

7.2 Celtic Seas ecoregion – Fisheries overview

Table of contents

Executive summary	1
Introduction.....	1
Who is fishing	2
Catches over time.....	6
Description of the fisheries.....	10
Fisheries management	17
Management plans.....	18
Status of the fishery resources	18
Mixed fisheries	27
Species interaction	30
Effects of fisheries on the ecosystem	30
Sources and references	33
Annex.....	35

Executive summary

The commercial fisheries in the Celtic Sea target a large number of stocks. The pelagic fisheries, which account for the largest catches (by weight) in the region are the mid-water trawl fisheries for blue whiting, mackerel, horse mackerel, herring, boarfish, and sprat. The largest demersal fishery targets hake along the shelf edge using gillnets and longlines. There are also large mixed bottom-trawl fisheries targeting benthic species, *Nephrops*, and gadoids. The species composition of these mixed fisheries tends to vary, depending on the area and the countries involved in the fishery.

The relationship of biomass status or the fishing mortality to reference points is not known for 60% of the 107 stocks that are assessed in the ecoregion. Though only 31% of the stocks are fished below F_{MSY} , these stocks account for nearly 44% of the total landings. There has been a trend of declining fishing mortality since the mid-1990s for the benthic and demersal stocks with known status. The average F/F_{MSY} ratio is below one for assessed benthic stocks and just above for the assessed demersal stocks. The trend for stock size in assessed benthic and demersal stocks has been increasing over the same period. The average F/F_{MSY} ratio is below one for the crustacean stocks and the average biomass has been above one in the past decade. The average F/F_{MSY} ratio for pelagic assessed stocks has been above one in recent years and the average stock size indicator is declining in recent years but remains above $MSY B_{trigger}$.

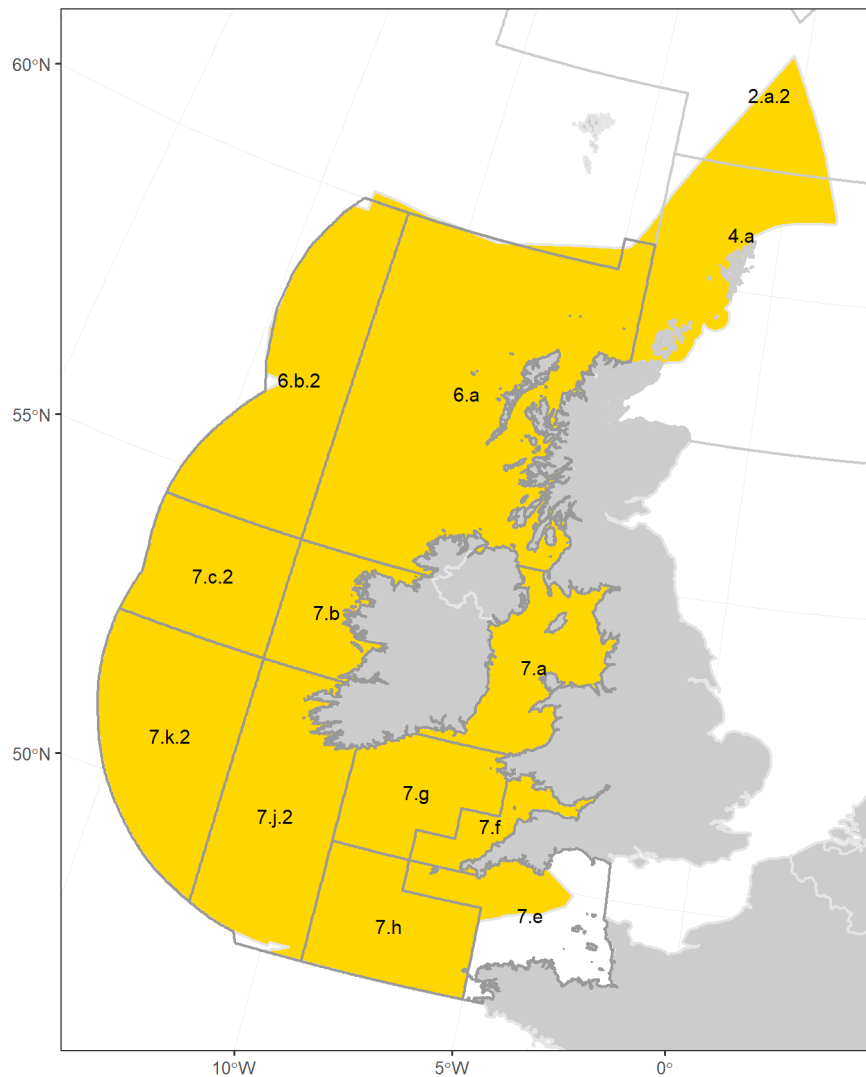
The technical interactions in demersal mixed fisheries are described for three areas within the ecoregion. *Nephrops* account for the highest landings in the Irish Sea; they are mainly taken in trawl fisheries where they account for more than 90% of the total landings. In the Celtic Sea and west of Ireland hake account for the majority of the landings; they are mainly taken in longline and gillnet fisheries which are also dominated by hake. In the west of Scotland *Nephrops* again account for the highest landings; they are mainly taken using otter trawls, but also in pots.

Introduction

The Celtic Seas ecoregion covers the northwestern shelf seas of the Europe (Figure 1). It includes areas of the deeper eastern Atlantic Ocean and coastal seas that are heavily influenced by oceanic inputs. The ecoregion ranges from north of Shetland to Brittany in the south. Three key areas constitute this ecoregion:

- Northern parts; the Malin shelf, west of Scotland, eastern Rockall Bank, and north of Scotland (parts of Subdivision 2.a.2, divisions 4.a and 6.a, and Subdivision 6.b.2);
- the Celtic Sea and west of Ireland (Division 7.b and Subdivision 7.c.2; parts of divisions 7.e, 7.f, 7.g, 7.h, and subdivisions 7.j.2 and 7.k.2);
- the Irish Sea (Division 7.a).

In the north there are strong linkages with the North Sea, in the southeast a strong linkage with the channel area, and in the south a strong link with the Bay of Biscay. The eastern part of the Rockall Bank is within the geographic scope of the ecoregion although it is separated from the western European shelf by the Rockall Trough.



Made with Natural Earth and ICES Marine Data

Figure 1 The Celtic Seas ecoregion (highlighted in yellow) and ICES statistical areas.

The overview covers ICES subareas 27.7 (excluding Division 27.7.d) and 27.6, (hereafter, the “27” area prefixes are omitted). Some fisheries statistics do not allow the full differentiation of sections of subareas 4 and 2, and (in earlier years) western sections of subareas 6 and 7 as well as the southeastern section of Division 7.e.

Who is fishing

Fourteen nations currently have fisheries targeting the many marine stocks within this diverse and extensive ecoregion. Landings by country has varied over the past ten years, with most taken by Norway, UK, Ireland, the Netherlands, Denmark and France. Lesser amounts are landed by the Faroe Islands, Germany, Spain, Belgium, Lithuania, Poland, and Estonia (Figure 2, but note that this figure includes some landings from waters to the west of the ecoregion).

Landings from several of these nations, including Norway, the Netherlands, Germany, Denmark, Lithuania, and Poland, are dominated by pelagic species. Nations within the UK and EU target a combination of pelagic, demersal (including *Nephrops*), deep-water, and shellfish species. Of these, the UK has the greatest landings, with an almost equal split between pelagic and non-pelagic landings. Scotland (UK) has the highest reported effort (Figure 3).

Belgium

The Belgian fleet consists of about 33 active vessels of which about 21 fish in the Irish Sea. The majority (89%) of the vessels are > 24 m, while the remainder of the vessels are between 18 and 24 m. The Belgian fleet uses beam trawls and otter trawls for rays, plaice, sole, and anglerfish. Since 2016, there has been no targeted fisheries for sole in Division 7.a.

Denmark

Eight Danish vessels fish in this ecoregion, targeting blue whiting with pelagic trawls.

Faroe Islands

Up to ten vessels from the Faroe Islands operate in this ecoregion, targeting blue whiting with pelagic trawls.

France

The French offshore fishery in the Celtic Sea (divisions 7.g and 7.h) is mostly composed of bottom trawlers (18–35 m, around 350 vessels) targeting gadoids, *Nephrops* or anglerfish, megrim, and rays, with less than ten vessels using Danish seine. In the west of Scotland (Division 6.a) around ten bottom trawlers target both saithe and deep-sea fish (at depths less than 800 m) and fewer smaller vessels target hake using longlines or nets. Finally, two large pelagic trawlers target herring and mackerel, and one is also involved in the blue whiting fishery.

Germany

About ten German vessels fish in the ecoregion. This includes vessels that mainly target anglerfish and hake with gillnets and longline, and about three large freezer-trawlers that target mackerel.

Ireland

The Irish fishing fleet is very diverse with around 1500 < 10 m and 500 ≥ 10 m active vessels. Small vessels (< 10 m) operate inshore, typically targeting shellfish with pots or demersal fish with nets. On the shoreline, there is widespread hand gathering of periwinkles. The vessels ≥ 10 m target a wide variety of species using several types of gear. Vessels in the 12–25 m length range target *Nephrops* using trawls on several grounds around Ireland and on the Porcupine Bank. Both inshore and offshore mixed demersal fisheries use trawls and seine nets to target gadoids and benthic species. Vessels using gillnets target hake offshore and pollack, monkfish, and cod in inshore areas. Ten beam trawlers target benthic species such as megrim, anglerfish, flatfish, and rays. There are dredge fisheries for razor clams and scallops in inshore and offshore areas. About 100 vessels are engaged in aquaculture related activities, including dredging for seed mussels, and mussel and oyster dredging. Twenty large (≥ 30 m) pelagic fishing vessels operate across the whole of the area. Vessels using pelagic trawls target mackerel, horse mackerel, blue whiting, boarfish, and sprat. Pelagic trawling for albacore tuna occurs in the ecoregion.

Lithuania

Two large Lithuanian freezer trawlers target pelagic species in this ecoregion.

Netherlands

Around 10–15 large Dutch pelagic freezer-trawlers operate in this ecoregion, mainly targeting horse mackerel and mackerel.

Norway

About 60 Norwegian vessels operate in this ecoregion. Pelagic trawlers mainly target blue whiting, but also other pelagic species. There is also a demersal longline fishery that mainly targets ling and blue ling.

Spain

The Spanish fleet comprises 67 vessels >24 m that operate mainly in Subarea 7 (the Porcupine and Great Sole banks) and, to a lesser degree, in Subarea 6 (west of Scotland). All of these vessels target demersal species: set longlines targeting hake (44 vessels), bottom otter trawl targeting megrim, anglerfish, and hake (21 vessels), and set gillnet targeting hake (2 vessels).

United Kingdom

Scotland

Most fishing activity by Scottish vessels (754 boats in 2015) occurs in Subarea 6. Around 62 demersal trawlers (mostly > 10 m) fish for mixed gadoids and benthic species such as anglerfish and megrim. A small number of boats target haddock at Rockall. In inshore areas, a fleet of 164 trawlers fish mainly for *Nephrops*—34 of these boats are under 10 m. Pot or creel fishing is carried out by almost 400 vessels. Over 300 of these boats are under 10 m and target either *Nephrops* or lobsters and various crab species. Around 60 larger vessels (> 10 m) fish for crustaceans (mainly brown crab) in more offshore areas to the far north and west of Scotland. Scallop fishing is carried out by around 50 dredgers (mostly > 10 m) and by hand gathering (diving). Limited amounts of inshore longlining and gillnetting are also carried out. About 20 large pelagic trawlers fish in the northern parts of the Celtic Seas ecoregion.

In the Irish Sea, the main Scottish activity is dredging for scallops around the Isle of Man, performed by around 50 boats (mainly > 10 m). Pot fishing occurs along the Solway Firth coast (22 vessels), and about 12 trawlers take part in the Irish Sea *Nephrops* fishery. Trawling for *Nephrops* also occurs at the Porcupine Bank and in the Celtic Sea (divisions 7.c and 7.k). Mixed-fish trawling, longlining, and gillnetting occurs in the Celtic Sea and western English Channel (Division 7.e). Some boats also dredge for scallops in the western English Channel.

Northern Ireland

The Northern Irish fleet consists of around 130 \geq 10 m and 180 < 10 m vessels. The fleet predominantly operates within divisions 7.a and 6.a. A small number of vessels target *Nephrops* or pelagic species in other parts of the ecoregion. Within the Irish Sea, demersal trawling for *Nephrops* dominates the fishing effort.

Vessels operating inshore typically target shellfish with pots, or by dredging (for king scallops) in divisions 6.a and 7.a. Both trawl nets and dredge gear are used to catch queen scallops in the Irish Sea and north of Rathlin Island in Division 6.a.

A small number of vessels trawl for haddock, hake, and (historically) cod. At present (2021), there is no permitted commercial targeted fishery for cod. A pelagic and gillnet herring fishery operates in late summer—early autumn in the pre- and post-spawning periods. The gillnet fishery occurs on the western Irish Sea coastline whilst two large pelagic trawlers target herring aggregations in the northern English Channel and around the Isle of Man.

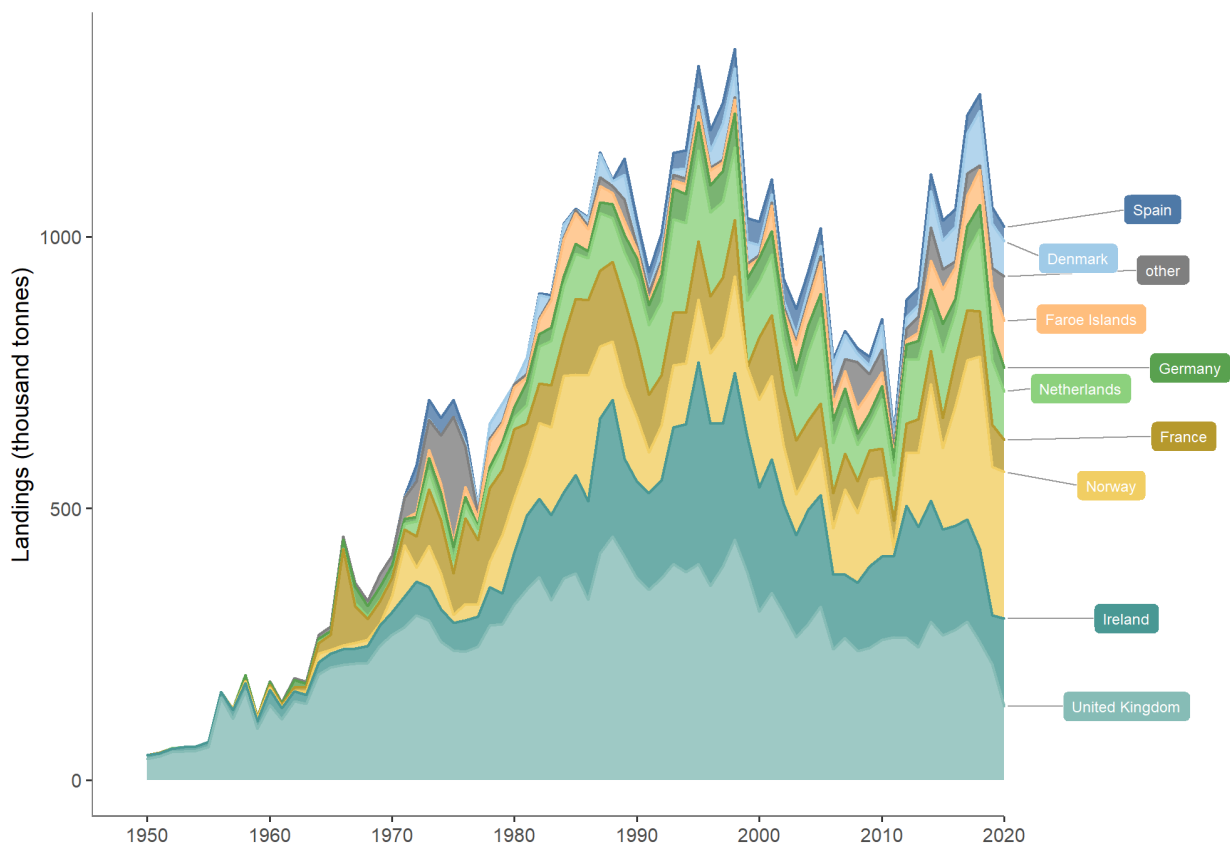
England and Wales

The largest sector in terms of vessel numbers are the potting fleets targeting non-quota stocks such as crabs, lobsters (mainly in divisions 7.e, 7.f, and 7.g), and whelks in Division 7.a. The majority of these vessels are under 10 m in length (~600 vessels from a total potting sector of ~700) although more than 50% are polyvalent (vessels using multiple gears).

Vessels employing otter trawls (~300 vessels, around half of which are < 10 m) are mostly found in Division 7.e, with additional activity in divisions 7.a and 7.f; they take a mixture of demersal stocks although some target whitefish and elasmobranchs. The *Nephrops* fleet in Division 7.a comprises around 15 vessels in the 10–15 m sector, with < 10 vessels under 10 m. This sector employs otter trawls that use selective gear to reduce whitefish bycatch. Beam-trawling activity (~60 vessels) is dominated by vessels longer than 15 m (~45 vessels), taking a mixture of flatfish and anglerfish with evidence of an increasing targeted fishery for cuttlefish in Division 7.e. Dredge fisheries, predominantly for king scallops, operate in divisions 7.e and 7.a. Dredging activity occurs across all vessel sizes although there is proportionally less activity by < 15 m vessels in Division 7.a.

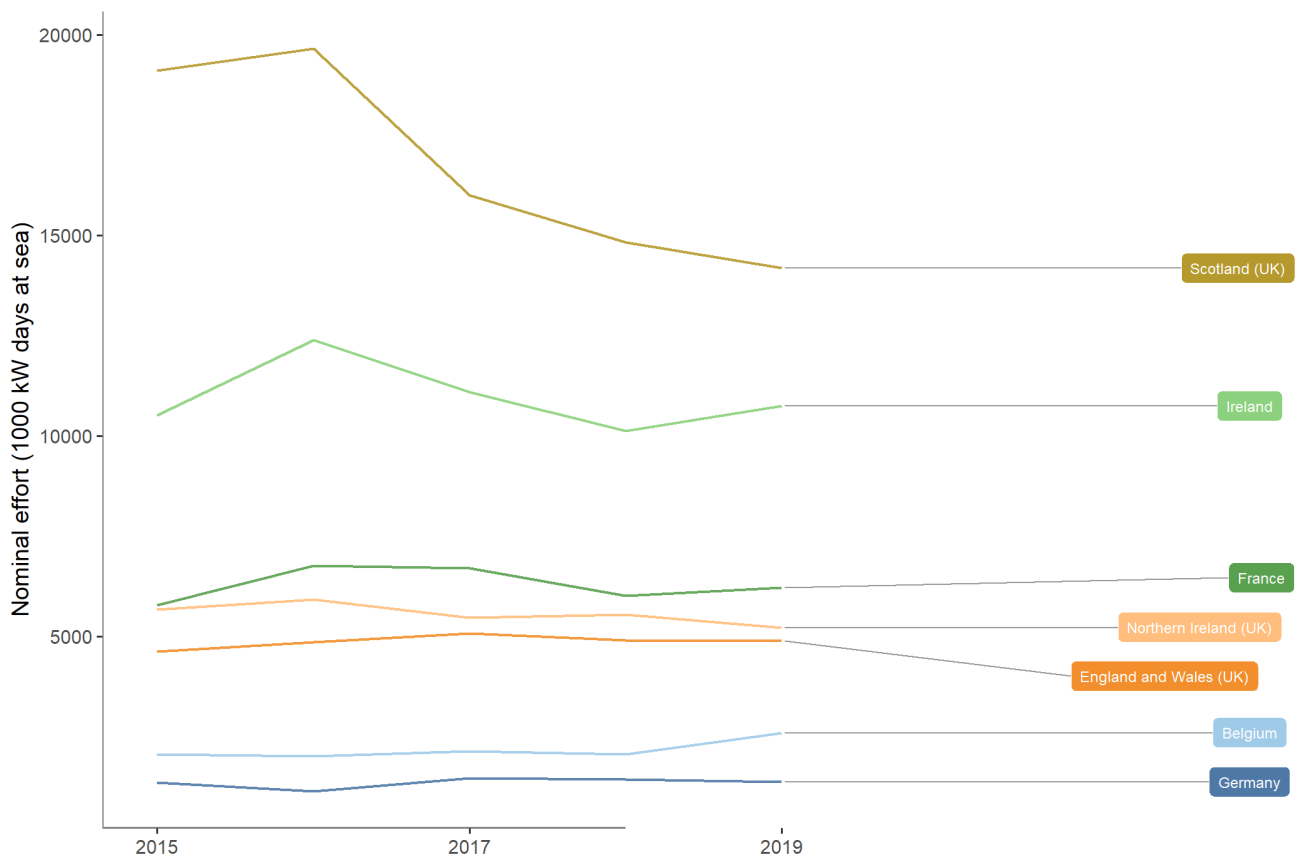
Isle of Man

The main fisheries undertaken in the Isle of Man's territorial sea (12 nautical miles) are for king scallop, queen scallop, crab, lobster, and whelk.



Historical Nominal Catches 1950-2010,
Official Nominal Catches 2006-2019
Preliminary Catches 2020
ICES, Copenhagen.

Figure 2 Landings (thousand tonnes) from ICES subareas 6 and 7 (excluding Division 7.d). This approximates to the majority of the Celtic Seas ecoregion in 1950–2020, by (current) country. The nine countries having the highest landings are shown individually; the remaining countries are aggregated and displayed as “other”.



STECF. Accessed October/2021.

Figure 3 ICES subareas 6 and 7 (excluding Division 7.d). Fishing effort (1000 kW hours at sea) in 2015–2019 for the main countries fishing in the ecoregion. Confidential values have been reported from Ireland, Portugal, and France.

Catches over time

Landings of pelagic species within the ecoregion showed an increasing trend from the 1960s to the mid-1990s then declined through the 2000s. Since 2011 pelagic landings again increased (Figure 4). Blue whiting and mackerel constitute the highest proportions of the catches, with herring and horse mackerel declining in relative importance in the last decade (Figure 5). The demersal fisheries show a generally increasing trend to the late 1980s and a declining trend since then (Figure 4). Hake, whiting, and haddock account for the highest landings of demersal species (Figure 5). Anglerfish and megrim are also very important, whereas the relative importance of cod, saithe, and ling has declined. Crustacean fisheries have remained relatively stable in the last few decades; *Nephrops* accounts for the highest landings (Figure 5). Other important crustacean species include scallop, crab, and lobster.

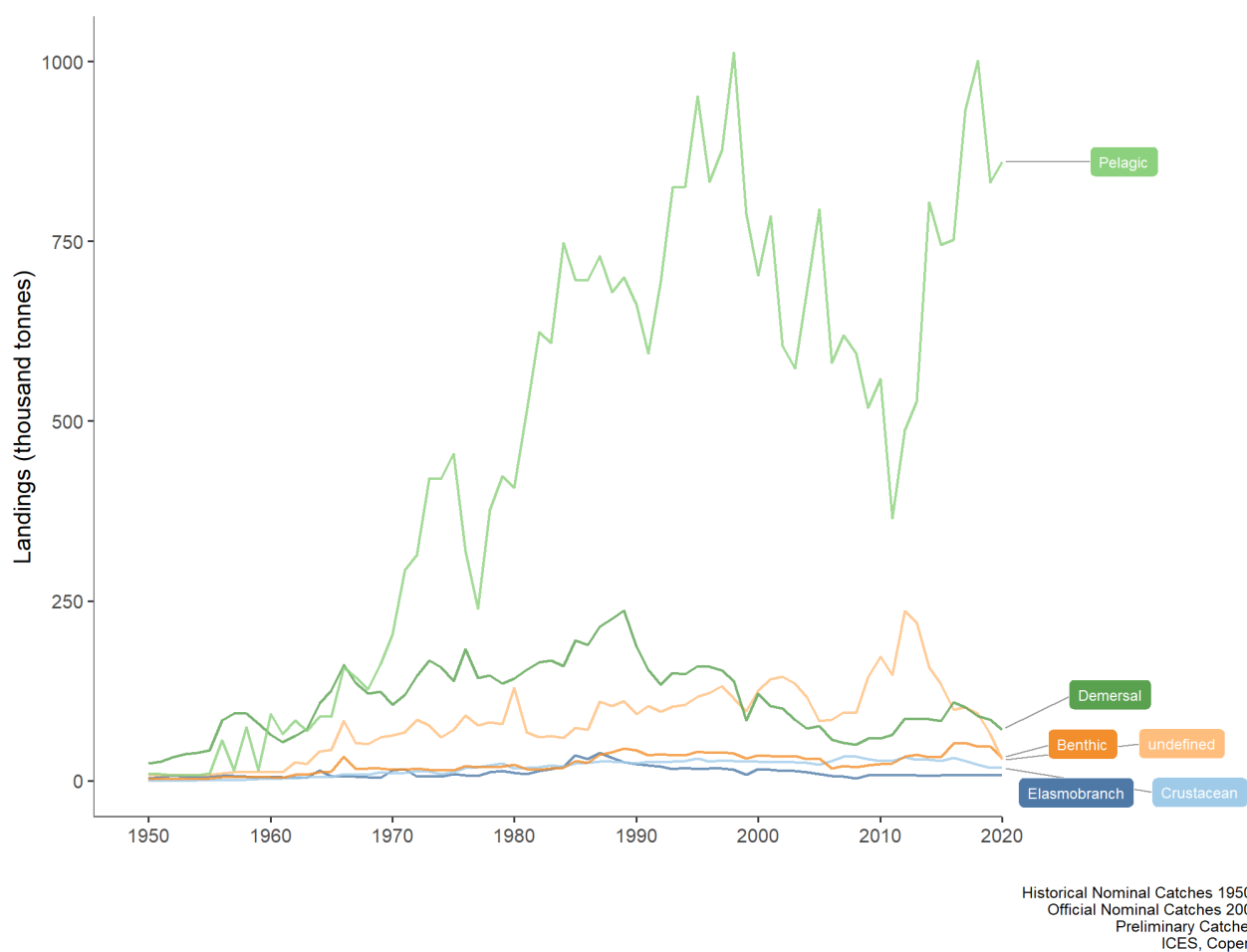


Figure 4 Landings (thousand tonnes) from ICES subareas 6 and 7 (excluding Division 7.d) in 1950–2020, by fish category. Table A1 in the Annex details the species that belong to each fish category.

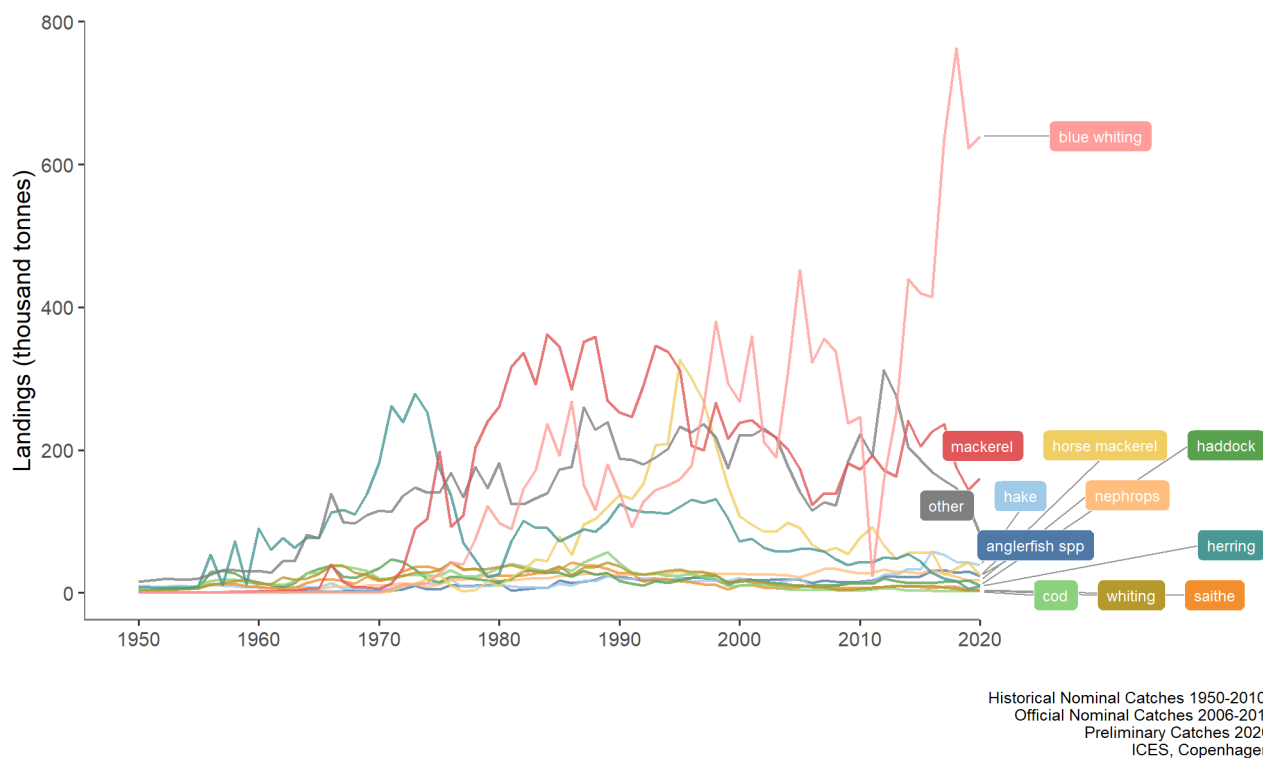
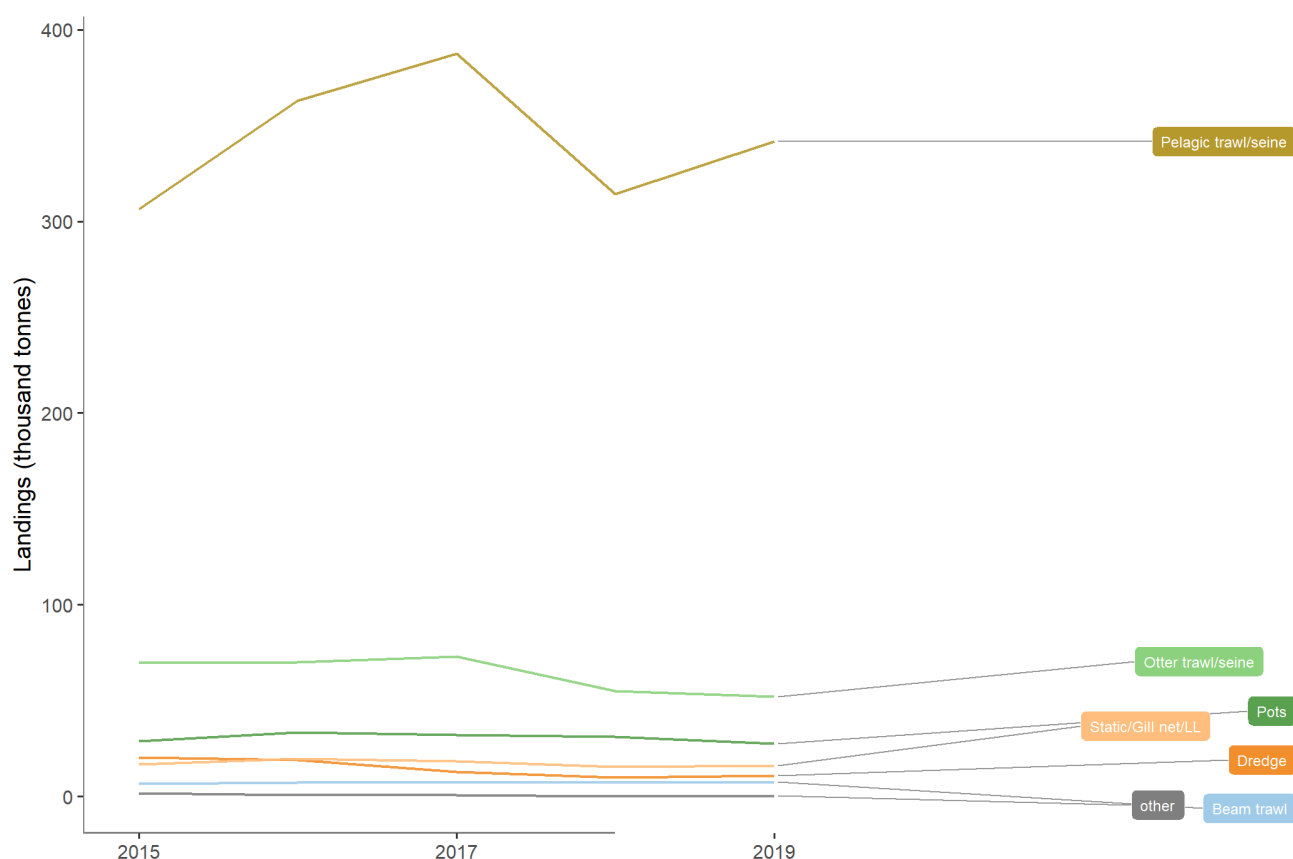


Figure 5 Landings (thousand tonnes) from ICES subareas 6 and 7 (excluding Division 7.d) in 1950–2020, by species. The eleven species having the highest cumulative landings over the entire time-series are displayed separately; the remaining species are aggregated and labelled as “other”.

There are fluctuations in pelagic landings (Figure 6). Landings by demersal otter trawls, beam trawlers, pots and static gears (mostly gillnet) have been more stable.



STECF. Accessed October/2021.

Figure 6 Commercial landings (thousand tonnes) from ICES subareas 6 and 7 (excluding Division 7.d) in 2015–2019, by gear type (LL = longline) for EU Member States. Confidential values have been reported from Ireland, Portugal, and France.

Discards

Total discard tonnage (and therefore rate) of pelagic species is estimated to be very low (Figure 7). Discards of demersal, crustacean, and benthic species are estimated to be around 10%. Discard rates for some species are very high in the ecoregion, for example plaice (around 60% of tonnage) and whiting (50–99% of tonnage).

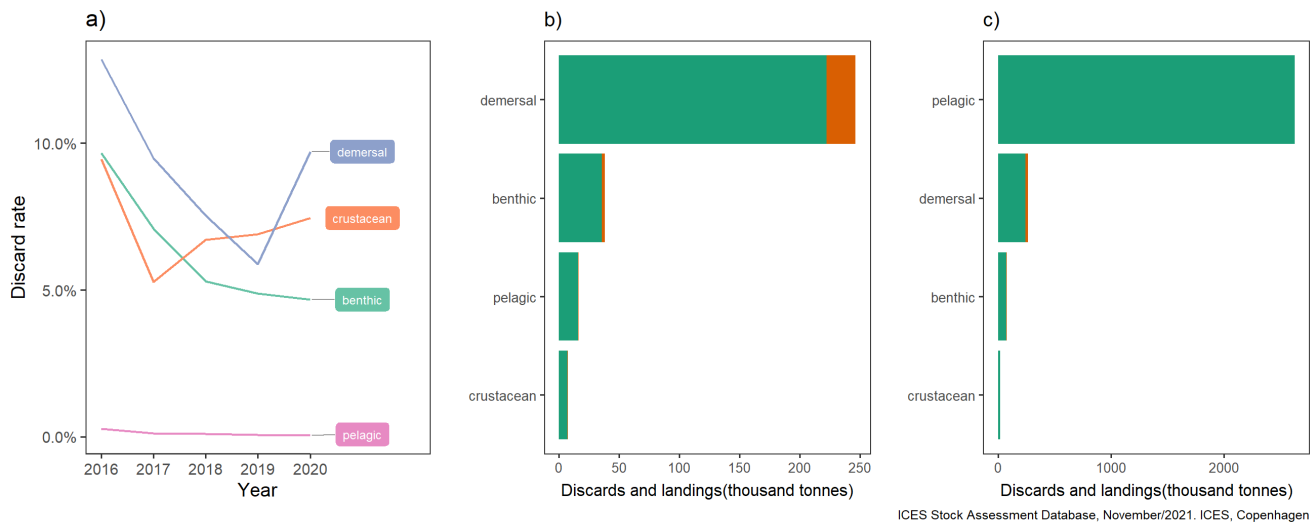


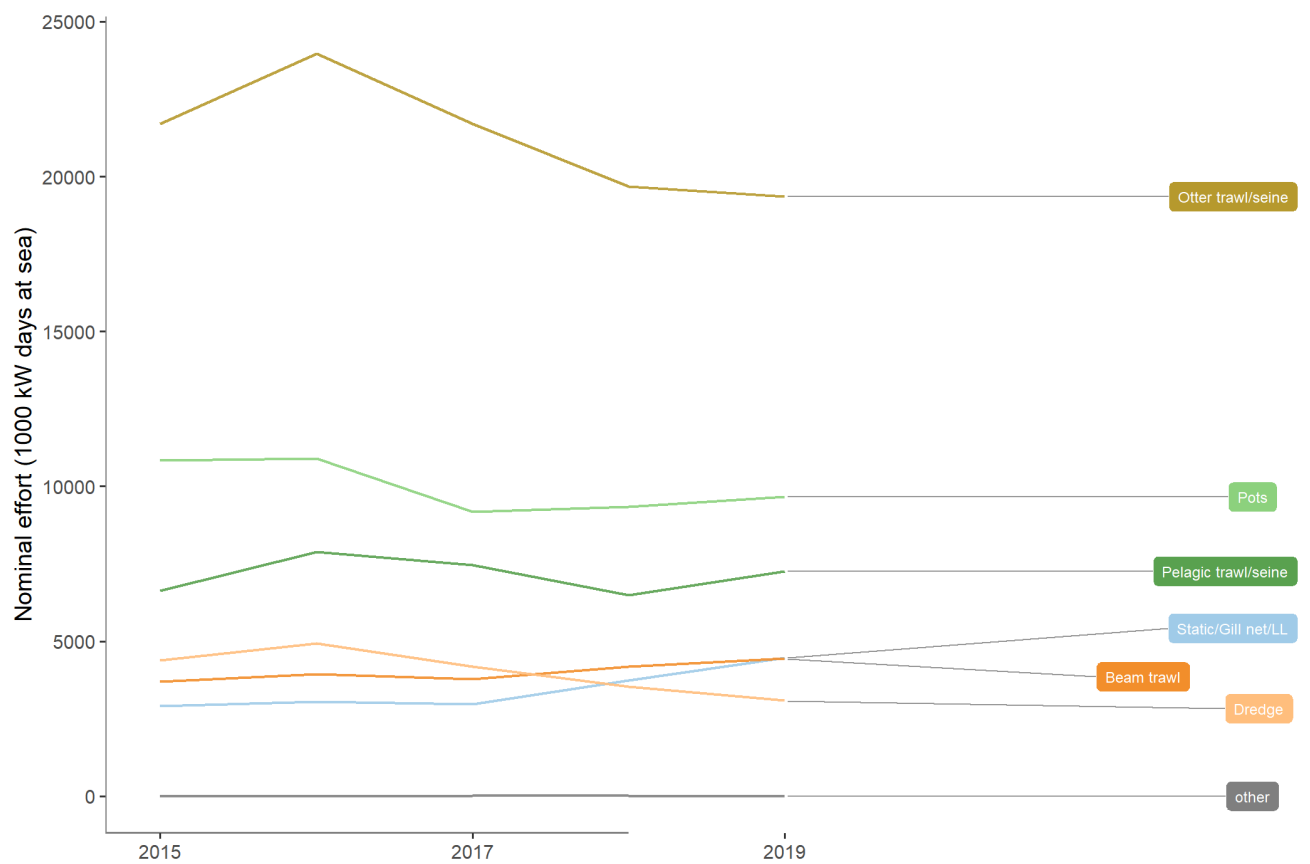
Figure 7 ICES subareas 6 and 7 (excluding Division 7.d). Left panel (a): discard rates in 2016–2020 by fish category, shown as percentages (%) of the total annual catch in that category. Middle panel (b): landings (green) and discards (orange) in 2020 by fish category (in thousand tonnes) only of those stocks with recorded discards. Right panel (c): landings (green) and discards (orange) in 2020 by fish category (in thousand tonnes) of all stocks, including stocks with zero discards or without discard information. There is uncertainty over the elasmobranch data and thus it is not presented here.[†]

Description of the fisheries

Fisheries that take place within the Celtic Seas ecoregion catch a wide range of different species, including those considered to be demersal, benthic, pelagic, widely distributed, and deep-water.

Otter trawlers and demersal seiners account for the majority of the fishing effort (Figure 8). Otter trawl fishing is highest on the *Nephrops* grounds in the Celtic Sea, and close to the continental shelf edge (Figure 9). Demersal seiners are mainly active in the Celtic Sea. Static gears (longlines and gillnets) account for the next highest levels of effort; these fisheries are also concentrated close to the continental shelf edge, particularly in the southern and northern parts of the ecoregion. Pelagic trawl fisheries (pelagic seines are not normally used in this ecoregion) occur throughout the ecoregion, but there is generally more effort close to the shelf edge (Figure 9). Beam-trawl effort is concentrated in the Celtic Sea and western English Channel, with some effort in the Irish Sea also. There is little beam trawling in the northern part of the ecoregion. Dredge fisheries are concentrated on scallop grounds around the Isle of Man, western English Channel, southeast of Ireland, and along the Scottish coast (Figure 9).

[†] Version 2: Figure and legend updated



STECF. Accessed October/2021.

Figure 8 ICES subareas 6 and 7 (excluding Division 7.d). Fishing effort (thousand kW hours at sea) in 2015–2019, by gear type for EU Member States. Confidential values have been reported from Ireland, Portugal and France.

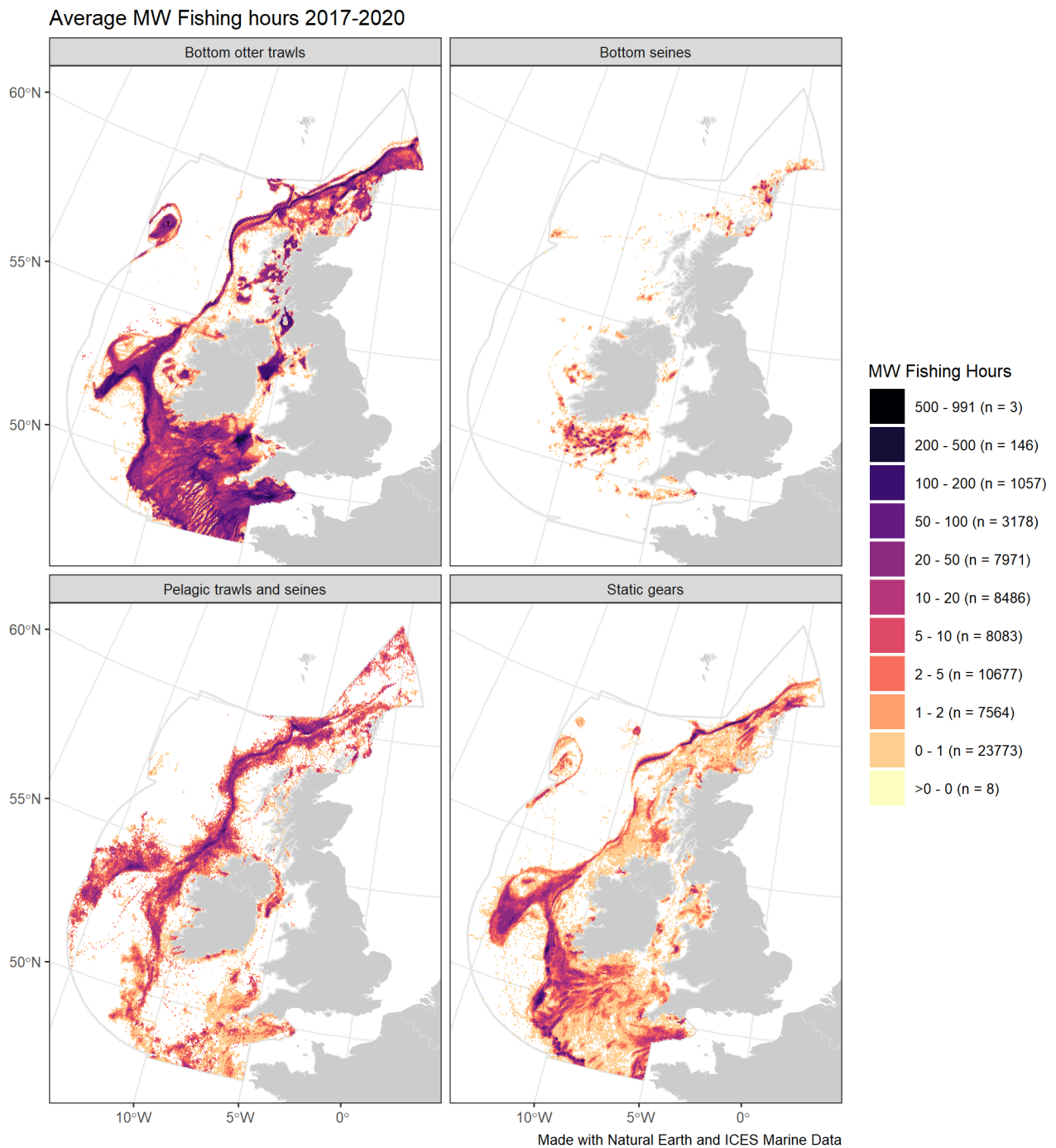


Figure 9 Spatial distribution of average annual fishing effort (MW fishing hours) in the Celtic Seas ecoregion, by gear type. Fishing effort data are only shown for vessels > 12 m with vessel monitoring systems (VMS), this will bias the distributions, particularly in coastal areas.

The catches of pelagic species vary both spatially and temporally. Mackerel and blue whiting are caught mainly on their southward migrations along the shelf edge to spawning grounds in spring. The highest mackerel catches in recent years have been in the northern part of the ecoregion, whilst the highest catches of blue whiting are around the Porcupine Bank (Figure 10). Horse mackerel are caught throughout the ecoregion and catches are highest west of Ireland in the spring. Herring catches are concentrated in three areas: north of Scotland, in the Celtic Sea, and around the Isle of Man. The

highest boarfish catches are in the western Celtic Sea. The albacore tuna fishery occurs in the southwestern part of the ecoregion.

Hake are caught in deeper waters (> 70 m) throughout the ecoregion. Catches are concentrated along the continental shelf edge in the southern and northern parts of the ecoregion where the directed gillnet and longline fisheries occur (Figure 10). Anglerfish are also common throughout the ecoregion, with the highest catches on the shelf edge, in the Celtic Sea and western English Channel. The highest megrim catches are in the western Celtic Sea.

Whiting catches are highest in the Celtic Sea south of Ireland where there are also significant catches of haddock and cod (Figure 10). Saithe are mainly caught in the northern part of the ecoregion. Pollack are mainly caught in inshore areas of Cornwall and along the southern coast of Ireland.

The main *Nephrops* catches are in the western Irish Sea, in the Minches, the Celtic Sea, and on the Porcupine Bank (Figure 10). There are also significant catches of scallops in the Irish Sea (around the Isle of Man) and off southern Cornwall. Brown crab catches mainly occur in coastal areas of Cornwall, north of Ireland, and north of Scotland.

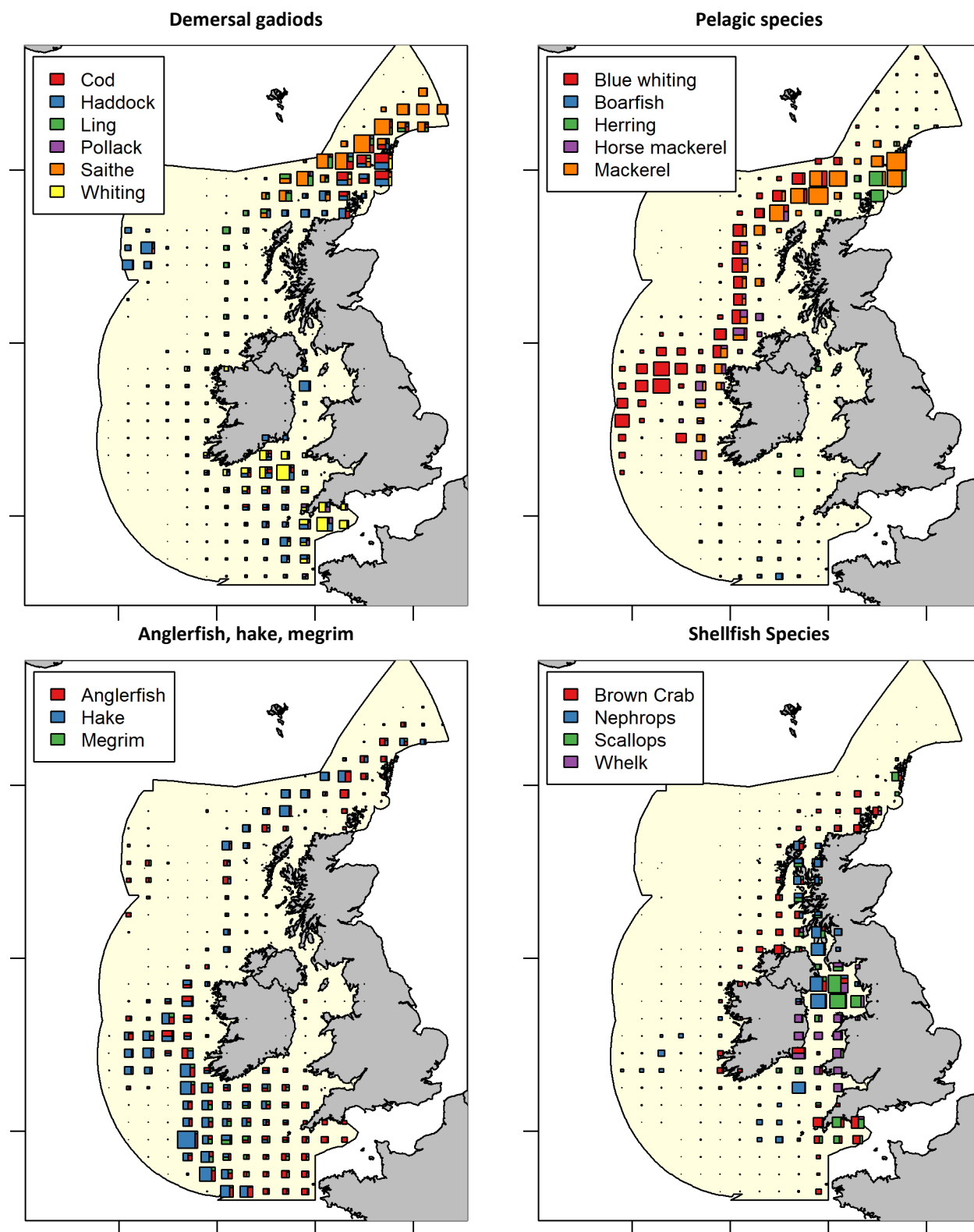


Figure 10 The spatial distribution of the landings for the main pelagic, benthic, gadoid, and shellfish species in the Celtic Seas ecoregion. Landings (tonnes) are represented proportionately within each panel, but not between panels. Based on data for > 10 m EU vessels, 2015–2019. Source: STECF FDI (<https://stecf.jrc.ec.europa.eu/dd/fdi/spatial-land-map>)

Otter trawl

Otter trawl is the main gear by effort used in demersal fisheries in the Celtic Seas ecoregion (Figure 8). The species caught depends on the area, depth-range habitat, and season fished as well as on the cod-end mesh size, but in all cases the catches consist of a mixture of different species.

Nephrops-directed otter trawlers

Nephrops is an important target species on discrete muddy grounds within the ecoregion. Vessels typically, although not exclusively, use twin- or quad-rig trawls with 80 mm cod-ends. A small unwanted bycatch of fish species includes cod, haddock, plaice, anglerfish, and to a lesser extent sole. The use of selective gears (grids, square mesh, and separator panels) to reduce unwanted fish bycatch has increased over time, but significant discarding issues still exist on some grounds. Mixed fisheries target both *Nephrops* and finfish in the Celtic Sea using a larger mesh size (100 mm or more).

Finfish-directed otter trawlers and seiners

Fish are targeted with both small (80–99 mm) and larger (> 99 mm) mesh sizes in different parts of the ecoregion, depending on regulation and target assemblage. Smaller mesh otter trawls and seiners are typically used to target a broad mixture of species, including gadoids, flatfish, and other benthic species. These fisheries primarily occur within the Celtic Sea, along the slope west of Ireland and Scotland, and in the western English Channel. Large-mesh otter trawlers (typically 100 mm or 120 mm) tend to target gadoids, anglerfish, or rays.

Deepwater trawl fisheries

Until 2016, deep-water trawl fisheries were conducted in ICES subareas 6 and 7, principally by France, with some Spanish, Irish, and Scottish participation. Trawling deeper than 800 m has been banned since December 2016. This mixed deep-water trawl fishery mainly targeted roundnose grenadier, black scabbardfish, and blue ling, with a bycatch mainly of smoothheads and deep-water sharks on the continental slope and offshore banks of subareas 6 and 7.

Beam-trawl fisheries

Beam trawlers operate on sandy grounds in the Irish and Celtic seas and in the western English Channel. The majority of the vessels use meshes in the range of 80–89 mm, and come from Belgium, the UK, and Ireland. In the Irish Sea, the vessels primarily target plaice and sole. There is also a fishery for ray species in the southern Irish Sea. In the Celtic Sea, the beam-trawl fishery occurs on grounds where sole, anglerfish, cuttlefish, and megrim are abundant and the seabed is suitable for beam trawling. The fishery has bycatches of anglerfish, cod, haddock, and whiting. In the western English Channel (Division 7.e) beam trawling, using 80–90 mm mesh, mainly targets sole and cuttlefish.

Gillnet fisheries

The main gillnet fishery, (mainly with 120 mm mesh size) in this ecoregion targets hake along the continental slope. Spanish, French, UK, and Irish vessels are involved in the fishery, which typically operates at depths of 150–600 m. In the shallower Celtic Sea, where mesh sizes used are 120–219 mm, target species include anglerfish, flatfish, and gadoids.

A large number of inshore gillnetters (< 12 m) are also active in the Celtic Seas ecoregion. The target species and gears used tend to vary spatially and temporally. In the first quarter, the primary target of inshore gillnetters operating in divisions 7.g and southern 7.a is cod. Fisheries around the Irish coast seasonally target anglerfish, flatfish, pollack, and dogfish.

Prior to 2006, UK, French, German, and Spanish gillnetters operated in deep waters of subareas 6 and 7 targeting hake, monkfish, and deep-water sharks. This fishery stopped or seriously reduced from 2006, following EU regulation of deep-water gillnetting at depths below 600 m.

Longline and line fisheries

Spanish-, French-, and UK-registered longliners target hake along the continental slope with bycatches of ling, blue ling, and other deep-water species. An English hand-line fleet operates inshore around the coast of Cornwall in divisions 7.e–f targeting mackerel, in an area where other fishing methods for this species are not permitted.

Pelagic trawls

The spatial distributions of the main pelagic species are shown in Figure 15.

Blue whiting

The main fisheries target spawning and post-spawning fish west of Ireland and of Scotland. The fishery extends into Faroese and international waters west of the Porcupine Bank. Most of the catch (~90%) is taken in the first half of the year. The multi-national fleet targeting blue whiting mostly consists of large pelagic trawlers. Blue whiting is mainly used for fishmeal.

Mackerel

The Northeast Atlantic mackerel stock ranges over a wide area, part of which includes the Celtic Seas ecoregion. Within the ecoregion the fleet consists of two pelagic trawl components: freezer-trawlers, which are commonly large vessels (up to 150 m) that usually operate a single mid-water pelagic trawl, although smaller vessels may also work as pair trawlers. Non-freezer trawlers vary in size, from 20 to 100 m, and operate both individually and as pairs. The larger of the pelagic trawlers use refrigerated seawater (RSW) tanks for storage.

Horse mackerel

Germany, the Netherlands, and Ireland have trawl fisheries for horse mackerel. The Dutch and German fleets operate mainly west of the English Channel. Irish vessels fish mainly to the west of Ireland. Prior to the 1990s, most of the catches were used for meal and oil; this has changed so most of the catches are now used for human consumption.

Herring

The herring fishery occurs in four main parts of the ecoregion.

- The fishery in Division 6.a North is conducted by single and pair RSW trawlers and by single-trawl freezer trawlers. Prior to 2006, there was a fairly even distribution of effort, both temporally and spatially. The UK and Ireland are the main exploiters, but vessels registered to the Netherlands, Germany, and France also participate in the fishery.
- In divisions 6.a South and 7.b–c, the fishery is conducted entirely by RSW pelagic trawlers and dry-hold vessels, both inshore and offshore on the northwestern Irish coast. In recent years, only Ireland has exploited herring in this area. The fishery is concentrated in quarters one and four.
- The herring Division 7.a North fishery has not changed in recent years. UK pelagic trawlers take the majority of catches in quarters three and four.
- The main herring fishery in divisions 7.a South and 7.g–k takes place on coastal spawning grounds, and on offshore feeding grounds south of Ireland. Ireland, the Netherlands, and Germany exploit this fishery using two types of vessels, larger boats with RSW storage and smaller dry-hold vessels.

Boarfish

The fishery operates from September to March. Catches are generally free from bycatch from September to February. From March onwards a bycatch of mackerel can be found in the catches and the fishery generally ceases at this time. Information on the bycatch of other species in the boarfish fishery is sparse, bycatch numbers are thought to be minimal. The fishery uses pelagic trawl nets with mesh sizes 32–54 mm.

Sprat

Sprat fisheries using pelagic trawls take place in the south Minch and in Irish inshore waters during autumn and winter.

Other fisheries

In addition, a number of small scale coastal fisheries exist throughout the ecoregion for stocks where ICES does not provide routine assessments or advice. For example, dredging for shellfish includes scallops, razor clams, cockles, clams, and oysters. There are also important pot and trap fisheries for crabs, lobsters, and whelks.

Eels migrate through the Celtic Sea, but there is no marine fishery targeting eel in the ecoregion. However, in some transitional waters of the United Kingdom, there are fisheries targeting glass eels (recruits). Similarly, Atlantic salmon also migrate through this ecoregion but commercial fisheries are either prohibited or very restricted.

Recreational fishing

Marine recreational fishing is an important activity in the Celtic Sea with a diverse range of species exploited from a variety of platforms (i.e. shore, boat, charters) using many gears (e.g. rod and line, speargun, nets, pots, traps). The main countries with recreational fisheries are the UK, France, and Ireland, with methods varying between countries. In the UK and Ireland, no license is required and angling from shore and boat is the most popular method, with a number of charter boats offering trips. Angling, nets and spearfishing are popular gears in France. Catches can be significant representing around 5%, 27% and 42% of total removals of cod, sea bass, and Pollack, respectively (Hyder *et al.*, 2018; Radford *et al.*, 2018). The main targets include: mackerel, pollack, sea bass, saithe, cod, spurdog (*Squalus acanthias*), flatfish (plaice, dab, flounder, sole), sea bream, wrasse, and whiting. There are also catches of sharks, skates, and rays. In addition, shellfish, crustaceans, and cephalopods are also caught by recreational fishers.

Fisheries management

The Celtic Seas ecoregion includes all or parts of the Exclusive Economic Zones (EEZs) of Ireland, UK, France, and of the Isle of Man. Management within EU waters has been conducted in accordance with the EU Common Fisheries Policy (CFP), and catching opportunities for stocks under EU competency are agreed during meetings of the Council of Ministers. Under the CFP's regionalization policy, proposals on certain issues (for example discard plans) are made by the North western waters Regional Fisheries Group and national authorities manage activities in coastal waters (i.e. within 12 nautical miles). From 2021, UK was no longer a member of the EU and catching opportunities for stocks under shared UK and EU competency are agreed during bilateral negotiations. The UK now sets the rules on technical measures for operations in UK waters. The fisheries for some widely distributed stocks are managed based on agreements by the North East Atlantic Fisheries Commission (NEAFC) and by coastal states. Salmon fisheries are managed nationally based on agreements at the North Atlantic Salmon Conservation Organization (NASCO), and fisheries for large pelagic fish are managed based on agreements at the International Commission for the Conservation of Atlantic Tunas (ICCAT). International 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), the Standing Scientific Committee of ICCAT, and the North Western Waters and Pelagic Advisory Councils.

Total allowable catch (TAC) is the main fishery management tool in the ecoregion. These were introduced for most stocks in 1982, but the TACs (and quotas) were generally not restrictive until the early 1990s. The 2013 reform of the Common Fisheries Policy aimed to eliminate discarding through the introduction of the EU landing obligation (LO). The LO was introduced for pelagic species in 2015 and was phased in for demersal TAC species since 2016. From 2019, the LO applies to all TAC species, although there are some exemptions.

A large number of technical measures are in place. These include measures to improve the selectivity of towed gears (partly in order to reduce bycatch), and gear restrictions.

Spatial management also occurs, both for fisheries and for ecosystem reasons. Closed areas/seasons are used to protect e.g. spawning grounds for fish. Protected areas have also been designated for habitats and species listed by EU Nature Directives (Natura 2000). Fishery regulations are in place to restrict certain fisheries that may affect relevant habitats and species, e.g. for cold-water corals.

Management plans

Several of the demersal stocks in the Celtic Sea are shared between EU and UK. For shared stocks, ICES advice is based on the MSY approach rather than on any management plan. Since 2016 the EC has developed multiannual sea basin plans for demersal species caught together in multispecies fisheries. These plans are commonly referred to as ,multiannual plans (MAPs). For the ecoregion the Western Waters MAP (2019/472) and the North Sea (2016/0238) MAPs are of most relevance. The MAPs set out to achieve the objectives of the CFP, facilitate the implementation of the landing obligation, and promote a fair standard of living for those who depend on fishing activities. They were drafted to be coherent with the MSFD (2008/56), and the Birds Directive (2009/147). Unlike previous management plans which laid out a TAC setting rule, the principle of the MAPs is to implement the MSY policy adopted under the CFP, following best scientific advice. This is done whilst having due regard to the fact that many species are caught together, and that some of the species caught by the fisheries are not targeted but bycatches. Implementing the principles has meant: that target species are identified under the plans (species not listed as target are implicitly considered as bycatches); that TACs are set on target species within a range about F_{MSY} , but the upper part of the range can only be used under the conditions set out in the MAPs. For stocks not shared with UK, the ICES advice is based on the MAPs

A number of pelagic stocks in the ecoregion have been managed under agreed multiannual management plans in the past. For pelagic stocks, ICES currently only provides advice according to the agreed international management plan for blue whiting.

Status of the fishery resources

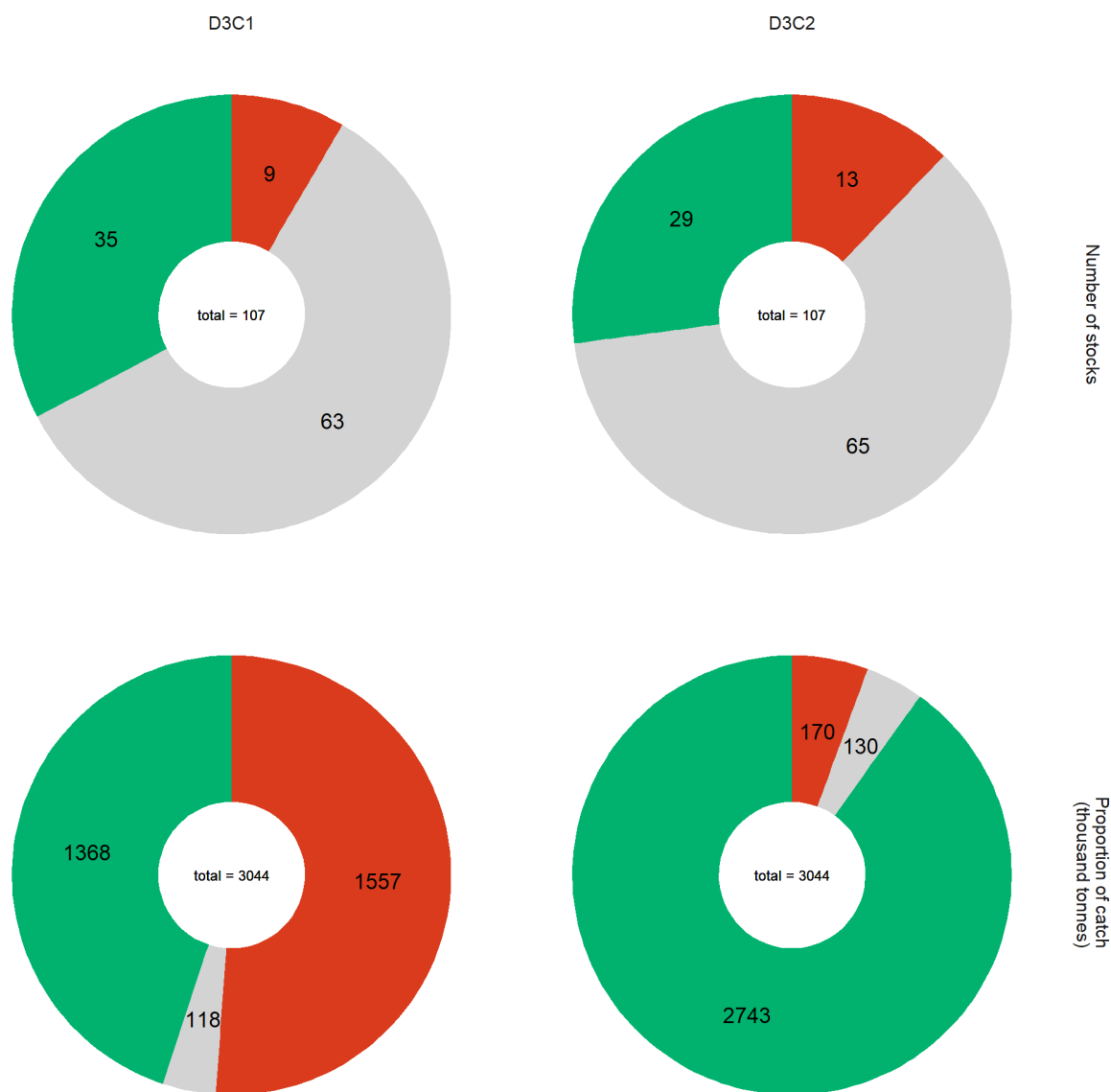
Fishing mortalities and spawning-stock sizes have been evaluated against maximum sustainable yield (MSY) and precautionary approach (PA) reference points, and the status of these stocks has also been assessed relative to safe biological limits, i.e. $F < F_{pa}$ and $SSB > B_{pa}$ (Figure 11). Around 33% of the assessed stocks are fished at or below F_{MSY} target levels. The majority of benthic and crustacean stocks are fished below F_{MSY} , the status of nearly all elasmobranch stocks is unknown, and the status for the majority of the demersal and pelagic stocks is also unknown.



ICES Stock Assessment Database, November 2021. ICES, Copenhagen

Figure 11

Status summary of Celtic Sea stocks in 2021 relative to ICES maximum sustainable yield (MSY) approach and precautionary approach (PA [excluding European eel, salmon, and sea trout]). Grey represents unknown reference points. For the MSY approach: green represents a stock that is either fished below F_{MSY} or whose size is greater than $MSY B_{trigger}$; red represents a stock status that is either fished above F_{MSY} or whose size is lower than $MSY B_{trigger}$. For the PA: green represents a stock that is fished at or below F_{pa} while its size is equal to or greater than B_{pa} ; orange represents a stock that is either fished between F_{pa} and F_{lim} or whose size is between B_{lim} and B_{pa} ; red represents a stock that is fished above F_{lim} or whose size is less than B_{lim} . Stocks with a fishing mortality at or below F_{pa} and whose size is above B_{pa} are defined as being inside safe biological limits. If this condition is not fulfilled the stock is defined as being outside safe biological limits. For stock-specific information, see Table A1 in the Annex.



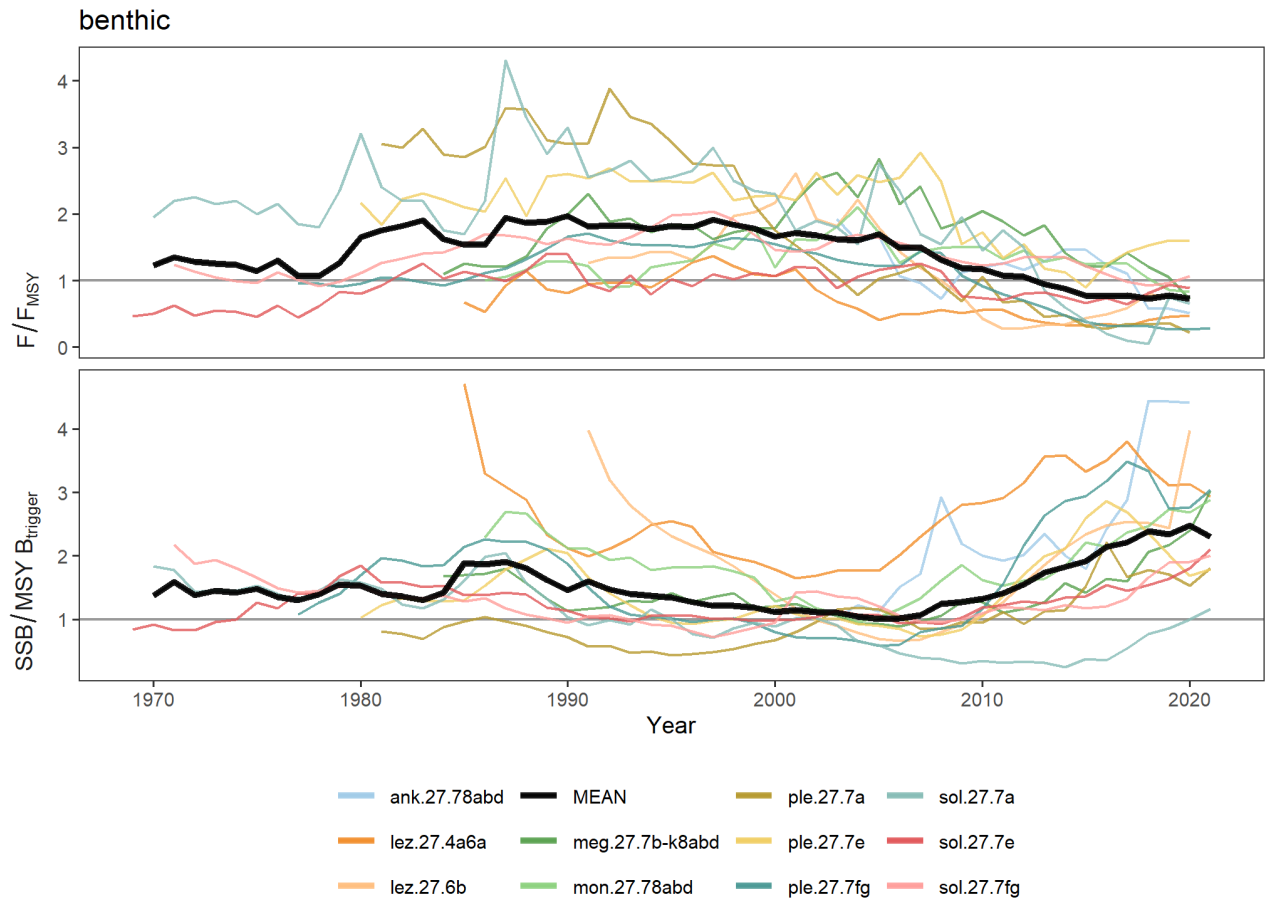
ICES Stock Assessment Database, November 2021. ICES, Copenhagen

Figure 12

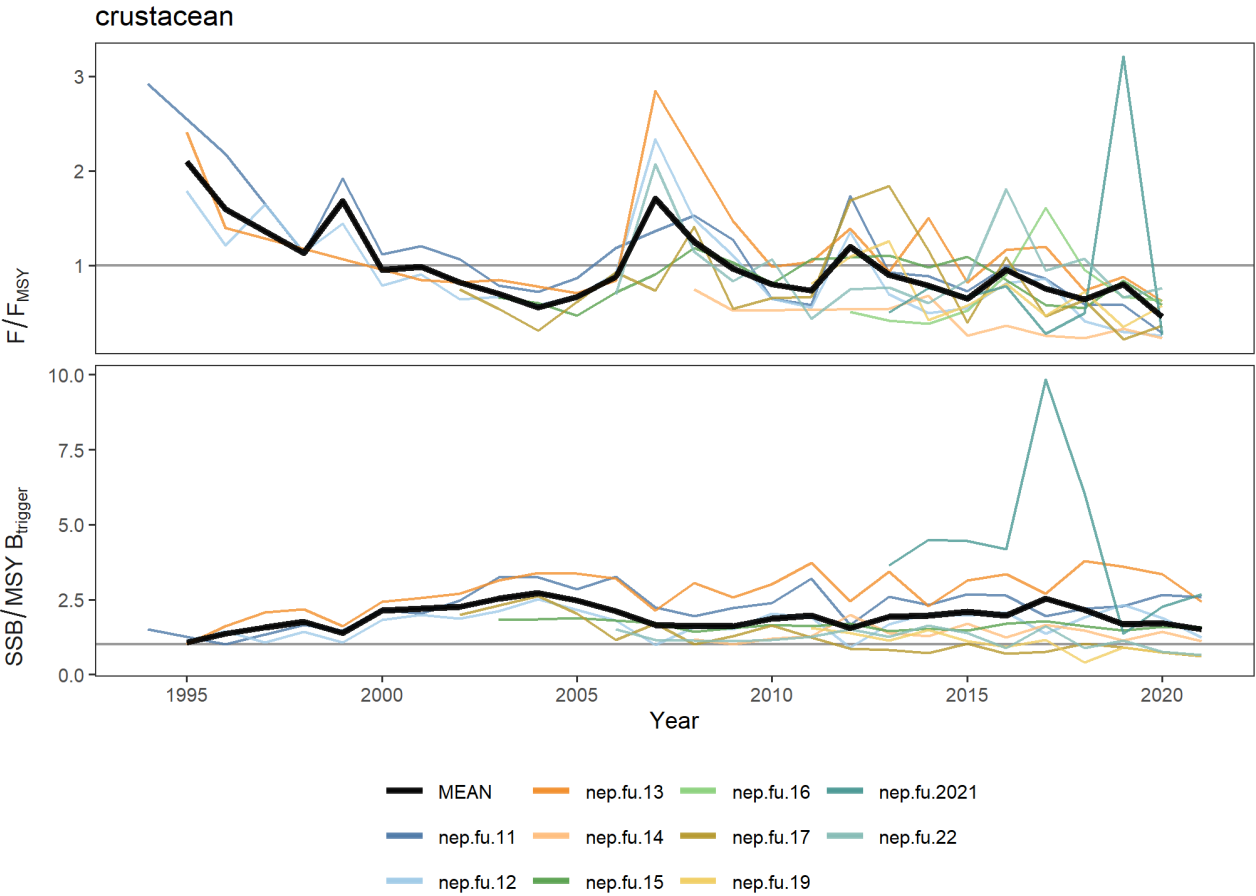
Status summary of Celtic Sea stocks in 2021 relative to the EU Marine Strategy Framework Directive (MSFD) assessment criteria of the level of pressure of fishing activity (D3C1) and reproductive capacity of the stock (D3C2). Green represents the proportion of stocks that are either fished below F_{MSY} or whose size is greater than $MSY B_{trigger}$, for criteria D3C1 and D3C2. Red represents the proportion of stocks that are either fished above F_{MSY} or whose size is lower than $MSY B_{trigger}$, for criteria D3C1 and D3C2. Grey represents the proportion of stocks without MSY reference points. For stock-specific information, see Table A1 in the Annex.

The Celtic Seas ecoregion has 107 stocks for which ICES provided advice in 2021. These encompass the following categories: 17 benthic, 12 crustacean, 33 demersal, 31 elasmobranch, and 14 pelagic stocks. Of these the pelagic, crustaceans (*Nephrops*), and demersal stocks are the best known, having the highest number of quantitative assessments (ICES data category 1 stocks). 31% are sustainably fished (i.e. D3C1 where $F < F_{MSY}$); these account for around 44% of the total landings (Figure 12). Other groups, such as the elasmobranchs, have a more limited knowledge base. This limited data means these stocks are placed in ICES categories 3, 5, and 6. While these “data-limited stocks” account for the majority of stocks (60%), they only account for less than 4% of the total landings (Figure 12). Around 26% of the stocks were assessed to be above $MSY B_{trigger}$ (D3C2); these accounted for around 90% of the total biomass caught.

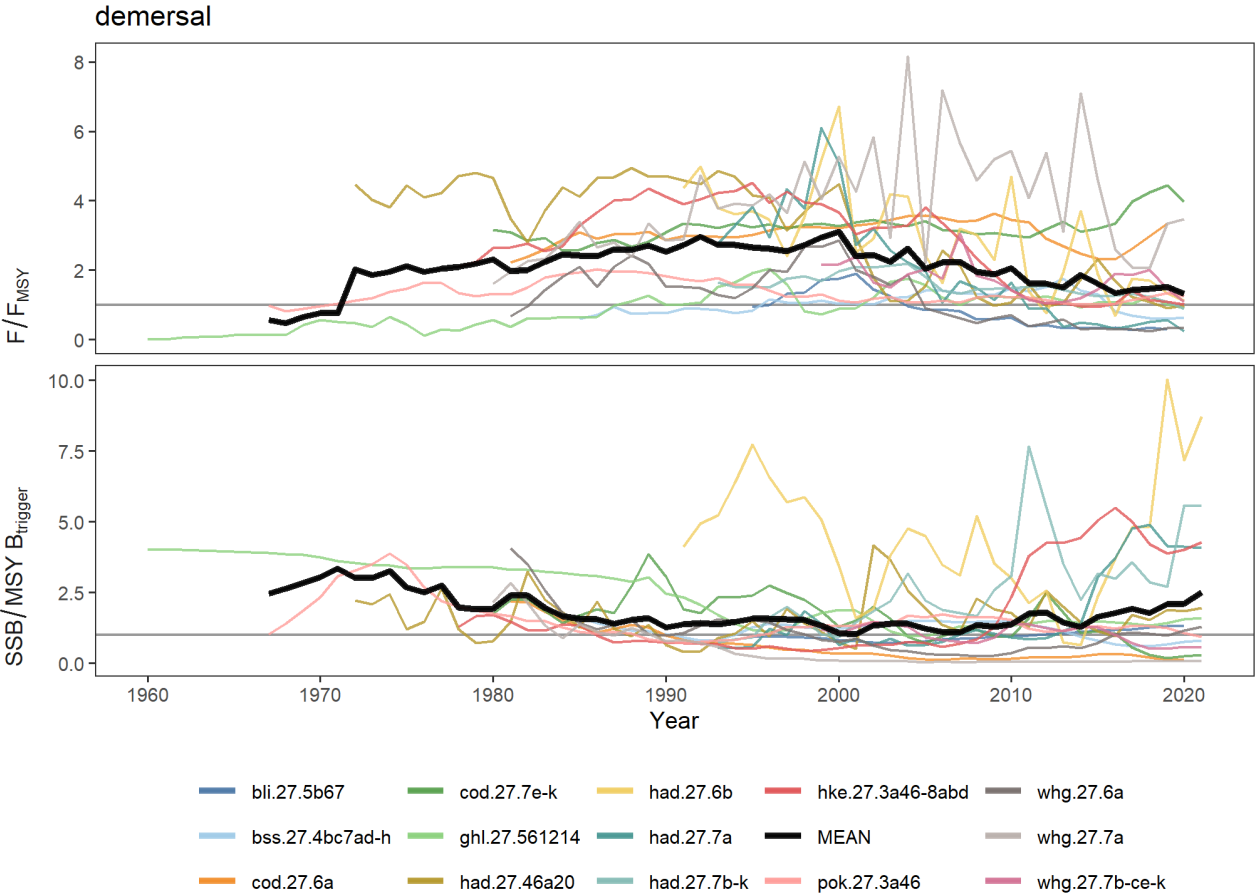
Clear trends show a declining fishing mortality ratio for category 1 benthic and demersal stocks since the mid-1990s (Figure 13). The mean fishing mortality is now below the F_{MSY} target. The SSB ratio shows an increasing trend over the same period and the mean values are now more than twice $MSY B_{trigger}$. Note that though the mean fishing mortality and biomass ratios are in a desirable condition, this does not infer that all stocks are in that condition. The mean fishing mortality ratio is fluctuating less than F_{MSY} and the SSB ratio is fluctuating above one for the crustacean stocks. For pelagic stocks, the mean fishing mortality ratio declined between 2000 and 2012 but has been increasing in recent years to above one. The mean biomass ratio for pelagic species remains above $MSY B_{trigger}$ but has also been declining in recent years.



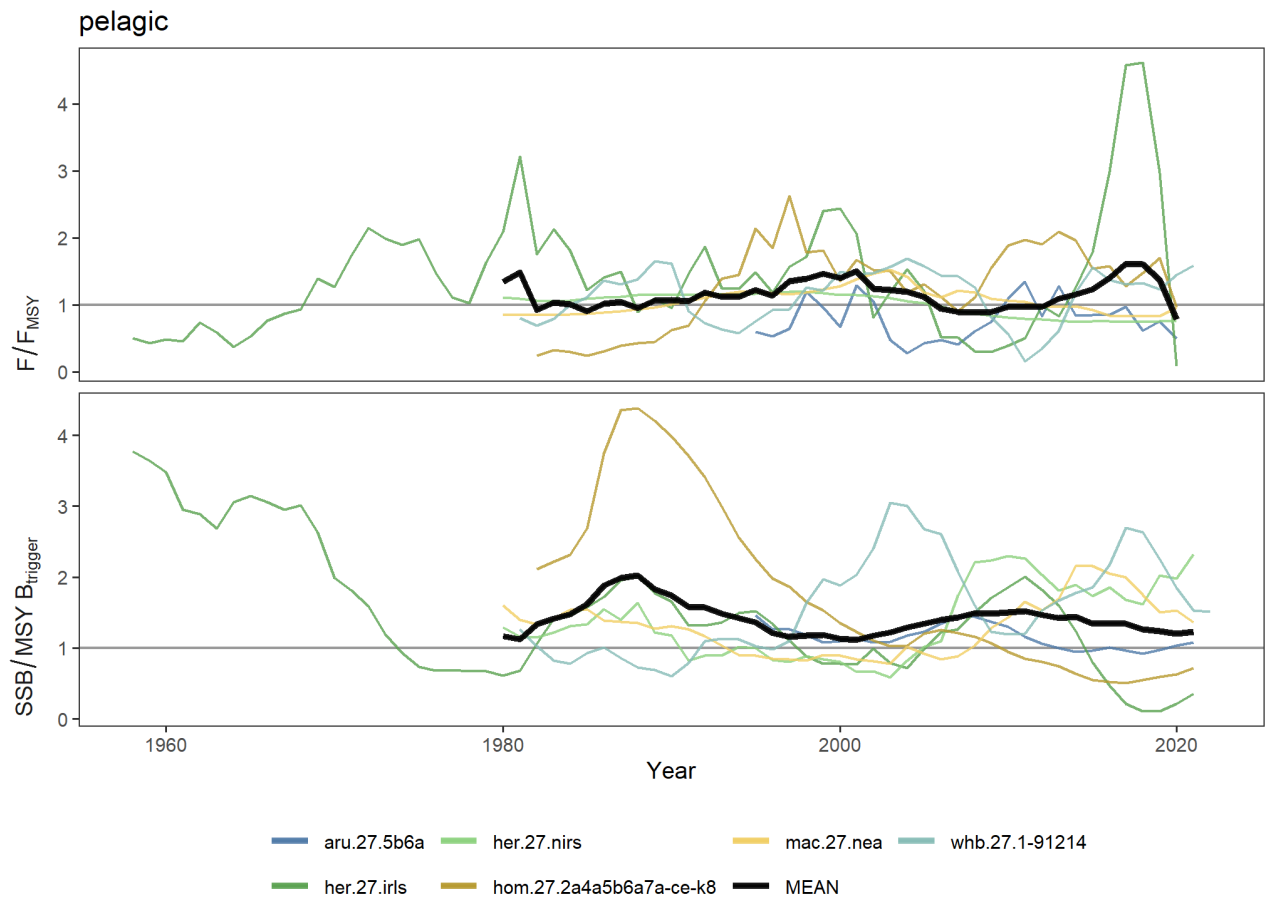
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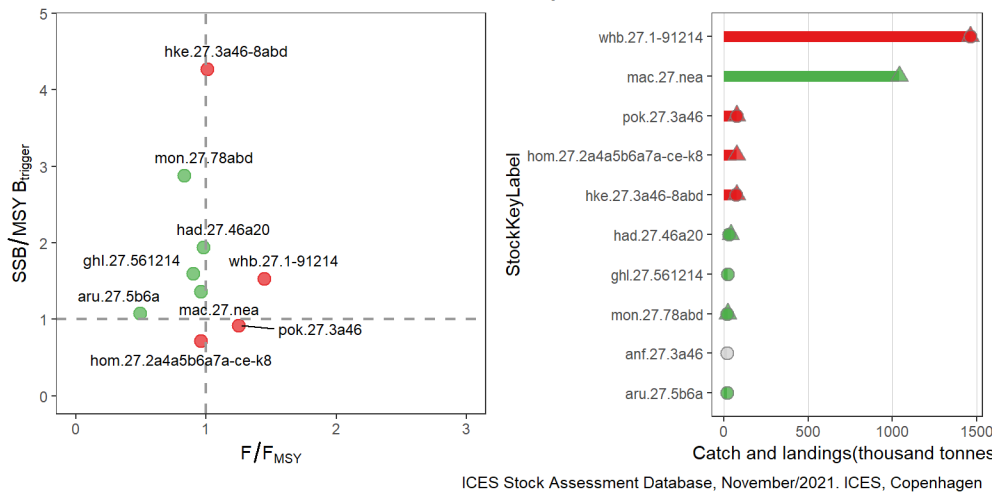
ICES Stock Assessment Database, October/2021. ICES, Copenhagen

Figure 13 Temporal trends in F/F_{MSY} and $SSB/MSY B_{trigger}$ for Celtic Sea benthic, crustacean, demersal, and pelagic stocks. Only stocks with defined MSY reference points are considered. For full stock names, see Table A1 in the Annex.

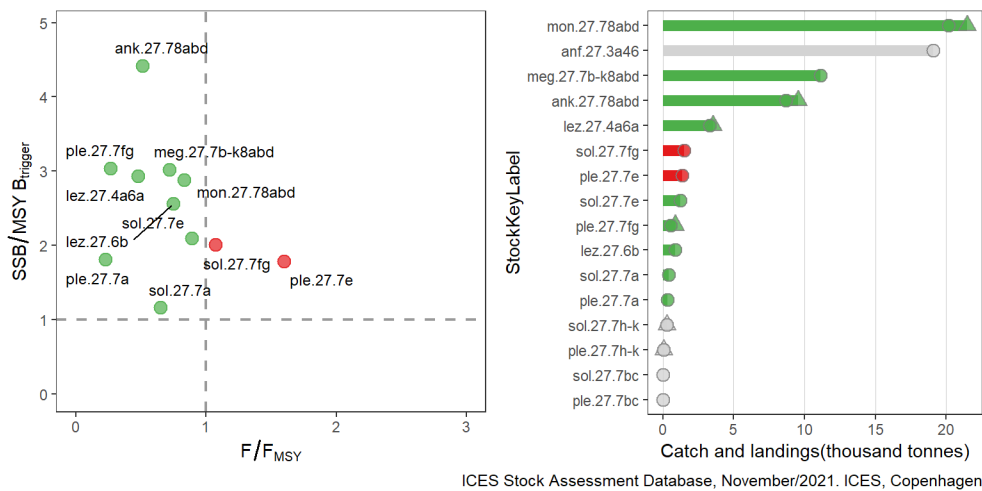
The stock status relative to F_{MSY} and $MSY B_{trigger}$ is shown for all stocks and partitioned by stock groups in Figure 14. This shows that the hake, anglerfish, and some haddock stocks have the best status among all stocks (multiples of $MSY B_{trigger}$). Cod in Division 6.a and 7.e–k and whiting in 7.a have the worst stock status, being fished around 2.5 times higher than F_{MSY} and with SSB well below $MSY B_{trigger}$. Blue whiting and mackerel account for the highest landings. Fishing mortality for blue whiting is higher than F_{MSY} while fishing mortality in mackerel is now estimated to be below F_{MSY} . Five demersal stocks are in the bottom right quadrant of the stock status plot indicate that they need to be rebuilt and that fishing mortality remains too high. Several stocks are in the bottom left quadrant, indicating that while fishing mortality is lower than F_{MSY} , stock size remains below $MSY B_{trigger}$. In general, the crustacean and benthic stocks have a better stock status than the demersal or pelagic stocks.

Top 10 Stocks

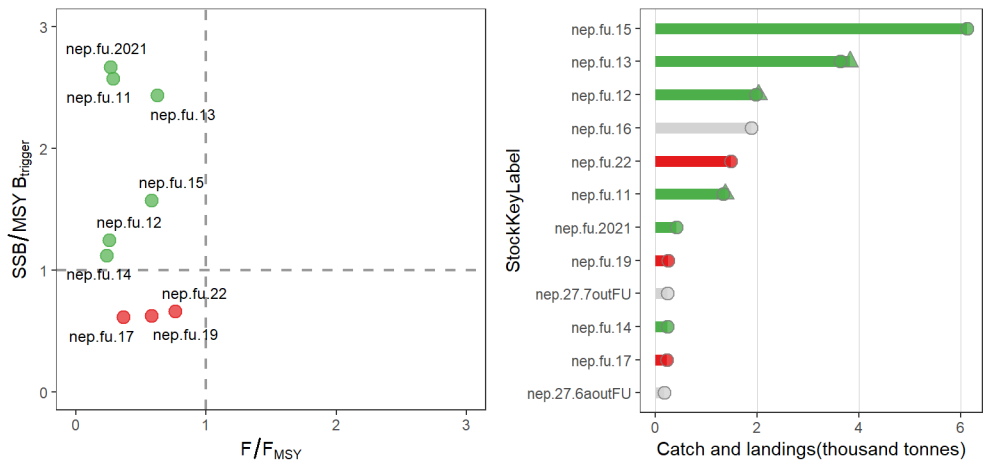
All stocks top 10



benthic

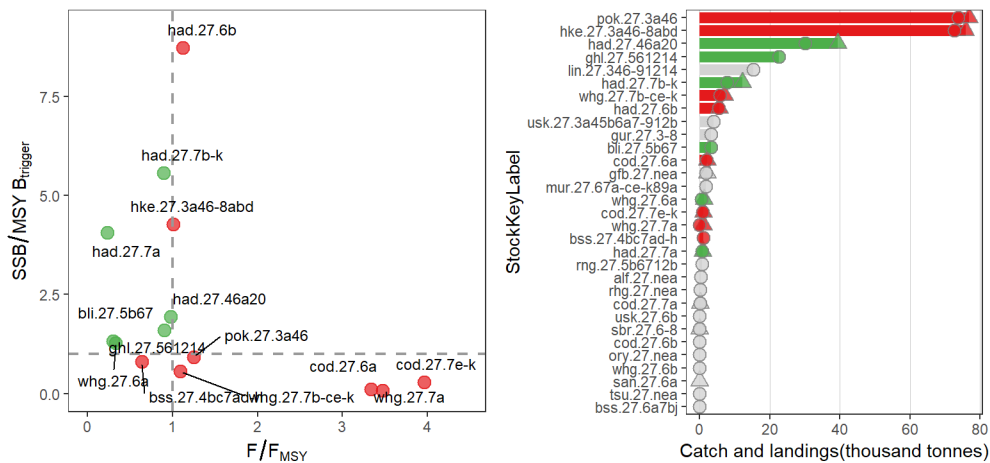


crustacean



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demersal



ICES Stock Assessment Database, November/2021. ICES, Copenhagen

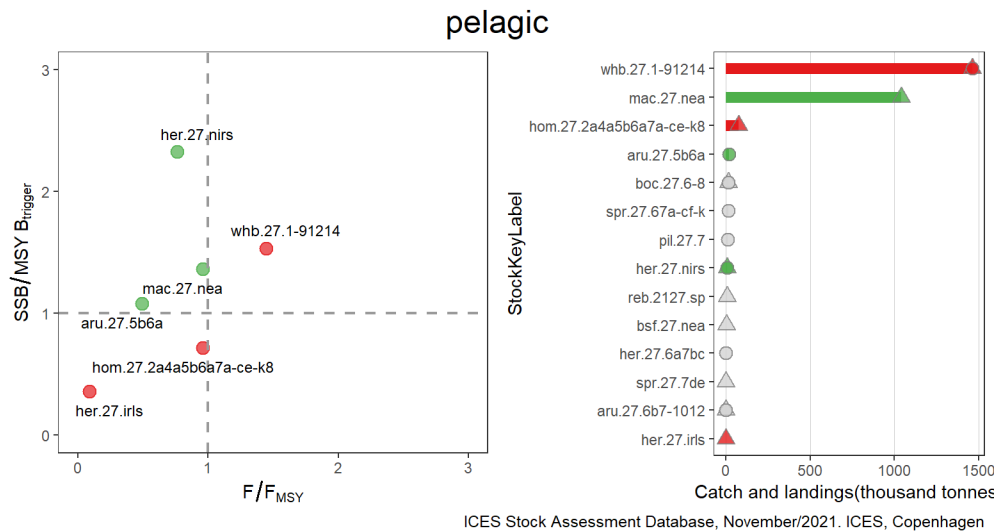


Figure 14 Status of Celtic Sea stocks relative to the joint distribution of exploitation (F/F_{MSY}) and stock size ($SSB/MSY B_{trigger}$) [left panels, by individual stocks] and catches (triangles)/landings (circles) from these stocks in 2021 [right panels]. The left panels only include stocks for which MSY reference points have been defined (MSY where available). Stocks in green are exploited at or below F_{MSY} while their size is also at or above $MSY B_{trigger}$. Stocks in red are either exploited above F_{MSY} or their size is below $MSY B_{trigger}$, or both. Stocks in grey have unknown/undefined status in relation to reference points. “All stocks” refers to the ten stocks with highest catch and landings across fisheries guilds in 2020. For full stock names, see Table A1 in the Annex.

European eel cannot be assessed against any PA or MSY reference points. Recruitment of European eel has declined sharply in recent decades due to a range of potential threats.

Mixed fisheries

Mixed fisheries advice

There is mixed-fisheries advice for cod (cod.27.7e-k), haddock (had.27.7b-k), whiting (whg.27.7b-ce-k), Norway lobster (functional units [FUs] 16, 17, 19, 20–21, 22, and 27.7 outside FUs), sole (sol.27.7fg), white anglerfish (mon.27.78abd), and megrim (meg.27.7b-k8abd) in this ecoregion. Based on mixed-fisheries considerations and single-stock catch advice, cod is the most limiting stock for Celtic Sea demersal fisheries. This is due to the zero-catch advice for cod, because almost all fisheries operating with demersal gears catch cod.

Mixed fisheries considerations

Fishing operations typically catch more than one species at a time, although some fishing operations are more species selective than others. For example, pelagic trawling tends to catch only one species, whereas demersal trawling normally catches several species simultaneously. These operations are reported to ICES at a level that is aggregated by EU Member States to the following key descriptors of fishing activity (hereafter called “métier”): gear, target assemblage, mesh size range, vessel length, ICES division, and quarter (quarters have been aggregated to year in the analyses below). The catch composition resulting from any fishing activity is described as a technical interaction.

In the absence of fine-scale spatial and temporal information on catches, analysis has been carried out at the EU Member State level. This allows the incorporation of the effects of spatial and temporal variation in fishing patterns and market considerations on technical interactions, but not to distinguish between these factors. In the descriptions below, the term “landings” is used because the analyses are based on landings reported in logbooks.

In this advice, only the technical interactions occurring within demersal fisheries in the Celtic Seas ecoregion are considered. For this analysis, an average of the 2018, 2019, and 2020 data on métier was used. The Celtic Seas ecoregion was subdivided into three distinct areas: Irish Sea (Division 7.a), Celtic Sea and west of Ireland (divisions 7.b–k, excluding Division 7.d), and west of Scotland (divisions 6.a and 6.b). The technical interactions within each of these areas are described in relation to the main demersal TAC species (cod, megrims, anglerfish, whiting, hake, haddock, *Nephrops*, plaice, sole, pollack, and saithe).

Irish Sea

The 11 demersal TAC species that dominate the landings in the Irish Sea (*Nephrops*, haddock, plaice, anglerfish, hake, megrim, cod, whiting, sole, plaice, saithe, and pollack; Figure 15) are predominantly landed by three countries (Ireland, United Kingdom, and Belgium) using five main métiers (OTB_CRU, OTB_DEF, OTM_DEF, TBB_DEF, SCC_DEF – see Table A4 in the Annex for a definition of métiers) (Figure 15).

Nephrops is the main species landed within the Irish Sea mixed fisheries (mean 6 728 tonnes year⁻¹). They are primarily targeted using otter trawls (OTB_CRU). Other species in the *Nephrops* fishery constitute a low proportion of the overall landings (< 10%; Figure 15). However, there is evidence of significant discarding in these fisheries, including whiting. Haddock account for the second highest landings (1 596 tonnes year⁻¹) and are mainly caught in otter trawls targeting demersal fish (OTB_DEF, OTM_DEF, Figure 15). Around 75% of haddock are caught by these two métiers (Figure 15). Plaice accounts for the third highest landings (410 tonnes year⁻¹) in the Irish Sea, mainly targeted by beam trawls, and have technical interactions with megrim, sole, and some other species (mainly rays; Figure 15). There is some variation in the landings profiles of each métier at the country level, reflecting different fishing patterns, practice, and quota shares.

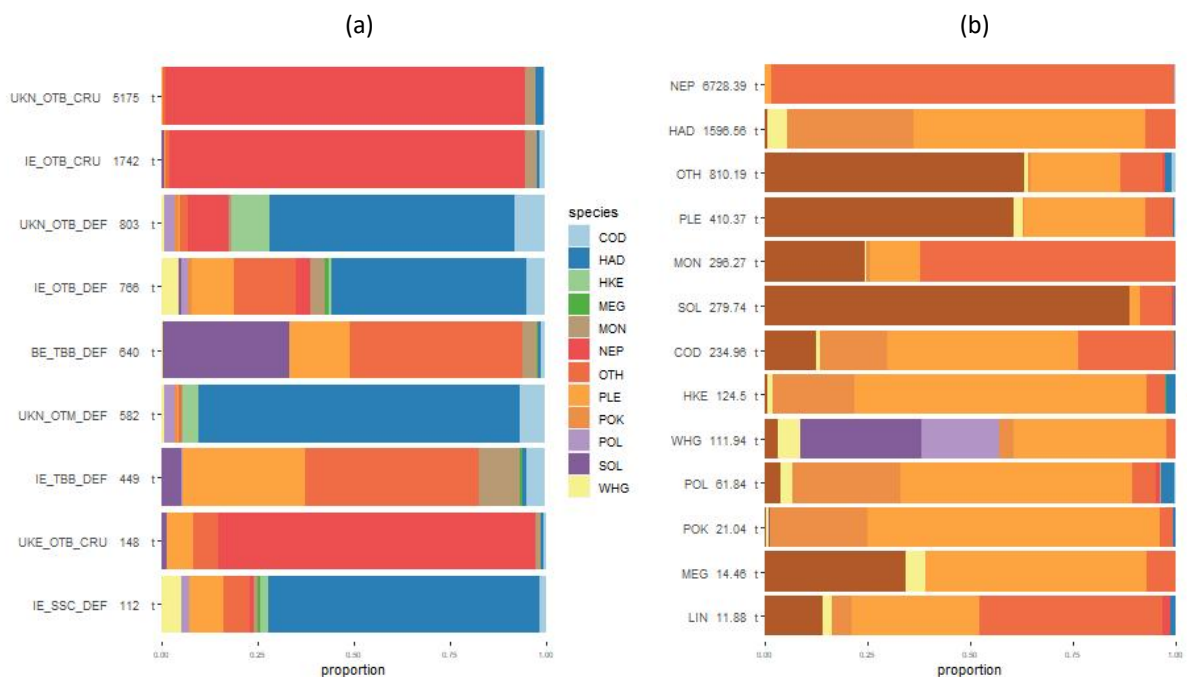


Figure 15 Description of technical interactions of demersal TAC species in the Irish Sea. The left panel (a) shows the species composition of the main demersal métiers (landings > 100 tonnes) operating in the Irish Sea. The label incorporates the country code, métier, and mean annual (2018–2020) landings (tonnes). The right panel (b) shows the proportion of the landings of each species accounted for by the different demersal métiers. The label includes the mean annual landings (2018–2020).

Celtic Sea and west of Ireland

The Celtic Sea and west of Ireland has highly diverse mixed fisheries. Twelve demersal TAC species dominate the landings in the Celtic Sea (hake, anglerfish, megrim, whiting, *Nephrops*, haddock, cod, pollack, sole, ling, saithe, and plaice; Figure 16b). These are landed by six nations (Ireland, France, United Kingdom, Spain, the Netherlands, and Belgium), using 14

Hake is the main species landed by demersal mixed fisheries (mean 23 114 tonnes year⁻¹) from the Celtic Sea and west of Ireland. Hake are targeted primarily by longliners (LSS_DEF) and gillnetters (GNS_DEF; Figure 16). The landings of other species in the hake directed fishery constitutes a low proportion of the overall catch (< 10%; Figure 16a). Hake are caught in the majority of métiers to varying extents. The slope species, anglerfish (18 862 tonnes year⁻¹) and megrims (8 106 tonnes year⁻¹), constitute the next highest landings. Both anglerfish and megrims are primarily targeted by otter trawls (OTB_DEF; Figure 16b) and represent the dominant species of that métier (> 50%; Figure 16a). Most whiting are caught by otter trawls targeting fish; these trawls also catch haddock and varying amounts of other benthic and gadoid species. 80% of *Nephrops* are caught in crustacean trawl fisheries with minor catches of other species.

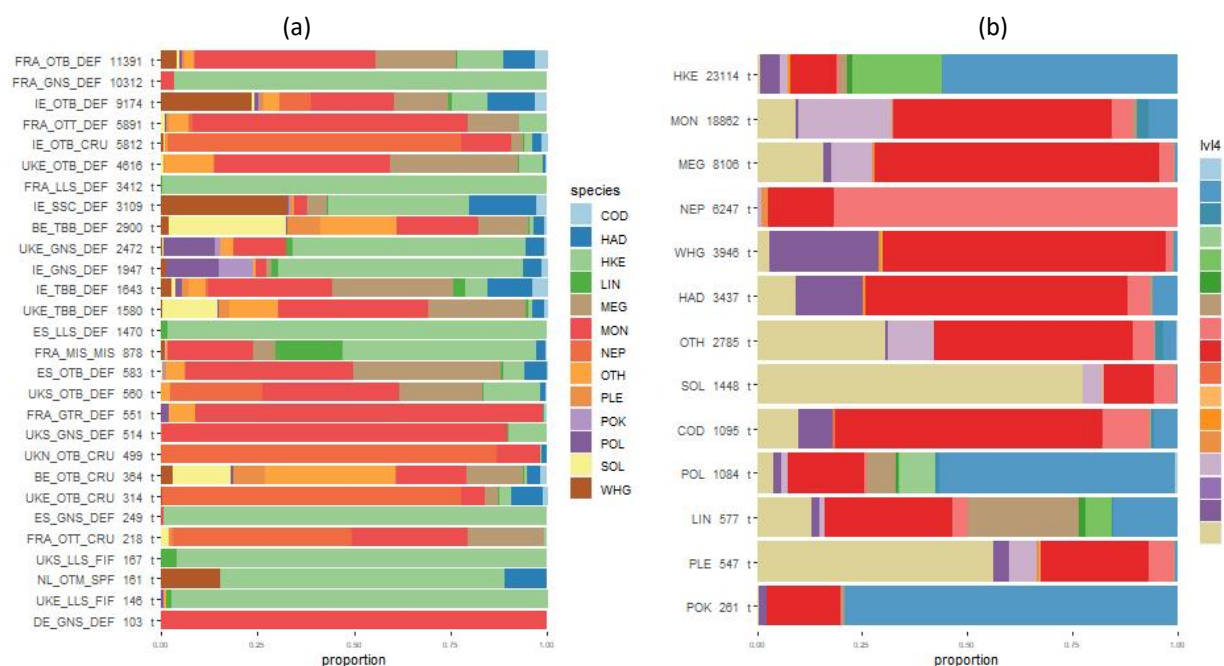


Figure 16 Description of technical interactions of demersal TAC species in the Celtic Sea and west of Ireland. The left panel (a) shows the species composition of the main demersal métiers (landings > 100 tonnes) operating in the Celtic Sea and west of Ireland. The label incorporates the country code, métier, and mean annual (2018–2020) landings (tonnes). The right panel (b) shows the composition of the landings of each species accounted for by the different demersal métiers. The label includes the mean annual landings (2018–2020).

Twelve demersal TAC species dominate the landings from west of Scotland (haddock, *Nephrops*, hake, anglerfish, saithe, ling, megrim, cod, whiting, plaice; pollack, and sole Figure 17). These are landed by five nations (United Kingdom, Ireland, France, Spain and the Netherlands) using eleven main métiers (OTB_DEF, OTB_CRU, LLS_DEF, LLS_FIF, FPO_CRU, GNS_DEF, OTT_DEF, SCC_DEF, OTT_DEF, OTM_SPF and OTB_DWS; Figure 17a).

Haddock is the main species in the landings of the demersal fisheries of west of Scotland (average 8 990 tonnes year⁻¹), and are primarily targeted by otter trawls (OTB_DEF), and has technical interactions with many other species, including hake, ling, pollack, anglerfish, and *Nephrops* (Figure 17). *Nephrops* accounts for the second highest landings (8834 tonnes year⁻¹); it is targeted mainly by otter trawls (OTB_CRU) and with creels (FPO_CRU). The landings of other species in the haddock fisheries constitutes a low proportion of the overall catch (< 10%; Figure 17). However, there is evidence of significant discarding in these fisheries. Hake has the third highest landings (6 004 tonnes year⁻¹) in fisheries in this area. It is mainly caught using longliners (LSS_DEF, LSS_FIF; Figure 17) and represents the dominant species of that métier (> 80%; Figure 17). As with the Celtic Sea, landings profiles in this area vary greatly depending on the EU Member

State. For example, the demersal otter trawl fisheries carried out by France, Ireland, and the United Kingdom have very different species compositions and therefore result in different technical interactions (Figure 17).

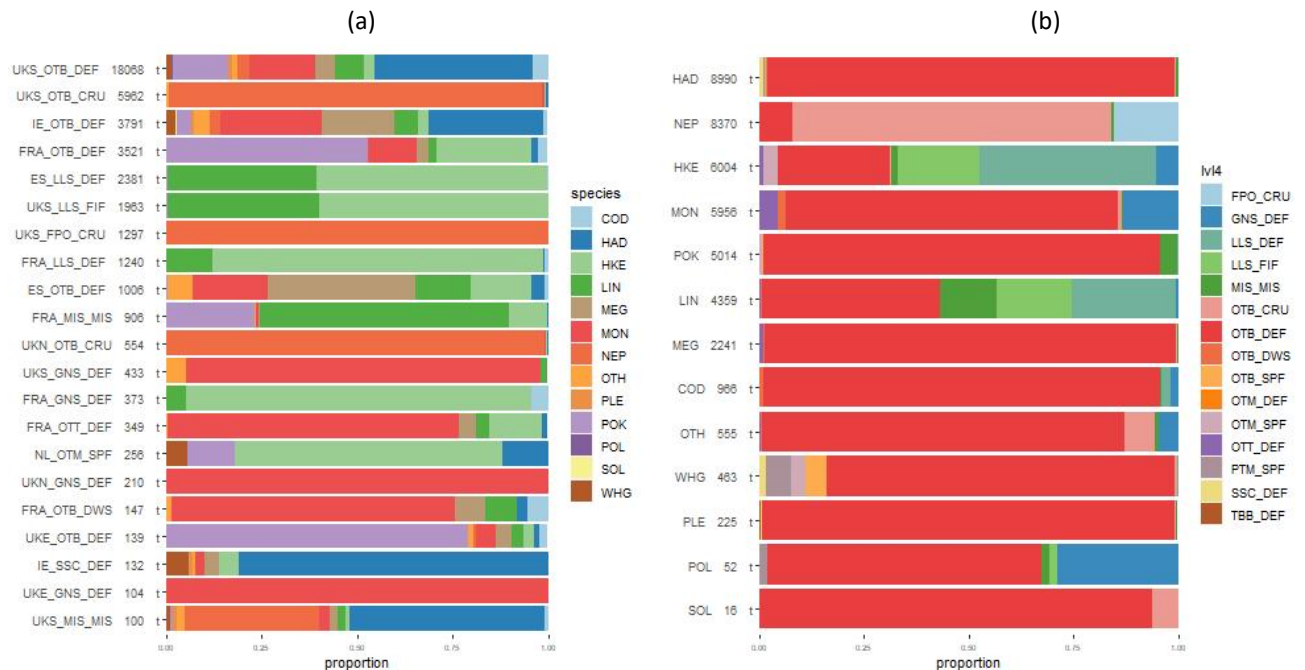


Figure 17 Description of technical interactions of demersal TAC species for the west of Scotland. The left panel (a) shows the species composition of the main demersal métiers (landings > 100 tonnes) operating in these seas. The label incorporates the country code, métier, and mean annual (2018–2020) landings (tonnes). The right panel (b) shows the proportion of the landings of each species accounted for by the different demersal métiers. The label includes the mean annual landings (2018–2020).

The species interactions and relative proportions of catches in mixed fisheries are not likely to change greatly between years. Generally, the interactions between species and the selectivity of fisheries change gradually over time.

Species interaction

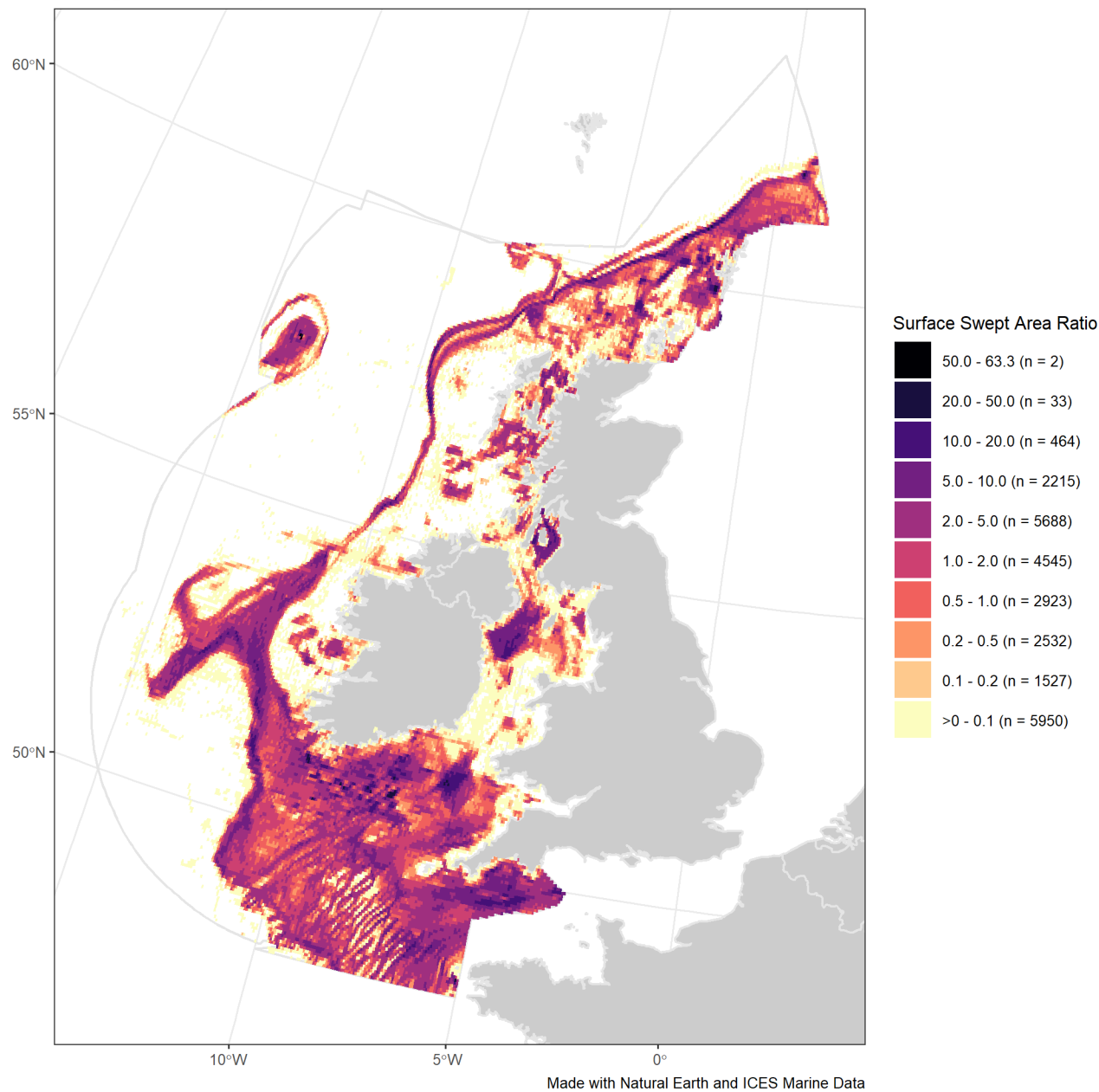
Fish species are part of the marine food web and interact in various ways, including through predation and competition. Natural mortality is becoming proportionately more significant in the Celtic Seas ecoregion because fishing mortality has been reduced on many stocks. Predation mortality can occur from other fish, seabirds, and marine mammals. The abundance of some mammal species has been increasing in some parts of the ecoregion.

There is no operational multispecies modelling of the interactions of Celtic Seas species to quantify predation mortality. However, in the North Sea, the modelling indicates that the yields of many stocks are strongly affected by the abundance of cod, saithe, and mackerel, which are the main predator fish species. Changes in fishing mortality on these species influences the abundance and yield of other fish stocks. Indirect predation effects are also important. For example, reduced fisheries exploitation on cod increases cod biomass, which not only leads to reductions in SSB and yields of whiting and haddock (direct predation effect) but also to increases in SSB and yield of herring, sandeel, Norway pout, and sprat. Similar interactions could be expected in the Celtic Seas ecoregion.

Effects of fisheries on the ecosystem

Abrasion of the seabed by mobile bottom-contacting fishing gears has been investigated to describe the extent, magnitude, and effects of fishing on benthic habitats. Mobile bottom-contacting gears are concentrated on the *Nephrops* grounds, along the continental shelf edge, and throughout the Celtic Sea (Figure 18). There is little activity by mobile bottom-contacting gears in much of the area west of Scotland and west of Ireland.

Average surface swept area ratio 2017-2020



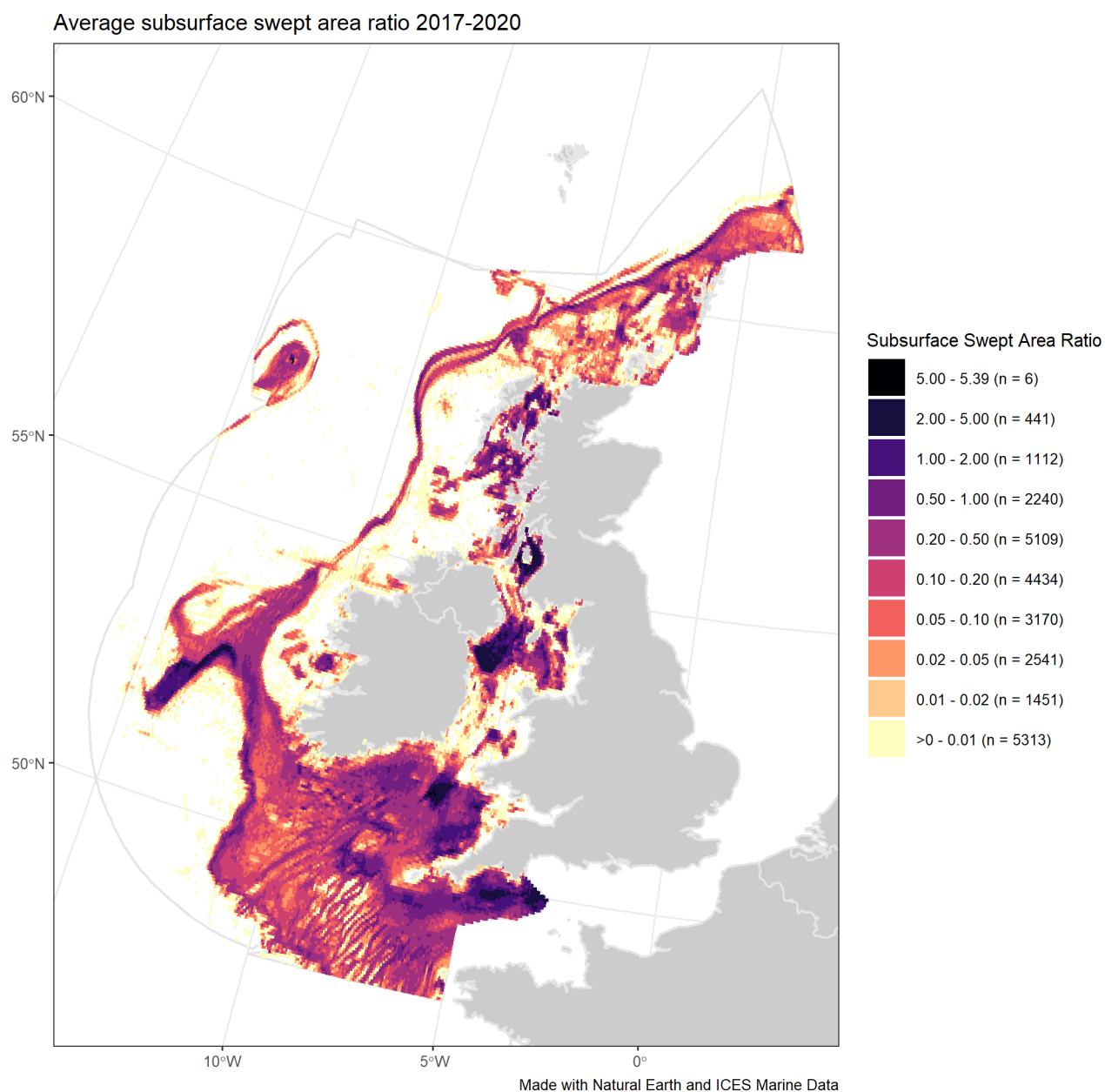


Figure 18 Average annual surface (left) and subsurface (right) disturbance by mobile bottom-contacting fishing gear (bottom otter trawls, bottom seines, dredges, beam trawls) in the Celtic Seas ecoregion, expressed as average swept-area ratios (SAR).

Bycatch of protected, endangered, and threatened species

Bottom-otter trawls and set gillnets pose the highest bycatch risk across species groups for the Celtic Sea, Irish Sea, and Western Ireland areas (FishPi, 2016). In addition, in the Celtic Sea fishing area multi-rig otter trawls and trammel nets, and

in the Western Ireland fishing area midwater otter trawls, were also determined to have high bycatch risk factors (FishPi, 2016).

ICES evaluated bycatch mortality across métiers for the common dolphin in the Celtic Seas, in the Bay of Biscay and the Iberian Coast, and in the western English Channel. The at-sea monitoring point estimate of bycatch mortality is just below the potential biological removal while the point estimate from strandings data exceeded it. The estimated mean annual bycatch of the common dolphin in the ecoregion in 2016–2018 across all métiers amounted to 720 (95% CI 278–1345) individuals, with bottom otter trawls and gillnets accounting for the largest bycatch (276 animals 95% CI 151–427, and 192 animals 95% CI 85–299, respectively [ICES, 2020, 2021d]).

For other marine mammal species, the highest bycatch rates are observed in the set net fishery (ICES, 2021d). The bycatch mortality level of the Celtic Sea subpopulation of harbour porpoise exceeded 2% of the population for the area. High bycatch rate in gillnets has also been observed for grey seal (0.25 specimens per monitored days-at-sea) in 2018 in the ecoregion in area Division 7.j.

Set and drift gillnets have the greatest number of documented cases of marine bird bycatch (ICES, 2018). Midwater otter trawls also pose high risk for bycatch for gannets; bottom otter trawls for gannets, shearwaters, cormorants, shags, gulls and guillemots; set nets for all these species as well as ducks and divers; long-lines for fulmar, shearwater species, gannets, cormorants, shags, skua, gulls, terns, and auks, pots; traps for shags. As a quantified evidence, high bycatch rate in nets per monitored days-at-sea in 2018 involved the common murre *Uria aalge*, in the first quarter (1.50 specimens per monitored days-at-sea) in the ICES Division 7.g (ICES, 2021d).

Bycatches of some vulnerable (e.g. spurdog, thorny skate) and near threatened (e.g. thornback ray) species are continuing to be observed (as classified by the International Union for Conservation of Nature [IUCN]), especially in mobile gears in the Celtic Sea

Under EU TAC regulations, it is prohibited to fish for or to land Starry ray, leafscale gulper shark, Portuguese dogfish, birdbeak dogfish, kitefin shark, great lanternshark, tope shark, basking shark, porbeagle, undulate ray in 6, common skate (*Dipturus batis*) complex (*Dipturus* cf. *flossada* and *Dipturus* cf. *intermedia*), and angel shark. If specimens are caught within the Celtic Seas ecoregion they should be promptly released unharmed.

It is prohibited to catch spurdog (piked dogfish) unless vessels are part of a monitored bycatch avoidance programme.

ICES has previously advised zero catches in this ecoregion for stocks of rare or threatened species such as basking shark, porbeagle, angel shark, the common skate complex, white skates, undulate rays, orange roughy, deep-water sharks (kitefin shark, leafscale gulper shark, Portuguese dogfish), and greater silver smelt. These stocks have been either targeted or by-caught in fisheries in the past and are now considered depleted. Information on these stocks is sparse, but they require special management attention to conserve remaining populations.

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Annex

Supporting data used in the Celtic Seas Fisheries overview is archived at ICES (2021c).

Table A1 Status summary of the Celtic Seas ecosystem stocks in 2021, in regards to ICES maximum sustainable yield (MSY) approach and precautionary approach (PA) for stocks within the Celtic Seas ecoregion. Grey represents unknown reference points. For the MSY approach: green represents a stock that is either fished below F_{MSY} or whose size is greater than $MSY_{B_{trigger}}$; red represents a stock that is either fished above F_{MSY} or whose size is less than $MSY_{B_{trigger}}$. For the PA: green represents a stock that is either fished below F_{pa} or whose size is greater than B_{pa} ; yellow represents a stock that is either fished between F_{pa} and F_{lim} or whose size is between B_{lim} and B_{pa} ; red represents a stock that is either fished above F_{lim} or whose size is less than B_{lim} . SBL = safe biological limits; MSFD = EU Marine Strategy Framework Directive; D3C1 = MSFD indicator for fishing mortality; D3C2 = MSFD indicator for spawning-stock biomass; GES = good environmental status.

Stock name	Stock description	Fisheries guild	Data category	Assessment year	Advice category	SBL	GES	Reference point	Fishing pressure	Stock size	D3C1	D3C2
ank.27.78abd	Black-bellied anglerfish in Subarea 7 and divisions 8.a–b and 8. d	Benthic	3.2	2021	PA	?	?	Maximum sustainable yield	✓	?	✓	?
								Precautionary approach	✓	?	✓	?
aru.27.5b6a	Greater silver smelt in divisions 5.b and 6.a	Pelagic	1	2021	MSY	✓	✓	Maximum sustainable yield	✓	✓	✓	✓
								Precautionary approach	✓	✓	✓	✓
bli.27.5b67	Blue ling in subareas 6-7 and Division 5.b	Demersal	1	2020	MSY	✓	✓	Maximum sustainable yield	✓	✓	✓	✓
								Precautionary approach	✓	✓	✓	✓

Stock name	Stock description	Fisheries guild	Data category	Assessment year	Advice category	SBL	GES	Reference point	Fishing pressure	Stock size	D3C1	D3C2
bss.27.4bc7ad-h	Seabass in divisions 4.b–c, 7.a, and 7.d-h	Demersal	1.2	2021	MSY			Maximum sustainable yield				
								Precautionary approach				
cod.27.6a	Cod in Division 6.a	Demersal	1.2	2020	MSY			Maximum sustainable yield				
								Precautionary approach				
cod.27.7e-k	Cod in divisions 7.e– k	Demersal	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				
dgs.27.nea	Spurdog in subareas 1–10, 12 and 14	Elasmobranch	1.2	2020	MSY/PA			Maximum sustainable yield				
								Precautionary approach				
ele.2737.nea	European eel throughout its natural range	Demersal	3.14	2021	PA			Maximum sustainable yield				
								Precautionary approach				

Stock name	Stock description	Fisheries guild	Data category	Assessment year	Advice category	SBL	GES	Reference point	Fishing pressure	Stock size	D3C1	D3C2
ghl.27.561214	Greenland halibut in subareas 5, 6, 12, and 14	Demersal	1	2021	MSY	?	✓	Maximum sustainable yield	✓	✓	✓	✓
								Precautionary approach	?	?	?	?
had.27.46a20	Haddock in Subarea 4, Division 6.a, and Subdivision 20	Demersal	1	2021	MSY	✓	✓	Maximum sustainable yield	✓	✓	✓	✓
								Precautionary approach	✓	✓	✓	✓
had.27.6b	Haddock in Division 6.b	Demersal	1	2021	MSY	✓	✗	Maximum sustainable yield	✗	✓	✗	✓
								Precautionary approach	✓	✓	✓	✓
had.27.7a	Haddock in Division 7.a	Demersal	1	2021	MSY	✓	✓	Maximum sustainable yield	✓	✓	✓	✓
								Precautionary approach	✓	✓	✓	✓
had.27.7b-k	Haddock in divisions 7.b–k	Demersal	1	2021	MSY	✓	✓	Maximum sustainable yield	✓	✓	✓	✓
								Precautionary approach	✓	✓	✓	✓

Stock name	Stock description	Fisheries guild	Data category	Assessment year	Advice category	SBL	GES	Reference point	Fishing pressure	Stock size	D3C1	D3C2
her.27.irls	Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k	Pelagic	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				
her.27.nirs	Herring in Division 7.a North of 52°30'N	Pelagic	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				
hke.27.3a46-8abd	Hake in subareas 4, 6, and 7, and divisions 3.a, 8.a–b, and 8.d, Northern stock	Demersal	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				
hom.27.2a4a5b6a7a-ce-k8	Horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a-c,e-k	Pelagic	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				
lez.27.4a6a	Megrim in divisions 4.a and 6.a	Benthic	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				

Stock name	Stock description	Fisheries guild	Data category	Assessment year	Advice category	SBL	GES	Reference point	Fishing pressure	Stock size	D3C1	D3C2
lez.27.6b	Megrim in Division 6.b	Benthic	2.11	2021	MSY			Maximum sustainable yield				
								Precautionary approach				
mac.27.nea	Mackerel in subareas 1–8 and 14 and Division 9.a	Pelagic	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				
meg.27.7b-k8abd	Megrim in divisions 7.b-k, 8.a–b, and 8.d	Benthic	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				
mon.27.78abd	White anglerfish in Subarea 7 and divisions 8.a-b and 8.d	Benthic	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				
nep.fu.11	Norway lobster in Division 6.a, Functional Unit 11	Crustacean	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				

Stock name	Stock description	Fisheries guild	Data category	Assessment year	Advice category	SBL	GES	Reference point	Fishing pressure	Stock size	D3C1	D3C2
nep.fu.12	Norway lobster in Division 6.a, Functional Unit 12	Crustacean	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				
nep.fu.13	Norway lobster in Division 6.a, Functional Unit 13	Crustacean	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				
nep.fu.14	Norway lobster in Division 7.a, Functional Unit 14	Crustacean	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				
nep.fu.15	Norway lobster in Division 7.a, Functional Unit 15	Crustacean	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				
nep.fu.16	Norway lobster in divisions 7.b–c and 7.j–k, Functional Unit 16	Crustacean	1	2021	F _{MSY} Ranges			Maximum sustainable yield				
								Precautionary approach				

Stock name	Stock description	Fisheries guild	Data category	Assessment year	Advice category	SBL	GES	Reference point	Fishing pressure	Stock size	D3C1	D3C2
nep.fu.17	Norway lobster in Division 7.b, Functional Unit 17	Crustacean	1	2021	F _{MSY} ranges	?	✗	Maximum sustainable yield	✓	✗	✓	✗
								Precautionary approach	✓	?	✓	?
nep.fu.19	Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19	Crustacean	1	2021	F _{MSY} ranges	?	✗	Maximum sustainable yield	✓	✗	✓	✗
								Precautionary approach	✓	?	✓	?
nep.fu.2021	Norway lobster in divisions 7.g and 7.h, functional units 20 and 21	Crustacean	1	2021	MSY	✓	✓	Maximum sustainable yield	✓	✓	✓	✓
								Precautionary approach	✓	✓	✓	✓
nep.fu.22	Norway lobster in divisions 7.f and 7.g, Functional Unit 22	Crustacean	1	2021	MSY	?	✗	Maximum sustainable yield	✓	✗	✓	✗
								Precautionary approach	✓	?	✓	?
ory.27.nea	Orange roughy in subareas 1-10, 12 and 14	Demersal	6.3	2020	PA	?	?	Maximum sustainable yield	?	?	?	?
								Precautionary approach	?	✗	?	✗

Stock name	Stock description	Fisheries guild	Data category	Assessment year	Advice category	SBL	GES	Reference point	Fishing pressure	Stock size	D3C1	D3C2
ple.27.7a	Plaice in Division 7.a	Benthic	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				
ple.27.7e	Plaice in Division 7.e	Benthic	3.2	2021	PA			Maximum sustainable yield				
								Precautionary approach				
ple.27.7fg	Plaice in divisions 7.f and 7.g	Benthic	3.2	2021	PA			Maximum sustainable yield				
								Precautionary approach				
ple.27.7h-k	Plaice in divisions 7.h-k	Benthic	3.2	2021	PA			Maximum sustainable yield				
								Precautionary approach				
pok.27.3a46	Saithe in subareas 4, 6 and Division 3.a	Demersal	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				

Stock name	Stock description	Fisheries guild	Data category	Assessment year	Advice category	SBL	GES	Reference point	Fishing pressure	Stock size	D3C1	D3C2
sbr.27.6-8	Blackspot seabream in subareas 6-8	Demersal	6.3	2020	PA	?	?	Maximum sustainable yield	?	?	?	?
								Precautionary approach	?	✗	?	✗
sol.27.7a	Sole in Division 7.a	Benthic	1	2021	MSY	✓	✓	Maximum sustainable yield	✓	✓	✓	✓
								Precautionary approach	✓	✓	✓	✓
sol.27.7e	Sole in Division 7.e	Benthic	1	2021	MSY	✓	✓	Maximum sustainable yield	✓	✓	✓	✓
								Precautionary approach	✓	✓	✓	✓
sol.27.7fg	Sole in divisions 7.f and 7.g	Benthic	1	2021	MSY	✓	✗	Maximum sustainable yield	✗	✓	✗	✓
								Precautionary approach	✓	✓	✓	✓
spr.27.7de	Sprat in divisions 7.d and 7.e	Pelagic	3.2	2021	PA	✓	✓	Maximum sustainable yield	✓	✓	✓	✓
								Precautionary approach	✓	✓	✓	✓

Stock name	Stock description	Fisheries guild	Data category	Assessment year	Advice category	SBL	GES	Reference point	Fishing pressure	Stock size	D3C1	D3C2
whb.27.1-91214	Blue whiting in subareas 1–9, 12, and 14	Pelagic	1	2021	MP			Maximum sustainable yield				
								Precautionary approach				
whg.27.6a	Whiting in Division 6.a	Demersal	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				
whg.27.7a	Whiting in Division 7.a	Demersal	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				
whg.27.7b-ce-k	Whiting in divisions 7.b–c and 7.e–k	Demersal	1	2021	MSY			Maximum sustainable yield				
								Precautionary approach				

Table A2 List of stocks in the Celtic Seas ecoregion in 2021 that do not have a full set of reference points.

Stock name	Stock description	Latin name	Fisheries guild	Data category	Assessment year	Advice category
agn.27.nea	Angel shark in subareas 1–10, 12 and 14	<i>Squatina squatina</i>	Elasmobranch	6.3	2019	PA
alf.27.nea	Alfonsinos in subareas 1–10, 12 and 14	<i>Beryx</i>	Demersal	5.2	2020	PA
anf.27.3a46	Anglerfish in subareas 4 and 6, and Division 3.a	<i>Lophius budegassa</i> , <i>Lophius piscatorius</i>	Benthic	3.2	2021	PA
aru.27.6b7-1012	Greater silver smelt in subareas 7–10 and 12, and Division 6.b	<i>Argentina silus</i>	Pelagic	3.2	2021	PA
boc.27.6-8	Boarfish in subareas 6–8	<i>Capros aper</i>	Pelagic	3.2	2021	PA
bsf.27.nea	Black scabbardfish in subareas 1, 2, 4–8, 10, and 14, and divisions 3.a, 9.a, and 12.b	<i>Aphanopus carbo</i>	Pelagic	3.2	2020	PA
bsk.27.nea	Basking shark in subareas 1–10, 12, and 14	<i>Cetorhinus maximus</i>	Elasmobranch	6.3	2019	PA
bss.27.6a7bj	Seabass in divisions 6.a, 7.b, and 7.j	<i>Dicentrarchus labrax</i>	Demersal	6.2	2020	PA
cod.27.6b	Cod in Division 6.b	<i>Gadus morhua</i>	Demersal	6.2	2020	PA

Stock name	Stock description	Latin name	Fisheries guild	Data category	Assessment year	Advice category
cod.27.7a	Cod in Division 7.a	<i>Gadus morhua</i>	Demersal	3	2021	PA
cyo.27.nea	Portuguese dogfish in subareas 1–10, 12 and 14	<i>Centrophorus squamosus</i> , <i>Centroscymnus coelolepis</i>	Elasmobranch	6.3	2019	PA
gag.27.nea	Tope in subareas 1–10, 12 and 14	<i>Galeorhinus galeus</i>	Elasmobranch	5.2	2021	PA
gfb.27.nea	Greater forkbeard in subareas 1–10, 12, and 14	<i>Phycis blennoides</i>	Demersal	3.2	2020	PA
guq.27.nea	Leafscale gulper shark in subareas 1–10, 12, and 14	<i>Centrophorus squamosus</i>	Elasmobranch	6.3	2019	PA
gur.27.3-8	Red gurnard in subareas 3–8	<i>Chelidonichthys cuculus</i>	Demersal	3	2021	PA
her.27.6a7bc	Herring in divisions 6.a and 7.b–c	<i>Clupea harengus</i>	Pelagic	3	2021	PA
ldb.27.7b-k8abd	Four-spot megrim in divisions 7.b-k, 8.a–b, and 8.d	<i>Lepidorhombus boscii</i>	Benthic	5.2	2021	PA
lin.27.346-91214	Ling in subareas 3,4, 6–9, 12, and 14	<i>Molva molva</i>	Demersal	3.2	2021	PA

Stock name	Stock description	Latin name	Fisheries guild	Data category	Assessment year	Advice category
mur.27.67a-ce-k89a	Striped red mullet in subareas 6 and 8, and divisions 7.a–c, 7.e–k, and 9.a	<i>Mullus surmuletus</i>	Demersal	5.2	2020	PA
nep.27.6aoutFU	Norway lobster in Division 6.a, outside the functional units	<i>Nephrops norvegicus</i>	Crustacean	5.2	2020	PA
nep.27.7outFU	Norway lobster in Subarea 7, outside the functional units	<i>Nephrops norvegicus</i>	Crustacean	5.2	2020	PA
pil.27.7	Sardine in Subarea 7	<i>Sardina pilchardus</i>	Pelagic	5.9	2019	PA
ple.27.7bc	Plaice in divisions 7.b–c	<i>Pleuronectes platessa</i>	Benthic	6.2	2020	PA
pol.27.67	Pollack in subareas 6–7	<i>Pollachius pollachius</i>	Demersal	4.12	2021	PA
por.27.nea	Porbeagle in subareas 1–10, 12 and 14	<i>Lamna nasus</i>	Elasmobranch	6.3	2019	PA
raj.27.67a-ce-h	Other rays and skates in Subarea 6 and divisions 7.a–c and 7.e–h	<i>Rajidae</i>	Elasmobranch	6.9	2020	No advice
reb.2127.sp	Beaked redfish in ICES subareas 5, 12, and 14 and NAFO subareas 1 and 2	<i>Sebastes mentella</i>	Pelagic	3	2021	PA

Stock name	Stock description	Latin name	Fisheries guild	Data category	Assessment year	Advice category
rhg.27.nea	Roughhead grenadier in subareas 5–8, 10, 12 and 14	<i>Macrourus berglax</i>	Demersal	6.3	2020	PA
rja.27.nea	White skate in subareas 1–10, 12 and 14	<i>Rostroraja alba</i>	Elasmobranch	6.3	2019	PA
rjb.27.67a-ce-k	Common skate complex and flapper skate in Subarea 6 and divisions 7.a–c and 7.e–k	<i>Dipturus batis</i>	Elasmobranch	6.3	2020	PA
rjc.27.6	Thornback ray in Subarea 6	<i>Raja clavata</i>	Elasmobranch	3.2	2020	PA
rjc.27.7afg	Thornback ray in divisions 7.a and 7.f–g	<i>Raja clavata</i>	Elasmobranch	3.2	2020	PA
rjc.27.7e	Thornback ray in Division 7.e	<i>Raja clavata</i>	Elasmobranch	5.2	2020	PA
rie.27.7de	Small-eyed ray in divisions 7.d and 7.e	<i>Raja microocellata</i>	Elasmobranch	5.2	2020	PA
rie.27.7fg	Small-eyed ray in divisions 7.f and 7.g	<i>Raja microocellata</i>	Elasmobranch	3.2	2020	PA
rif.27.67	Shagreen ray in subareas 6–7	<i>Leucoraja fullonica</i>	Elasmobranch	5.2	2020	PA

Stock name	Stock description	Latin name	Fisheries guild	Data category	Assessment year	Advice category
rjh.27.4a6	Blonde ray in Subarea 6 and Division 4.a	<i>Raja brachyura</i>	Elasmobranch	5.2	2021	PA
rjh.27.7afg	Blonde ray in divisions 7.a and 7.f–g	<i>Raja brachyura</i>	Elasmobranch	5.2	2020	PA
rjh.27.7e	Blonde ray in Division 7.e	<i>Raja brachyura</i>	Elasmobranch	5.2	2020	PA
rji.27.67	Sandy ray in subareas 6–7	<i>Leucoraja circularis</i>	Elasmobranch	5.2	2020	PA
rjm.27.67bj	Spotted ray in Subarea 6 and divisions 7.b and 7.j	<i>Raja montagui</i>	Elasmobranch	3.2	2020	PA
rjm.27.7ae-h	Spotted ray in divisions 7.a and 7.e–h	<i>Raja montagui</i>	Elasmobranch	3.2	2020	PA
rjn.27.678abd	Cuckoo ray in subareas 6–7 and divisions 8.a-b and 8.d	<i>Leucoraja naevus</i>	Elasmobranch	3.2	2020	PA
rjr.27.23a4	Starry ray in subareas 2 and 4, and Division 3.a	<i>Amblyraja radiata</i>	Elasmobranch	3.14	2019	PA
rju.27.7bj	Undulate ray in divisions 7.b and 7.j	<i>Raja undulata</i>	Elasmobranch	6.3	2020	PA

Stock name	Stock description	Latin name	Fisheries guild	Data category	Assessment year	Advice category
rju.27.7de	Undulate ray in divisions 7.d and 7.e	<i>Raja undulata</i>	Elasmobranch	3.2	2020	PA
rng.27.5b6712b	Roundnose grenadier in subareas 6-7 and divisions 5.b and 12.b	<i>Coryphaenoides rupestris</i>	Demersal	5.2	2020	PA
san.27.6a	Sandeel in Division 6.a	<i>Ammodytes</i>	Demersal	6.3	2021	No advice
sck.27.nea	Kitefin shark in subareas 1-10, 12 and 14	<i>Dalatias licha</i>	Elasmobranch	6.3	2019	PA
sdv.27.nea	Smooth-hound in subareas 1–10, 12 and 14	<i>Mustelus asterias</i>	Elasmobranch	3.2	2021	PA
sho.27.67	Black-mouth dogfish in subareas 6 and 7	<i>Galeus melastomus</i>	Elasmobranch	3.9	2021	PA
sol.27.7bc	Sole in divisions 7.b and 7.c	<i>Solea solea</i>	Benthic	6.2	2020	PA
sol.27.7h-k	Sole in Divisions 7.h–k	<i>Solea solea</i>	Benthic	5	2021	PA
spr.27.67a-cf-k	Sprat in Subarea 6 and Divisions 7.a–c and 7.f–k	<i>Sprattus sprattus</i>	Pelagic	5.2	2021	PA

Stock name	Stock description	Latin name	Fisheries guild	Data category	Assessment year	Advice category
syc.27.67a-ce-j	Lesser spotted dogfish in Subarea 6 and divisions 7.a-c and 7.e-j	<i>Scyliorhinus canicula</i>	Elasmobranch	3.9	2021	PA
syt.27.67	Greater-spotted dogfish in subareas 6 and 7	<i>Scyliorhinus stellaris</i>	Elasmobranch	3.9	2021	No advice
tsu.27.nea	Roughsnout grenadier in subareas 1-2, 4-8, 10, 12, 14 and Division 3a	<i>Trachyrincus scabrus</i>	Demersal	6.3	2020	PA
usk.27.3a45b6a7-912b	Tusk in subareas 4 and 7-9 and divisions 3.a, 5.b, 6.a, and 12.b	<i>Brosme brosme</i>	Demersal	3.2	2021	PA
usk.27.6b	Tusk in Division 6.b	<i>Brosme brosme</i>	Demersal	5.2	2020	PA
whg.27.6b	Whiting in Division 6.b	<i>Merlangius merlangus</i>	Demersal	6.2	2021	PA

Table A3 Scientific names of species.

Common name	Scientific name	Common name	Scientific name
Albacore tuna	<i>Thunnus alalunga</i>	Mackerel	<i>Scomber scombrus</i>
Angel shark	<i>Squatina squatina</i>	Megrim	<i>Lepidorhombus whiffiagonis</i>
Alfonsinos	<i>Beryx</i> spp.	Megrim	<i>Lepidorhombus</i> spp.
Anglerfish	<i>Lophius budegassa</i> , <i>Lophius piscatorius</i>	Norway lobster	<i>Nephrops norvegicus</i>
Basking shark	<i>Cetorhinus maximus</i>	Norway pout	<i>Trisopterus esmarkii</i>
Birdbeak dogfish	<i>Deania calcea</i>	Norwegian skate	<i>Dipturus nidarosiensis</i>
Black-bellied anglerfish	<i>Lophius budegassa</i>	Orange roughy	<i>Hoplostethus atlanticus</i>
Black-mouth dogfish	<i>Galeus melastomus</i>	Oyster	<i>Ostrea edulis</i>
Black scabbardfish	<i>Aphanopus carbo</i>	Plaice	<i>Pleuronectes platessa</i>
Blackspot seabream	<i>Pagellus bogaraveo</i>	Pollack	<i>Pollachius pollachius</i>
Blonde ray	<i>Raja brachyura</i>	Porbeagle	<i>Lamna nasus</i>
Blue ling	<i>Molva dypterygia</i>	Portuguese dogfish	<i>Centroscyrmnus coelolepis</i> ,
Blue whiting	<i>Micromesistius poutassou</i>	Queen scallop	<i>Chlamys opercularis</i>
Boarfish	<i>Capros aper</i>	Rays and skates	<i>Rajidae</i>
Brown crab	<i>Cancer pagurus</i>	Razor clam	<i>Ensis magnus</i>
Clam	<i>Spisula</i>	Red gurnard	<i>Chelidonichthys cuculus</i>
Cockle	<i>Cerastoderma edule</i>	Roughhead grenadier	<i>Macrourus berglax</i>
Cod	<i>Gadus morhua</i>	Roughsnout grenadier	<i>Trachyrincus scabrus</i>
Common dolphin (Long-finned)	<i>Delphis delphinus</i>	Roundnose grenadier	<i>Coryphaenoides rupestris</i>
Common skate	<i>Dipturus batis</i> -complex includes flapper skate <i>Dipturus cf. flossada</i> and blue skate <i>Dipturus cf. intermedia</i>	Saithe	<i>Pollachius virens</i>
Cuckoo ray	<i>Leucoraja naevus</i>	Salmon	<i>Salmo salar</i>
Cuttlefish	<i>Sepia officinalis</i>	Sandy ray	<i>Leucoraja circularis</i>
European eel	<i>Anguilla anguilla</i>	Sardine	<i>Sardina pilchardus</i>
Four-spot megrim	<i>Lepidorhombus boscii</i>	Sea bass	<i>Dicentrarchus labrax</i>
Great lanternshark	<i>Etmopterus princeps</i>	Sea trout	<i>Salmo trutta</i>
Greater forkbeard	<i>Phycis blennoides</i>	Shagreen ray	<i>Leucoraja fullonica</i>
Greenland halibut	<i>Reinhardtius hippoglossoides</i>	Small-eyed ray	<i>Raja microocellata</i>
Greater silver smelt	<i>Argentina silus</i>	Smooth-head	<i>Alepocephalus bairdii</i>
Greater-spotted dogfish	<i>Scyliorhinus stellaris</i>	Smooth-hound	<i>Mustelus</i> spp.
Haddock	<i>Melanogrammus aeglefinus</i>	Smooth lanternshark	<i>Etmopterus pusillus</i>
Harbour porpoise	<i>Phocoena phocoena</i>	Sole	<i>Solea solea</i>
Herring	<i>Clupea harengus</i>	Spotted ray	<i>Raja montagui</i>
Hake	<i>Merluccius merluccius</i>	Sprat	<i>Sprattus sprattus</i>
Horse mackerel	<i>Trachurus trachurus</i>	Spurdog (Piked dogfish)	<i>Squalus acanthias</i>
Kitefin shark	<i>Dalatias licha</i>	Starry ray	<i>Amblyraja radiata</i>
Leafscale gulper shark	<i>Centrophorus squamosus</i>	Striped red mullet	<i>Mullus surmuletus</i>
Lesser-spotted dogfish	<i>Scyliorhinus canicula</i>	Thornback ray	<i>Raja clavata</i>
Ling	<i>Molva molva</i>	Thorny skate	<i>Amblyraja radiata</i>
Lobster	<i>Homarus gammarus</i>	Thresher sharks	<i>Alopias</i> spp.
Tope	<i>Galeorhinus galeus</i>		
Tusk	<i>Brosme brosme</i>	White skate	<i>Rostroraja alba</i>
Undulate ray	<i>Raja undulata</i>	Whelk	<i>Buccinum undatum</i>
White anglerfish	<i>Lophius piscatorius</i>	Whiting	<i>Merlangius merlangus</i>

Table A4 Métier definitions.

Area	Gear type	Target assemblage	Métier label
West of Scotland (Division 6.a) and Rockall (Division 6.b)	Pots and traps	Crustaceans	FPO_CRU
	Gillnets	Demersal fish	GNS_DEF
	Longline	Finfish	LLS_FIF
	Otter trawl	Crustaceans	OTB_CRU
		Demersal fish	OTB_DEF
		Deep-water species	OTB_DWS
		Molluscs	OTB_MOL
	Mid-water trawl	Demersal fish	OTM_DEF
		Small pelagic fish	OTM_SPF
Irish Sea (Division 7.a)	Seines	Small pelagic fish	SSC_SPF
	Others	Miscellaneous	MIS_MIS
	Pots and traps	Crustaceans	FPO_CRU
		Molluscs	FPO_MOL
	Gillnets	Demersal fish	GNS_DEF
	Otter trawl	Crustaceans	OTB_CRU
		Demersal fish	OTB_DEF
		Molluscs	OTB_MOL
	Beam trawl	Demersal fish	TBB_DEF
West of Ireland (divisions 7.b–c) and Celtic Sea slope (divisions 7.k–j)	Others	Miscellaneous	MIS_MIS
	Gillnets	Demersal fish	GNS_DEF
		Deep-water species	GNS_DWS
	Otter trawl	Demersal fish	OTB_DEF
		Deep-water species	OTB_DWS
		Molluscs	OTB_MOL
		Small pelagic fish	OTB_SPF
		Crustaceans	OTB_CRU
	Midwater trawl	Small pelagic fish	OTM_SPF
		Demersal fish	OTM_DEF