (EEZs) of three EU Member States (UK, Ireland and France). Fisheries are managed through the EU Common Fisheries Policy (CFP), usually under the Total Allowable Catch (TAC, or ‘quota’) system, while some stocks managed by the North East Atlantic Fisheries Commission (NEAFC) and by coastal state agreements.

Fish are a renewable resource, which can provide continued benefits to society in terms of food, revenue and jobs if well managed. Over-exploitation means smaller catches, lower revenues and fewer jobs. Recovery of overexploited stocks is a precondition to future economic benefits. MSY “means the highest theoretical equilibrium yield that can be continuously taken on average from a stock under existing average environmental conditions without significantly affecting the reproduction process.”<sup>10</sup> As a yield, MSY can only be achieved through reaching a level of biomass (BMSY) that can support this level of fish mortality (FMSY)<sup>11</sup> and it is important to state that MSY is a maximum, or limit, rather than a target.<sup>12</sup>

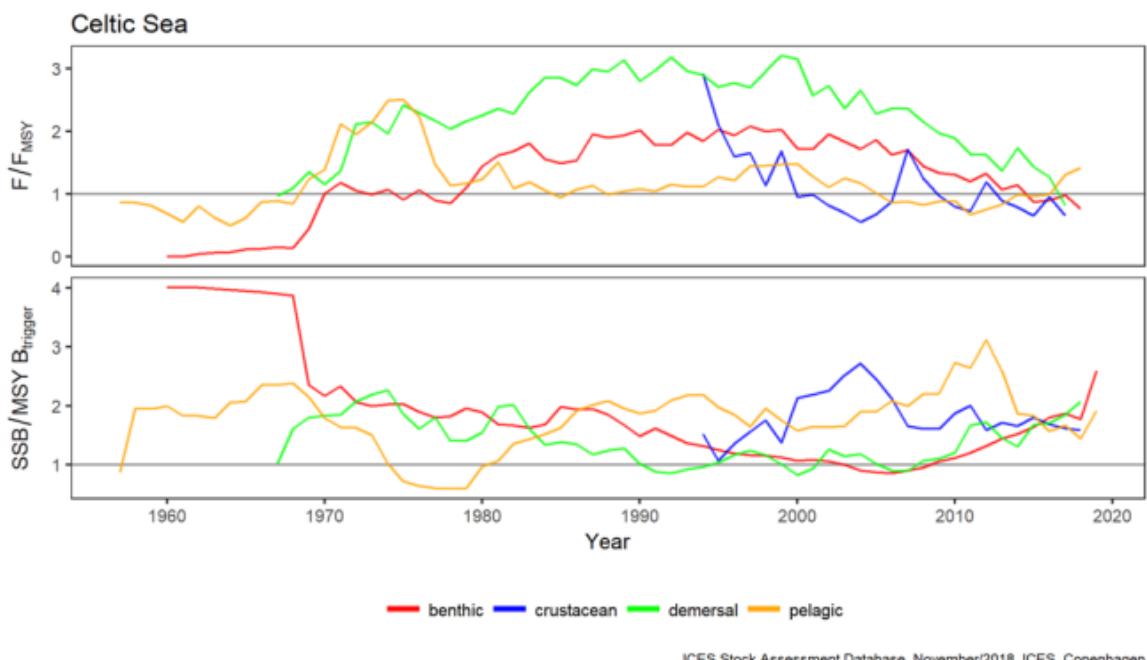
The CFP aims to achieve the ‘maximum sustainable yield’ (MSY) for all commercial species by 2020 at the latest (Art 2.2. – *Annex 1*).

Scientific fisheries advice is provided by the International Council for the Exploration of the Sea (ICES), the European Commission’s Scientific Technical and Economic

Committee for Fisheries (STECF), and the North Western Waters (NWWAC) and Pelagic Advisory Councils (ACs). Environmental policies are managed by national government agencies (Defra, the MMO and IFCAs – Inshore Fisheries and Conservation Authorities in England) as well as OSPAR.<sup>13</sup>

Overall fishing pressure in the CSE has decreased since the peak 20 years ago and the average fishing mortality (F) to FMSY ratios for the combined demersal, flatfish, and pelagic stocks is now close to FMSY. Figure 8 below provides the time-series of average of relative fishing mortality (F to FMSY ratio) and spawning-stock biomass (SSB to BMSY trigger ratio) for benthic, demersal and pelagic stocks.

**Figure 8:** Time-series of average of relative fishing mortality (F to FMSY ratio) and biomass (SSB to BMSY trigger ratio) for benthic, demersal and pelagic stocks (Source: ICES)<sup>14</sup>.



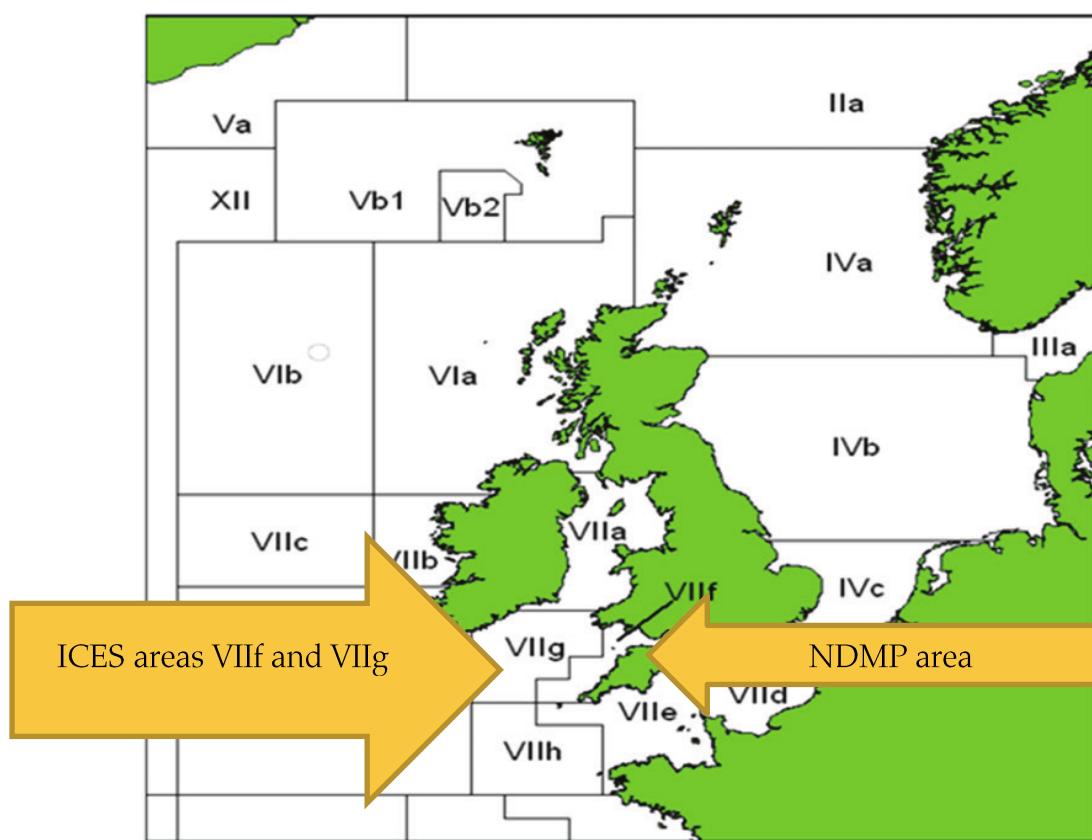
Overall F for shellfish, demersal, and pelagic fish stocks has reduced over the past 20 years. F on 45 stocks has been evaluated against MSY reference points and 30 stocks are now fished at or below MSY. The relative SSB has also increased since the late 1990s and is now above the biomass reference points used to assess 78% of the stocks in the Celtic Sea. A number of stocks still have very low stock biomasses, including cod and sole in the Irish Sea.<sup>15</sup>

The fishing effort of bottom towed mobile gears (trawls and dredges) has decreased by 35% from 2003 to 2014, reducing the footprint and average number of times the seabed is trawled per year.<sup>16</sup> There has been an overall reduction in fishing effort by the most used gears, although several species (including spurdog, the common skate, angel shark,

porbeagle shark, and some deep-water sharks) have been historically depleted by fishing and are on the OSPAR list of threatened and declining species.<sup>17</sup> Although there are zero TACs or prohibited listings for these species, several of them remain vulnerable to existing fisheries, e.g., Spurdog and the common skate are caught as bycatch in mixed demersal trawl fisheries and gillnet fisheries, and deep-water sharks are caught in the mixed deep-water trawl fishery – a spurdog bycatch avoidance programme is being developed by Cefas.<sup>18</sup> Data gaps regarding spawning areas include the Bristol Channel, especially regarding sole.<sup>19</sup> *For a full list Threatened and declining species and habitats in the Celtic Sea see ICES (2018)<sup>20</sup>*

For the subsequent section on stock assessments, we focus on ICES areas VIIf and VIIg as shown in Figure 9.

**Figure 9:** ICES areas around the UK. VIIf and VIIg (ICES divisions 7.f and 7.g (Bristol Channel, Celtic Sea) are of main importance to the NDMP fleet, but areas VIIg and VIIh are also relevant for the stocks targeted. Source: ICES



The area of North Devon's Biosphere Reserve is 3,300 square km of which 2300 km<sup>2</sup> is marine<sup>21</sup>, in comparison, ICES area VII covers the Irish Sea, West of Ireland, Celtic Sea, South West approaches and the English Channel. For England and Wales, the largest fishing sector active in VIIf are the potting fleets targeting non-quota stocks such as crabs, lobsters and whelks (~600 under 10m vessels of ~700 in total. Over 50% of these

vessels use multiple gears (i.e. are polyvalent). Otter trawling for mixed demersal species (whitefish and elasmobranchs – sharks, skates and rays) is undertaken by around 300 vessels, evenly split between under and over 10m vessels (mainly active in ICES VII.e and VIIa and VIIf).<sup>22</sup>

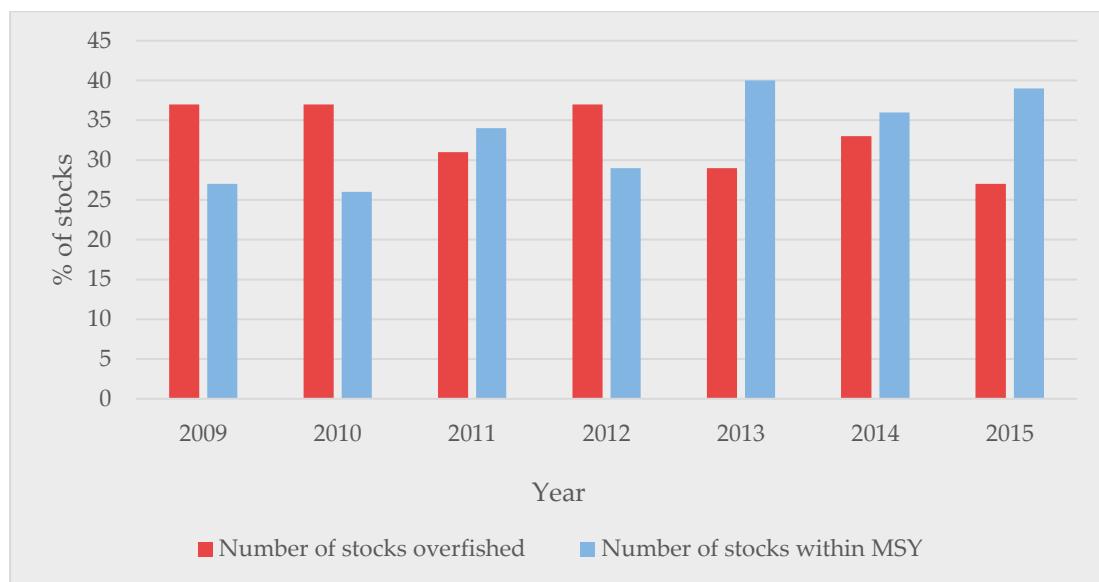
## **6. Options for local management – what can be done at NDMP level?**

To determine what opportunities are available for local level management it is important to understand that stocks that operate under TACs (Total Allowable Catches) set at EU level have overall contributed to notable improvements in stock health over recent years. It is also important to understand that the success of these quotas would be greater if scientific advice were followed without politics intervening to satisfy industry demands. The extent to which scientific advice is followed or ignored has been studied in detail by NEF for the past five years and the results are available in the ‘landing the blame’ series (the Northeast Atlantic is of relevance to this briefing).<sup>23</sup>

The success of quota systems (biologically – *as the social dimension has been an abject failure for the English inshore fleet as briefing 2 on fishing opportunities explains*) relies on good science and industry following agreed limits. Figure 10 below shows how stocks in the region have improved between 2009 and 2015, despite being fished by vessels from throughout the EU. For wide ranging stocks (that may span the Celtic Sea or even further) it is impossible to unilaterally set quotas or move to effort systems as what determines the health of the stock and good science relies on having a limit in common which is adhered to.

As the UK’s Institute for Government states, setting unilateral quotas post-Brexit would also risk international disputes (and a return to ‘cod wars’ or ‘mackerel wars’ is in nobody’s interest or the good of the fishery)<sup>24</sup>.

**Figure 10:** Percentage of stocks overfished / within MSY in the Northeast Atlantic and adjacent waters. Source: European Commission.<sup>25</sup>



*The analysis informing the summary conclusions presented in Table 6 below can be found in Annex 3.* The split between recommendations for shellfish and finfish are very pronounced, mainly as a result of the more localised nature of the shellfish stocks (divided by English management units for crab and lobster and Celtic seas level for whelks and squid) and fisheries, compared to wide ranging trans-national stocks (rays, bass, cod, mackerel, herring, haddock, sole and plaice). It is important to note that the current stocks identified by ICES may not reflect the underlying biology of the species (e.g. herring, cod, bass) which might have finer scale structuring warranting changes to the existing ICES stock definition. This would not necessarily result in increases in quota for newly defined stocks though. Where stocks are not at levels capable of producing MSY there is no case for increasing the fishing effort and this is also true for stocks where there is insufficient data, as the precautionary principle must be adhered to in terms of collectively agreed limits. This is frequently opposed by the fishing industry, as the current experience on the fishing grounds may seem to contradict scientific advice. It is however worth noting that there is a difference between scientific surveys at the stock level and the experiences of individual fishing vessels involved in the fishery and observations (which is echoed by experienced of the NDMP fisheries group engagement). Differences include the extent of the observations, the time lag between research and assessments and finally the phenomenon of fisher's ability to find fish (it is this ability to find fish that can obscure the bigger picture when it comes to wide ranging stocks and cause distrust from industry regarding science). The success of the quota

system so far (the journey is by no means complete) relies on this science and is supported by it, whether it is collected locally by IFCAs, nationally by Cefas or internationally by ICES. For shellfish stocks, it is worth noting that the science lags behind (most likely as a result of their importance to small-scale fishing vessels, versus large-scale industries fishing for demersal and pelagic finfish who are able to lobby at EU level). Nonetheless, without data to inform stock assessments, and given the extent of overcapacity within the inshore fleet who (*through their relative exclusion from the quota / FQA system* – see briefing 2) have re-directed their fishing effort to shellfish, there also seems little prospect to increase fishing effort (again this has been confirmed through the NMDP).

The key point is that for quota species it is not feasible to set quotas unilaterally without jeopardising the health of the stock (and therefore the future of the fishery), nor is it possible to move to an effort system in one area (as this would mean that the shared *limit* ceases to apply as catches / landings are not restricted). The quota available could however be fished *differently*, which is the focus of briefing 2.

Regarding the specific fisheries in the NDMP area:

- Ilfracombe - all shellfish species, ray, sole, dogfish and bass are the main current stocks of interest to the fleet.
- Bideford - shellfish, bass and rays are the main current stocks of interest to the fleet.
- Clovelly – lobsters and bass are the main current stocks of interest to the fleet.
- Appledore – all shellfish are the main current stocks of interest to the fleet.

Table 6: Summary of stock status and options for local management. (ICES, 2018)

<u>Species</u>	<u>Could the stock sustain increased fishing pressure</u>	<u>Is local management at NDMP level possible?</u>	<u>Reason</u>
<b>Shellfish</b>			
King Scallop ( <i>Pecten maximus</i> )			<ul style="list-style-type: none"> <li>• no stock assessment</li> <li>• NDMP specific management e.g. of effort (DAS or dredges or seasons) is possible.</li> </ul>

<b>Crab</b> ( <i>Cancer pagurus</i> )			<ul style="list-style-type: none"> <li>• stock below MSY yield level, moderate exploitation rate around MSY</li> <li>• NDMP area effort management (pot limits) or other measures (e.g. catch limits) possible</li> <li>• Southwest Crab &amp; lobster pot FIP</li> </ul>
<b>Lobster</b> ( <i>Homarus gammarus</i> )			<ul style="list-style-type: none"> <li>• stock below MSY target, moderate exploitation rate below max ref point , stable or decreasing</li> <li>• NDMP area effort management (pot limits) or other measures (e.g. catch limits) possible</li> <li>• Southwest Crab &amp; lobster pot FIP</li> <li>• A re-introduction of voluntary pot limits or spatial closures is possible but IFCA bylaw or entire NDMP regulation would strengthen management.</li> </ul>
<b>Whelk</b> ( <i>Buccinum undatum</i> )			<ul style="list-style-type: none"> <li>• limited management, stock unknown, age at maturity (D&amp;SIFCA minimum size increases from 45mm to 55mm in November 2018 and MCRS will increase from 55 to 65 mm in November 2020) and spawning season (possible closure – D&amp;SIFCA have collected some information and Byelaw permit conditions are adaptive and flexible to bring in management)</li> <li>• NDMP area effort management (pot limits) or other measures (e.g. closed seasons, catch limits) possible</li> </ul>
<b>Squid</b> ( <i>Loligo vulgaris</i> and <i>Loligo forbesii</i> )			<ul style="list-style-type: none"> <li>• no management or stock assessment</li> <li>• NDMP area management seasons / sizes possible</li> </ul>
<b>Finfish</b>			
<b>Skates and Rays</b> (thornback ray, blonde ray, undulate ray and small-eyed ray)			<ul style="list-style-type: none"> <li>• ICES cannot assess stock, no ref points</li> <li>• Quota can't be increased locally.</li> <li>• NDMP area gear restrictions, closed seasons or minimum sizes could be formalised as it appears voluntary measures are not adhered to.</li> </ul>

<b>Cod</b> ( <i>Gadus morhua</i> )			<ul style="list-style-type: none"> <li>• below bLIm, mortality above FMSY</li> <li>• Quota can't be increased locally.</li> <li>• NDMP area gear restrictions, closed seasons or minimum sizes could be formalised</li> </ul>
<b>Bass</b> ( <i>Dicentrarchus labrax</i> )			<ul style="list-style-type: none"> <li>• SSB below BLim,</li> <li>• Vessel catch limits can't be increased locally.</li> <li>• NDMP area management could be developed e.g. estuaries</li> </ul>
<b>Dover Sole</b> ( <i>Solea solea</i> )			<ul style="list-style-type: none"> <li>• F above FMSY, SSB around Blim</li> <li>• Quota can't be increased locally.</li> <li>• NDMP area gear restrictions, closed seasons or minimum sizes could be formalised</li> </ul>
<b>Plaice</b> ( <i>Pleuronectes platessa</i> )			<ul style="list-style-type: none"> <li>• biomass increasing since 2007 above MSY, fishing pressure below FMSY</li> <li>• Quota may increase at UK level</li> <li>• NDMP area gear restrictions, closed seasons or minimum sizes could be formalised</li> </ul>
<b>Dogfish</b> ( <i>Scyliorhinus canicula</i> )			<ul style="list-style-type: none"> <li>• stock indicator increased, no ref point</li> <li>• Quota can't be increased locally.</li> <li>• NDMP area gear restrictions, closed seasons or minimum sizes could be formalised</li> </ul>
<b>Mackerel</b> ( <i>Scomber scombrus</i> )			<ul style="list-style-type: none"> <li>• SSB above MSY, F above FMSY,</li> <li>• Quota can't be increased locally.</li> </ul>
<b>Herring</b> ( <i>Clupea harengus</i> )			<ul style="list-style-type: none"> <li>• SSB above MSY; F below FMSY, low recruitment</li> <li>• There is D&amp;SIFCA evidence of a local stock which could inform ICES advice. Results from herring work are identifying important spawning grounds in the Bristol Channel area.</li> <li>• Quota can't be increased locally.</li> </ul>

<b>Haddock</b> <i>(Melanogrammus aeglefinus)</i>			<ul style="list-style-type: none"> <li>• SSB above MSY, low recruitment , fishing pressure above FMSY</li> <li>• Quota can't be increased locally.</li> <li>• NDMP area gear restrictions, closed seasons or minimum sizes</li> </ul>
<b>Pollock</b> ( <i>Pollachius pollachius</i> )			<ul style="list-style-type: none"> <li>• unknown stock size, no ref points.</li> <li>• Quota can't be increased locally.</li> <li>• NDMP area gear restrictions, closed seasons or minimum sizes</li> </ul>
<b>Monks / Anglerfish</b> <i>(Lophius piscatorius and L. budegassa)</i>			<ul style="list-style-type: none"> <li>• SSB increasing, F above FMSY, reduction in quotas was needed</li> <li>• Quota can't be increased locally.</li> <li>• NDMP area gear restrictions, closed seasons or minimum sizes</li> </ul>
<b>Lemon Sole</b> <i>(Microstomus kitt)</i>			<ul style="list-style-type: none"> <li>• stock status unknown</li> <li>• Quota can't be increased locally.</li> <li>• NDMP area gear restrictions, closed seasons or minimum sizes could be formalised</li> </ul>
<b>Smooth-hound</b> <i>(Mustelus mustelus)</i> -			<ul style="list-style-type: none"> <li>• no stock assessment</li> <li>• Fishery cannot be reopened</li> </ul>
<b>Turbot</b> ( <i>Psetta maxima</i> )			<ul style="list-style-type: none"> <li>• data deficient to large extent</li> <li>• NDMP area gear restrictions, closed seasons or minimum sizes</li> </ul>

For the full detail on the species, the fishery, management measures and stock status see annexes 2 and 3.

## 7. Recommendations at the species level – in response to the NDMP 2nd workshop report

FINFISH:

Bass

- The EU level management measures for bass are working and should continue. It is clear that there is a time lag between these regulatory changes and the effect

on the stock. Given the recent positive signs regarding bass recruitment, it does appear that for future years the fishery may improve.

- A ‘bass pool’ (similar to that operated by the MMO to deal with the landings obligation) could also be set up (and deducted from overall fishing opportunities) to account for possible accidental catches of bass if the vessel limits are not agreed at EU level. In the interim, a precautionary approach accounting for discards should remain in place.
- Management measures should be at IFCA district level for inshore areas and MMO for the 6-12nM zone overall, rather than at the level of the NDMP as these would have to be more restrictive (rather than less restrictive) given the EU management measures. The stock is international and fished by multiple EU fleets so NDMP changes must work within the agreed management limits (catches, bycatches and MCRS).
  - Offshore management: the MMO need to monitor and enforce the offshore fishery beyond 6nM. Discards are unknown and other incidental bycatch is unrecorded, this includes the need to monitor cetacean bycatch.
  - Inshore management: Regionally different and gear-specific
    - The rod and line fishery needs fishing opportunities to reflect both the scale of vessel and the number of crew, but also whether this crew are full or part time (FT/PT) as 5.5 tonnes per year exceeds the catch for the majority of the R&L fleet.
    - For nets, an annual quota that can be used for some targeted fishing of bass has been proposed by fishers as more workable than a trip level percentage or catch or a monthly limit. 1.2 tonnes could be annual rather than monthly, but no targeted fishery is currently allowed using nets.
    - For trawls, the main concern remains the bycatch of bass and having to discard. A proposal to allow skippers to land and bass bycatch but lose some Days At Sea (via the introduction of a penalty system, which deducts fishing time from the value of landings) could reduce the mortality of bass, which is currently discarded, and take pressure off other fisheries. The value of the bass landed should be deducted from the average annual turnover of the business and through discussions with managers; the equivalent days at sea should be removed from the vessel. The value of the bass landed should be lower than what the vessel is likely to forfeit in terms of days at sea (we suggest by 25%) to ensure that vessels do not target bass with mobile gears as they will lose out financially, albeit without having to discard bass they have caught.<sup>26</sup>
    - Bycatches – the monitoring of trawl bycatches of bass is essential and an observer program is recommended. Better data on

bycatches of bass will help inform management that reflects the experience of skippers involved in the fishery.

## Skates and Rays

- Sharks and rays are vulnerable to overfishing due to their life history: late maturation and low fecundity. Area closures are possible in terms of management (experience with thornback rays in the southern North Sea have shown seasonal closures to be more effective than permanent closures).<sup>27</sup>
- The generic 'SKA' code for skates and rays is a problem for data collection and management. E-logbooks have improved elasmobranch species recording for over 15m vessels and needs to be rolled out for over 12m vessels. For under 10m vessels this remains a challenge, as sales notes do not provide enough detail.<sup>28</sup> The recent consultation on under 10m reporting by Defra may provide the urgently needed solutions to the reporting issue.
- The introduction of separate TACs for individual skate and ray species or stocks is one option but this requires EU level and national UK changes, but the allocation between EU Member States would make this problematic and would require better landings and discards data. The sub-TAC for small-eyed ray (occurs mainly in inshore grounds in England and Wales) in the Bristol Channel resulted in the quota share using the same allocation key as for all skates and rays in the Celtic Seas ecoregion.<sup>29</sup>
- The North Devon Ray Pilot Project was funded by D&S IFCA, Northern Devon FLAG, the European Fisheries Fund, North Devon Coast Area of Outstanding Natural Beauty (AONB) and North Devon Biosphere Reserve. The NDFA uses voluntary minimum size restriction and the 'ray box' (see *Annex 4*), which is closed during the breeding season and this could be formalised in the future.<sup>30</sup> This could be accompanied by a Cefas observer program or one funded and developed by the NDMP in partnership with Cefas, MMO and IFCAs.<sup>31</sup>
- Effort management: this would be unlikely to work, as reconciling effort management for skates (or any species) in mixed-trawl fisheries (where other species are quota-managed) is not possible.<sup>32</sup>
- Spatial / temporal closures to control mortality could be effective.
- Minimum /maximum sizes would need to be species specific and the current recording systems do not allow for this (and would require an education program), furthermore this may conflict with the landings obligation.<sup>33</sup>

## Cod, Haddock, Sole, Plaice, Lemon Sole and Turbot

- The discard ban presents a challenge for the mixed trawl fisheries, and the MMO has announced the set-up of 'discard pools' which are effectively a quota uplift to account to account for previously discarded fish.<sup>34</sup>
- Quota increased for stock in the Celtic Seas Ecoregion for Sole or Cod are unlikely in the near future, this is not the case for plaice but as plaice is the lowest

value species in the mixed demersal trawl fishery this is unlikely to produce any benefits unless a targeted daylight hours plaice fishery with static nets were initiated.

- Effort management: this would not work in mixed-trawl fisheries (where other species are quota-managed).

### **Spurdog**

- Spurdog is a long-lived, slow-growing, and late-maturing species and is therefore particularly vulnerable. Spurdog cannot be landed. ICES advises that when the precautionary approach is applied, there should be no targeted fisheries on this stock in 2019 and 2020. Landing of bycatch should be part of a management plan, including close monitoring of the stock and fisheries. There is no case for re-opening a spurdog fishery.
- A bycatch avoidance programme is being developed and needs to be promoted by the NMDP.<sup>35</sup>
- Juvenile spurdog were widely distributed in the Celtic Sea<sup>36</sup> but the total biomass and recruitment have declined substantially since the 1960s to the lowest level observed (stable over the last decade). There have been no targeted fisheries in EU or Norwegian waters since 2011. Recovery will be slow (e.g. over 20 years to reach current MSY Btrigger) and not biologically feasible under short-term management time frames.<sup>37</sup>
- Restrictions on spurdog are thought to have contributed to increases in smooth-hound landings. The zero TAC (since 2011) has increased regulatory discards of spurdog in mixed fisheries<sup>38</sup>.

**Real time closures** have been used effectively for other species and especially during the peak in bass catches in the South West in mobile gears, real times closures and ‘moving on’ provisions needs to be adopted by skippers and promoted by the MMO.<sup>39</sup> MMO enforced real time closures and move on measures should be adopted.

The big picture management needs to adopt an *ecosystem approach*, whereby these fisheries are managed within a system that accounts for how fishers adapt to changing opportunities, and needs to take real time action when fisheries are overexploited.

### **SHELLFISH:**

#### **Whelk**

- Increases to the Minimum Landing Size (MLS) for Whelk were investigated and then implemented by D&S IFCA following on from a research project that looked into the Whelk reproductive cycle and size at maturity to inform the future management of the whelk fishery. Size at sexual maturity findings meant a

size increase was necessary (45mm EU size was increased in 2018 to 55mm and will increase to 65mm in 2020). A national MLS has been proposed by MRAG.

- Current research is underway to determine spawning seasons, with the possibility of a closed season being put forward.
- The whelk fishery is an established fishery with high (and increasing) fishing effort including potting from larger vessels causing displacement. Pot limits (e.g. as implemented by Sussex IFCA via the shellfish permit byelaw<sup>40</sup>) are also a possible management measure within the district or the NDMP area.
- Management of the offshore whelk fishery is also necessary with the option of pot limits so the fishery (the main fishery that English – and Welsh – inshore vessels are engaged in) can provide the year-round fishery that these vessels rely on. This will require stock assessments and regional management including both IFCA and Defra/ MMO as sizes, seasons, and limits would need to be coordinated and ideally harmonised (this also applies to the Welsh fishery).
- There are also some concerns regarding the bait for whelk pots, as usually crab (*Cancer pagurus*), and/ or the lesser spotted dogfish (*Scyliorhinus canicula*), which may be caught and used directly (not recorded in landings data).<sup>41</sup>

### Crab

- Following from Project Inshore (2012-2014) brown crab are now part of the Project UK Fishery Improvement Project (FIP) including Lobster, via the Marine Stewardship Council (MSC).
- Stock assessments are undertaken for the Western Channel (ICES areas VIIe, h & part of d) and the Celtic Sea (ICES areas VII f & g) in area fished by UK vessels as well as those from Ireland, France and the Channel Islands. No TACs are set for the fishery. Around 8,000 tonnes were landed in 2013, 2014 and 2015, with the majority (5,000 tonnes) landed by UK vessels. Landings for the Celtic Sea stock assessment area are estimated at 3,000 tonnes, with the UK landing 2,000 tonnes.<sup>42</sup>
- The fishery therefore requires a coherent Harvest Control Rule (HCR). Technical Measures do not provide the necessary adaptive management regime, and therefore cannot be shown to be effective in moving the crab stock towards the MSY target (and maintaining it thereafter). Unless HCRs are established, alongside other measures put forward in the FIP the fishery will fail MSC assessment.<sup>43</sup>

### Lobster

- Following from Project Inshore (2012-2014) lobster are now part of the Project UK Fishery Improvement Project (FIP) including brown crab, via the MSC.
- Stock assessments are undertaken for the Southwest (ICES areas VIIe, VIIf, and part of VIIg) in an area fished mainly by UK vessels. No TACs are set for the fishery. Total landings range between 200 tonnes and 300 tonnes for the

Southwest lobster stock unit for 2006, 2007, 2008, 2009, 2010, 2011, 2012 and 2013.<sup>44</sup>

- The fishery therefore requires a coherent HCR. Technical Measures do not provide the necessary adaptive management regime, and therefore cannot be shown to be effective in moving the lobster stock towards the MSY target (and maintaining it thereafter). Unless HCRs are established, alongside other measures put forward in the FIP the fishery will fail MSC assessment. Pot limits introduced at D&S IFCA level and an adaptive management regime are proposed.<sup>45</sup> Despite local support these measures would need to apply to neighbouring regions and vessels from outside the NMDP area to be effective and equitable.

The Project UK Crab and Lobster Fishery Improvement Project (FIP) follows MSC principles, and suggests necessary improvements to meet MSC certification. This requires HCR, but these need to be coordinated or harmonised for both fishing grounds inside 6nM and outside 6nM which requires IFCA-MMO collaboration. No TACs are set for the Western Channel & Celtic Sea brown crab fishery or the Southwest lobster fishery.<sup>46</sup>

The Action Plan proposes alternative management measures alongside improvements to current monitoring and research to inform management. Based on the HCR developed as the first of six actions, adaptive and precautionary management is needed. This would include IFCA level and offshore (>6 nm) changes. Trans-boundary (international) management authorities is also needed.<sup>47</sup>

## ANNEX 1:

CFP Article 2 <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1380&from=EN>

“Article 2

### ***Objectives***

*1. The CFP shall ensure that fishing and aquaculture activities are environmentally sustainable in the long-term and are managed in a way that is consistent with the objectives*

of achieving economic, social and employment benefits, and of contributing to the availability of food supplies.

2. The CFP shall apply the precautionary approach to fisheries management, and shall aim to ensure that exploitation of living marine biological resources restores and maintains populations of harvested species above levels which can produce the maximum sustainable yield.

In order to reach the objective of progressively restoring and maintaining populations of fish stocks above biomass levels capable of producing maximum sustainable yield, the maximum sustainable yield exploitation rate shall be achieved by 2015 where possible and, on a progressive, incremental basis at the latest by 2020 for all stocks.

3. The CFP shall implement the ecosystem-based approach to fisheries management so as to ensure that negative impacts of fishing activities on the marine ecosystem are minimised, and shall endeavour to ensure that aquaculture and fisheries activities avoid the degradation of the marine environment.“

## ANNEX 2:

### Assessment of Celtic Seas fish populations against CFP Article 2<sup>48</sup> objectives

EcoRegion	Description	F<Fms y	Within safe biological limits?	Meets CFP objectives
Celtic Seas	Cod (Gadus morhua) in Division 6.a (West of Scotland)	NO	NO	NO
Celtic Seas	Cod (Gadus morhua) in Division 7.a (Irish Sea)	YES	NO	NO
Celtic Seas	Cod (Gadus morhua) in divisions 7.e-k (eastern English Channel and southern Celtic Seas)	NO	NO	NO
Celtic Seas	Haddock (Melanogrammus aeglefinus) in Division 6.b (Rockall)	YES	YES	YES
Celtic Seas	Haddock (Melanogrammus aeglefinus) in Division 7.a (Irish Sea)	YES	YES	YES
Celtic Seas	Haddock (Melanogrammus aeglefinus) in divisions 7.b-k (southern Celtic Seas and English Channel)	NO	YES	NO
Celtic Seas	Herring (Clupea harengus) in divisions 6.a and 7.b-c (West of Scotland. West of Ireland)	YES	NO	NO
Celtic Seas	Herring (Clupea harengus) in divisions 7.a (Irish Sea. Celtic Sea. and southwest of Ireland)	NO	NO	NO
Celtic Seas	Herring (Clupea harengus) in Division 7.a (Irish Sea)	YES	YES	YES
Celtic Seas	Megrim (Lepidorhombus spp.) in divisions 4.a and 6.a (northern North Sea. West of Scotland)	YES	NA	YES
Celtic Seas	Norway lobster (Nephrops norvegicus) in Division 6.a. Functional Unit 11 (West of Scotland. North Minch)	YES	NA	YES

<b>Celtic Seas</b>	Norway lobster ( <i>Nephrops norvegicus</i> ) in Division 6.a. Functional Unit 12 (West of Scotland. South Minch)	YES	NA	YES
<b>Celtic Seas</b>	Norway lobster ( <i>Nephrops norvegicus</i> ) in Division 6.a. Functional Unit 13 (West of Scotland. the Firth of Clyde and Sound of Jura)	NO	NA	NO
<b>Celtic Seas</b>	Norway lobster ( <i>Nephrops norvegicus</i> ) in Division 7.a. Functional Unit 14 (Irish Sea. East)	YES	NA	YES
<b>Celtic Seas</b>	Norway lobster ( <i>Nephrops norvegicus</i> ) in Division 7.a. Functional Unit 15 (Irish Sea. West)	YES	NA	YES
<b>Celtic Seas</b>	Norway lobster ( <i>Nephrops norvegicus</i> ) in divisions 7b-c and 7.j-k. Functional Unit 16 (west and southwest of Ireland. Porcupine Bank)	YES	NA	NA
<b>Celtic Seas</b>	Norway lobster ( <i>Nephrops norvegicus</i> ) in Division 7.b. Functional Unit 17 (west of Ireland. Aran grounds)	NO	NA	NO
<b>Celtic Seas</b>	Norway lobster ( <i>Nephrops norvegicus</i> ) in divisions 7.a. 7.g. and 7.j. Functional Unit 19 (Irish Sea. Celtic Sea. eastern part of southwest of Ireland)	YES	NA	NO
<b>Celtic Seas</b>	Norway lobster ( <i>Nephrops norvegicus</i> ) in divisions 7.g and 7.f. Functional Unit 22 (Celtic Sea. Bristol Channel)	NO	NA	NO
<b>Celtic Seas</b>	Plaice ( <i>Pleuronectes platessa</i> ) in Division 7.a (Irish Sea)	YES	YES	YES
<b>Celtic Seas</b>	Plaice ( <i>Pleuronectes platessa</i> ) in Division 7.f and 7.g (Bristol Channel, Celtic Sea)	YES	YES	YES
<b>Celtic Seas</b>	Sole ( <i>Solea solea</i> ) in divisions 7.f and 7.g (Bristol Channel. Celtic Sea)	NO	NO	NO
<b>Celtic Seas</b>	Whiting ( <i>Merlangius merlangus</i> ) in Division 7.a (Irish Sea)	NO	NO	NO
<b>Celtic Seas</b>	Whiting ( <i>Merlangius merlangus</i> ) in divisions 7.b-c and 7.e-k (southern Celtic Seas and eastern English Channel)	YES	YES	YES
<b>Celtic Seas</b>	Sole ( <i>Solea solea</i> ) in Division 7.a (Irish Sea)	YES	NO	NO
<b>Celtic Seas</b>	Whiting ( <i>Merlangius merlangus</i> ) in Division 6.a (West of Scotland)	YES	NO	NO

## ANNEX 3:

### Key shellfish and finfish species landed in the NDMP area, stock management system and stock status.

<u>Species</u>	<u>Description of biology and fishery</u>	<u>Management type and responsibility</u>	<u>Stock health</u>  <u>ICES advice VIIe /VIIIf where available , or Cefas assessment.</u>
<b>Shellfish</b>			
<b>King Scallop</b> <i>(Pecten maximus)</i>	<ul style="list-style-type: none"> <li>• large bivalve mollusc</li> <li>• found on the continental shelf of north-western Europe at depths from 5-200m</li> <li>• generally on muddy sand and coarse gravel beds.</li> <li>• Permanent hermaphrodites producing up to two million eggs</li> <li>• spawning between spring to autumn.</li> <li>• Larvae remain in the plankton for around a month and travel large distances.</li> <li>• The Celtic Sea is fished by English, Welsh, Scottish and Irish Scallop dredgers.</li> <li>• UK scallop fisheries include large (<math>\geq 15m</math>) nomadic<sup>49</sup> vessels and smaller (10-15m) vessels fishing a more localised range.</li> </ul>	<ul style="list-style-type: none"> <li>• Non-quota species regulated by Effort for over 15m vessels in Western Waters Regime (Days / Hours at Sea).</li> <li>• 6-12nM: MMO responsibility; licensed activity. Licence conditions (for vessels over 10m) and gear restrictions, with some spatial differences inshore (&lt;6 nM) and offshore (6-12nM).</li> <li>• Devon and Severn IFCA byelaws: scallop minimum sizes; Scallop dredge technical measures; No more than 12 dredges per vessel and where multiple dredges are used, not exceeding 5.18m in length; dredging is only permitted between 7am and 7pm; the</li> </ul>	<ul style="list-style-type: none"> <li>• No stock assessment is available for ICES area VIIIf or the Bristol Channel.</li> <li>• Considered a minor stock</li> </ul>

	<ul style="list-style-type: none"> <li>The Bristol Channel is not heavily dredged compared to other areas e.g. VIIe and VIIh.<sup>50</sup></li> </ul>	<p>fishery is closed in July, August and September.<sup>51</sup></p> <ul style="list-style-type: none"> <li>EU regulations Minimum Landing Size - 110 mm shell length for UK vessels and maximum fishing effort within the region, managed at vessel level.</li> </ul>	
<b>Crab (<i>Cancer pagurus</i>)</b>	<ul style="list-style-type: none"> <li>Brown / Edible crab are found from Scandinavia to Portugal and widespread in UK waters up to 100m depth.</li> <li>Mating occurs inshore during spring and summer. Eggs hatch in the spring and summer and undergo a planktonic stage for around five weeks before settling on the seabed.</li> <li>It takes about five years for a juvenile crab to grow to commercial size following annual moults.</li> <li>Fished using pots.</li> <li>At the MLS's used in this region around 100% of males and 94-98% of females should be sexually mature.</li> <li>Stock boundaries remain poorly understood; females travel large distances to spawn and are largely inactive over the winter.<sup>52</sup></li> </ul>	<ul style="list-style-type: none"> <li><b>Non-quota species</b></li> <li><b>Fishery management beyond 6 nautical miles: Defra and the MMO are responsible for managing crab fisheries.</b></li> <li><b>From the coast out to 6 nautical miles, responsibility lies with IFCA's.</b></li> <li><b>Devon and Severn IFCA potting permit byelaw:</b> No berried crabs to be removed; any parts (claws) detached from the crab body; any crab that has cast its shell; size limits (different for male / female crabs); daily catch limits per vessel (25 / 3 depending on permit category); technical measures on pot design.<sup>53</sup> D&amp;S IFCA has introduced increase in MCRS – males crab to 160mm and females to 150mm – larger than EU MCRS. Escape gaps on pots with soft eye – e.g. parlours</li> <li>The UK Western Channel and Celtic Sea edible crab fisheries comprise coastal inshore pot and trap fisheries prosecuted by</li> </ul>	<ul style="list-style-type: none"> <li>The NDMP is within the Celtic Sea CFU.</li> <li>Stock size: Below Maximum Sustainable Yield level but above minimum reference point limit.</li> <li>Exploitation rate: Moderate. Around level generating Maximum Sustainable Yield.<sup>54</sup></li> <li>CFU and IFCA boundaries do not match, which is challenging for management.</li> </ul>

		<p>smaller (mainly under-10m vessels) and deeper water, more offshore, fisheries conducted by larger vessels that split time between inshore and offshore locations.</p> <ul style="list-style-type: none"> <li>• Fishery Unit Definitions - five Crab Fishery Units (CFU) have been defined for England and each includes waters covered by International, National and local legislation at IFCA level.</li> <li>• <b>Project UK Southwest Crab &amp; lobster pot FIP</b></li> </ul>	
<b>Lobster</b> <i>(Homarus gammarus)</i>	<ul style="list-style-type: none"> <li>• European lobster are found from Scandinavia to North Africa, mainly on rocky substrates.</li> <li>• Lobsters eat small crustaceans, molluscs and worms.</li> <li>• Moulting in summer / annually.</li> <li>• Mating occurs soon after female moulting</li> <li>• Most females are expected to have a 2-year reproductive cycle.</li> <li>• larvae in water for 3-4 weeks before the first juvenile stages settle on the seabed<sup>55</sup>.</li> <li>• Fished using pots.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Non-quota species</b></li> <li>• <b>Fishery management beyond 6 nautical miles: Defra and the MMO are responsible for managing crab fisheries.</b></li> <li>• <b>From the coast out to 6 nautical miles, responsibility lies with IFCAs.</b></li> <li>• <b>Devon and Severn IFCA potting permit byelaw:</b> No berried lobster to be removed; No V-notched lobsters to be removed; any parts (claws) detached from the body; minimum sizes; no lobster that has recently cast its shell is to be removed; technical measures on pot design (escape gaps).<sup>56</sup> Increased MCRS to 90mm above the EU / national size of 87mm</li> <li>• Fishery Unit Definitions - six Lobster Fishery Units (LFU) have been defined for</li> </ul>	<ul style="list-style-type: none"> <li>• NDMP is within the Southwest LFU.</li> <li>• Stock size: Above minimum reference point limit but below MSY target</li> <li>• Exploitation rate: Moderate. Above rates consistent with MSY but below maximum reference point limit. Stable or decreasing over the past 3 years.<sup>57</sup></li> <li>• LFU and IFCA boundaries do not match which is challenge for management.</li> </ul>

		<p>England, based on the distribution of the fisheries, hydrology and larval distribution.</p> <ul style="list-style-type: none"> <li>• Each LFU includes waters covered by International, National and local (IFCA) legislation</li> <li>• <b>Project UK Southwest Crab &amp; lobster pot FIP</b></li> </ul>	
<b>Whelk</b> <i>(Buccinum undatum)</i>	<ul style="list-style-type: none"> <li>• A large whelk up to 10 cm high and 6 cm wide.</li> <li>• Distributed from Iceland and Norway to Bay of Biscay and throughout the North Atlantic.<sup>58</sup></li> <li>• The UK is the largest producer of whelks in the northeast Atlantic.</li> <li>• Whelk are fished by pots primarily for the export market (South Korea and Asia) and the price has risen correspondingly (from £500 per tonne in 2005 to £1,200 per tonne in 2018)<sup>59</sup>, driving further fishing effort for whelks.</li> <li>• The increased demand has seen estimated value of English whelk landings increase from £5.3 million (2008) to £12.8 million (2017), with a high reliance on the species for the inshore fleet (and often providing a seasonal alternative for crab and lobster fishers).</li> </ul>	<ul style="list-style-type: none"> <li>• Non-quota species regulated by effort (pot limits for inshore and offshore).</li> <li>• IFCA and MMO responsibility.</li> <li>• <b>Devon and Severn IFCA potting permit byelaw:</b> Minimum sizes.<sup>59</sup></li> <li>• Informal agreement: 'Whelk Box'<sup>60</sup> see Annex 4.</li> <li>• Whelk are considered a displacement fishery, with vessels moving from more regulated species, into whelk fisheries, putting increased pressure on the stock and making whelks the 5<sup>th</sup> most important shellfish species for the UK (after Nephrops, scallop, crab and lobster).<sup>61</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Limited management measures<sup>62</sup> protecting the fishery, which differ at IFCA district level.</li> <li>• Spawning season and size at maturity determined by D&amp;SIFCA.</li> </ul>

<b>Squid (<i>Loligo vulgaris</i>)</b>	<ul style="list-style-type: none"> <li>Landings of common squid include a number of species: <i>Loligo forbesi</i>, <i>Loligo vulgaris</i> and <i>Alloteuthis subulata</i> which are all found seasonally.<sup>63</sup></li> <li>In England and Wales, <i>Loligo vulgaris</i> represents the majority of the catch of any squid species.</li> <li>Squid populations experience dramatic variation on a year-to-year basis due to high sensitivity to environmental factors, which need to be understood to assess the viability and sustainability of the future of the squid fishery in English waters.</li> </ul>	<ul style="list-style-type: none"> <li><b>Non-quota species, no regulation.</b></li> <li>Currently, no direct management measures are in place for squid in the Channel, although without information on the sustainability and without any management in place the risk of overexploitation exists.</li> </ul>	<ul style="list-style-type: none"> <li>Accurate stock assessments including environmental factors are needed.</li> <li>Management measures would include limits to the catching of new recruits, entry into to the fishery should be capped or managed through a permit scheme and spawning grounds need to be understood and protected.</li> </ul>
<i>Loligo forbesii</i> (Atlantic long-finned squid)	<ul style="list-style-type: none"> <li>Atlantic long-finned squid occur from the southern Iberian Peninsula to UK and Irish waters and a lower abundance in summer months has been noted which may indicate that the animals move outside the range of the UK squid fishery during that time (probably to deeper waters or to die post spawning).</li> <li>The fishery peaks during the months of August-November. Squid are targeted while ascending through the water column to feed in surface waters at night. Early in the</li> </ul>	<ul style="list-style-type: none"> <li><b>Non-quota species, no regulation.</b></li> <li>Currently, no direct management measures are in place for squid in the Channel, although without information on the sustainability and without any management in place the risk of overexploitation exists.</li> </ul>	<ul style="list-style-type: none"> <li>Although stock assessment exercises have been carried, using historical datasets these two squid species remain unmanaged and hence defining stock health is a challenge.<sup>65</sup></li> </ul>

	season, fishing takes place inshore and shifts to deeper waters as the season progresses. <sup>64</sup>		
<b>Finfish</b>			
<b>Skates and Rays</b>  Rajidae species such as thornback ray ( <i>Raja clavata</i> ), blonde ray ( <i>Raja brachyura</i> ), undulate ray ( <i>Raja undulata</i> ), and small-eyed ray ( <i>Raja microocellata</i> ) may be taken in species-specific targeted inshore fisheries using nets, lines, and trawl.	<ul style="list-style-type: none"> <li>• Skates and rays (Rajiformes) are cartilaginous fishes related to sharks and dogfish.</li> <li>• There are over 230 species worldwide.</li> <li>• Approximately 30 species occur in the North-East Atlantic, including about a dozen around the British Isles.</li> <li>• There are around 18 species of skates and rays that are regularly found in UK waters, 8 are common.</li> <li>• Skates and rays can sustain only moderate fishing mortality. Large, flat-bodied coastal species are the most vulnerable to extinction due to slow growth and maturity, low number of offspring and long reproductive cycles. In the UK, larger skates (such as the White Skate and Flapper Skate) have become some of the most threatened species in British waters.<sup>66</sup></li> <li>• Juvenile common skate were captured primarily off North-western Scotland and Celtic Sea<sup>67</sup></li> </ul>	<ul style="list-style-type: none"> <li>• EU TAC / quota species</li> <li>• Managed by FQAs for over 10m vessels</li> <li>• Managed under monthly MMO quota pool for under 10m vessels</li> <li>• Devon and Severn IFCA mobile gear permit byelaw<sup>69</sup></li> <li>• Devon and Severn IFCA netting permit byelaw<sup>70</sup></li> <li>• Voluntary 'ray box' (2005) spatial management<sup>71</sup></li> <li>• Most commercially landed skates and rays are not separated to species level (hence 'skates and rays', and so accurate landing statistics, which are important for stock assessment, are unavailable).<sup>72</sup></li> <li>• Management in 6a, 6b, 7a-c and 7e-k. Single TAC for all species. White skate, common skate, long-nosed skate, and undulate ray in 6, are prohibited from landing and must be returned unharmed where possible.</li> <li>• Management measures: Quota management is the main management tool at the present</li> </ul>	<ul style="list-style-type: none"> <li>• The most recent stock size indicator is higher than in the preceding ten years.</li> <li>• ICES cannot assess the stock and exploitation status relative to the maximum sustainable yield (MSY) and precautionary approach (PA) reference points because the reference points are undefined.</li> <li>• No reference points are defined for this stock.<sup>75</sup></li> <li>• ICES advises that removing the EU TAC for skates and rays in ICES divisions 6.a, 6.b, 7.a-c, and 7.e-k may generate a high risk of the stocks being exploited unsustainably.</li> </ul>

	<ul style="list-style-type: none"> <li>• Thornback ray is a coastal and shelf species that is a bycatch of trawl and gillnet fisheries. Areas of importance to juvenile thornback ray includes the Bristol Channel.<sup>68</sup></li> <li>• Skates and rays are a relatively important group of commercial species, usually landed from trawlers in mixed demersal fisheries.</li> <li>• Some local fisheries target rays with set nets.</li> <li>• In the Celtic Sea, there are target fisheries for rays, in particular for blonde rays. Most other species are retained as important, marketable bycatch in mixed demersal fisheries.</li> </ul>	<p>time, with some areas having local regulations on minimum landing sizes. The TAC was set higher than both landings and ICES advice for several years. The TAC became restrictive from 2015 onwards.<sup>73</sup></p> <ul style="list-style-type: none"> <li>• Small-eyed ray: ICES advises that when the precautionary approach is applied, landings should be no more than 192 tonnes for 2019 and 2020.</li> <li>• Thornback ray: ICES advises that when the precautionary approach is applied, landings should be no more than 1663 tonnes for 2020.<sup>74</sup></li> <li>• Blonde ray (<i>Raja brachyura</i>) Divisions 7.a and 7.f–g rjh.27.7afg 5. Precautionary approach 895 in 2019. Blonde ray (<i>Raja brachyura</i>) Division 7.e rjh.27.7e 5. Precautionary approach 333</li> <li>• Accidental bycatches of undulate ray in area 7.e of no more than 161 t may be taken or of no more than 154 t of small-eyed ray in 7.f and g. There is a requirement to separately report catches of cuckoo, <i>R. clavata</i>, blonde, <i>R. montagui</i>, sandy and shagreen ray.</li> </ul>	
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		<ul style="list-style-type: none"> <li>ICES is not in a position to evaluate if such an increase in fishing mortality is sustainable.</li> </ul>	
<b>Cod (<i>Gadus morhua</i>)</b>	<ul style="list-style-type: none"> <li>Atlantic cod are found all around the coasts of Britain and Ireland, as far south as the Bay of Biscay and to the north Barents Sea.</li> <li>Cod prefer cold temperate waters and can be found from the shoreline down to depths of 600 m.</li> <li>Mature <i>Gadus morhua</i> grow to approximately 120 cm in length, weighing around 12 kg, however, larger fish have been recorded.</li> <li>Atlantic cod are productive breeders. Spawning occurs between February and April when 3 to 6 million buoyant eggs are released before hatching after 12 days.</li> <li>Young <i>Gadus morhua</i> feed mainly on copepods but become increasingly dependent on fish as they age, eating the likes of herring, capelin, haddock and even other cod<sup>76</sup></li> <li>Atlantic cod is one of the UKs most popular commercial species and as a result has been fished extensively in UK waters. They can</li> </ul>	<ul style="list-style-type: none"> <li><b>EU TAC / quota species</b></li> <li><b>Managed by FQAs for over 10m vessels</b></li> <li><b>Managed under monthly MMO quota pool for under 10m vessels</b></li> <li><b>Devon and Severn IFCA mobile gear permit byelaw<sup>77</sup></b></li> <li><b>Devon and Severn IFCA netting permit byelaw<sup>78</sup></b></li> <li>ICES advises that when the MSY approach is applied, there should be zero catch in 2019.</li> </ul>	<ul style="list-style-type: none"> <li>Spawning-stock biomass (SSB) has been below Blim since 2004, except from 2011 to 2013.</li> <li>Fishing mortality has been above FMSY for the entire time-series but has been decreasing since 2014.</li> <li>Recruitment has been highly variable over time. Recent recruitment has been very weak with the exception of the 2013 year class, which is above average.</li> <li>ICES assesses that fishing pressure on the stock is above FMSY and between Fpa and Flim, and that the spawning-stock size is below MSY Btrigger, Bpa, and Blim.</li> <li>The stock size has also been revised down significantly in the latest assessment.</li> </ul>

	often be found in large, dense shoals, making them an easy target for fishermen who target them using trawls, nets and rod and line.		<ul style="list-style-type: none"> <li>Catch advice for 2019 is 0 (zero) tonnes because no scenario would result in the stock recovering to Blim by 2020<sup>79</sup></li> </ul>
Bass <i>(Dicentrarchus labrax)</i>	<ul style="list-style-type: none"> <li>Bass are found throughout the Mediterranean, Black Sea and the North Eastern Atlantic from Norway to Senegal.</li> <li>Found in coastal waters to a depth of 100 m (winter), as well as estuaries (summer)</li> <li>Voracious predator, feeding on crustaceans, molluscs and fish.</li> <li>In the Atlantic bass reach sexual maturity at four years (males) and seven years (females).<sup>80</sup></li> <li>UK wide fished by three main gear types (trawls, nets, rod and line).</li> <li>The bass fishery has grown in prominence for the inshore fleet throughout England and Wales as it was (and remains) a non-quota species therefore a lot of additional fishing effort was exerted on the stock<sup>81,82</sup>.</li> </ul>	<ul style="list-style-type: none"> <li><b>Non-quota species</b></li> <li><b>Vessel catch limits / bycatch allowance (by gear type) and closed seasons set at EU level. Originally under 2015 Emergency Measures.</b></li> <li><b>Devon and Severn IFCA mobile gear permit byelaw<sup>83</sup></b></li> <li><b>Devon and Severn IFCA netting permit byelaw<sup>84</sup></b></li> <li>Emergency Measures started in 2015 with a ban on pelagic trawling during spawning season; an increase in Minimum Conservation Reference Size from 36 to 42cm (for both commercial and recreational fishing) and maximum catches by the different gear types prevalent in the fishery as well as restrictions of 3 fish per day per recreational angler<sup>85</sup>)</li> <li>In 2016<sup>86</sup> spatial management in the form of closed areas<sup>87</sup> and also a closed season during February and March of each year</li> </ul>	<ul style="list-style-type: none"> <li>Spawning-stock biomass (SSB) has been declining since 2005 and is now below Blim.</li> <li>Fishing mortality (F) has increased over the time-series, peaking in 2013 before a rapid decline to below FMSY.</li> <li>Recruitment was estimated to be poor since 2008, with the exception of the 2013 and 2014 year-class estimates which show average recruitment.</li> <li>ICES advises that when the MSY approach is applied, total removals in 2019 should be no more than 1789 tonnes.</li> <li>ICES assesses that fishing pressure on the stock is below FMSY, Fpa, and Flim, and that the spawning-stock size is below MSY Btrigger, Bpa, and Blim.</li> </ul>

		<p>were introduced, alongside monthly catch limits for each of the gear types involved in the fishery.<sup>88</sup></p> <ul style="list-style-type: none"> <li>• In 2017 the closure continued in February and March; a 3% bycatch allowance for demersal trawls and seines; and a fixed net bycatch allowance of 250Kg per month; as well as an annual limit of 10t for hook and line fisheries (on the basis of social and economic impacts).</li> <li>• 2019 –vessel catch limits and bycatch allowances: A maximum 1% bycatch per day for trawls (210kg per month); hooks 5.5 tonnes per year and fixed nets unavoidable by-catch of 1.4 tonnes per year.<sup>89’90</sup></li> <li>• Recreational fishers are allowed 1 bass per angler per day from April to October. Catch and release only from November to March.</li> </ul>	<ul style="list-style-type: none"> <li>• Stock identity remains poorly understood and tagging and genetic studies are ongoing to address this.<sup>91</sup></li> </ul>
<b>Dover Sole</b> ( <i>Solea solea</i> )	<ul style="list-style-type: none"> <li>• A fast-growing flatfish species found throughout UK waters, mainly on sandy and muddy grounds and estuaries to a maximum depth of around 70m (up to 120m in winter).</li> <li>• Sole are a UK Biodiversity Action plan (BAP) species and listed as vulnerable to over-exploitation.</li> <li>• Juveniles grow in coastal nursery areas before migrating to deeper waters after around 3 years.</li> </ul>	<ul style="list-style-type: none"> <li>• EU TAC (<b>quota</b>) species</li> <li>• Managed by FQAs for over 10m vessels</li> <li>• Managed under monthly MMO quota pool for under 10m vessels</li> <li>• Devon and Severn IFCA mobile gear permit byelaw<sup>93</sup></li> <li>• Devon and Severn IFCA netting permit byelaw<sup>94</sup></li> </ul>	<ul style="list-style-type: none"> <li>• ICES assesses that fishing pressure on the stock is above FMSY and between Fpa and Flim and spawning-stock size is above MSY Btrigger, Bpa and Blim</li> <li>• The spawning-stock biomass (SSB) has been fluctuating since the 1980s, but has decreased and is now around Blim.</li> </ul>

	<ul style="list-style-type: none"> <li>Sole are mainly nocturnal feeders and the net fishery is usually at night as a result.</li> <li>Sole spawn from March to May after which the larvae are planktonic for 6 weeks and subsequently settle on the seabed in inshore nursery areas.</li> <li>Sole are caught in trawl and fixed net fisheries.</li> <li>There are several nominal sole stocks in the UK EEZ including the Celtic Sea (ICES Divisions VIIf and g), Irish Sea (VIIa), eastern English Channel (VIId), western English Channel (VIIe) and North Sea (Subarea IV) stocks<sup>92</sup></li> </ul>	<ul style="list-style-type: none"> <li>ICES advises that when the MSY approach is applied, catches in 2019 should be no more than 864 tonnes.</li> <li>A TAC constraint has been applied in the forecast because recent landings have been close to the TAC. The strong 2017 recruitment may be overestimated and was revised down by 23% in the short-term forecast, based on assessment revisions of previous strong year-class estimates.<sup>95</sup></li> </ul>	<ul style="list-style-type: none"> <li>ICES assesses that fishing pressure on the stock is below FMSY proxy and biomass is above MSY Btrigger proxy.</li> <li>As the fishing mortality is below and the stock size above the proxy levels, no additional precautionary buffer was applied.</li> </ul>
Plaice ( <i>Pleuronectes platessa</i> )	<ul style="list-style-type: none"> <li>There are several nominal stocks of plaice in the UK EEZ, including Celtic Sea (ICES Divisions VIIf and g), Irish Sea (VIIa), eastern English Channel (VIId), western English Channel (VIIe) and North Sea (Subarea IV) stocks<sup>96</sup></li> <li>Sole and plaice are caught in mixed fisheries, which generates high discards of plaice owing to a mismatch in the selectivity properties of the gear and the plaice minimum landings size. In addition, the relatively low market value of plaice may contribute to the high and variable discard rates.</li> </ul>	<ul style="list-style-type: none"> <li><b>EU TAC (quota) species</b></li> <li><b>Managed by FQAs for over 10m vessels</b></li> <li><b>Managed under monthly MMO quota pool for under 10m vessels</b></li> <li><b>Devon and Severn IFCA mobile gear permit byelaw<sup>98</sup></b></li> <li><b>Devon and Severn IFCA netting permit byelaw<sup>99</sup></b></li> <li>ICES advises that when the precautionary approach is applied, catches in 2019 should be no more than 2160 tonnes.</li> </ul>	<ul style="list-style-type: none"> <li>Fishing mortality has been declining since the late 1990s and is now below FMSY proxy.</li> <li>The biomass has been increasing since 2007 and is above MSY Btrigger proxy.</li> <li>ICES assesses that fishing pressure on the stock is below FMSY proxy and biomass is above MSY Btrigger proxy.<sup>100</sup></li> </ul>

	<ul style="list-style-type: none"> <li>Catchpole et al. (2015) estimate discard survival of plaice around 40%. The mean discard rate in 2013–2017 was 71% of the total catch.<sup>97</sup></li> </ul>	<ul style="list-style-type: none"> <li>Fishing mortality has been declining since the late 1990s and is now below FMSY proxy..</li> </ul>	
<b>Dogfish</b> <i>(Scyliorhinus canicula)</i>	<ul style="list-style-type: none"> <li>Small shark has a slender shark-shaped body with a blunt head, rounded snout and small dorsal fin.</li> <li>Common on all British and Irish coasts to a depth of 100 m.<sup>101</sup></li> <li>Frequent bycatch in trawl and fixed net fisheries</li> <li>Scyliorhinids are generally productive species in comparison to other demersal elasmobranchs and are typically either discarded or landed as a low-value bycatch.</li> <li>Discarding is known to occur and is very high and variable between fishing fleets, but it has not been fully quantified.</li> <li>Inshore fleets are expected to have extensive overlap with this stock, and landings data for vessels &lt; 10 m length overall may not be reported fully.<sup>102</sup></li> </ul>	<ul style="list-style-type: none"> <li><b>EU TAC (quota) species</b></li> <li><b>Managed by FQAs for over 10m vessels</b></li> <li><b>Managed under monthly MMO quota pool for under 10m vessels</b></li> <li><b>Devon and Severn IFCA mobile gear permit byelaw<sup>103</sup></b></li> <li><b>Devon and Severn IFCA netting permit byelaw<sup>104</sup></b></li> <li>ICES advises that when the precautionary approach is applied, landings should be no more than 4296 tonnes in each of the years 2018 and 2019.</li> <li>Landings data are incomplete. Some landings are included in generic “dogfish” or “catshark” categories.</li> </ul>	<ul style="list-style-type: none"> <li>The stock size indicator has increased over the time series</li> <li>Reference points are not defined for this stock.<sup>105</sup></li> </ul>

<b>Mackerel</b> <i>(Scomber scombrus)</i>	<ul style="list-style-type: none"> <li>Mackerel are fast swimming, migratory, shoaling fish that range all around the North East Atlantic.</li> <li>They feed on plankton and small fishes.</li> <li>Juvenile mackerel grow quickly and can reach 22cm after one year, and 30cm after 2 years, to a maximum length of about 70cm and are mature by year 3.</li> <li>Mackerel are batch spawners (females shed their eggs in about twenty separate batches over the course of the spawning season), they spawn mainly in March to July; the eggs and larvae are pelagic.<sup>106</sup> The main spawning period in 2018 was found to be consistent with last year at the end of January.</li> </ul>	<ul style="list-style-type: none"> <li><b>EU TAC (quota) species</b></li> <li><b>Managed by FQAs for over 10m vessels</b></li> <li><b>Managed under monthly MMO quota pool for under 10m vessels</b></li> <li>ICES advises that when the MSY approach is applied, catches in 2019 should be no more than 770 358 tonnes</li> <li>ICES assesses that fishing pressure on the stock is above FMSY but below Fpa and Flim, while spawning stock size is above MSY Btrigger, Bpa, and Blim.</li> <li>The stronger recruitment of recent years has led to an increase in stock size, supporting the increase in catches seen since the mid-2000s.<sup>107</sup></li> <li>This stronger recruitment may not continue in the future.</li> <li>Fishing mortality has been above FMSY since 1985.<sup>108</sup></li> </ul>	<ul style="list-style-type: none"> <li>The North East Atlantic (NEA) mackerel stock is comprised of three spawning components; the western, southern and North Sea, but is assessed by ICES as one stock. The stock has an extensive migration pattern with widely spread spawning areas.<sup>109</sup></li> <li>The spawning-stock biomass (SSB) is estimated to have increased in the late 2000s, reaching a maximum in 2014. It has declined since, but has remained above MSY Btrigger since 2008.</li> <li>The fishing mortality (F) has declined from high levels in the mid-2000s, but remains above FMSY.<sup>110</sup></li> <li>There has been a succession of large year classes since the early 2000s, with year classes since 2012 estimated to be above average.</li> </ul>
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			<ul style="list-style-type: none"> <li>• Current catches would not be sustainable if recruitment goes back to the levels estimated during the period 1985 to 2000.<sup>111</sup></li> </ul>
<b>Herring (<i>Clupea harengus</i>)</b>	<ul style="list-style-type: none"> <li>• Herring are clupeids, like sprat and pilchard.</li> <li>• They can grow to 40cm although most herring landed are around 25cm.</li> <li>• Herring are sexually mature at between 3-9 years (depending on stock) and populations include both spring and autumn spawners.</li> <li>• Herring have an important role in the marine ecosystem, transforming plankton at the bottom of the food chain to higher trophic or levels for cod, seabirds and marine mammals.</li> <li>• Herring spawning and nursery areas are sensitive and vulnerable to human influences such as sand and gravel extraction.<sup>112</sup></li> </ul>	<ul style="list-style-type: none"> <li>• EU TAC (quota) species</li> <li>• Managed by FQAs for over 10m vessels</li> <li>• Managed under monthly MMO quota pool for under 10m vessels</li> <li>• ICES advises that when the MSY approach is applied, catches in 2019 should be no more than 311 572 tonnes</li> <li>• ICES assesses that fishing pressure on the stock is below FMSY, Fpa and Flim; and spawning stock size is above MSY Btrigger, Bpa, and Blim.</li> <li>• The 2017 assessment predicted a reduction in stock size in 2018 and 2019 due to the weak 2014 year class. Following the ICES MSY approach, this results in a substantially lower catch advice for 2019.<sup>113</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Spawning-stock biomass (SSB) fluctuated between 1.5 and 2.6 million tonnes between 1998 and 2017, and in all years it was above MSY Btrigger.</li> <li>• Fishing mortality (F) has been below FMSY since 1996.</li> <li>• Even though the size of the stock has been large, the recruitment has been relatively low since 2002, with the two lowest year classes falling within the recent four of the last 30 years.</li> </ul>
<b>Haddock (<i>Melanogrammus aeglefinus</i>)</b>	<ul style="list-style-type: none"> <li>• Haddock prefer cool waters and during cold years their stocks do much better.</li> <li>• They can live for up to 20 years and can grow to one meter in length.</li> </ul>	<ul style="list-style-type: none"> <li>• EU TAC (quota) species</li> <li>• Managed by FQAs for over 10m vessels</li> <li>• Managed under monthly MMO quota pool for under 10m vessels</li> </ul>	<ul style="list-style-type: none"> <li>• Spawning stock biomass (SSB) has been above MSY Btrigger in most of the years since 2002.</li> <li>• Recruitment since 2000 has been</li> </ul>

	<ul style="list-style-type: none"> <li>Populations of haddock tend to fluctuate depending on varying numbers of young fish entering the population. As a consequence, haddock populations may be composed of a relatively small range of year classes.<sup>114</sup></li> <li>Mixed demersal fishery with cod</li> </ul>	<ul style="list-style-type: none"> <li><b>Devon and Severn IFCA</b> mobile gear permit byelaw<sup>115</sup></li> <li><b>Devon and Severn IFCA</b> netting permit byelaw<sup>116</sup></li> <li>Fishing mortality (F) has been fluctuating above FMSY for most of the time-series and is above FMSY in 2017.</li> <li>ICES advises that when the MSY approach is applied, total catches in 2019 should be no more than 33 956 tonnes.</li> <li>The principal driver of the stock is the occasional larger year classes, which results in strongly fluctuating advice. The magnitude of these strong year classes is decreasing.<sup>117</sup></li> </ul>	<p>characterized by a low average level with occasional larger year classes, the size of which is diminishing.</p> <ul style="list-style-type: none"> <li>ICES assessed that fishing pressure on the stock is above FMSY and below Fpa and Flim; SSB is above MSY Btrigger, Bpa, and Blim.</li> </ul>
<b>Pollock</b> <i>(Pollachius pollachius)</i>	<ul style="list-style-type: none"> <li>Distributed throughout the northeast Atlantic, belonging to the cod family.</li> <li>Mostly found close to the shore (wrecks and rocky bottoms), usually occurring at 40-100m depth (found down to 200m).</li> <li>Pollock can reach a length of 120-130cm and a maximum weight of 18 kg</li> <li>Growth is rapid, approaching 10 cms per year</li> </ul>	<ul style="list-style-type: none"> <li><b>EU TAC / quota species</b></li> <li><b>Managed by FQAs for over 10m vessels</b></li> <li><b>Managed under monthly MMO quota pool for under 10m vessels</b></li> <li><b>Devon and Severn IFCA</b> mobile gear permit byelaw<sup>119</sup></li> <li><b>Devon and Severn IFCA</b> netting permit byelaw<sup>120</sup></li> </ul>	<ul style="list-style-type: none"> <li>Information on stock structure and biological parameters are needed before alternative assessment models can be applied.</li> <li>This indication of decline in abundance together with an unknown stock size justifies the application of an additional precautionary buffer. The</li> </ul>

	<ul style="list-style-type: none"> <li>Maturity occurs at approximately 3 years and spawning occurs between January and April.</li> <li>Young of the first year are particularly common close inshore and may therefore be protected from fisheries in the early life stages.<sup>118</sup></li> <li>Mainly caught in fixed nets and by rod and line</li> </ul>	<ul style="list-style-type: none"> <li>ICES advises that when the precautionary approach is applied, commercial catches should be no more than 3360 tonnes in 2019.</li> <li>The fishing mortality is thought to be below possible reference points and the stock size is unknown.</li> </ul>	<ul style="list-style-type: none"> <li>advised catch for 2019 is lower than the previous advice, due to the application of the precautionary buffer.<sup>121</sup></li> <li>No reference points are defined for this stock.<sup>122</sup></li> </ul>
<b>Monks / Anglerfish (<i>Lophius piscatorius</i> and <i>L. budegassa</i>)</b>	<ul style="list-style-type: none"> <li>Monkfish are found all around Britain, predominantly on the west coast of England, Wales and Scotland and the north, south and east coasts of Ireland.</li> <li>Two species are caught (primarily white monkfish <i>Lophius piscatorius</i> and also black bellied monkfish <i>Lophius budegassa</i>).</li> <li>Monkfish are long-lived, slow moving, cryptic, ambush predators.</li> <li>Females mature around 9-11 years (70 - 90cm although they can grow up to 2m in length weighing 40Kg) and males around 6 years (50cms, Max 1m).</li> <li>Monkfish spawn from January to July in deep water off the edge of the continental shelf.</li> <li>The species are vulnerable to overfishing, and are caught in beam trawls and nets.<sup>123</sup></li> </ul>	<ul style="list-style-type: none"> <li><b>EU TAC / quota species</b></li> <li><b>Managed by FQAs for over 10m vessels</b></li> <li><b>Managed under monthly MMO quota pool for under 10m vessels</b></li> <li><b>Devon and Severn IFCA mobile gear permit byelaw<sup>125</sup></b></li> <li><b>Devon and Severn IFCA netting permit byelaw<sup>126</sup></b></li> <li>The two anglerfish species (<i>L. piscatorius</i> and <i>L. budegassa</i>) are not totally separated in the landings. A single TAC covers both species</li> <li>ICES advises that when the MSY approach is applied, catches in 2019 should be no more than 31 042 tonnes.</li> <li>Recruitment has been variable over the time-series. ICES assesses that fishing</li> </ul>	<ul style="list-style-type: none"> <li>SSB has been increasing since 2005 and is now estimated to be the highest in the timeseries.</li> <li>F has been above FMSY but has trended downwards since the mid-2000s and is now at FMSY.</li> <li>A reduction in quotas (and restrictions on deep-water netting) have improved the stock sustainability.</li> <li>ICES considers that management of the two anglerfish species under a combined TAC prevents effective control of the single-species exploitation rates and could lead to overexploitation of either species.</li> </ul>

	<ul style="list-style-type: none"> <li>TACs are set for the Western &amp; Channel fishery, the UK share (initial allocation) accounts for under a quarter of the total TAC, with the French fleet allocated the majority.<sup>124</sup></li> </ul>	<p>pressure on the stock is at FMSY and below <math>F_{pa}</math> and <math>F_{lim}</math>, and that the spawning stock size is above MSY <math>B_{trigger}</math>, <math>B_{pa}</math> and <math>B_{lim}</math>.<sup>127</sup></p> <ul style="list-style-type: none"> <li>A Fisheries Improvement Plan (FIP) has been set up for the Western and Channel Monkfish fishery.</li> <li>Council Regulation (EC) No. 1954/2003 restricts fishing effort in a “biologically sensitive area” in Divisions VIIb, VIIj, VIIg, and VIIh. Tangle nets used to target monk and turbot have a minimum mesh size of 220mm. There is no MCRS for monkfish, but an EU Council Regulation (EC) No. 2406/96 laying down common marketing standards for certain fishery products fixes a minimum weight of 500g.<sup>128</sup></li> </ul>	
<b>Lemon Sole</b> <i>(Microstomus kitt)</i>	<ul style="list-style-type: none"> <li>Lemon sole are moderately sized flatfish reaching up to 30 cm, belonging to the plaice family (Pleuronectidae) and found in the shelf waters of the North Atlantic<sup>129</sup> and common in the North Sea, Celtic Sea, the western English Channel, the western approaches and the Irish Sea<sup>130</sup>.</li> <li>In the western English Channel, lemon sole spawn in April and May.<sup>131</sup></li> </ul>	<ul style="list-style-type: none"> <li>EU TAC set for the North Sea</li> </ul>	<ul style="list-style-type: none"> <li>No medium or long-term projections are carried out for North Sea lemon sole. As there is no age- and catch-based assessment for lemon sole.</li> <li>Stock status is therefore evaluated using <math>F(MSY)</math> proxies estimated using a suite of length based indicators (LBIs),</li> </ul>

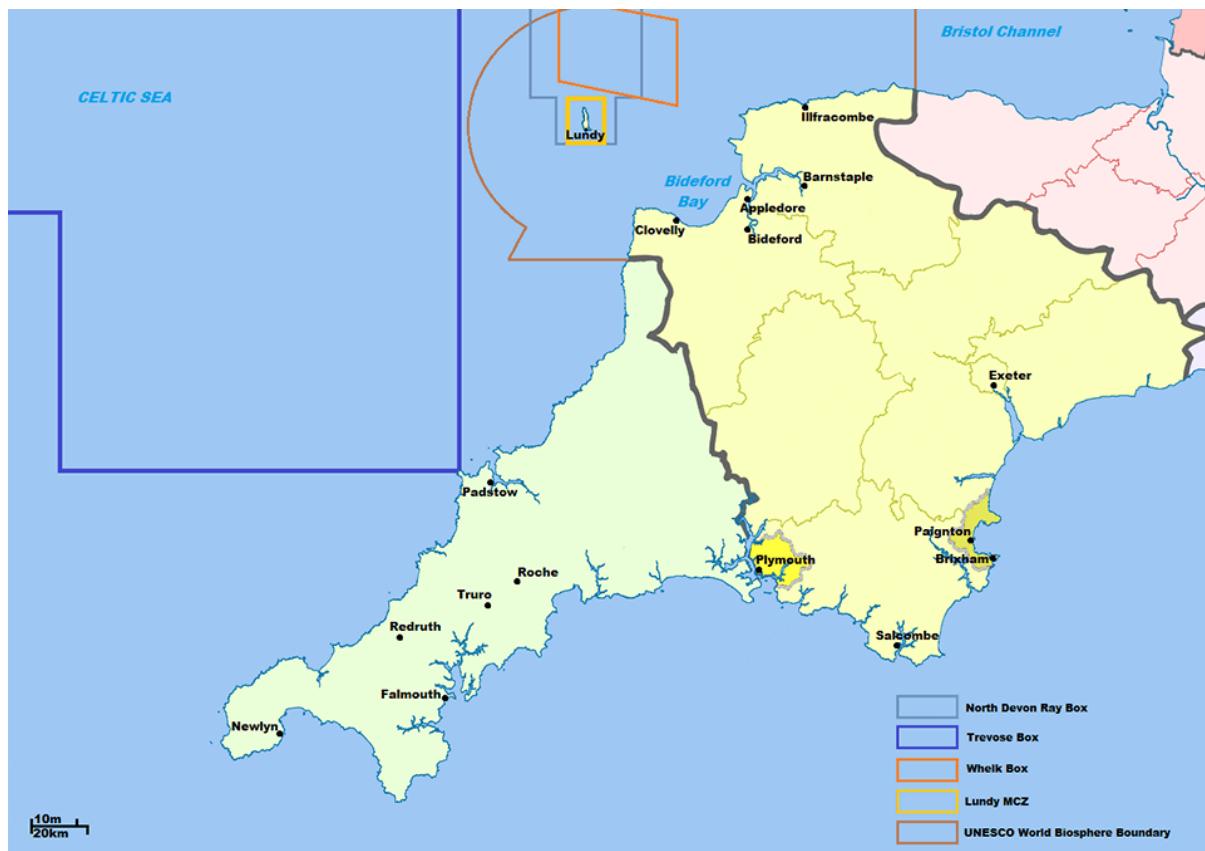
	<p>Lemon sole is one of the most valuable flatfish species on the UK market.</p> <ul style="list-style-type: none"> <li>the UK has historically been by far the most significant participant in the lemon sole fishery</li> </ul>		<p>following the standard approach<sup>132</sup></p>
<b>Smooth-hound</b> ( <i>Mustelus mustelus</i> ) -	<ul style="list-style-type: none"> <li>Smooth-hound are a shallow water shark species, found on sand or shingle grounds.</li> <li>The range covers the Eastern Atlantic, from the UK to the Mediterranean, Morocco and Canary Islands; and further south into tropical waters.</li> <li>Large males can reach a length of 2m and smooth-hounds are found at depths ranging from 5 to 350m.</li> <li>The IUCN red list categorises smooth hound as vulnerable with a decreasing population trend.<sup>133</sup></li> <li>Starry smooth-hound <i>Mustelus asterias</i>: This is the dominant smooth-hound in northern European waters.</li> <li>Smooth-hounds are a seasonal bycatch in trawl, gillnet and longline fisheries. Though</li> </ul>	<ul style="list-style-type: none"> <li><b>Non-quota species</b></li> <li>In the absence of more detailed studies on stock identity, WGEF considers there to be a single biological stock unit of <i>Mustelus asterias</i> in the continental shelf waters of ICES Subareas 4, 6–8. The southern limits are uncertain.</li> <li>There are no specific management measures for smooth-hounds.</li> <li>EC Council Regulations 850/98 for the 'conservation of fishery resources through technical measures for the protection of juveniles of marine organisms' details the minimum mesh sizes that can be used to target fish. Although other dogfish (<i>Squalus acanthias</i> and <i>Scyliorhinus spp.</i>) could be targeted in fixed nets of 120–219 mm and</li> </ul>	<ul style="list-style-type: none"> <li>No quantitative stock assessment is available yet.</li> <li>Smooth-hounds appear to be increasing in relative abundance in trawl surveys, and in commercial landings data.</li> <li>Given the potential expansion in fisheries for smoothhounds (which may reflect an increased abundance and that fishing opportunities for <i>S. acanthias</i> are limited), further studies to understand the dynamics of this stock are required.</li> </ul>

	<p>they are discarded in some fisheries, other fisheries land this bycatch, depending on market demands. Some may also be landed to supply bait for pot fisheries.</p> <ul style="list-style-type: none"> <li>Studies on in the Celtic Seas ecoregion indicated that the total length (and age) at 50% maturity for male and females are 78 cm LT (4–5 years) and 87 cm LT (six years), respectively (Farrell et al., 2010b).<sup>134</sup></li> </ul>	<p>&gt;220 mm mesh size (in regions 1 and 2), <i>Mustelus</i> spp. would be classed under ‘all other marine organisms’, and so can only be targeted in fixed nets of &gt;220 mm. This has been queried by some fishermen.</p> <ul style="list-style-type: none"> <li>In 2017, ICES advised that when the precautionary approach is applied, landings should be no more than 3855 tonnes in each of the years 2018 and 2019.<sup>135</sup></li> </ul>	
<b>Turbot (<i>Psetta maxima</i>)</b>	<ul style="list-style-type: none"> <li>Turbot are one of the fastest growing flatfish (they can reach 30cm in their first 3 three years) and grow to about 1m in length.</li> <li>Turbot are found throughout the North East Atlantic to Morocco, the Mediterranean and the Black Sea.</li> <li>They are ambush predators (fish and crustaceans), mainly found over muddy sand and lightly broken grounds and spawn in early spring.</li> <li>Turbot are mainly caught in the southern and eastern part of the North Sea and western Channel.</li> <li>Both turbot and brill are high value species.</li> <li>Beam trawls were responsible for 70% of the catches of turbot in 2016, bottom trawls 21%, and other gears 9%.</li> </ul>	<ul style="list-style-type: none"> <li><b>Non-quota species</b></li> <li><b>Devon and Severn IFCA</b> mobile gear permit byelaw<sup>137</sup></li> <li><b>Devon and Severn IFCA</b> netting permit byelaw<sup>138</sup></li> <li>The North Sea fishery is controlled by a precautionary TAC based on previous catches and is combined with brill (<i>Scophthalmus rhombus</i>).<sup>139</sup></li> <li>ICES advised in 2017 that when the precautionary approach is applied, catches should be no more than 4952 tonnes in each of the years 2017, 2018, and 2019.</li> <li>Management of turbot and brill under a combined species TAC prevents effective</li> </ul>	<ul style="list-style-type: none"> <li>ICES assessed in 2017 the stock to be within safe biological limits</li> <li>The stock status lacks basic information and is considered data deficient to a large extent due to a lack of updates, gaps in the time series, little data on discards and limited survey information.<sup>140</sup></li> </ul>

	<ul style="list-style-type: none"> <li>Turbot is mainly caught in fisheries targeting sole and plaice.</li> <li>Brill - Beam trawls were responsible for 65% of the catches in weight of brill in 2016, otter trawls 18%, trammel/gillnets 10%, and other gears 6%.</li> <li>Brill is mainly caught in fisheries targeting sole and plaice. Mixed fisheries analysis indicate that targeting of brill does occur</li> <li>in ICES divisions 3.a and 7.d-e and that less targeting occurs in ICES Subarea 4 where catches are subject to the TAC.<sup>136</sup></li> </ul>	<p>control of the exploitation rates of the individual species and could lead to the overexploitation of either species.</p> <ul style="list-style-type: none"> <li>Discards of turbot were between 3% and 16% of the total catch in the period 2013 to 2016.</li> <li>Brill: ICES advised in 2017 that when the precautionary approach is applied, catches should be no more than 3170 tonnes in each of the years 2018 and 2019.</li> <li>Discards of brill were between 4% and 8% of the total catch in the period 2012 to 2016.</li> </ul>	
<b>Spurdog</b> <i>(Squalus acanthias)</i>	<ul style="list-style-type: none"> <li>Grow to a maximum size of 124 cm.</li> <li>Spurdog is a long-lived, slow-growing, and late-maturing species and therefore particularly vulnerable to fishing mortality.</li> <li>The species is assessed as Critically Endangered in the North East Atlantic by IUCN and has been recently added to the OSPAR list of threatened and/or declining species and habitats.<sup>141</sup></li> </ul>	<ul style="list-style-type: none"> <li><b>Zero TAC</b></li> <li>The North East Atlantic stock is now considered to be depleted.</li> <li>Targeted fisheries for the species have effectively been outlawed as there is Zero TAC for the species.<sup>142</sup></li> <li>Spurdog remains a bycatch in the mixed demersal and gillnet fisheries, and an unquantified amount of discarding now takes place in these fisheries.<sup>143</sup></li> </ul>	<ul style="list-style-type: none"> <li>The harvest rate has declined substantially and is estimated to be well below the MSY level (HRMSY)</li> <li>ICES assesses that fishing pressure on the stock is below HRMSY, and total biomass is below MSY Btrigger.</li> <li>No other reference points for fishing pressure and stock size have been defined for this stock.</li> </ul>

## ANNEX 4:

Location of Lundy MCZ, the 'ray box' and 'whelk box' within the NDMP area:  
<http://www.northdevonfishermen.co.uk/location>



## ENDNOTES

<sup>1</sup> <https://www.northdevonbiosphere.org.uk/>

<sup>2</sup> North Devon Marine Pioneer Part 1: State of the art report of the links between the ecosystem and ecosystem services in the North Devon Marine Pioneer (2019)

[https://www.researchgate.net/publication/333144626\\_North\\_Devon\\_Marine\\_Pioneer\\_Part\\_1\\_State\\_of\\_the\\_art\\_report\\_of\\_the\\_links\\_between\\_the\\_ecosystem\\_and\\_ecosystem\\_services\\_in\\_the\\_North\\_Devon\\_Marine\\_Pioneer](https://www.researchgate.net/publication/333144626_North_Devon_Marine_Pioneer_Part_1_State_of_the_art_report_of_the_links_between_the_ecosystem_and_ecosystem_services_in_the_North_Devon_Marine_Pioneer)

<sup>3</sup> MMO Statistical data set (April 2019) Vessel lists over / under 10 metres. Registered and licensed vessels over 10 metres

<https://www.gov.uk/government/statistical-data-sets/vessel-lists-over-10-metres>

<sup>4</sup> Rees, S.E., Ashley, M., Cameron, A. (2019) North Devon Marine Pioneer 2: A Natural Capital Asset and Risk Register. SWEEP/WWF-UK report. University of Plymouth

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<sup>5</sup> NDFA membership <http://www.northdevonfishermen.co.uk/membership>

<sup>6</sup> NDFA 'who we are' <http://www.northdevonfishermen.co.uk/who-we-are.html>

<sup>7</sup> ICES Ecosystem Overviews Celtic Seas Ecoregion (2018) Celtic Seas Ecoregion – Ecosystem overview  
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<sup>8</sup> ICES Ecosystem Overviews Celtic Seas Ecoregion (2018) Celtic Seas Ecoregion – Ecosystem overview  
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<sup>9</sup> ICES Ecosystem Overviews Celtic Seas Ecoregion (2018) Celtic Seas Ecoregion – Ecosystem overview  
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<sup>10</sup> NEF (2015) Managing EU fisheries in the public interest - Results from the Bio-Economic Model of European Fleets <https://neweconomics.org/2015/03/managing-eu-fisheries-in-the-public-interest>

<sup>11</sup> In reality, the biomass must be larger than BMSY and the yield slightly less than MSY to ensure system stability. These MSY levels are necessary conditions to increase the supply of fish, profits and jobs into the future.

<sup>12</sup> Pew <https://www.ices.dk/news-and-events/news-archive/news/The-journey-to-set-targets-and-limits-in-fisheries-management.aspx>

<sup>13</sup> ICES Ecosystem Overviews Celtic Seas Ecoregion (2018) Celtic Seas Ecoregion – Ecosystem overview  
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<sup>14</sup> ICES Ecosystem Overviews Celtic Seas Ecoregion (2018) Celtic Seas Ecoregion – Ecosystem overview  
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<sup>15</sup> ICES Ecosystem Overviews Celtic Seas Ecoregion (2018) Celtic Seas Ecoregion – Ecosystem overview  
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<sup>16</sup> ICES Ecosystem Overviews Celtic Seas Ecoregion (2018) Celtic Seas Ecoregion – Ecosystem overview  
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- <sup>21</sup> NDMP <https://www.northdevonbiosphere.org.uk/map.html>
- <sup>22</sup> ICES Fisheries Overviews Celtic Seas Ecoregion Published 30 November 2018  
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<sup>35</sup> <https://www.gov.uk/government/news/spurdog-picked-dogfish-by-catch-avoidance-programme>

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<sup>40</sup> Sussex IFCA <https://www.sussex-ifca.gov.uk/shellfish-permit>

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<sup>43</sup> Acoura (2016) MSC Pre-Assessment for UK Western Channel and Celtic Sea edible crab fishery.  
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<sup>44</sup> Acoura (2016) MSC Pre-Assessment for UK Southwest lobster  
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