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Scientific, Technical and Economic Committee for Fisheries (STECF) - Assessment and advice for non-quota stocks, to support the development of multi-annual strategies in the context EU-UK (STECF-22-04)

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1.1 Abstract

Commission Decision of 25 February 2016 setting up a Scientific, Technical and Economic Committee for Fisheries, C(2016) 1084, OJ C 74, 26.2.2016, p. 4–10. The Commission may consult the group on any matter relating to marine and fisheries biology, fishing gear technology, fisheries economics, fisheries governance, ecosystem effects of fisheries, aquaculture or similar disciplines.

This report includes the results of the meeting of an expert working group on non-quota stocks (NQS) in STECF. A specific data call was issued and the report provides information per Member State (MS) on the available data, the 20 most important non-quota species regarding landings weight and effort distribution of catches of NQS of vessels of the MS. It was not possible to fully assess the most important species regarding landings weight and landings value from the delivered data due to limited comparability between MS.

The information on species and sea basins is included in factsheets for different species. The first indicative list of species DG Mare provided by analysis of the FDI database includes pouting, edible crab, red gurnard, tub gurnard, European pilchard, king scallop, spinous spider crab and whelk). Those 9 species cover a variety of *taxa* but not all species belong to the 10 most important species regarding landings weight or landings value from the data of the MS or the FDI database. In addition, the report includes information on economic importance of NQS extracted from the database on the economic data collected under the DCF and available in a JRC database (also the basis of the Annual Economic Report on the EU fishing fleets - AER). This analysis of economic data includes more stocks than the factsheets and can give an indication on what additional stocks need to be looked at in a next EWG.

The report provides a comprehensive overview on available fisheries management measures for the management of NQS. The management measures are divided in three main groups: input, output and governance/economic measures. The chapter also includes pros and cons of measures and includes background information on some more general management processes. One of such more process-oriented management approach is a co-management approach. Such an approach can be beneficial as, for example, Advisory Councils can also provide proposals for management measures. The process of implementation can sometimes have higher importance for the implementation and success of a measure than which actual measure would be implemented. A co-management approach, for example, may be preferable compared to a top-down approach.

1.2 Background provided by the Commission

In the context of the development and implementation of the EU policies and to support the commitment with the UK under the Trade and Cooperation Agreement (TCA), DG-Mare requested STECF to give advice on non-quota stocks (NQS) to support the development of multi-year management strategies. The EWG is requested to provide an overview and identify the main issues that constitute a baseline to inform stock assessment and support fishery management of NQS.

1.3 Request to the STECF

The EWG 22-04 is requested to provide two deliverables, first providing a data set and carry out a quality analysis of the data. Secondly, provide a desk-based review of the current state of knowledge on six areas (fishing activity, data collection, stock assessment, ecosystem knowledge, social and economic importance, and fisheries management) of NQS by sea basin: North Sea (ICES div 4a,b,c), Eastern Channel (div 7d), Western Channel (div 7e), Irish Sea (7a), Celtic Sea (div 7f,g,h,j) and West of Scotland (div 6a) using available data, scientific/technical literature, and insights from stakeholders, where possible.

In preparation and ahead of the EWG, two dedicated ad hoc contracts will be launched to i) catalogue scientific information about stock status derived from national and regional activities; and ii) compile information on existing management measures for NQS in different Member States and literature about fisheries management measures and strategies.

This translates in the following terms of reference:

ToR 1. a) Evaluate the quality of data for NQS and fisheries compiled from different sources of information; b) Identify gaps and limitations of these data to inform stock assessment and support fisheries management; c) Define appropriate procedures and methods for improving the data collection for the conservation and management of NQS.

ToR 2. a) Evaluate the current state of knowledge for each sea basin with respect to main NQS (in both landings and value). The evaluation should cover the following six areas: fishing activity, data collection, stock assessment, ecosystem knowledge, social and economic importance, and fisheries management; b) Identify specific issues for each sea basin; c) Prioritize common issues within the six areas and provide guidelines for how to address them. This work should be using and expanding a catalogue of stock status relevant scientific activities provided by an ad hoc contract.

ToR 3. a) Create a list of relevant literature on fisheries management measures and strategies that are already used and others that can be adapted/expanded, to be used and consulted in the future; b) Based on the adhoc contract, analyse the current management measures/strategies for NQS identifying their pros and cons.

The participation for this EWG should include MS experts dealing with data collection and MS experts dealing with fisheries management.

1.4 STECF comments

General comments

EWG 22-04 met online from the 9th to the 13th of May 2022. The meeting was attended by 9 experts, including two STECF members, and four JRC staff members. Two DG MARE representatives attended parts of the meeting and 4 observers (from France and The Netherlands) attended a special stakeholder session during the meeting.

STECF notes that expert attendance was low, in spite of intensive efforts by the EWG 22-04 chairs to attract experts from all the relevant Member States. National expertise was particularly needed, since the EWG was set up to look specifically at the management measures in the coastal waters of four Member States (Belgium, France, Ireland and the Netherlands) in six sea basins (e.g. North Sea or Celtic Sea). In particular, missing expertise from France was considered a serious gap by the EWG. STECF agrees that additional expertise would have been highly valuable as many management measures for the fisheries on NQS are introduced at MS level and not via EU regulations. Nevertheless, the STECF considers that despite this absence of participants with expertise in data collection and fisheries management in all relevant member States, the EWG has produced a comprehensive and informative report where all ToRs were addressed.

STECF notes that two ad hoc contracts were planned to be issued ahead of the EWG, but only one of them could be fulfilled, due to lack of any available experts. The first contract was aimed at listing the biological information available on e.g. stocks status and fisheries-independent information such as specific NQS oceanographic surveys and sampling in the Member States. It was, however, not possible to find an expert to complete this ad hoc contract and, therefore, the planned input was not available to the meeting. The limited information in the report is now based on expert knowledge. The second contract produced a draft for the management measures chapter, a template for stock/fishery factsheets and summarised the publicly available information on management measures in the MSs. This ad hoc contract was made available to the EWG.

STECF notes that EWG 22-04 was the first meeting of STECF on NQS. STECF acknowledges the effort of the EWG to answer the ToRs and is aware that this EWG was considered a starting point which shall be followed-up by future EWGs.

STECF observes that the EWG report includes an overview of the available data on NQS, and formatted more specifically the information available on nine species in dedicated factsheets. The JRC prepared a specific chapter on the economic importance of NQS and the fourth chapter includes an overview on possible future management measures and management approaches for NQS.

Specific comments by ToR

ToR 1

As concerns ToR 1, STECF observes that time and expertise limitations did not allow EWG 22-04 to provide for every NQS in EU waters a thorough overview that would supplement existing databases (such as FDI and AER), fill the gaps in NQS data coverage and quality, and present the available data in a useable format. STECF notes also that the EWG was requested by DG MARE to perform data checks and summarise the data collected through the specific data call for the EWG.

STECF notes that the EWG participants checked the data (TOR 1) and made decisions on additional analyses to perform with the available data. This is the first time that data was delivered in such a specific data call for NQS and not unexpectedly the EWG participants found multiple data issues. DG MARE made subsequently the MS' aware of those data issues and provided an opportunity for MS to re-submit data for future EWGs in a standardised and useable form.

STECF observes that EWG 22-04 was uncertain on how to deal with the data checks, as there was no time to resubmit the data and check it again. The data checks addressed the data that were submitted, but the EWG participants could not give an overview on data gaps or on data not collected. The EWG had to use data that was submitted in the first data call with limited quality control and therefore, the analysis of the data is borne with caveats. STECF notes that for all recurrent STECF EWGs involving data calls, many data checks needed to be performed before the meeting (via JRC or in a specific preparatory meeting).

STECF observes that EWG 22-04 could not provide an overview on fishing effort by sea basin and species. The MS delivered effort data in different formats, and this did not allow making an aggregation at sea basin level. STECF suggests that before the next EWG meeting, a meeting with MSs should be organised by DG MARE to agree on a common approach for the calculation of effort for NQS. This is especially important as data on small-scale vessels was only partially available in the submitted data, while this segment is important for NQS.

STECF notes that determining whether the submitted data is usable for the purposes of stock assessment is a complex answer, since different stock assessment approaches can be used depending on the data available: data-moderate stock assessment methods (like surplus production model) require fisheries independent data (i.e. surveys), more advanced assessment models also require e.g. length frequency data. To assess the suitability of data for assessment work, an appropriate assessment model would thus need to be fitted to check whether enough information is contained in the data to determine stock status. As such, it is not possible to broadly determine the usefulness of the data for assessment purposes. This would require a species-by-species analysis within the context of the fleet data and available survey data.

ToR 2

STECF notes that in ToR 2 the EWG was requested to look at NQS in six sea basins (North Sea, Western channel, Eastern channel, Celtic Sea, Irish Sea and West of Scotland) which include coastal waters of Belgium, France, Ireland and the Netherlands. The EWG decided to provide factsheets which include information for single species in all sea basins combined and separately for each sea basin. As the species-specific factsheets per sea basin should be a stand-alone document, some of the information is repeated for each species by sea basin.

STECF observes that the ToRs gave some freedom for the EWG 22-04 to decide what analyses were possible after the data checks. It was decided to concentrate on a limited number of species which were selected after a first assessment of NQS from the FDI database, and not from the data provided in response to the EWG-specific data call as these were too heterogeneous for that purpose. This species list does not necessarily include the most important species regarding landings weight and landings value, but the objective was to select a wide variety of species for this first attempt.

STECF notes that the fact sheets do not provide a comprehensive overview of the state of knowledge of the relevant stocks. They report the basic landings, and value data and the geographic distribution of landings. There are many data collection programmes and stock assessments for NQS at national level and these are not detailed in the fact sheets. The workload of bringing that information together is significant, and will become even more important when the work will address stock assessment and MSY estimates for specific species in specific sea basins. STECF notes that this work is already progressing in ICES WGCrab and WGScallop for those NQS species, and advises that duplication of work be avoided.

STECF notes that JRC provided a chapter on the economic importance of non-quota stocks using data from the AER database. This chapter includes information on the main NQS by landings weight and value, but also information on the importance of NQS for certain fleet segments. That information is very valuable for an evaluation of the economic importance of NQS. Further, elaboration on whether this analysis could be added to the ToRs of the AER EWG should be considered.

STECF notes that it would be helpful that DG MARE provides a list of non-quota species for each sea basin as some species are subject to quotas in one area while being a NQS in another.

ToR 3

STECF observes that to address ToR 3, the EWG 22-04 report includes an overview of available management measures for NQS. The report lists specific measures such as mesh sizes or spatial closures, but also discusses management processes like co-management which may help to develop multi-year strategies as proposed under the TCA between the EU and the UK. A co-management approach could also be useful regarding the acceptance of management measures by the fishing sector. In the past, Advisory Councils have proposed management plans. This could also be a model for multi-year strategies for NQS.

STECF observes that a sea basin analysis was not possible during the EWG 22-04 with the provided data. If a sea basin analysis combining information on NQS from the different MS is to be carried out in a future meeting, this would require catch data linked to spatial information from Logbooks and VMS data. Increasing the details on fishing locations and haul composition would allow assessing the activities within the sea basin rather than using ICES statistical rectangles as a proxy.

STECF notes that ICES holds a considerable amount of data on NQS, through on specific expert groups on NQS (even at species level). There are data other than landings and effort in various MS. However, without a clear picture as to what data is available in ICES, it was not possible for the EWG 22-04 to extract specific data for certain species as extra information on those species. DG MARE may wish to consider the most appropriate way to ensure that all information on NSQs can be assembled and analysed in any future meeting on NSQs.

STECF observes that it was not possible to give information on all NQS or all management measures existing in the EU. For the next EWG, criteria should be developed with the aim to prioritize species and/or areas. In this EWG report, it was possible to provide only limited information on some stocks and areas. However, there are many more NQS within EU waters which have not been considered or for which data is even more limited.

STECF recognises that providing a unique method to calculate effort is challenging. As the need increases, it would be wise to initiate a series of workshops/external contracts to harmonise the calculation of effort, as overarching analyses such as sea basin analysis are not feasible with the current multitude of methods utilised by MS. STECF is aware that similar issues exists for the FDI report.

1.5 STECF conclusions

STECF concludes that the EWG report includes information on NQS and possible management measures of NQS. Despite the lack of participants with expertise in data collection and fisheries management in all relevant Member States, the EWG has produced a comprehensive and informative report. It will be essential for the next EWG meeting to have specific expertise on coastal waters of the affected MS attending, since many MS have specific national management measures in coastal areas, and to attract more experts to analyse the delivered data.

STECF concludes that the next EWG shall be organised as early as possible in 2023 to continue the work of EWG 22-04 and discuss more specific multi-year strategies for some NQS. It will though be important to avoid the time of the year when several relevant ICES working and advice drafting groups are meeting (to be published by July 1st). STECF bureau and DG MARE should discuss which preparatory work including data checks should take place (e.g. a specific preparatory meeting as for the balance report) to avoid time consuming data checks during the EWG week. It would also allow MS an opportunity to resubmit data before the EWG meeting.

STECF concludes that further discussion is needed between STECF and DG MARE on the structure and content of the factsheets.

STECF concludes that the STECF bureau and the chair of the AER EWGs should elaborate with DG MARE Unit A4 and Unit C5 whether it is possible to add an analysis of the importance of NQS for MS fleet segments to the TOR of the AER EWG.

STECF concludes that some clarification of the expectations and work requests on NQS from DG MARE to ICES and STECF respectively, as well as some facilitation to knowledge exchange and data access, would be useful and welcome.

STECF concludes that a discussion on prioritization of species and/or areas may be needed for the next EWG. It could allow a more comprehensive analyses of all available information (e.g. effort, landings or impacted fleet segments) when those analyses are limited to a certain number of key case studies.

STECF concludes that DG MARE could organise a workshop with experts and representatives from MS familiar with the data collection to discuss a harmonisation of the effort calculation especially for small-scale vessels. This could also include a discussion on how the EWG can get access to VMS and logbook data for an improved analyses regarding sea basins.

STECF concludes that the management measures that are or could be implemented for NQS are very diverse and can vary by species, coastal area, sea basin and fishery. It could be, therefore, a pragmatic approach to involve Advisory Councils in the preparatory work of the multi-year strategies to take into account local or regional conditions and be able to integrate a broader knowledge background regarding those NQS. Management measures discussed with the fishing sector can also enhance the enforcement of and compliance with the measures (higher acceptance).

1.6 Contact details of STECF members

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REPORT TO THE STECF

EXPERT WORKING GROUP ON

Assessment and advice for non-quota stocks, to support the development of multi-annual strategies in the context EU-UK (EWG-22-04)

Virtual meeting, 09-13 May 2022

This report does not necessarily reflect the view of the STECF and the European Commission and in no way anticipates the Commission's future policy in this area

1 INTRODUCTION

In the Trade and Cooperation Agreement (TCA) between the EU and the UK, the two parties agreed in Art. 2 on a Specialised Committee on Fisheries (SCF) which should also cover the management of non-quota stocks (NQS). A distribution key for agreed Total Allowable Catches (TAC) for shared stocks (regulated species) is included in the TCA for the next five years but there is no agreement on management measures for non-quota stocks.

The TCA includes a list of objectives (Art. 494) for agreements on management measures for stocks including, for example, harvest species above biomass levels that can produce maximum sustainable yield, applying the precautionary approach to fisheries management or promoting the long-term sustainability (environmental, social and economic) and optimum utilisation of shared stocks. In this sense the objectives are not different from the general objectives of the Common Fisheries Policy (CFP). However, for several of the agreed objectives achieving them can be more difficult for non-quota stocks as less scientific information, for example, on stock status is available.

In Art. 500 (2) the two parties state that they "may agree, in annual consultations, further specific access conditions in relation to (…) (b) any multi-year strategies for non-quota stocks developed under point (c) of Article 508(1[1])". STECF is requested now to provide input to the discussions on those multi-year strategies.

EWG 22-04 was the first working group meeting on non-quota stocks in STECF. Due to the schedule of the first consultation on non-quota stocks between the UK and the EU in July, STECF had to organise the first meeting in May 2022 at the latest to provide advice before July 2022. The dates of the EWG were, however, at a time when many ICES meetings are scheduled to prepare stock advice from ICES. Due to this problem, it was not easy for the chairs to attract experts to the EWG and overall only 9 experts attended with additional 4 participants (including a co-chair) from JRC. In addition, as the measures will be implemented in sea areas mainly connected to coastal waters or EEZs of Belgium, France, Ireland and the Netherlands, it was essential to have expertise about NQS and possible management measures from those countries. While expertise for Belgium, Ireland and the Netherlands was available in the meeting, no expert was available from France.

The requirement to do a data check of the delivered data following a specific data call on NQS took longer than expected during the 5 day meeting. The decision was taken to provide information on the available data and the quality of the data delivered to the EWG (Chapter 2), and to concentrate on providing fact sheets on a list of species discussed with DG Mare before the meeting (Chapter 3). Those factsheets include where available information on fishing activities, data collection, stock assessment, economic importance, fisheries management measures and additional information like ecosystem knowledge. It was not possible to analyse the data and to decide on which species to select for the factsheets following from those analysis. Therefore, it was decided to compile factsheet for 9 species of the list DG Mare provided before the meeting.

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[1] Art. 508 (c): develop multi-year strategies for the conservation and management of non-quota stocks as referred to in point (b) of Article 500(2)

Those species cover a variety of types including molluscs, crustaceans, elasmobranchs, and teleosts, but are not necessarily the 9 most important species regarding landings weight or landings value. In Chapter 4 the report provides an overview on the economic importance of NQS from analyses of the AER database on economic data. This chapter includes more stocks than the factsheets and can give an indication what additional stocks need to be looked at in a next EWG.

The EWG was also requested to look at possible management measures for NQS (Chapter 5). The EWG decided to address this by not only providing a list of possible measures but also to discuss important aspects of the process of the implementation of measures. The process of implementation can sometimes have a higher importance for the implementation and success of a measure than which actual measure would be implemented. A co-management approach, for example, may be preferable compared to a top-down management approach.

1.1 Terms of Reference for EWG-22-04

ToR 1. a) Evaluate the quality of data for NQS and fisheries compiled from different sources of information; b) Identify gaps and limitations of these data to inform stock assessment and support fisheries management; c) Define appropriate procedures and methods for improving the data collection for the conservation and management of NQS.

ToR 2. a) Evaluate the current state of knowledge for each sea basin with respect to main NQS (in both landings and value). The evaluation should cover the following six areas: fishing activity, data collection, stock assessment, ecosystem knowledge, social and economic importance, and fisheries management; b) Identify specific issues for each sea basin; c) Prioritize common issues within the six areas and provide guidelines for how to address them. This work should be using and expanding a catalogue of stock status relevant scientific activities provided by an ad hoc contract.

ToR 3. a) Create a list of relevant literature on fisheries management measures and strategies that are already used and others that can be adapted/expanded, to be used and consulted in the future; b) Based on the ad hoc contract, analyse the current management measures/strategies for NQS identifying their pros and cons.

2 OVERVIEW ON AVAILABLE DATA BY MS (DATA ISSUES, IMPORTANT SPECIES, EFFORT DISTRIBUTION)

2.1 Belgium

Belgium submitted both data tables (effort and landings) and a file specifying supporting information. The data was extracted from the national fisheries data base. Belgium has been collecting data by ICES rectangle since 2006. No under 10m fleet exists in Belgium.

The catch data contained 222161 rows covering 100 species. The data covered the time period from 2006 to 2021. Between 2017 and 2021, the 5 most important species landed by mean weight over that period were: ANF (1377t), CSH (856t), CTC (840t), NEP (779t), GUU (702t). According to this data call, the most important species by value (average over the past 5 years) were: ANF (4.79mill EUR), NEP (4.26mill EUR), TUR (3.95mill EUR), CSH (3.66mill EUR) and CTC (2.97mill EUR). In 2021 the landings from NQS stocks were 10999t and worth 31.98mill EUR.

Table 2-1 Twenty species with the largest landings from the Belgian fleet, by weight, within the sea basins under consideration.

Species	Landings (t)	Value (EUR)
ANF	1495.461	5222029.14
CTC	736.944	2509270.24
NEP	720.104	3259666.29
LEZ	688.419	1056483.5
LEM	609.011	2198560.04
RJH	593.492	1614390.53
GUU	588.053	726313.73
CSH	574.515	2468866.81
RJC	472.473	941170.27
SCE	445.922	919131.83
SYC	441.267	223329.31
HAD	297.713	251952.97
TUR	270.586	3081964.38
SOS	267.666	1438311
WHG	258.455	232816.85
BIB	223.335	90065.48
WHE	195.503	207124.68
BLL	192.88	1634405.48
DAB	190.559	151443.31
RJM	163.331	237434.03

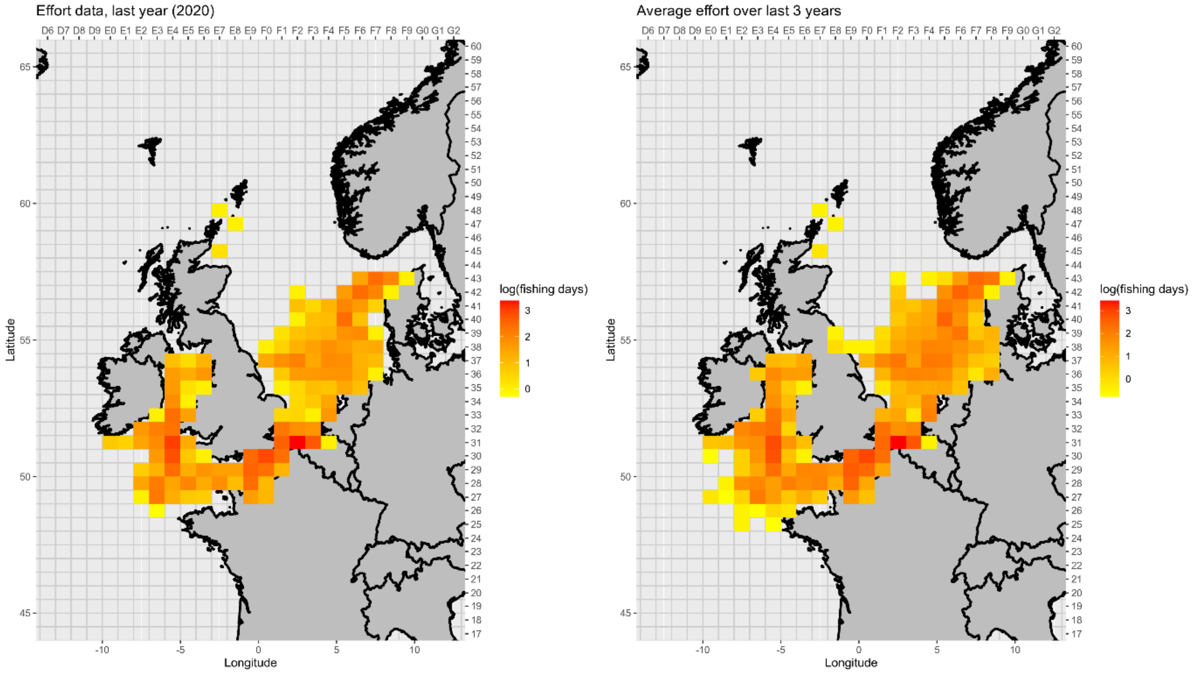


Figure 2-1: Effort distribution of Belgian fleet. On the left the effort in 2020 (last data year available) and on the right the average over the past 3 years. The scale is in log10 to provide contrast.

Figure 2-2: Belgian effort (blue) and catch (red) over the years.

2.2 Germany

Germany submitted both tables and an explanatory file. The data were based on logbook information available collected by the Bundesanstalt fuer Landwirtschaft und Ernaehrung (BLE). The data cover a period from 2002 to 2021, with certain caveats, such as pre 2017 EEZ descriptions being only XEU. This means that the catches were split between EEZs by assessing the coverage of the respective EEZs within an ICES border rectangle. There are no under 10m vessels from the German fleet operating in the areas concerned. It should be noted that Germany submitted NQS and quota species within this data call. The total number of species submitted are 125 (including the quota species).

Table 2-2: Twenty species with the largest landings from the German fleet, by weight, within the sea basins under consideration. These species include quota species as submitted by Germany

Species	Landings (t)	Value (EUR)
HER	25597.754	12096497
WHB	24805.601	9740768
MAC	11391.205	10684166
CSH	8741.158	34414878
HOM	7258.715	3260449
POK	4310.173	6202416
SPR	3669.632	1144461
SAN	1819.756	643739
PLE	1262.086	2914036
MUS	1206.227	410795
ARU	774.49	294305
COD	773.177	3064950
HKE	692.528	2482090
SOL	646.406	7235391
NOP	487.669	117365
HAD	478.137	664456
ARY	464.174	176386
NEP	394.978	2044267
ANF	261.186	782105
TUR	221.478	2398509

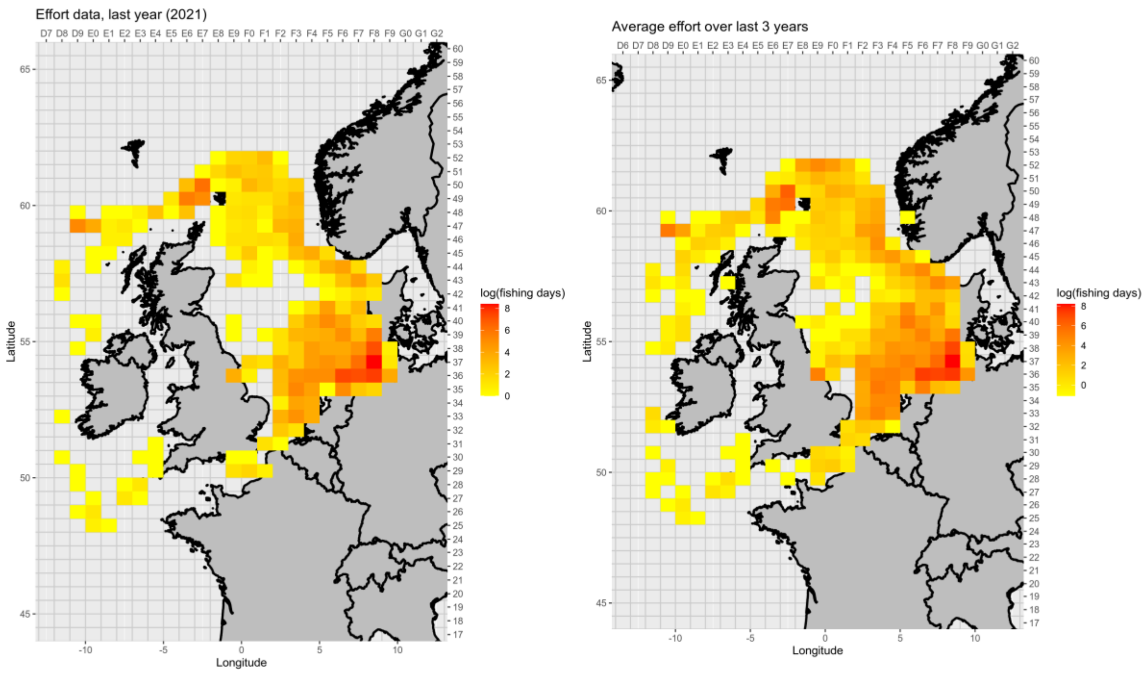


Figure 2-3: German effort data: left last year available from the data call (2021), right the average over the last 3 submitted data years. The scale is in log10 to provide contrast.

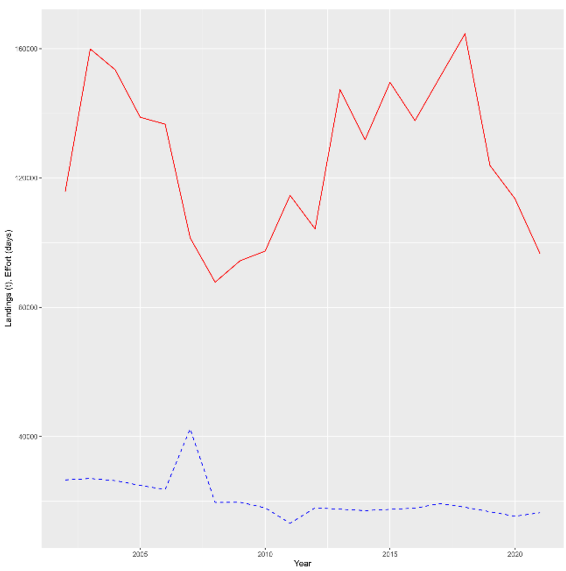


Figure 2-4: German effort (blue) and landing data (red).

2.3 Denmark

Denmark submitted both tables and an explanatory text. The data result from the combination of sales notes, logbooks and fleet register as collected for the Danish Fisheries Analysis Database (DFAD). VMS data was used to determine the EEZ within which the catches occurred. The following information is taken straight from the explanatory note:

- Non-quota species. A table listing quota stocks by year for the period 2000-2021 was made available to DTU Aqua from the Danish Fisheries Agency, and was merged to the DFAD data by year, species, area and EEZ. The stocks not listed in the table of quota stocks are assumed to be non-quota stocks.
- EEZ: the EEZ has not been reported on the requested level historically in logbooks/sales notes, as all fisheries within the EU has been reported as EEC. Following steps have been applied to report by EEZ:
    - Step 1: where VMS data are available, the position data are used to allocate the EEZ with the requested coding. A speed filter is used to distinguish between when the vessel is fishing and steaming, and for the positions where fishing activity is assumed, the EEZ is found. If fishing activity took place in several EEZ's within the same vessel, date and IECES rectangle, the value and weight of landings are allocated according to the effort within each EEZ.
    - Step 2: a table has been created with the EEZ by ICES statistical rectangle, as many rectangles are completely within one EEZ category requested (e.g. XEU). If the EEZ was not assigned in step 1, it will be assigned in step 2 for ICES rectangles that only includes one EEZ.
    - Step 3: for rectangles that includes several EEZs the landings by ICES statistical rectangle, TARGET_ASSEMBLAGE and EEZ (where available) is found, and used to distribute landings by EEZ where they are not known.
- FISHING_TECH: A list of FISHING_TECH by year and vessel ID was made available to DTU Aqua from Statistics Denmark (who are responsible for the AER data call) for the years 2012 to 2021. For the years 2000 to 2011, the FISHING_TECH codes are assigned using a method outlined by Statistics Denmark and sent to DTU Aqua, based on fleet register vessel types and overall length of the vessel.
- TARGET SPECIES: this information is not reported in logbooks, so it is assumed as the species within a trip that contributes to more than 20% of the value of landings.
- TOTFISHDAYS: In table 1 where it is to be filled in in case effort is attribute only to one target species, it is filled in for the following non-quota species that is normally fished as the single target species: blue mussel (MUS) and brown shrimp (CSH).

For vessels without logbooks:

- Sales notes are available for each landing with species composition, weight and value of landings.
- GEAR_TYPE: for the vessels without logbooks, there is no direct information about the gear used. An algorithm has been developed (RCG ISSG on métier and transversal variable issues) to estimate the métier level 6 using a hierarchical approach, based on the catch composition reported in the sales notes, area, fleet register gear and in some cases expert knowledge.
- MESH_SIZE_RANGE: for the vessels without logbooks, there is no direct information about the mesh size used. An estimated mesh size is extracted from the estimated mesh size range in the métier level 6 (see GEAR_TYPE), and the average mesh size within the range is used with allocating to the mesh size ranges requested in this data call.

- ICES STATISTICAL RECTANGLE: is assigned based on position data (AIS/BlackBox) where available, otherwise it is assigned based on the landings harbor.
- TOTFISHDAYS: for effort allocation where logbooks are not available, it is assumed that one landing reported in sales notes equals one fishing day.
- EEZ assumed based on rectangles. The under-10 m vessels are fishing close to the Danish coast and are within XEU EEZ.

Table 2-3 Twenty species with the largest landings, by weight, from the Danish fleet within the sea basins of interest.

Species	Landings (t)	Value (EUR)
CSH	1092.486	5344854.355
DAB	367.035	456713.788
PIL	288.009	89024.156
CRE	178.206	1278007.401
GUG	168.481	52505.804
ANE	93.678	29994.116
FLE	93.123	215683.646
CEP	48.379	75666.894
PLN	41.778	182146.126
PLA	37.714	9585.340
CRA	32.348	19384.776
LBE	30.571	810517.592
ARY	23.483	6362.544
LUM	23.381	547602.602
POL	21.698	89896.061
GAR	20.057	11165.771
GUU	19.335	37586.238
GDG	17.289	4794.158
CAT	15.123	69657.418
FPE	13.602	31854.388

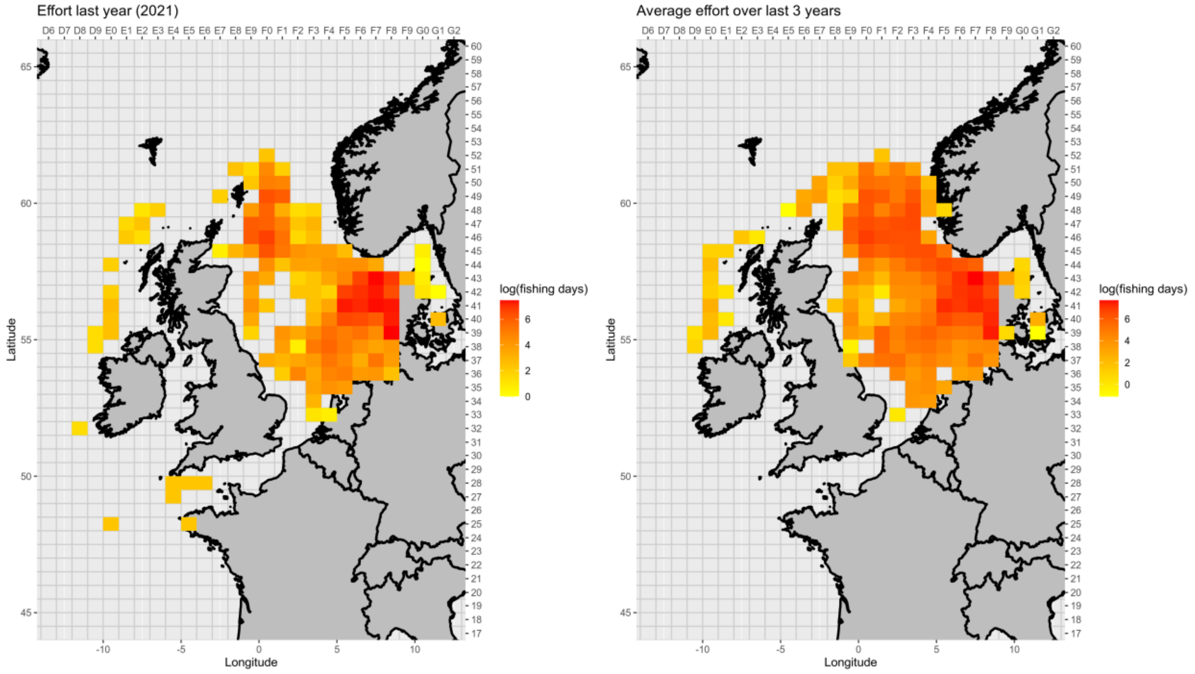


Figure 2-5: Effort distribution for Denmark: Left hand side is last year's effort (2021), right hand side is the average effort over the past 3 years. The scale is in log10 to provide contrast.

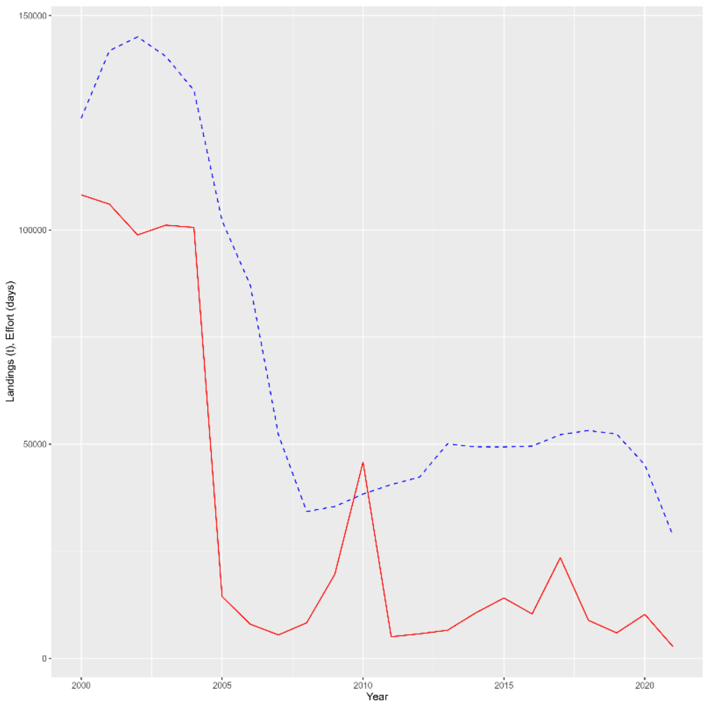


Figure 2-6: Total Danish landings (red) and effort (blue).

2.4 Spain

Spain submitted both tables and an explanatory sheet. The data arose from a combination of sales notes, logbooks, VMS and the official register of fishing vessels. For under 10m vessels, VMS data was used, when available. For u10m vessels without VMS, the catches were attributed according to the landing port and the centroid of influence associated with that landing port. The species submitted in this data call, were chosen according to their status in 2022 – if no TAC stock was associated with the species, the data were submitted.

Table 2-4 Twenty species with the largest landings by the Spanish fleet from the sea basins under consideration.

Species	Landings (t)	Value (EUR)
VMA	5309.922	3469159.73
SQI	4750.547	8118769
SAU	3062.008	2677681.27
BOG	3021.142	1292222.41
PIL	3005.816	6409596.81
OCC	2474.941	17985554.94
DPS	1938.108	17181140.06
COE	1617.739	3222462.09
SWX	1281.398	855451.26
CTC	1023.549	6744598.3
SYC	993.612	546574.68
SVE	967.282	2944338.3
BIB	964.594	1734177.46
COC	621.961	4279168.85
GFB	559.429	1859685.04
SQE	545.964	1816961.84
BRF	510.15	1989302.48
SWA	488.688	3012278.95
URM	474.666	4325690.75
SLM	455.778	310897.35

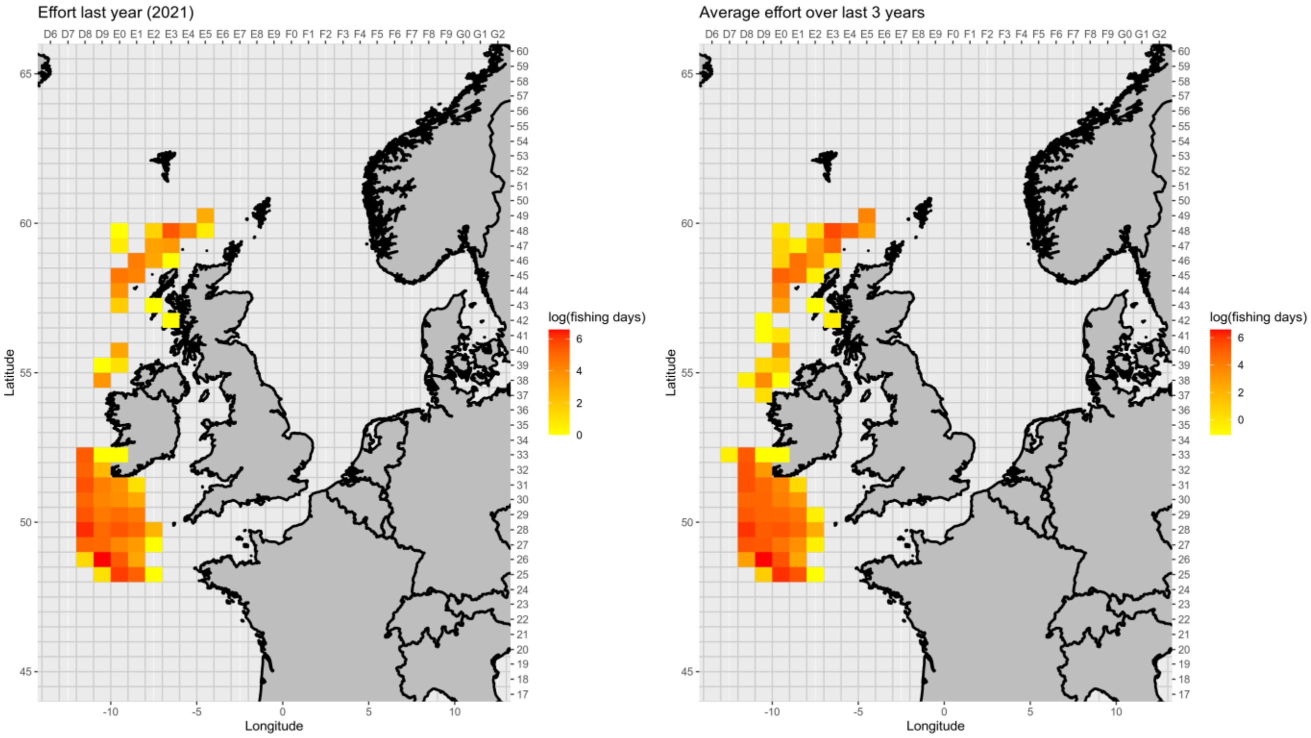


Figure 2-7 Spanish effort distribution: left last year (2021), right average effort over the last 3 years. Scale is in log10 to provide contrast.

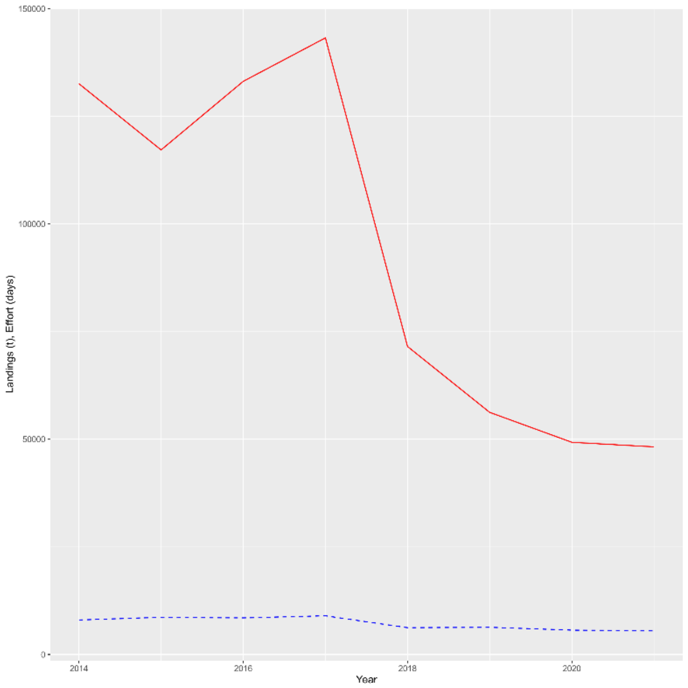


Figure 2-8: Landings (red) and effort (blue) by the Spanish fleet.

2.5 France

Both tables and an explanatory sheet were submitted by France. The data stem from the SACROIS database, which contains all French fishing activity: a combination of sales notes, logbooks, and VMS (geolocation) data. The species submitted were based on the TAC and quota agreement in 2021, i.e. if there are no quotas or TACs associated with a species in 2021, they made it into the data call. The SACROIS database contains EEZ information for all catches, which in the case of under 10m vessel is obtained thusly:

1) Fisher's declaration of EEZ
2) VMS in absence of fisher's declaration
3) Mean between 1 and 2 if both are available bu incoherent
4) ICES rectangle: catch split depending on coverage of EEZ
5) Annual polls by IFREMER

The gear types of the submitted data included a lot of unknown abbreviations, which was resolved by France submitting a "translation sheet" to change the submitted gear codes into the gear codes allowed by the data call. France expressed the intention of resubmitting data at a later date.

Table 2-5 Twenty species with the largest landings from the French fleet within the sea basins under consideration.

Species	Landings (t)	Value (EUR)
SCE	37861.14772	99844180.14
LQD	36906.81302	1550085.94
LAH	16875.71536	675028.59
PIL	13765.95118	10847351.81
WHE	11008.54035	25199717.15
SCR	7439.69888	15489598.64
GKL	4256.45875	2170081.41
CTC	3424.34105	15011931.52
SYC	2702.40157	1288288.14
SDV	2645.5898	3380185.6
QSC	2503.24757	2871350.27
GUR	2150.80096	1789453.74
BIB	2059.04863	1667380.06
SQZ	1726.11721	13390226.69
COE	1597.98431	1458154.53
BRB	1486.05266	4437263.84
CRE	1257.481	5315731.35
JOD	1078.2319	12774698.52
MUR	816.73326	5185395.77
GUU	724.78681	1059321.94

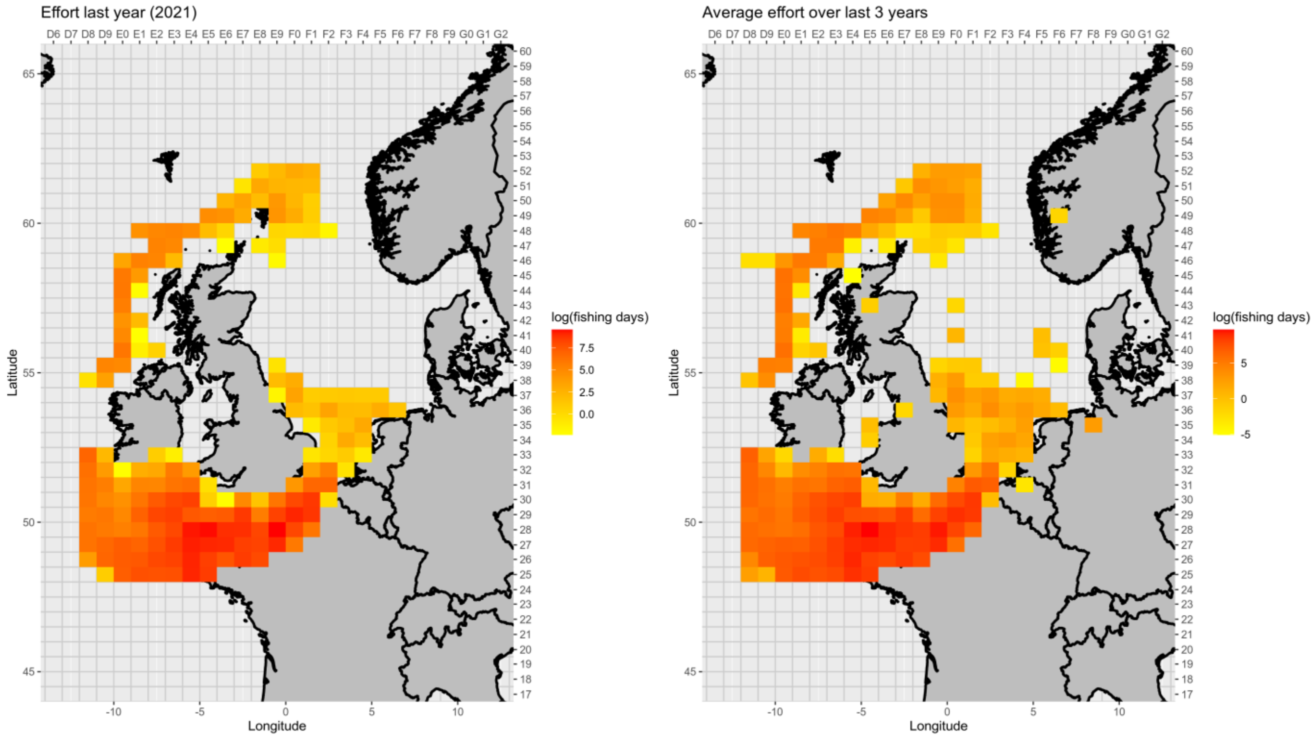


Figure 2-9: Effort distribution of French fleet: left last submitted year (2021), on the right average of the last 3 years. Scale is in log10 to provide contrast.

Figure 2-10: Total effort (blue) and landings (red) from the Spanish fleet.

2.6 Ireland

Ireland submitted both tables and an explanatory note. The data came from electronic logbooks, sales notes and VMS data (2003-2021); whereas data prior to that (2000-2002) came from manual logbooks with a lower precision. This means that the older data should be treated with more uncertainty. The catch was allocated to the ICES rectangle using electronic logbook data, which then was raised according to end of trip port data. EEZs were determined with the help of VMS data, when available, otherwise the usual splitting catches by EEZ coverage of ICES rectangle was carried out.

Data for under 10m vessels came from sales notes (from 2015 onward) and from estimates arising from port reports (2003-2015). Data prior to 2003 regarding under 10m vessels are few and far between. The catch location for under 10m vessels was estimated to be the nearest ICES rectangle from the landing port.

The data might contain some miss-specified species due to reporting issues, such as grouping of similar species etc.

Effort estimations were conducted using the R package fecR which has been developed to calculate the number of fishing days within a fishing trip, taking into account the split between passive and active gear if used at the same time.

Table 2-6 Twenty species with the largest landings from the Irish fleet from the sea basins under consideration.

Species	Landings (t)	Value (EUR)
MAC	58542.354	49509583
WHB	18275.641	4241456.3
JAX	14460.058	8710667.5
SPR	13119.987	2846628.5
BOR	8168.52	1410602.8
CRE	6851.904	18441443.8
WHE	5436.157	8112231.5
HAD	4602.697	7672914.4
NEP	4192.012	22264580.3
HKE	3623.009	10092975.2
HER	3533.259	1346482.6
WHG	2958.612	4755076.3
ANF	2716.622	8905937.6
SCE	2654.969	12341566.4
LEZ	2176.424	5353946
RAJ	730.265	1339251.6
ANE	727.407	166964
POL	597.294	1433339.1
PIL	508.713	58556
SCR	473.578	302172.4

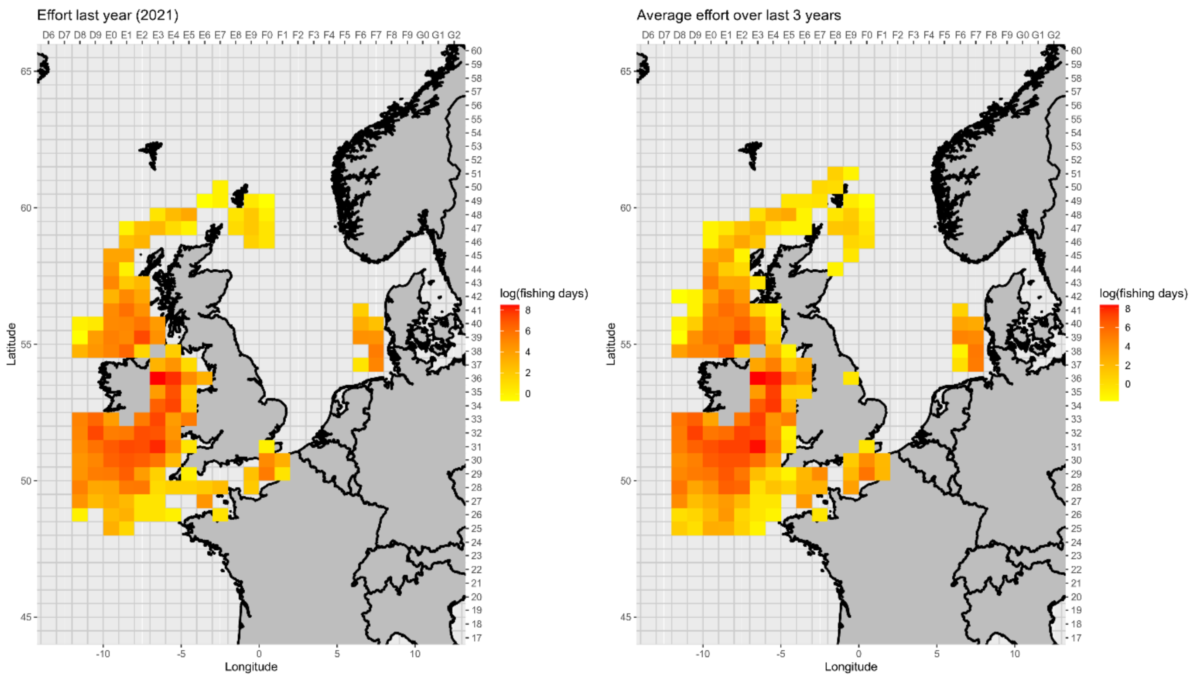


Figure 2-11 Irish effort distribution: on the left the last year (2021), on the right the average of the past 3 years. Scale is is log10 to provide contrast.

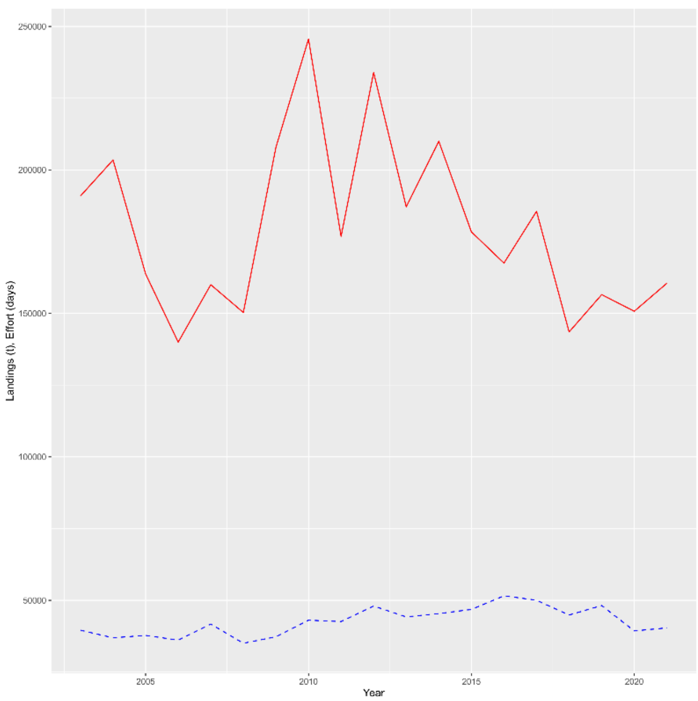


Figure 2-12: Total landings (red) and effort (blue) from the Irish fleet.

2.7 Lithuania

Both tables and an explanatory note were submitted by Lithuania. The data spans the time 2013-2021 as prior data was not available on a spatial level. No records of NQS landings was found in the years 2013, 2015, 2016 and thus no data were submitted for those years. No under 10m vessels are operating around the EU/UK EEZ interface and thus no u10m data were submitted. In 2021 no fisheries occurred within the waters of interest. The only fish species caught was PLA (?) weighing 119t and worth 98k EUR.

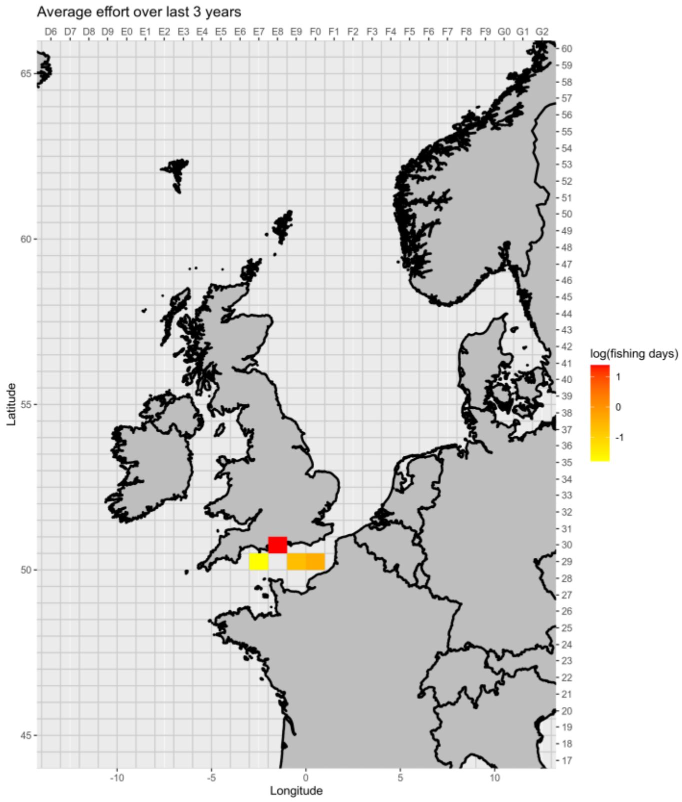


Figure 2-13: Average effort distribution over the past 3 years. No fishing in 2021 in the relevant sea basins.

2.8 Netherlands

The Netherlands submitted both tables but no explanatory sheet. The data series ranges from 2002 to 2021. Both quota and NQS were submitted.

Table 2-7 Twenty species with the largest landings from the Dutch fleet from the sea basins under considerations. Quota species are included as they were submitted by the Netherlands.

Species	Landings (t)	Value (EUR)
HER	66407.396	24059661.28
WHB	32196.089	9241921.397
MAC	23379.462	16205391.74
HOM	19344.368	10273509.45
CSH	14934.881	34786681.77
PLE	14737.527	34893287.19
ULO	11080.155	13850193.75
EQE	9040.619	11300773.75
SOL	6106.727	69630595.26
DAB	2813.96	2436360.247
ARU	2471.308	1308853.78
GUU	1864.25	3361510.31
TUR	1637.822	15414861.44
ARY	1572.23	832684.221
NEP	1275.707	6992192.763
MUR	1244.875	5171277.773
WHG	984.561	1005623.06
FLE	931.581	731399.139
SQR	825.183	1865547.911
CRE	606.508	1539000.053

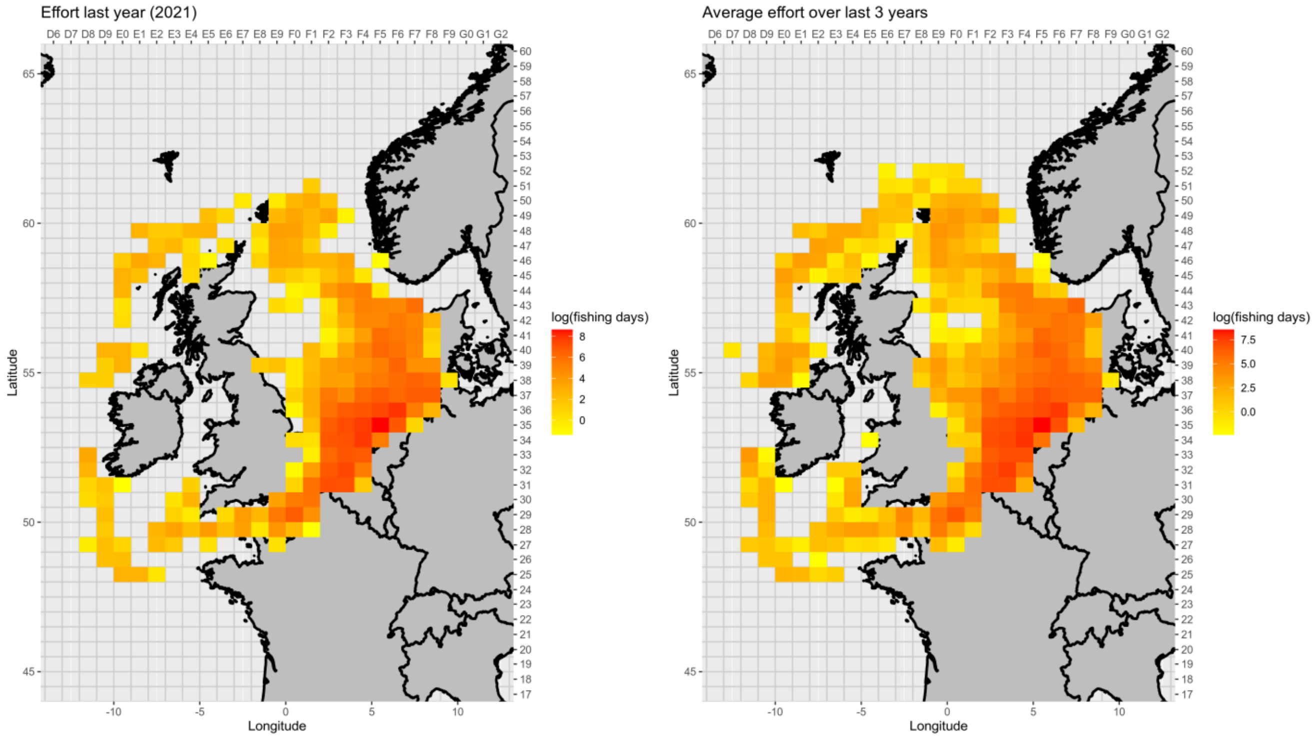


Figure 2-14: Effort distribution of the Netherlands. Left hand side shows the last year (2021), whereas the right hand side shows the average of the past 3 year. The scale is in log10 to provide contrast.

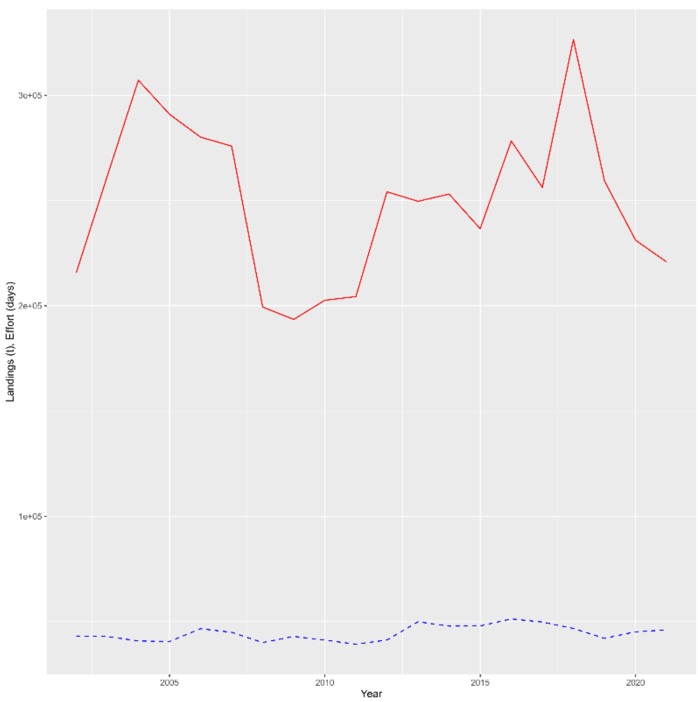


Figure 2-15 Total landings (red) and effort (blue) by the Dutch fleet.

2.9 Poland

Poland submitted both tables for landing and effort but no extra information. There are two different levels of precision: 2010-2021 and 2004-2009. The latter has less information as some information was not collected prior to 2010. Further clarification was given that the effort was calculated using the logbooks, where fishers indicate whether they were fishing on that day or not.

Table 2-8 Species caught by the Polish fleet within the sea basins of interest. No landing value was submitted.

Species	Landings (t)	Value (EUR)
HOM	1569.691	NA
MAC	1092.059	NA
BOC	35.307	NA
SQM	7.778	NA
CRA	5.299	NA
DPY	2.341	NA
ARU	0.662	NA

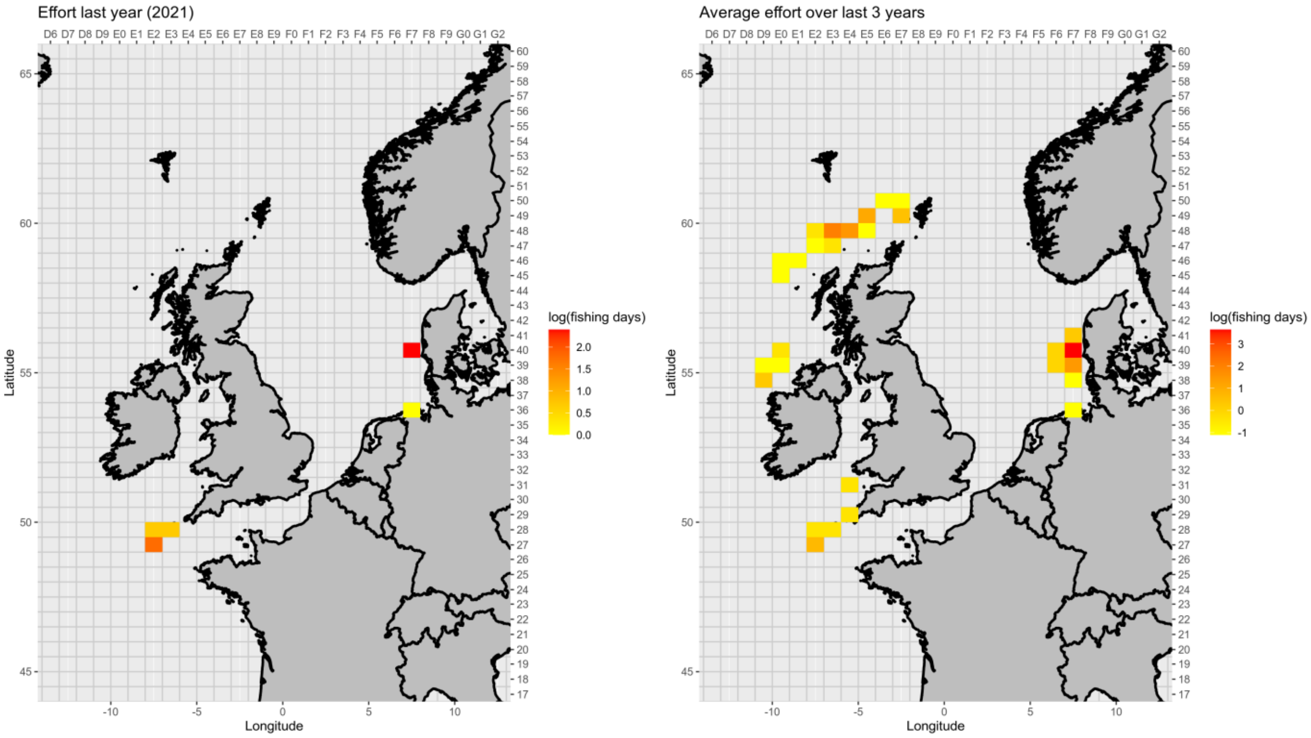


Figure 2-16: Total effort distribution by the Polish fleet. On the left, only the last submitted year (2021) and on the right, the average of the last 3 years. Scale is on log10.

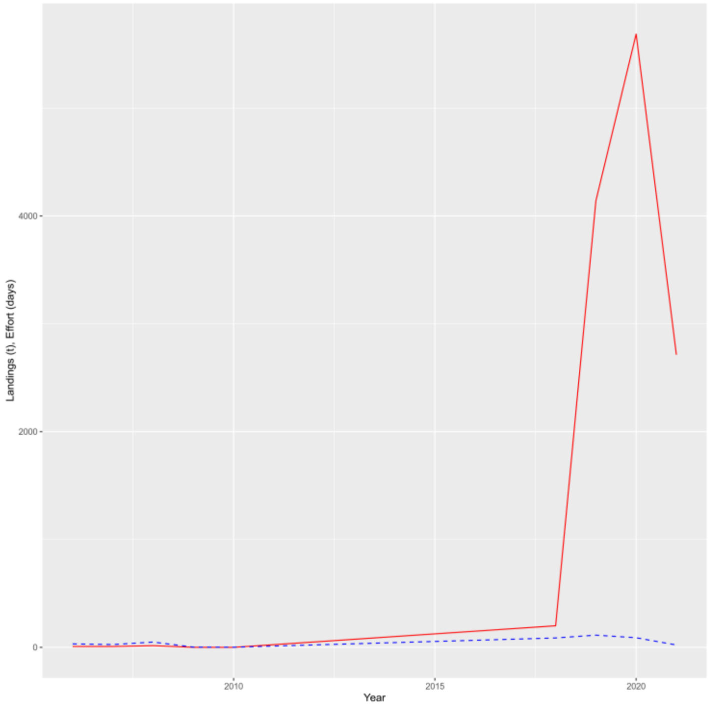


Figure 2-17 Total effort (blue) and landings (red) of the Polish fleet from the relevant sea basins.

2.10 Portugal

Portugal submitted both tables as requested but no explanatory sheet. The data span the years 2013 to 2021, with the year 2018 and 2021 missing in the landings file, but not in the effort file. We suspect that no NQS species was caught in those years. In 2021 only BIB (pouting) and LDV (large scaled gurnard) were reported without any landing value; the tonnage was 36t and 9t, respectively.

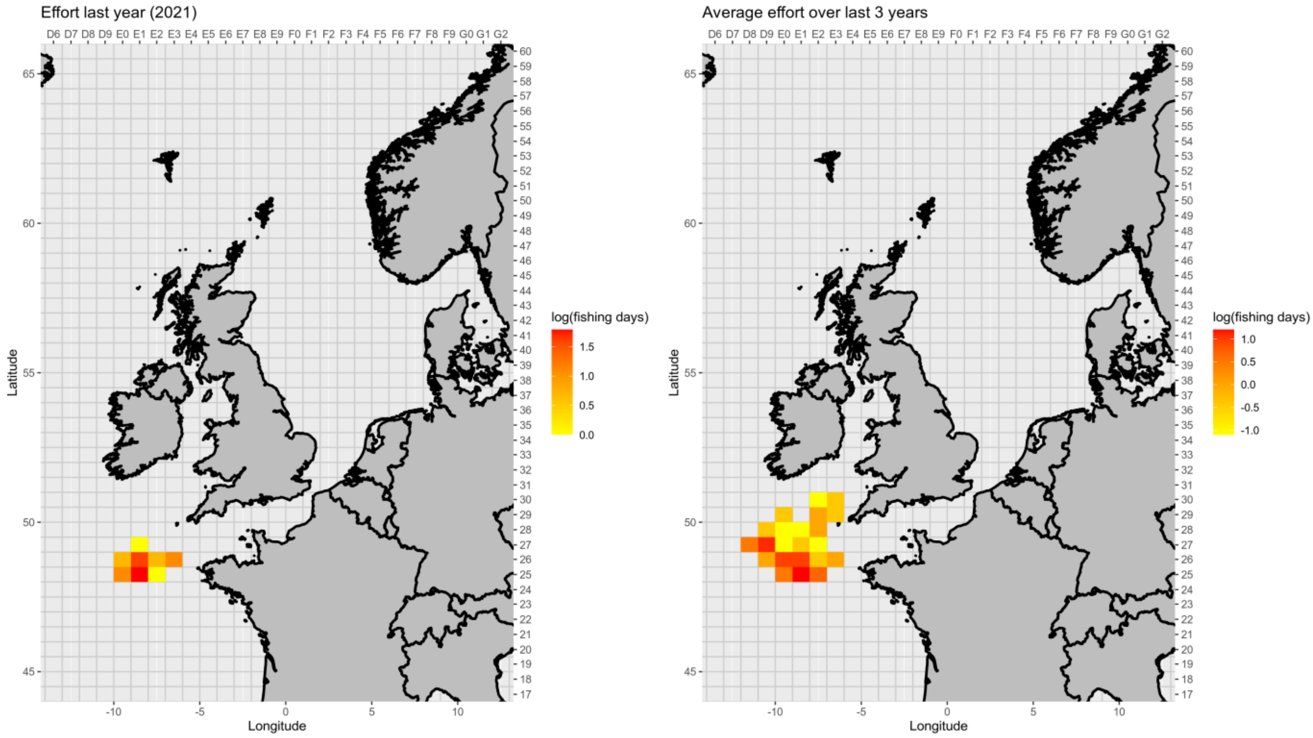


Figure 2-18 Effort distribution of Portugal, right hand shows the average over the past 3 years, whereas the left shows the last year (2021). The scale is log10 to provide contrast.

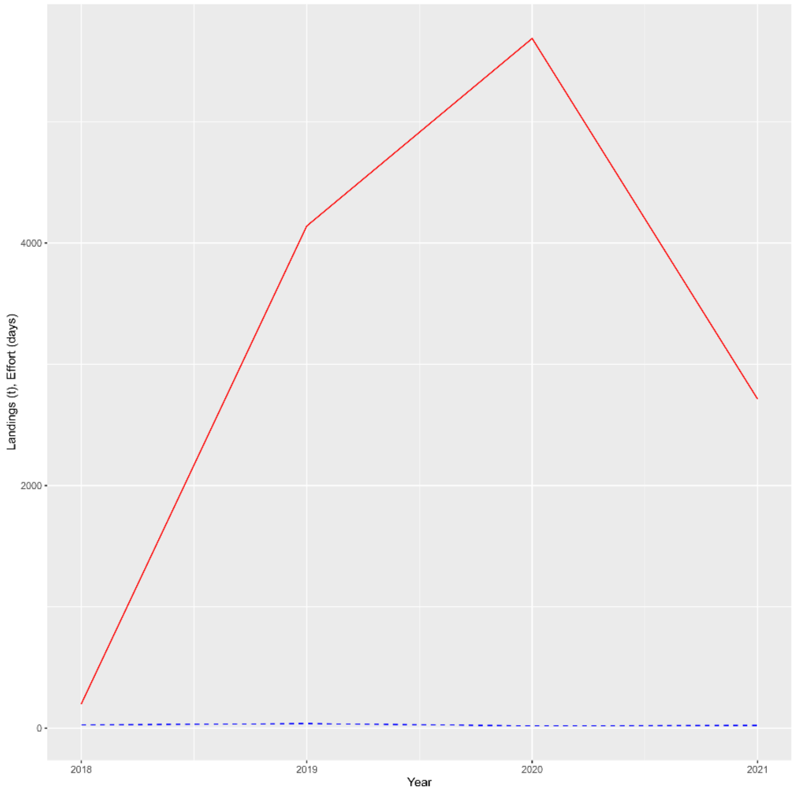


Figure 2-19 Total landings (red) and effort (blue) by the Portuguese fleet within the sea basins of interest.

2.11 Sweden

Landings were derived from logbooks and monthly fishing journals (in case of vessels not carrying logbooks). Spatial information was recorded in either type of records, leading to precise data on spatial distribution of catches. Data prior to 2003 was deemed of too poor of quality and thus not included in the data call. For effort estimation fecR was used when haul by haul information was available. For monthly fishing journals information is more aggregated and thus the number of fishing days per month were split by gear type, mesh size and spatial area; the submitted data was rounded to nearest integer.

Table 2-9 Species caught by Sweden in the relevant sea basins.

Species	Landings (t)	Value (EUR)
CAT	22.37	77013.20
HAL	8.62	89158.27
DAB	3.03	829.60
GUG	2.62	1061.53
SQZ	2.13	13135.25
OCT	0.51	0.00
LUM	0.37	1061.37
MZZ	0.26	0.00
IOD	0.25	123.21

FAC	0.17	1339.94
POD	0.08	0.00
PLA	0.05	11.64
FLE	0.03	9.50
WEG	0.02	5.41
RED	0.00	0.00
CMO	0.00	0.00
USB	0.00	64.16
KCT	0.00	2.17

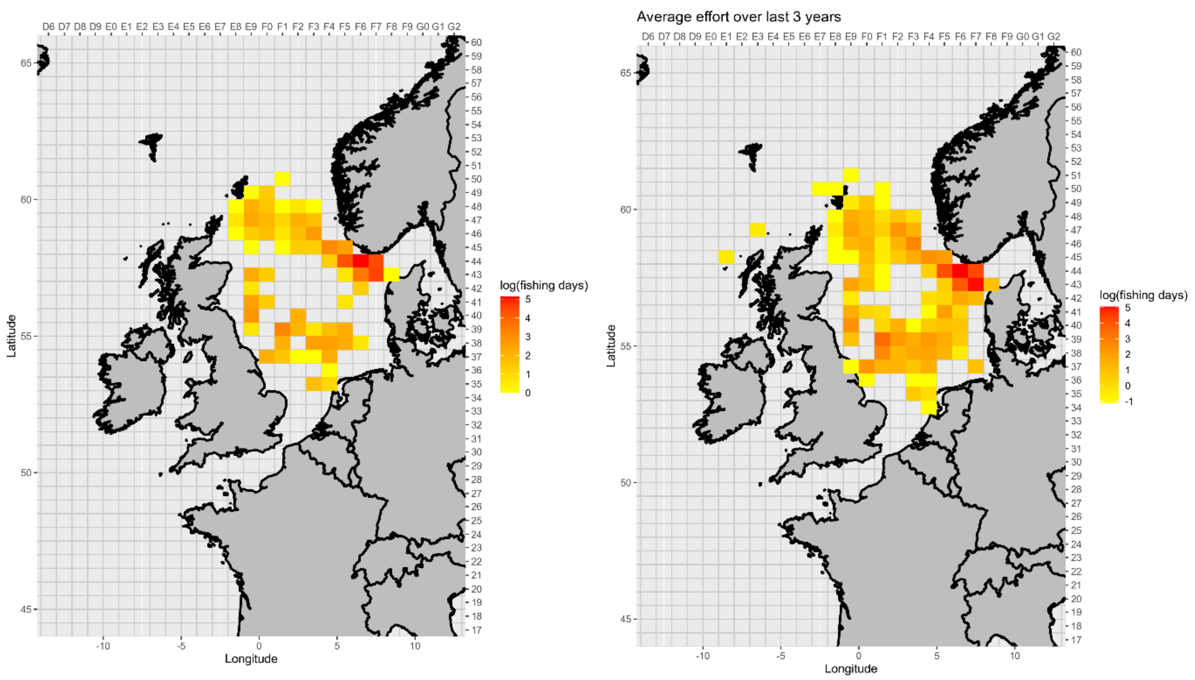


Figure 2-20 Swedish effort distribution. Right hand side shows the average effort over the past 3 years, left shows last year's effort distribution. Scale is in log10 to provide contrast.

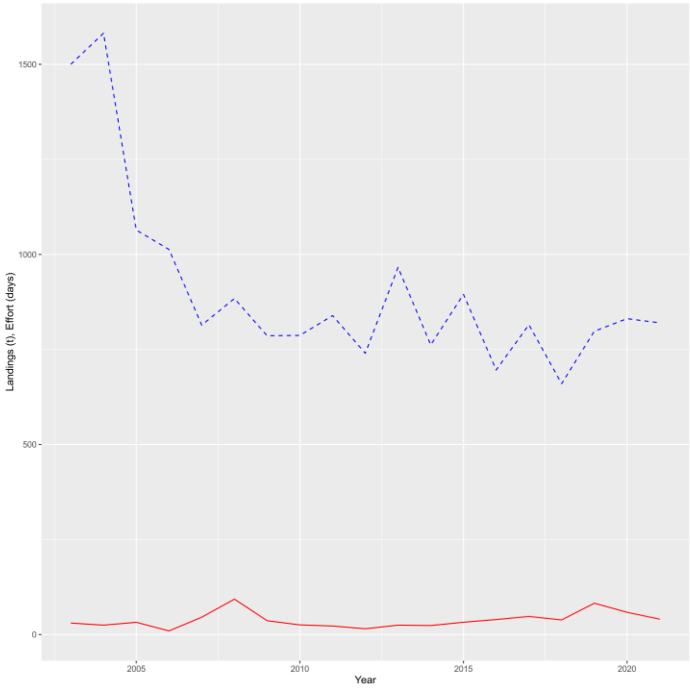


Figure 2-21 Total effort (blue) and landings (red) from the Swedish fleet within the relevant sea basins.

2.12 Effort

The EU fisheries control system includes measures on access to waters (through handing out licences), control through fishing effort, technical measures such as fishing gear restrictions and control on catches. These measures can be combined to optimize fisheries management. A sound scientific basis to develop management strategies or monitor the effectiveness of these measures is often required for these purposes.

There currently is a lack however of a strict definition on how fishing effort should be derived from fisheries logbook and, if available, VMS data to inform fisheries management. Fishing effort could be considered as the time a vessel is out at sea, the time the fishing gear is in the water and anything in between. The attribution of fishing effort to target and bycatch/non-target species is even more complex due to the mixed fisheries nature of the fleets and the sporadic catches of bycatch/non-target species in the North East Atlantic. Due to the lack of a clear definition, EU member states report fishing effort using varying methodologies and consistency in applying these methods across data calls such as NQS, FDI, RCG, ICES is not warranted.

An appropriate definition is key however when fisheries management aims to ensure sustainable exploitation at the basis of effort management regimes. It is expected that a clear definition will result in standardized effort calculations that would allow to sum fishing effort across member states and relevant fleet segments without the need for extensive corrections to be applied.

It is hence recommended to work towards a standardized approach to calculate fishing effort from logbook and, if available, VMS data sources. A standardized approach has been suggested by ICES WGSDF working group (https://github.com/ices-eg/wg_WGSFD/blob/master/VMSdatacall/VMSdatacall_proposedWorkflow.r) but lacks in accounting for active-vs-passive gears as well as the attribution of fishing effort to individual species. Differentiating between active versus passive gears is paramount and further refinements to account for fishing effort derived from logbooks vs VMS systems, as well as accounting for the role of engine size in effort calculations should be considered. Partitioning of species caught to fishing effort during a fishing trip should be considered as well.

3 FACTSHEETS FOR A FIRST LIST OF IMPORTANT SPECIES (TOR 1 AND 2)

In this chapter we provide factsheets for 9 species. They cover a variety of species and fisheries, but the list is indicative and reflects only a first attempt to identify important NQS from an analysis of the FDI database. The factsheets include, first, a factsheet with a summary for all sea basins and, second, a factsheet for each sea basin where the species is important as target or bycatch species. On the first page, the factsheet includes a figure on the landings per ICES square

2.1 Pouting (*Trisopterus luscus,* BIB)

Factsheet Pouting (*Trisopterus luscus*)

Facts at a glance

Landings:

2,676 to 4,140 t y^{-1}

Value:

2.2 – 3.95 million Euro (EU)

Fishing areas:

EEC > WEC > CS > NS > WSc

Countries:

FRA > NLD > BEL

Gears:

OTB > TBB > SSC > GTR

Data issues:

No info on discarding

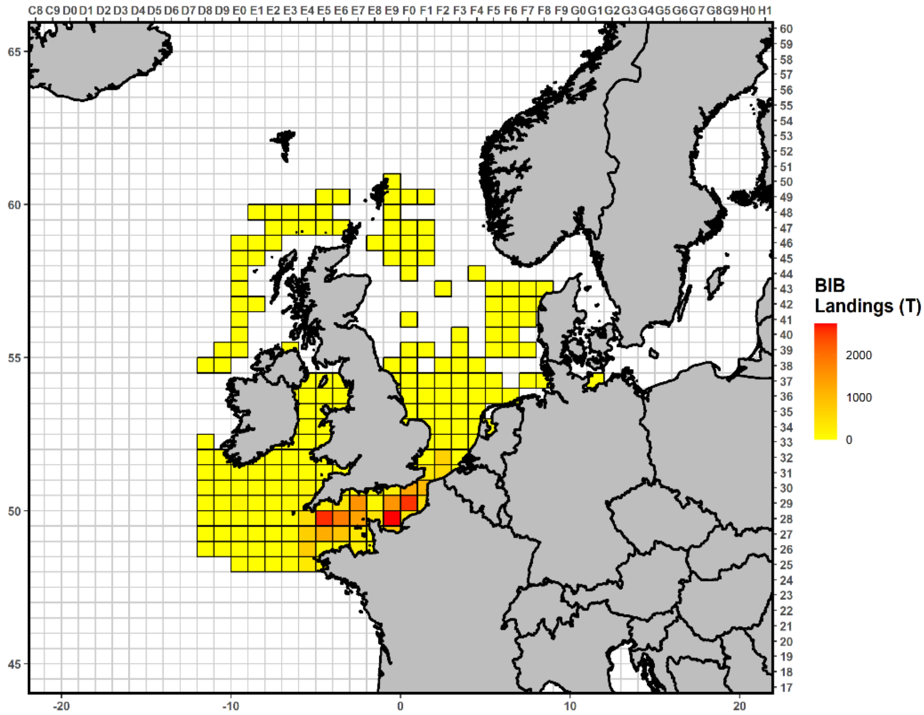


Figure 3-1 Landings of pouting in the six sea basins by ICES rectangle

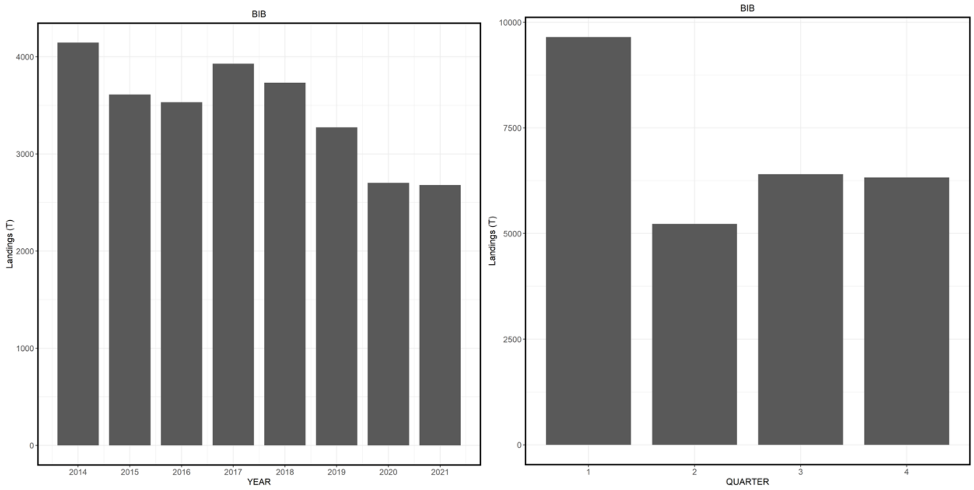


Figure 3-2 Landings of pouting per year and quarter in all six sea basins

Table 3-1 Landings of pouting within the respective ICES statistical rectangles. Data from the Annual Economic Report (AER).

ICES division	Landings live weight (kg)	Landings value (EUR)
27.4.a	5269.3614	1,183
27.4.b	6662.09	3,141
27.4.c	899575.13	350,093
27.6.a	4302.06	4,321
27.7.a	7856.25	5,164
27.7.d	4701568.22	3,017,541
27.7.e	4618346.386	2,902,485
27.7.f	72669.51	49,561
27.7.g	17323.12	13,511
27.7.h	628375.53	572,918
27.7.j	890.28	793
Total	10962837.94	6,920,712

Table 3-2 Landings of pouting by Nation, including UK. Data from AER.

Country	Landings weight (kg)			Landings value (EUR)		
	2017	2,018	2,019	2,017	2,018	2,019
Belgium	350866.04	330,381	302,773	183,303	145,119	120,132
Denmark	2240.6114		2	376		0
France	3060977.01	2,940,506	2,601,718	2,162,581	1,956,025	1,967,784
Germany	2000			120		
Ireland	248.92	10,965	4,178	206	859	4,155
Netherlands	526554	459,396	369,990	155,310	126,283	98,409
Spain			42			50
EU Total	3942886.581	3741247.666	3278703.69	2501895.851	2228286.27	2190529.918
United Kingdom	725233.7	654,187	708,424	324,051	279,095	342,415
Grand Total	4668120.281	4,395,435	3,987,127	2,825,947	2,507,381	2,532,945

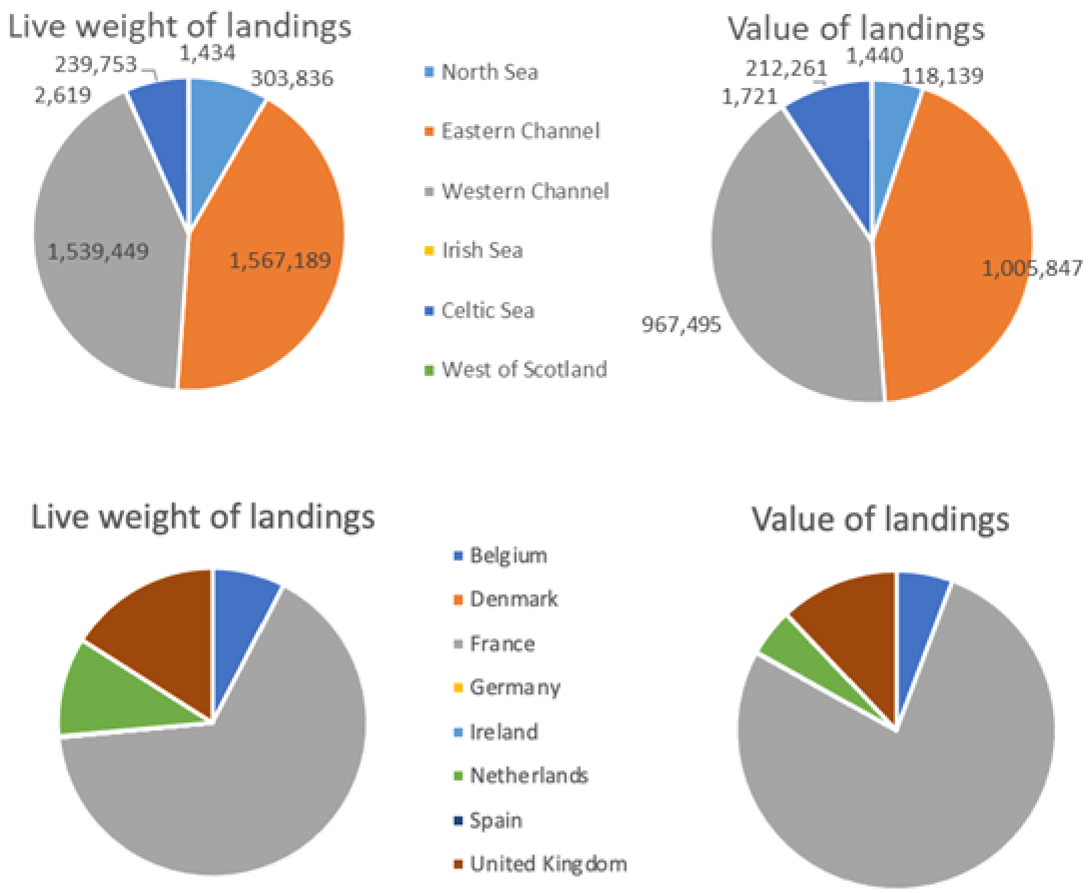


Figure 3-3 Landings of pouting by weight and value by country.

Table 3-3 Main fleets landing pouting. Data from AER

Fleet	Live weight of landings	Landings value
FRA NAO DTS1824	3,849,456	2,685,885
FRA NAO DTS2440	3,211,998	2,126,050
BEL NAO TBB2440	795,917	396,926
FRA NAO DTS1218	441,768	345,743
NLD NAO DTS2440	713,488	193,443
FRA NAO DFN1012	204,379	174,430
NLD NAO TBB40XX	578,067	171,028
FRA NAO MGP1218	166,980	139,352
FRA NAO DTS1012	158,898	130,871
FRA NAO MGP1012	130,572	109,204
Other	711,315	447,779
Total	10,962,838	6,920,712

3.1.1 Factsheet pouting *North Sea (ICES div. 27.4a,b,c)*

Facts at a glance

Landings:

132 to 380 t y^{-1}

Value:

118,139 Euro

Assessment:

No

Countries:

NLD > FRA > BEL

Gears:

TBB > OTB > SSC > OTM > GTR

Target/Bycatch species:

Bycatch

Data issues:

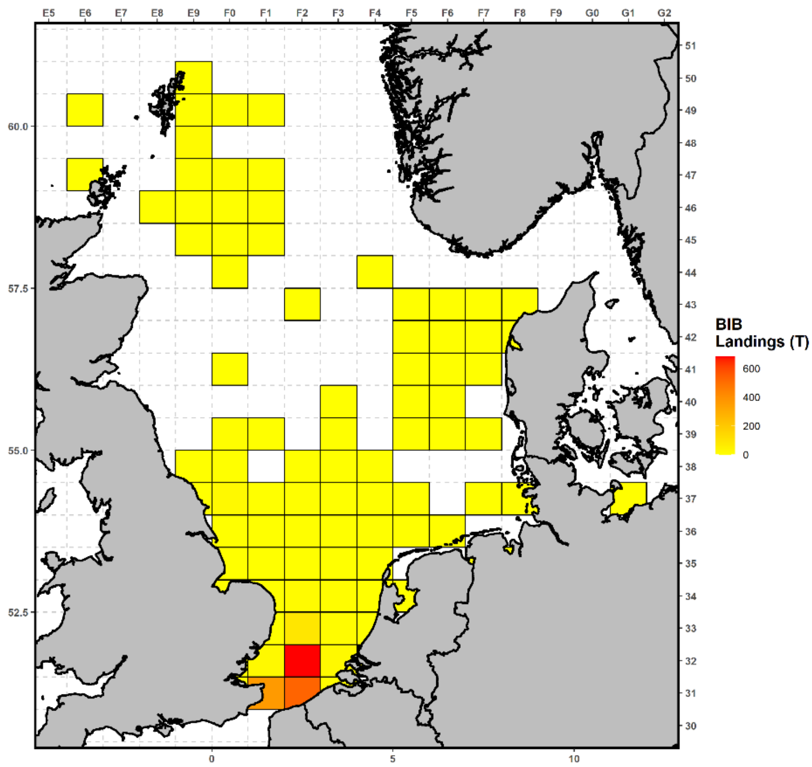


Figure 3-4 Landings of pouting in the North Sea by ICES rectangle

No info on discarding

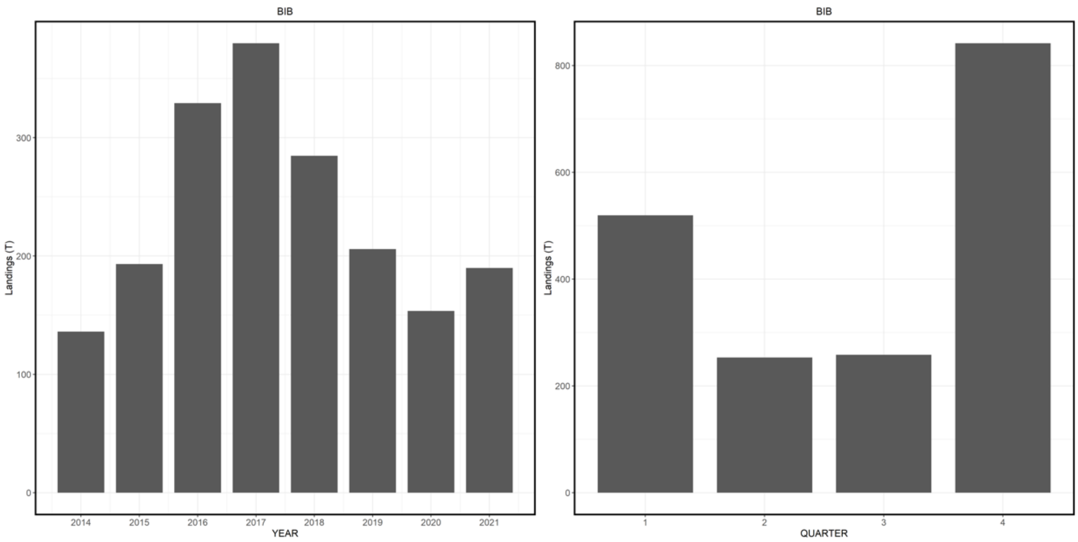


Figure 3-5 Landings of pouting per year and quarter in the North Sea

Fishing activity

Pouting is mainly caught as bycatch by demersal trawlers in mixed fisheries.

Data collection

Information from scientific trawl surveys on pouting abundance is available through the ICES DATRAS portal. The STECF FDI database comprises information on landings.

Stock assessment

To our knowledge, no assessments have been conducted for pouting in the North Sea.

Fisheries management measures

There are no technical measures, specifically designed for pouting management, at the European level. Some Member States have technical measures at the national level (e.g. Belgium has an MCRS for pouting of 20 cm).

Additional information, e.g. ecosystem knowledge

Pouting has a preference for hard substrate habitats and is known to aggregate around windfarms (Ruebens et al. 2012). In response to climate change, Dulvy et al. (2008) found a shift in depth range over time with pouting moving into shallower waters.

3.1.2 Factsheet pouting (ICES div. 27.7d) Eastern English Channel

Facts at a glance

Landings:

1039 to 1822 t y^{-1}

Value:

1006 thousand Euro

Assessment:

No

Countries:

FRA > BEL > NLD

Gears:

OTB > SSC > TBB > GTR > SDN

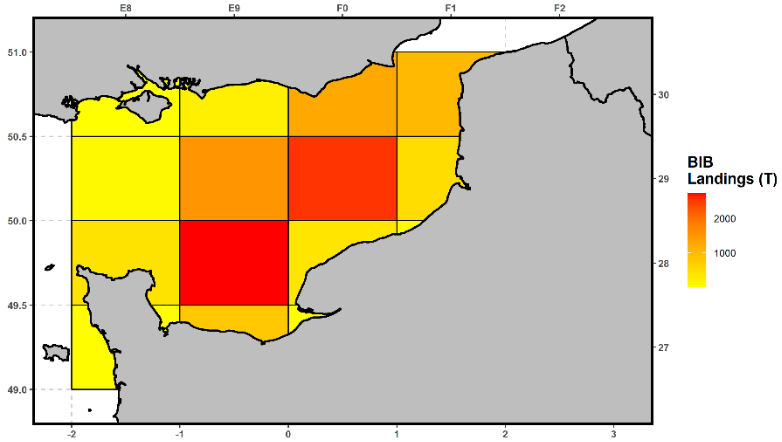


Figure 3-6 Landings of pouting in the North Sea by ICES rectangle

Target/Bycatch species:
Bycatch

Data issues:

No info on discarding

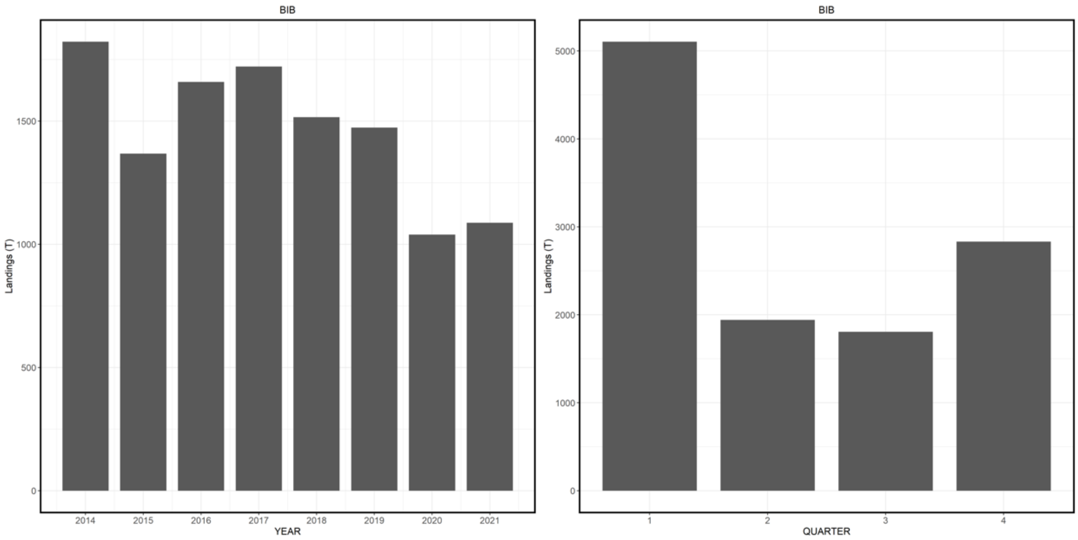


Figure 3-7 Landings of pouting per year and quarter in the Eastern English Channel

Fishing activity

Pouting is caught as a bycatch in mixed fisheries, mainly by demersal trawlers and seines.

Data collection

Information from scientific trawl surveys on pouting abundance is available through the ICES DATRAS portal. The STECF FDI database comprises information on landings.

Stock assessment

To our knowledge, no assessments have been conducted for pouting in the Eastern English Channel.

Fisheries management measures

There are no technical measures, specifically designed for pouting management, at the European level. Some Member States have technical measures at the national level (e.g. Belgium has an MCRS for pouting of 20 cm).

Additional information, e.g. ecosystem knowledge

The spatial distribution of pouting is known to be affected by environmental drivers. Notably, sea water temperature is supposed to have a major effect causing a north-eastwards shift of the species.

Facts at a glance

Landings:

1165 to 1695 t y^{-1}

Value:

967,000 Euro

Assessment:

No

Countries:

FRA > NLD > BEL

Gears:

OTB > SSC > TBB

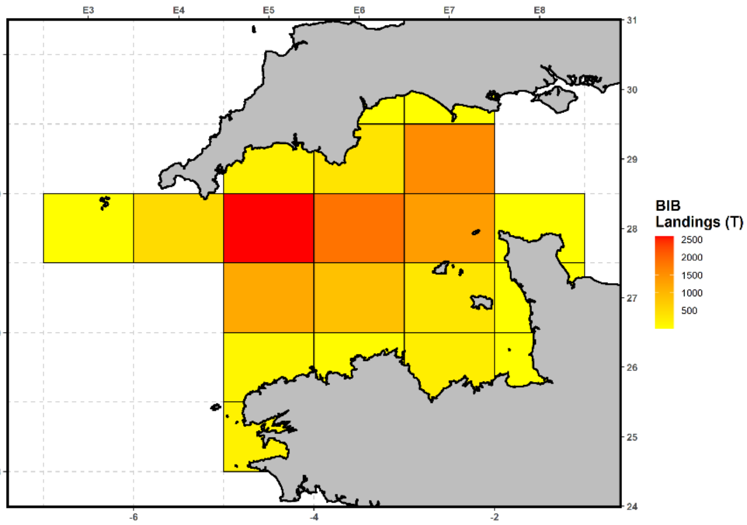


Figure 3-8 Landings of pouting in the North Sea by ICES rectangle.

Target/Bycatch species:

Bycatch

Data issues:

No info on discarding

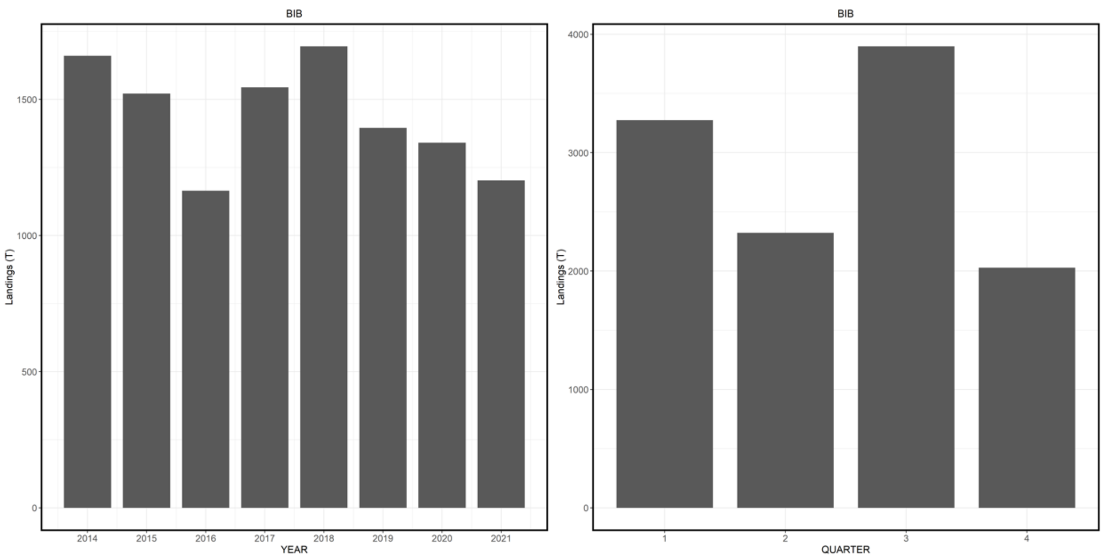


Figure 3-9 Landings of pouting per year and quarter in the Western English Channel

Fishing activity

Pouting is caught as a bycatch in mixed fisheries, mainly by demersal trawlers and seines.

Data collection

Information from scientific trawl surveys on pouting abundance is available through the ICES DATRAS portal. The STECF FDI database comprises information on landings.

Stock assessment

To our knowledge, no assessments have been conducted for pouting in the Western English Channel.

Fisheries management measures

There are no technical measures, specifically designed for pouting management, at the European level. Some member states have technical measures at the national level (e.g. Belgium has an MCRS for pouting of 20 cm).

Additional information, e.g. ecosystem knowledge

The spatial distribution of pouting is known to be affected by environmental drivers. Notably, sea water temperature is supposed to have a major effect causing a north-eastwards shift of the species.

Facts at a glance

Landings:

165 to 526 t y^{-1}

Value:

212,000 EUR

Assessment:

No

Countries:

FRA > BEL

Gears:

OTB > TBB > OTT

Target/Bycatch species:

Bycatch

Data issues:

No info on discarding

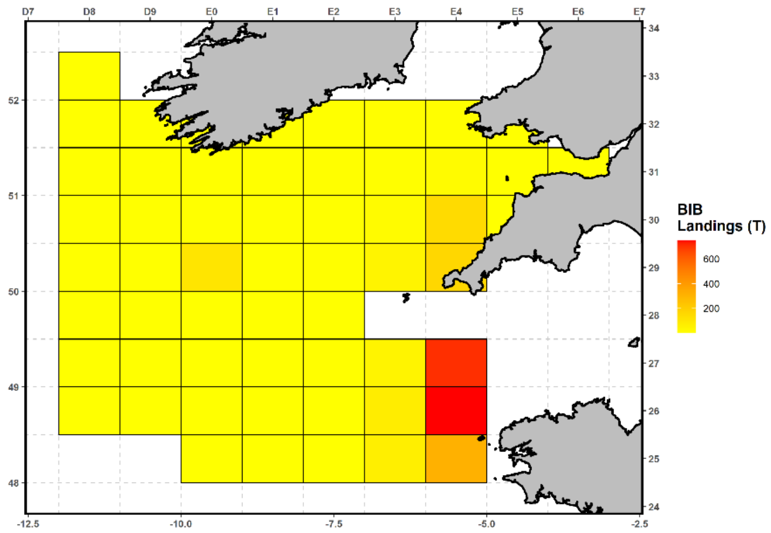


Figure 3-10 Landings of pouting in the Celtic Sea by ICES rectangle

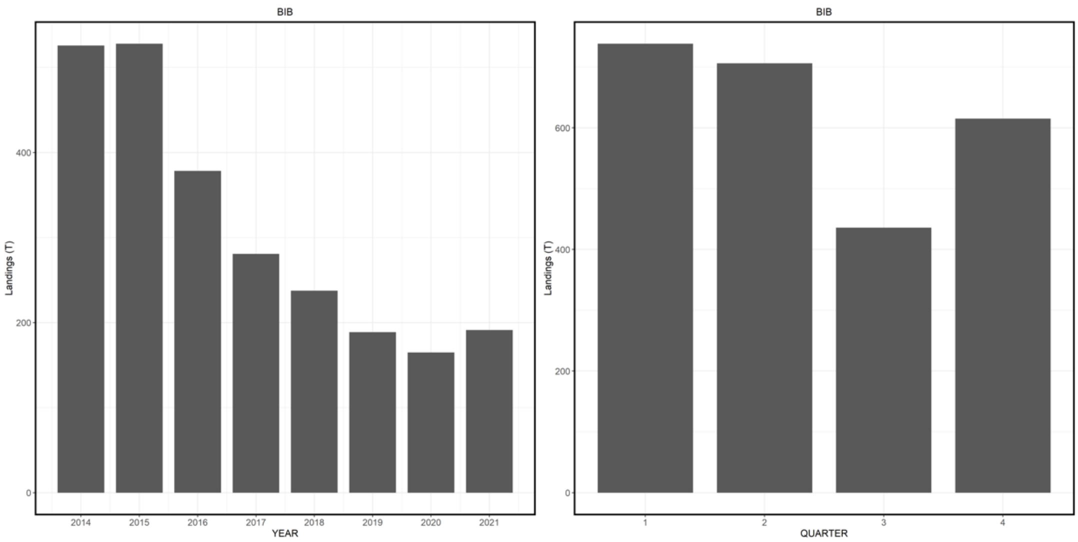


Figure 3-11 Landings of pouting per year and quarter in the Celtic Sea

Fishing activity

Pouting is caught as a bycatch in mixed fisheries, mainly by demersal trawlers.

Data collection

Information from scientific trawl surveys on pouting abundance is available through the ICES DATRAS portal. The STECF FDI database comprises information on landings.

Stock assessment

To our knowledge, no assessments have been conducted for pouting in in the Celtic Sea.

Fisheries management measures

There are no technical measures, specifically designed for pouting management, at the European level. Some member states have technical measures at the national level (e.g. Belgium has an MCRS for pouting of 20 cm).

Additional information, e.g. ecosystem knowledge

The spatial distribution of pouting is known to be affected by environmental drivers. Notably, sea water temperature is supposed to have a major effect causing a north-eastwards shift of the fish.

Facts at a glance

Landings:

0.011 to 4.768 t y^{-1}

Value:

1400 EUR

Assessment:

No

Countries:

IRL > FRA

Gears:

PTM > GNS> OTT

Target/Bycatch species:

Bycatch

Data issues:

No info on discarding

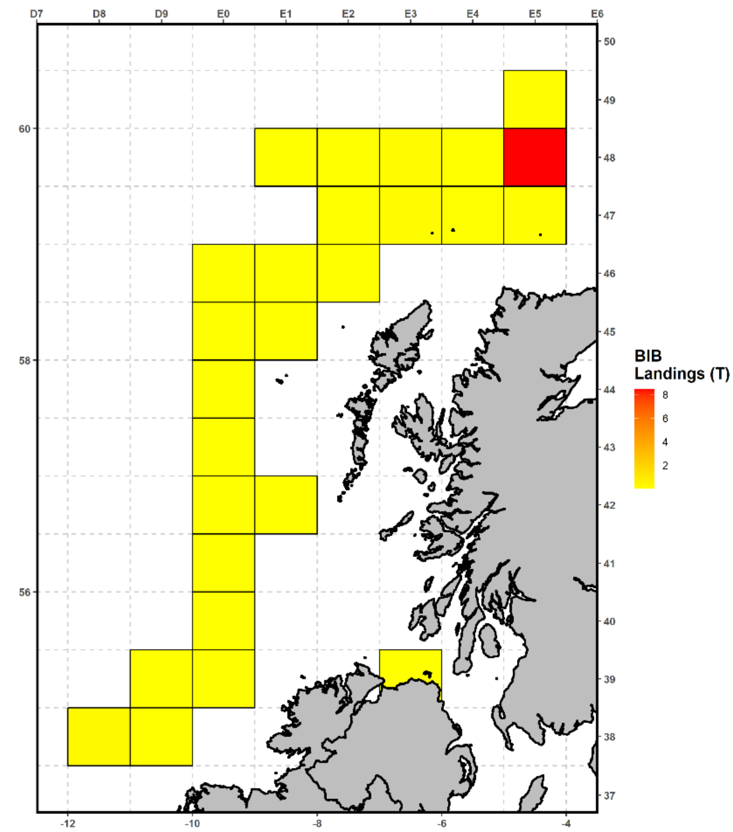


Figure 3-12 Landings of pouting in the West of Scotland by ICES rectangle

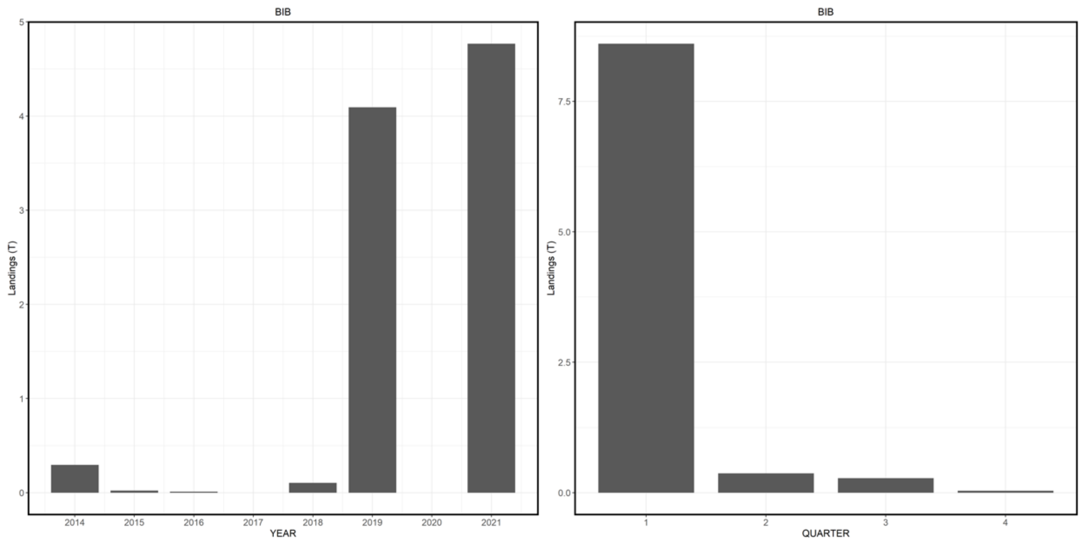


Figure 3-13 Landings of pouting per year and quarter in the West of Scotland

Fishing activity

Landings of pouting are negligible in this area.

Data collection

Information from scientific trawl surveys on pouting abundance is available through the ICES DATRAS portal. The STECF FDI database comprises information on landings.

Stock assessment

To our knowledge, no assessments have been conducted for pouting in the West of Scotland.

Fisheries management measures

There are no technical measures, specifically designed for pouting management, at the European level. Some member states have technical measures at the national level (e.g. Belgium has an MCRS for pouting of 20 cm).

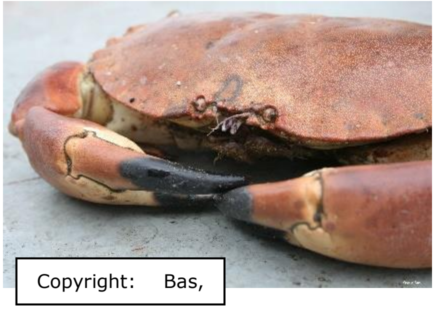
Additional information, e.g. ecosystem knowledge

References

Reubens JT, Braeckman U, Vanaverbeke J, Van Colen C, Degraer S, Vincx M (2013a). Aggregation at windmill artificial reefs: CPUE of Atlantic cod (*Gadus morhua*) and pouting (*Trisopterus luscus*) at different habitats in the Belgian part of the North Sea. Fish Res 139: 28−34

Dulvy, N.K., Rogers, S.I., Jennings, S., Stelzenmüller, V., Dye, S.R. and Skjoldal, H.R. (2008). Climate change and deepening of the North Sea fish assemblage: a biotic indicator of warming seas. J Appl Ecol. 45: 1029-1039. https://doi.org/10.1111/j.1365-2664.2008.01488.x

3.2 Fact Sheet Brown crab (*Cancer pagurus*; CRE)



Copyright: Bas,

Facts at a glance

Landings:

12000 to 9000 tonnes. decrease since 2014 (EU data only). More important in Q3 and Q4.

Value:

77 513 thousand EUR

Fishing areas:

West Scotland, Irish Sea, Celtic Sea, Channel, North Sea

Countries:

FRA, DNK, NLD, IRL, BEL, DEU (UK not included)

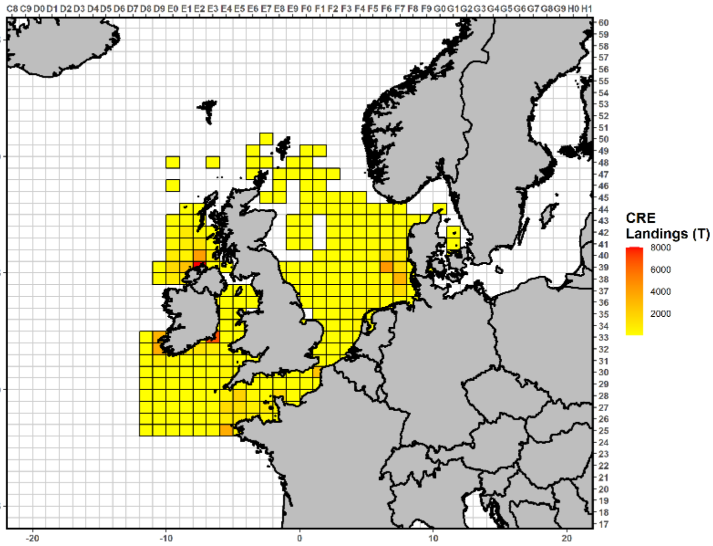


Figure 3-14 Landings of brown crab in the six sea basins by ICES rectangle

Gears: FPO, GNS although caught as bycatch by trawlers and dredgers.

Data:

Poor effort metrics generally but especially for <10m vessels. CPUE time series available for some stocks. No directed surveys. Low catchability in IBTS survey time series. Data for sentinel fleets, self-sampling schemes, observer data, port sampling data available in some areas. Catch and effort data for under 10s available in some areas from national logbook schemes.

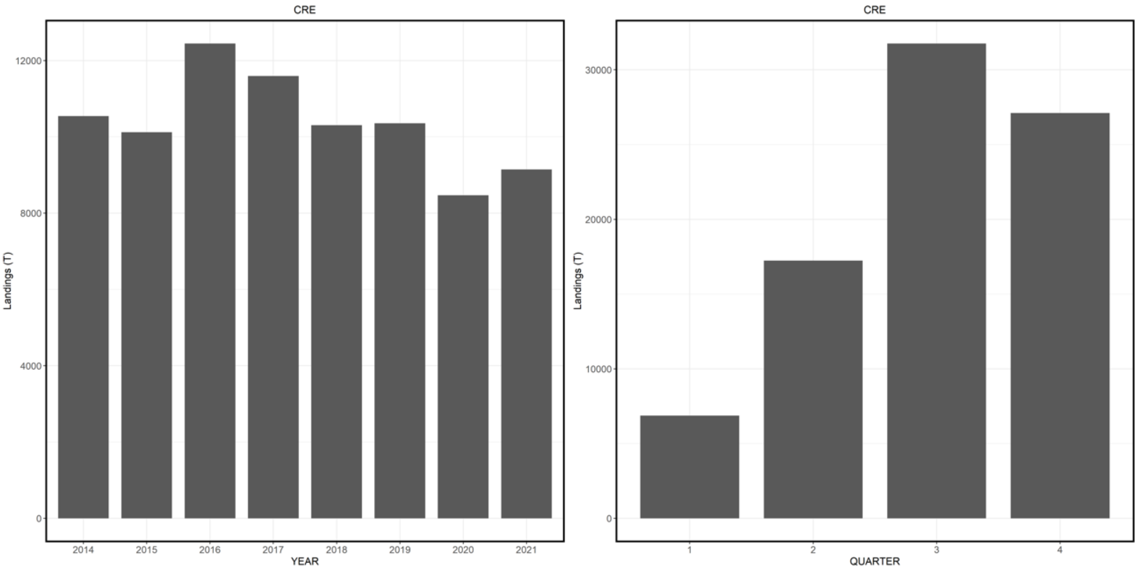


Figure 3-15 Landings of brown crab per year and quarter in the six sea basins

Biology: Long lived crustacean distributed from intertidal to 200m depth from Norway south to Spain and in the North Sea. Migratory including inshore offshore migrations. Some spatial segregation of male and female crabs which tend to occur in different habitats. Pelagic larval phase. Stock structure likely to be at sea basin scale. Size at maturity generally known and with some regional variability.

Fishery: Mainly a single species targeted pot fishery with lobster and other crab species as bycatch. Also important catches in set nets and incidental catches in trawl, beam trawl and scallop dredges. Trap fishery involves both SSF and LSF vessels. LSF vessels are typically 'vivier' with capacity to hold large quantities of crab in seawater holding tanks. SSF vessels including under 10s can have high effort. Gear may be left at sea and not carried on the vessel. Fishery is open all year. Fishery targets female crab in particular. MCRS varies regionally and is as high as 150mm carapace width. Discard rates are high and there is substantial high grading and discarding of recently moulted crab. Discard survival in pot fisheries is very high.

Assessment

Approaches to assessment vary from production modelling (IRL), standardized time series and trends in CPUE (FR, IRL) and length-based methods (UK). ICES WGCrab report on data and assessment.

Management

The main management measures are minimum landing size, restrictions in the landings of clawed crabs (1% of weight of catch on board can be claws, upper limit of 75kg of claws for netters) and kwday limits (Western Waters regulation). The MLS varies from 140-150mm in most sea basins and has increased generally from the EU MLS of 130mm in recent years in many areas. Increase in the MLS has been the main response to changes in stock status. Although the MLS should protect spawning biomass, recruitment has been declining in many areas in recent years (ICES WGCrab—not published).

UK: landing of berried and soft crabs is prohibited. More information in CEFAS and Marine Scotland assessment of Brown Crab Stocks.

Table 3-4 Landings of brown crab within the respective ICES division. Data from AER.

ICES division	Live weight of landings	Landings value
27.4.a	397	1916
27.4.b	6179755	17888369
27.4.c	788835	1980326
27.6.a	8732486	20056430
27.7.a	2734610	5263740
27.7.d	1781766	3961639
27.7.e	2652061	9997442
27.7.f	205514	590579
27.7.g	1264043	3740723
27.7.h	2112912	6992011
27.7.j	3680196	7027330
27.7.j.2	2547	12107
Grand Total	30135123	77512612

Table 3-5 Landings of brown crab by country including UK. Data from AER.

Country	Live weight of landings			Landings value		
	2017	2018	2019	2017	2018	2019
Belgium	276325	231033	219153	216438	245506	232966
Denmark	150725	237342	154812	609727	811823	769962
France	2633628	2046845	1974529	7381284	7236034	7141726
Germany	131966	113083	142948	82135	84305	120635
Ireland	7759892	5413753	6923399	13823576	15821324	18372328
Netherlands	570881	547045	603942	1505806	1514872	1519379
Spain	2547	591	682	12107	5048	5630
Total EU	11525965	8589693	10019465	23631074	25718911	28162627

United Kingdom	33262086	33697044	31917113	63277929	85667141	85788916
Grand Total	44788050	42286737	41936578	86909002	111386053	113951543

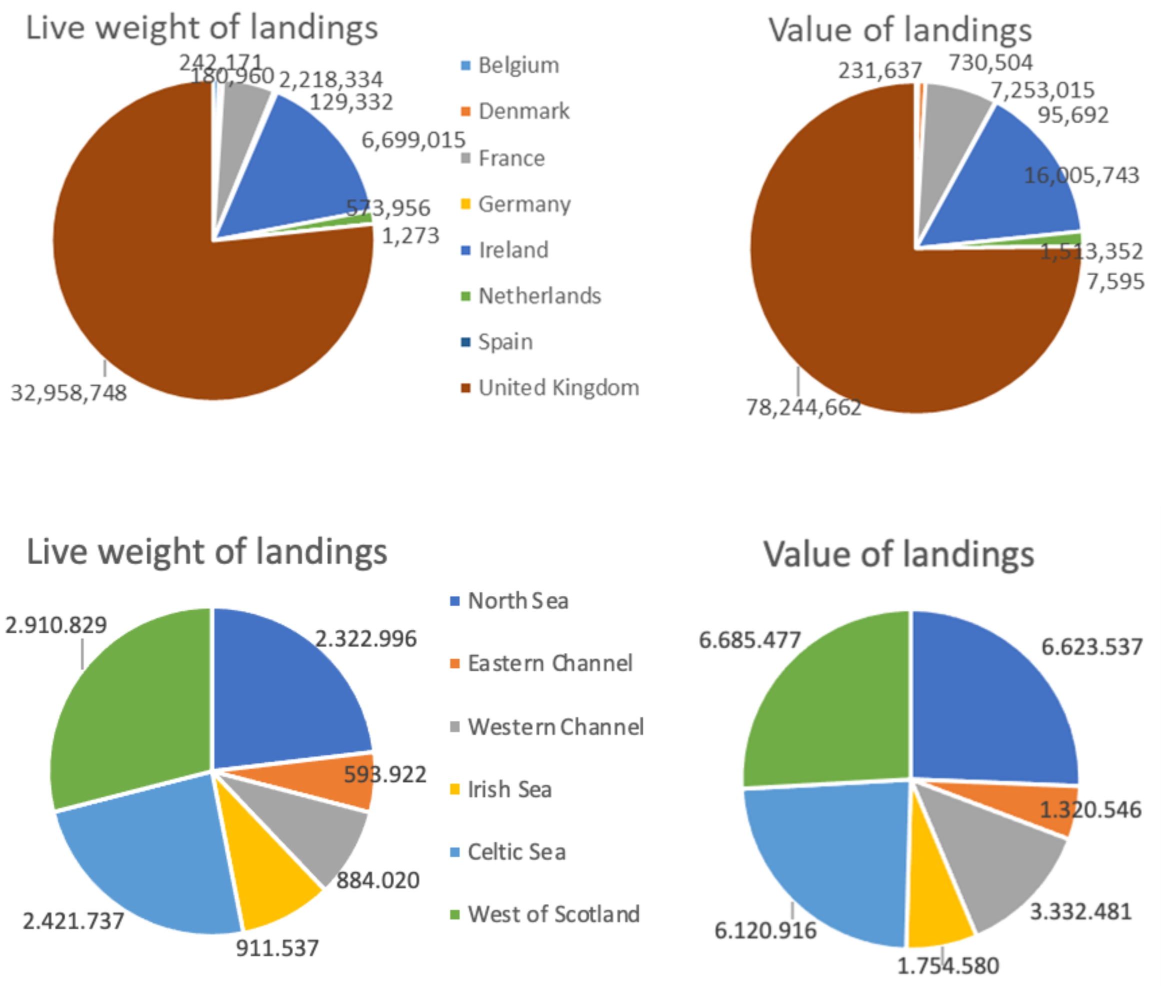


Figure 3-16 Landings of brown crab by country. Data from AER

Table 3-6 Main fleets landing brown crab

Fleet	Live weight of landings	Landings value
IRL NAO FPO1218	10,434,196	27,111,613
IRL NAO FPO1012	5,190,774	12,582,519
FRA NAO FPO1824	2,613,365	9,449,765
FRA NAO DFN1218	1,278,430	4,346,964
IRL NAO FPO0010	2,232,606	4,306,367
NLD NAO TBB40XX	970,251	2,539,377
FRA NAO FPO0010	651,017	2,535,145
FRA NAO FPO1012	789,007	1,981,633
IRL NAO DFN0010	1,112,137	1,952,695
FRA NAO DFN1012	736,320	1,847,299
Other	4,127,019	8,859,235
Total	30,135,123	77,512,612

Facts at a glance

Landings:
2000-3000 tonnes and increasing (EU data only)

Value:
6264 thousand EUR

Assessment:
Survey data (dredge and trawl; not directed survey) in the east of Scotland (Mesquita *et al*., 2021). Scotland applies length-cohort analysis (LCA) methods for each stock sub-units (Mesquita *et al*., 2017). Bi-annual LCA in England (CEFAS, 2020).

Countries:
DNK, NLD, DEU, BEL, FRA, IRL (UK not included)

Gears:
FPO, GNS

Target/Bycatch species:
Gears:
FPO, GNS

Target/Bycatch species:
Target, but also caught as bycatch in lobster fishery and static net fisheries

Recreational fisheries:
No, or locally

Threats: n.a.

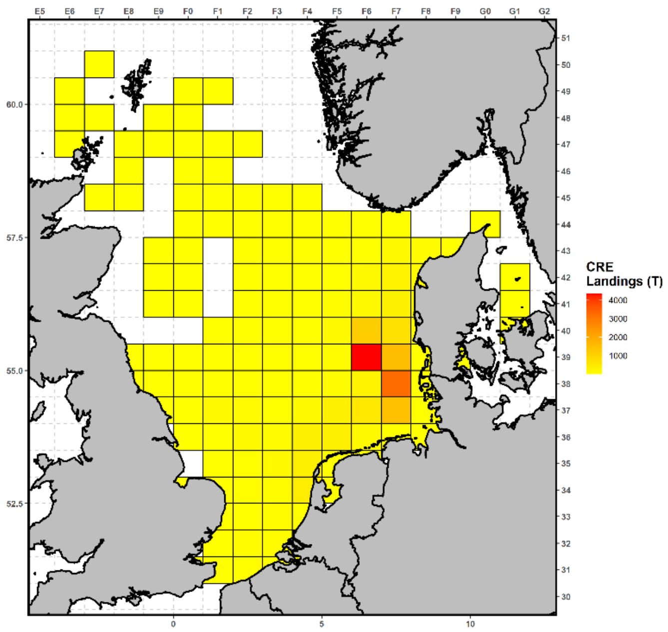


Figure 3-17 : Landings of brown crab in the North Sea basins by ICES rectangle

Data issues: n.a.

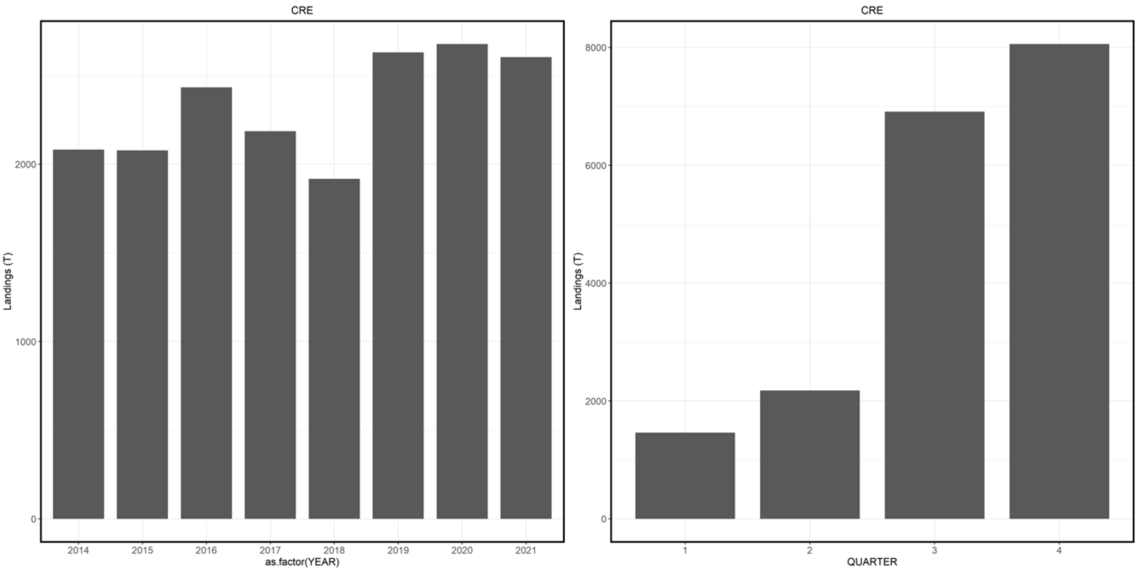


Figure 3-18 Landings of brown crab by year and quarter in the North Sea

Fishing activity: n.a.

Data collection: n.a.

Stock assessment: n.a.

Fisheries management measures:

UK: landing of berried and soft crabs is prohibited. More information in CEFAS and Marine Scotland assessment of Brown Crab Stocks.

Facts at a glance

Landings:
Decrease since 2016 (exception 2021; EU data only)

Value:
6685 thousand EUR

Assessment:
Yes. Combined Surplus Production Model (SPiCT) for UK and IRL landings. Scotland applies LCA methods for each stock sub-units (Mesquita *et al*., 2017).

Countries:
IRL (UK not included)

Gears:
FPO

Target/Bycatch species:
Target, but also caught as bycatch in lobster fishery. Used as bait in whelk fishery.

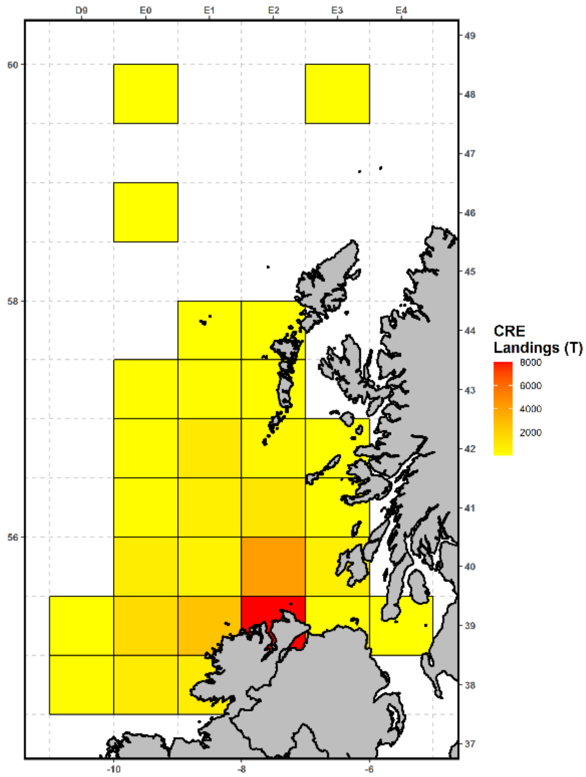


Figure 3-19 Landings of brown crab in the West of Scotland by ICES rectangle

Recreational fisheries:
No, or locally

Threats:
Surplus Production Model indicates current biomass is below Bmsy and fishing pressure (F) above Fmsy. Extra sources of mortality not accounted in assessment model includes the use of crab as bait in the whelk fishery.

Landing of crab of bad quality.

Data issues:
Incomplete landings for <10m vessels. No census of effective effort.

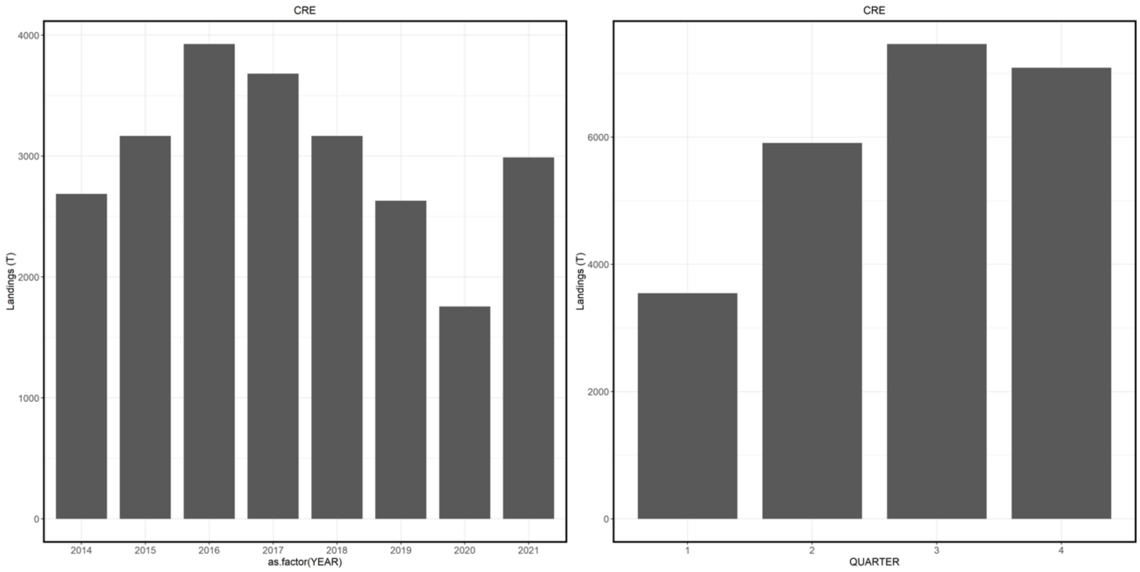


Figure 3-20 Landings of brown crab by year and quarter in the West of Scotland

Fishing activity:

Data collection: Logbook and VMS data on landings and effort (>10m), sales notes (<10m), port sampling size data at ICES rectangle resolution, self-sampling scheme on haul by haul basis on landings, discards and effort.

Fisheries management measures:

IRL:

- MCRS 140 mm carapace width
- Western waters effort control measure in ICES area VI. Annual effort by vessels over 15 m in length is restricted (1415/2004 EC) to 465,000 kw.days

UK:

- MCRS 150mm Scotland since 2017. Recent increase to 150mm in Northern Ireland.

Facts at a glance

Landings:
Decrease in 2016 (EU data only)

Value:
1755 thousand EUR

Assessment:
Relative abundance indices (LPUE) from self-sampling schemes.

Countries:
IRL, BEL (UK not included)

Gears:
FPO

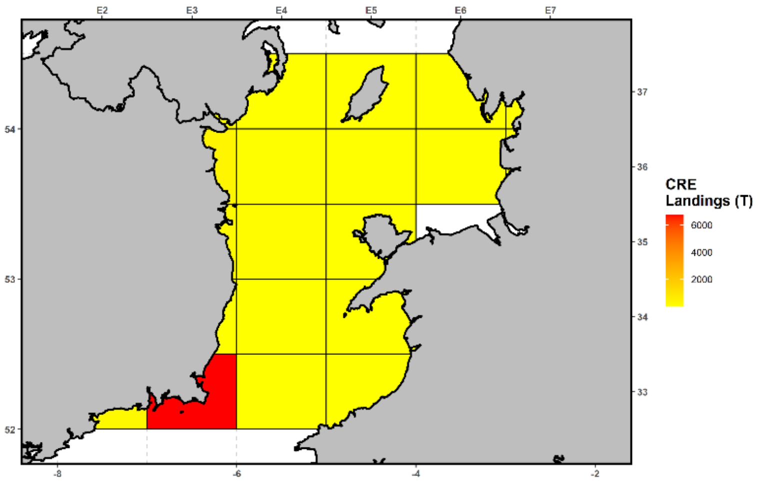


Figure 3-21 Landings of brown crab in the Irish Sea by ICES rectangle

Target/Bycatch species:
Target, but also caught as bycatch in lobster fishery. Used as bait in whelk fishery.

Recreational fisheries:
No, or locally

Data issues:
incomplete landings for <10m vessels

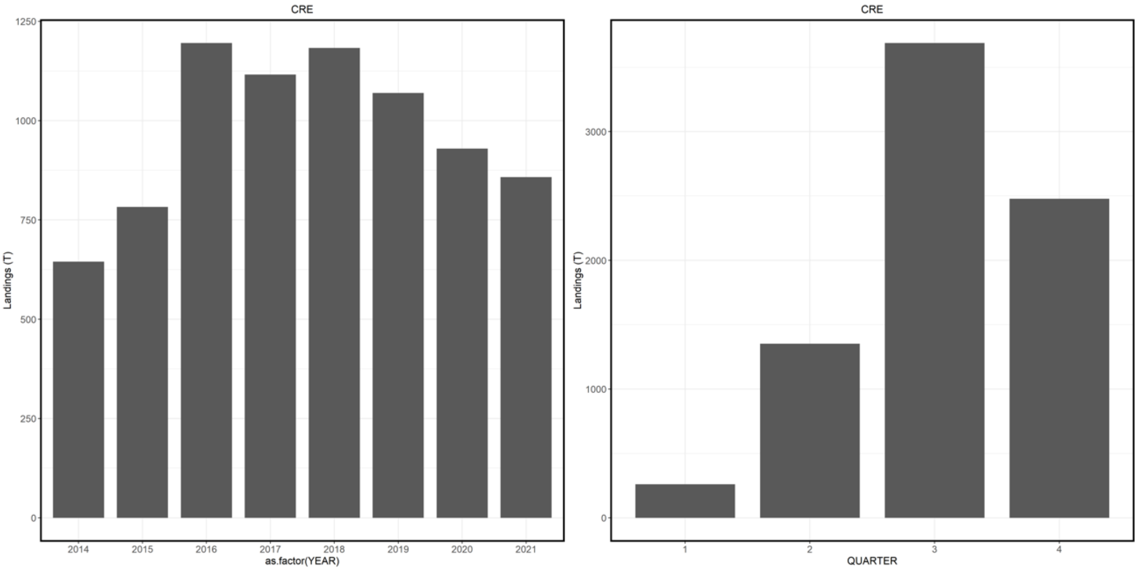


Figure 3-22 Landings of brown crab by year and quarter in the Irish Sea

Fishing activity:

Data collection: Logbook and VMS data on landings and effort (>10m), sales notes (<10m), port sampling size data at ICES rectangle resolution, self-sampling scheme on haul by haul basis on landings, discards and effort.

Fisheries management measures:

IRL:

- MCRS 140 mm carapace width
- Annual effort by vessels over 15 m in length is restricted (1415/2004 EC) to 40,960 kw.days outside of the Biologically Sensitive Area (BSA) and to 63,198 kw.days in the BSA for all vessels over 10 m in length.

Facts at a glance

Landings:
Decrease since 2016 (EU data only)

Value:
6121 thousand EUR

Assessment:
Yes.
Bi-annual LCA's in England (CEFAS, 2020)
Relative abundance indices (LPUE) from self-sampling schemes (IRL)
Relative abundance indices (FRA)

Countries:
FRA, IRL, BEL (UK not included)

Gears:

FPO

Target/Bycatch species:
Target, but also caught as bycatch in lobster fishery. Used as bait in whelk fishery.

Recreational fisheries:
No, or locally

Data issues:
Incomplete landings for <10m vessels

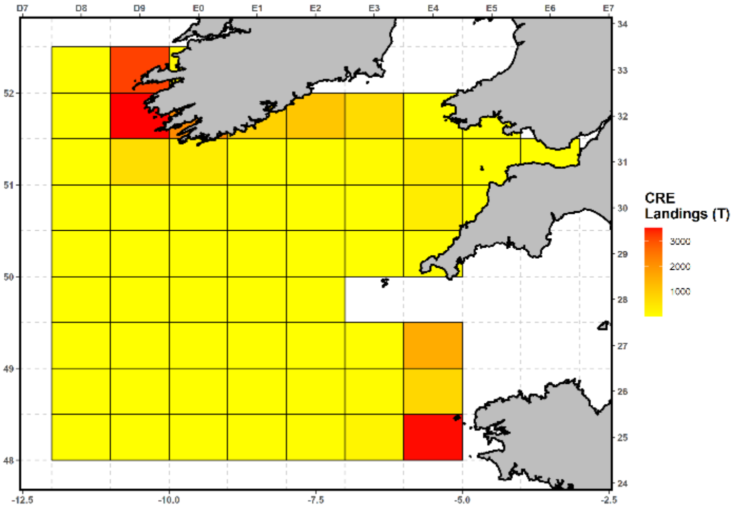


Figure 3-23 Landings of brown crab in the Celtic Sea by ICES rectangle

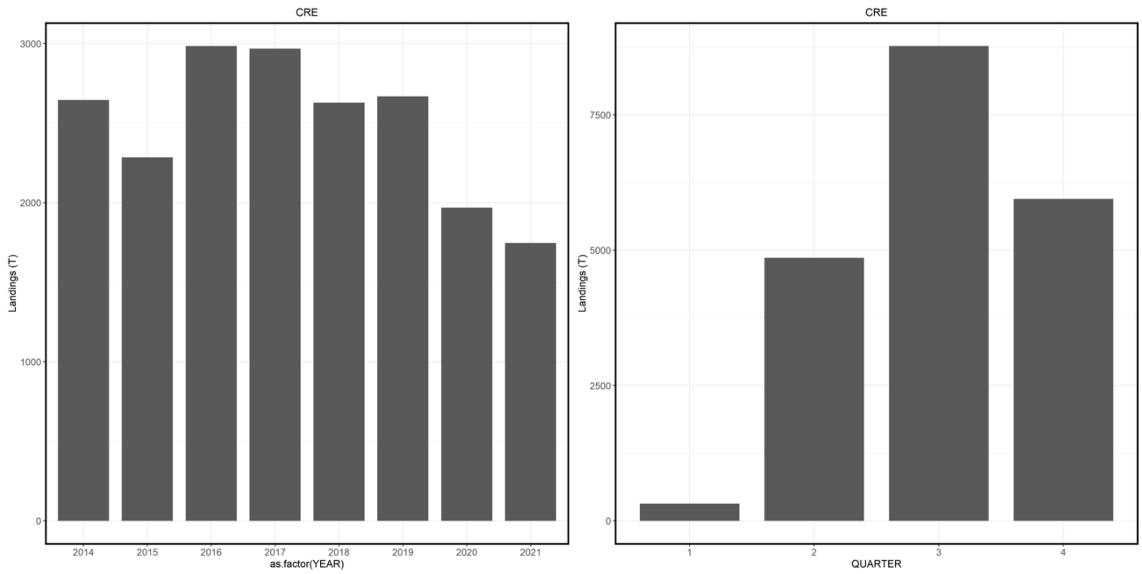


Figure 3-24 Landings of brown crab by year and quarter in the Celtic Sea

Data collection: Logbook and VMS data on landings and effort (>10m), sales notes (<10m), port sampling size data at ICES rectangle resolution, self-sampling scheme on haul by haul basis on landings, discards and effort.

Fisheries management measures:
IRL: MCRS 140 mm carapace width
UK: The main regulatory mechanism is a minimum landing size (140mm CW with local exemptions) and restrictions in the landings of clawed crabs. There are also limits in the number of shellfish licenses available and the landing of berried and soft crabs. More information in CEFAS assessment of Brown Crab Stocks.

3.3 Factsheet Cuttlefish (*Sepia officinalis*)

Facts at a glance

Landings:

4,437 to 7,614 t y^{-1}

Value:

70064 thousand EUR

Fishing areas:

WEC > EEC > CS > NS > WSc

Countries:

FRA > BEL > NLD

Gears:

OTB > TBB > FPO > OTT > SSC > DRB

Data issues:

No info on discarding

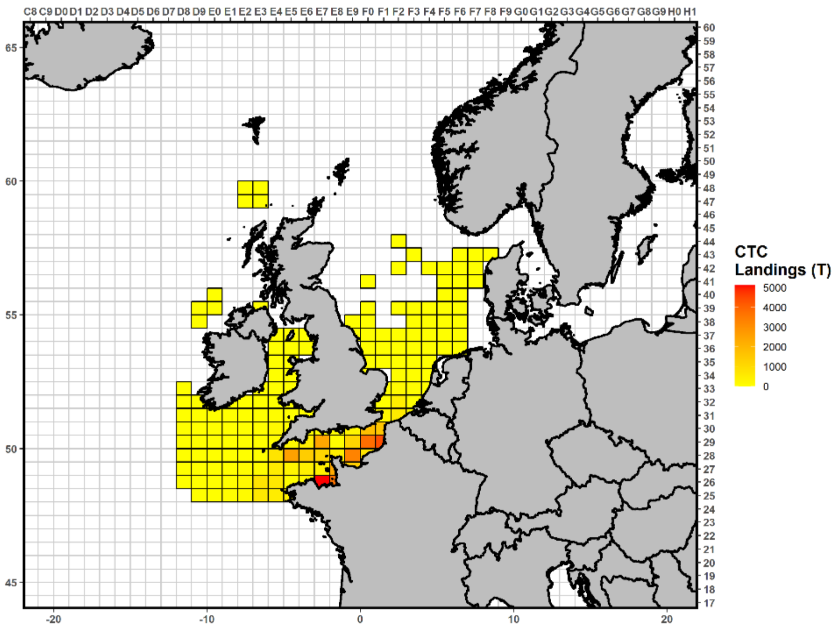


Figure 3-25 : Landings of cuttlefish in the six sea basins by ICES rectangle

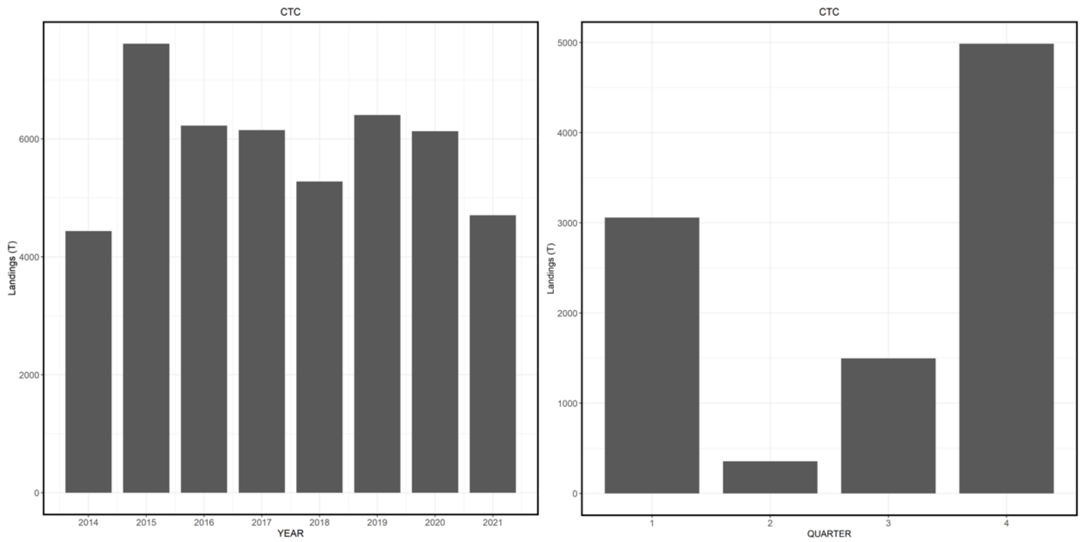


Figure 3-26 Landings of cuttlefish by year and quarter for all sea basins

Table 3-7 Landings of cuttlefish by ICES division.

ICES rectangles	Live weight of landings	Landings value
27.4	240	1439
27.4.b	2281	5639
27.4.c	330639	1000454
27.6.a	30	117
27.7.a	945	2854
27.7.d	7399835	28977312
27.7.e	8538122	34401960
27.7.f	115925	449921
27.7.g	90202	343538
27.7.h	1269495	4718215
27.7.j	32889	146155
27.7.j.2	3287	16745
Grand Total	17783889	70064349

Table 3-8 Landings of cuttlefish by country.

Country	Live weight of landings			Landings value		
	2017	2018	2019	2017	2018	2019
Belgium	909174	812407	814569	3903291	3487349	2489411
France	4789388	3809804	4701363	21156198	17655011	15218222
Ireland	301353	417202	361460	771103	1652996	1431481
Netherlands	150160	229139	467937	391269	623507	1186391
Spain	3706	15885	340	18884	77659	1578
Grand Total	6153781	5284438	6345669	26240745	23496522	20327083

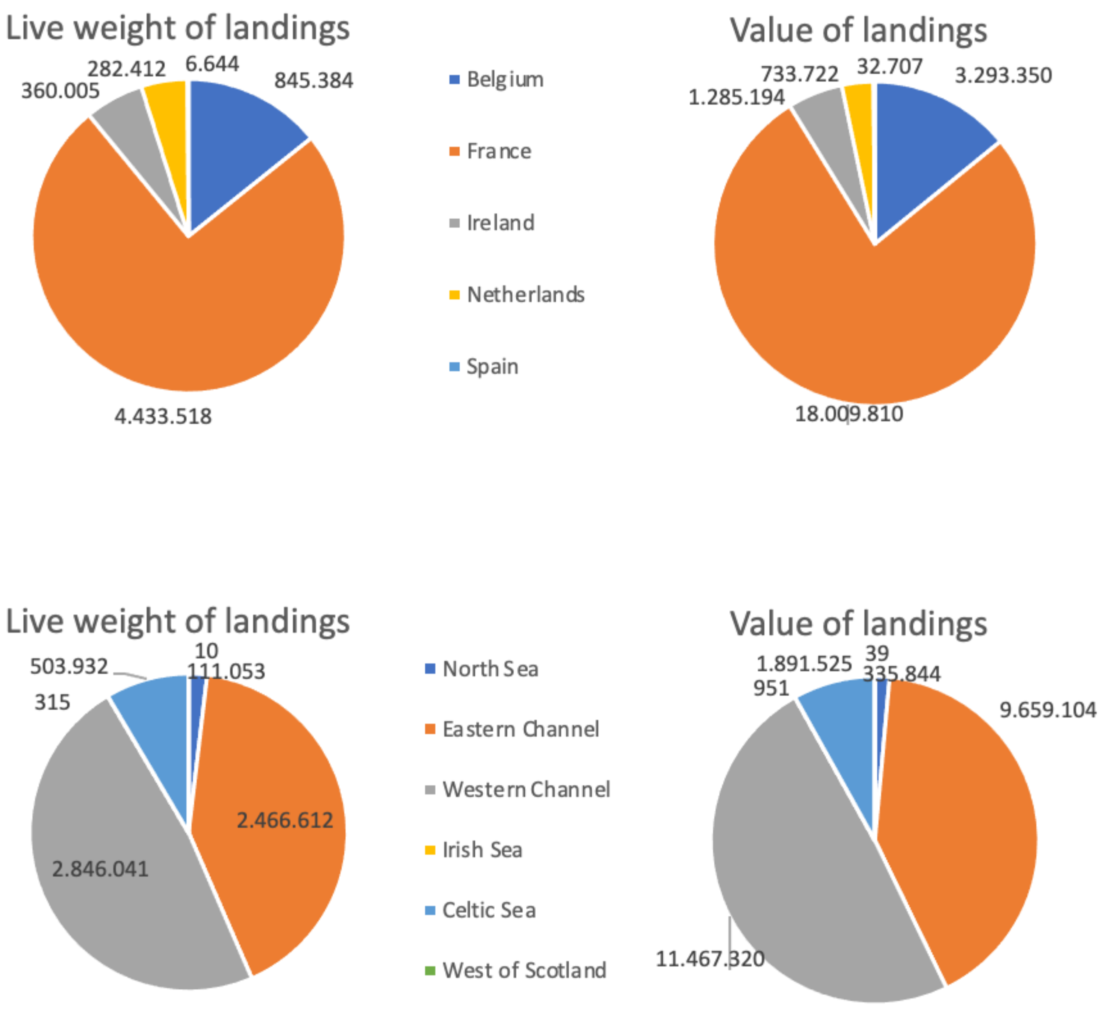


Figure 3-27 Live weight and value of landings of cuttlefish in the six sea basins and MS

3.3.1 Factsheet cuttlefish North Sea (ICES div. 27.4a,b,c)

Facts at a glance

Landings:

89 to 381 t y^{-1}

Value:

335844 EUR

Assessment:

No

Countries:

NLD > FRA > BEL

Gears:

TBB > GTR > OTB > FPO

Target/Bycatch species:

Target (2%) / Bycatch (98%)

Data issues:

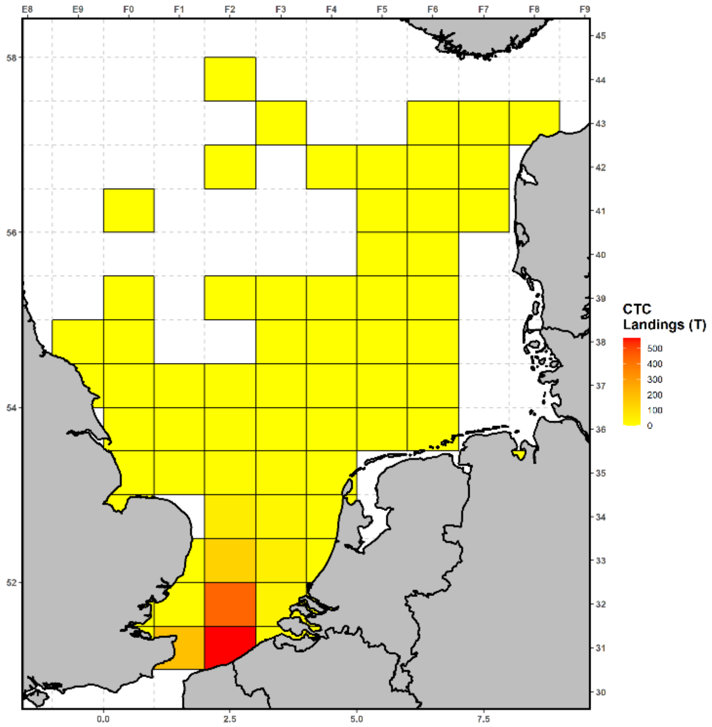
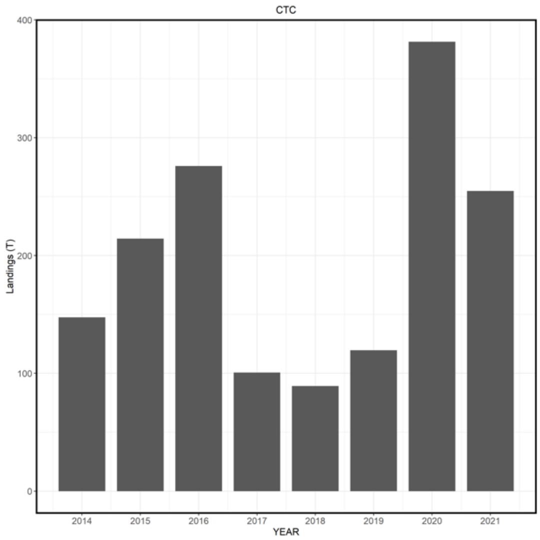


Figure 3-28 Landings of cuttlefish in the North Sea by ICES rectangle

No info on discarding



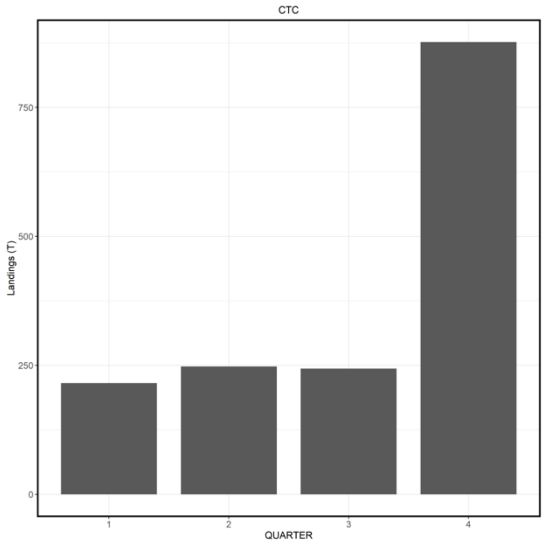


Figure 3-29 Landings of cuttlefishby year and quarter in the North Sea

Fishing activity

Cuttlefish is mainly caught as bycatch of beam trawlers in mixed fisheries.

Data collection

Information from scientific trawl surveys on cuttlefish abundance is available through the ICES DATRAS portal. The STECF FDI database comprises information on landings.

Stock assessment

To our knowledge, no assessments have been conducted for cuttlefish in the North Sea.

Fisheries management measures

There are no technical measures, specifically designed for cuttlefish management, at the European level.

Additional information, e.g. ecosystem knowledge

The spatial distribution of cephalopods is known to be affected by environmental drivers. Notably, sea water temperature is supposed to have a major effect causing a north-eastwards shift of the stock in the North Sea (Schikele et al., 2021).

3.3.2 *Factsheet cuttlefish* *Eastern English Channel (ICES div. 27.7d)*

Facts at a glance

Landings:

1521 to 2952 t y^{-1}

Value:

9659 thousand EUR

Assessment:

No

Countries:

FRA > BEL > NLD

Gears:

OTB > TBB > FPO > SSC > DRB > SDN

Target/Bycatch species:

Target (23%) / Bycatch (77%)

Data issues:

No info on discarding

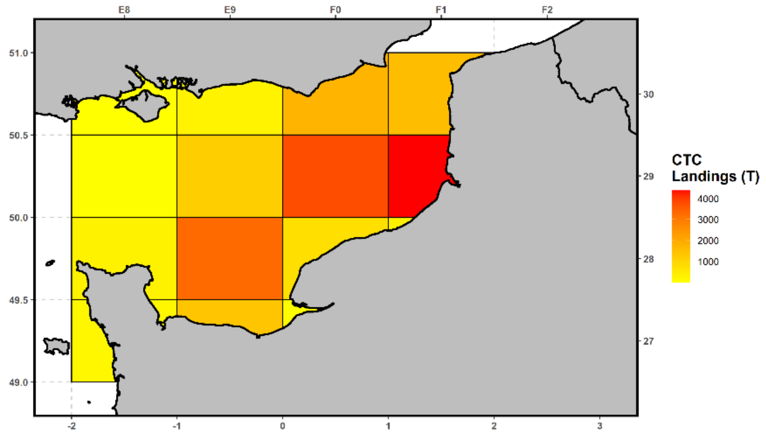


Figure 3-30 Landings of cuttlefish in the Eastern English Channel by ICES rectangle

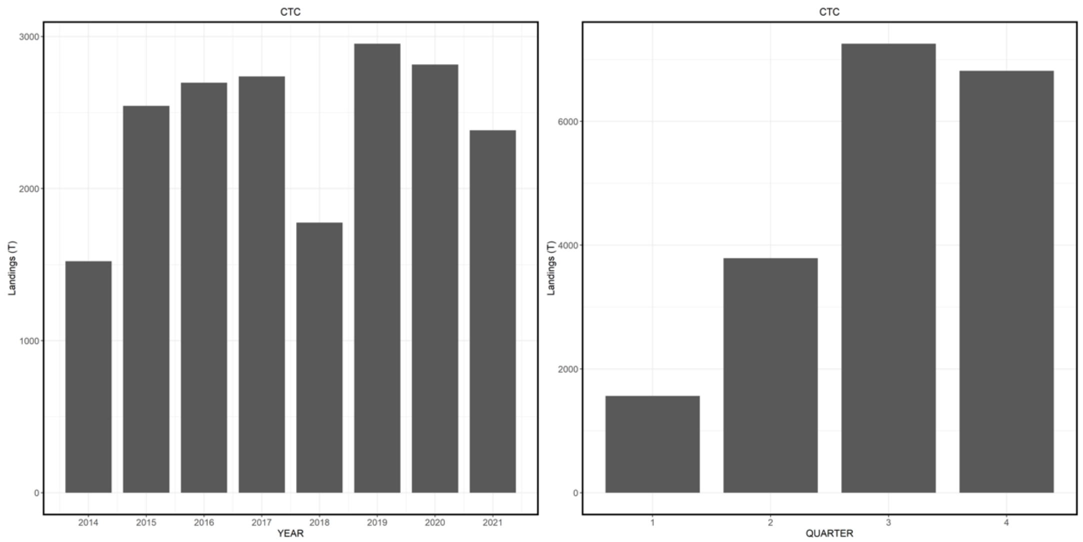


Figure 3-31 Landings of cuttlefish by year and quarter in the Eastern English Channel

Fishing activity

Cuttlefish is mainly caught as a bycatch by demersal trawlers in mixed fisheries. There is also a target fishery using fykes, Scottish and Danish seines.

Data collection

Information from scientific trawl surveys on cuttlefish abundance is available through the ICES DATRAS portal. The STECF FDI database comprises information on landings.

Stock assessment

A two-stage biomass model has been applied to the cuttlefish stock across the English Channel for the period 1992 - 2008. A high variability in abundance was observed over the time series, with a decline over the most recent years. There was no indication of overexploitation during that study period. No stock recruitment relationship was found, however, it appeared that recruitment was mainly driven by sea-surface temperature (Gras et al. 2014).

Fisheries management measures

There are no technical measures, specifically designed for cuttlefish management, at the European level.

Additional information, e.g. ecosystem knowledge

The spatial distribution of cephalopods is known to be affected by environmental drivers. Notably, sea water temperature is supposed to have a major effect causing an eastward shift of the stock (Schikele et al., 2021).

Facts at a glance

Landings:

1801 to 3989 t y^{-1}

Value:

11467 thousand EUR

Assessment:

No

Countries:

FRA > BEL > IRL

Gears:

OTB > FPO > OTT > TBB > DRB

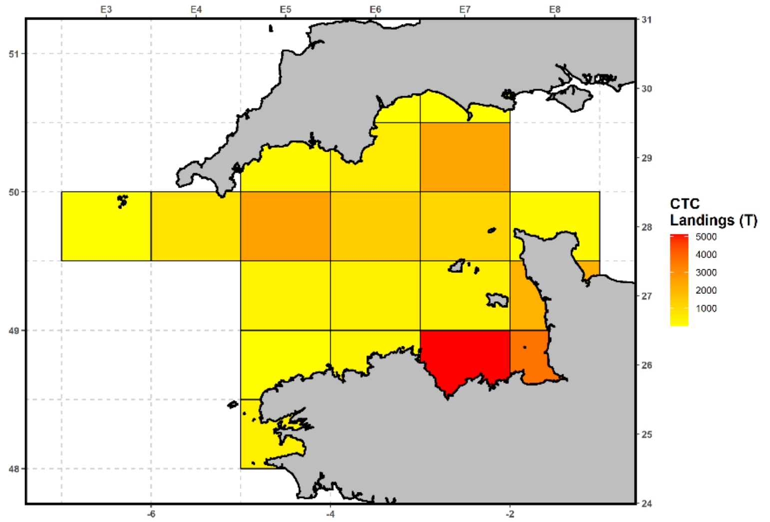


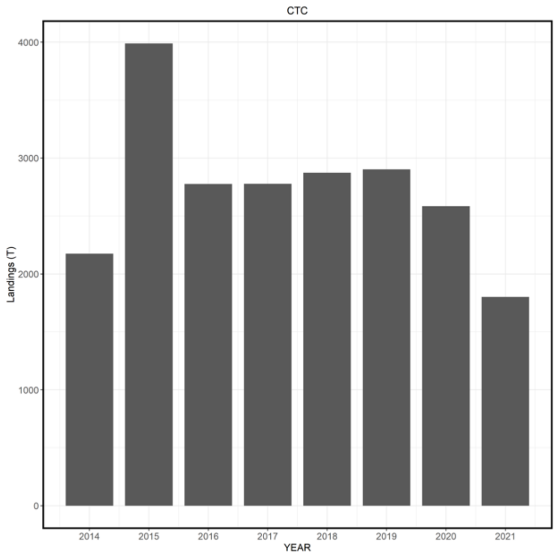
Figure 3-32 Landings of cuttlefish in the Western English Channel by ICES rectangle

Target/Bycatch species:

Target (9%) / Bycatch (91%)

Data issues:

No info on discarding



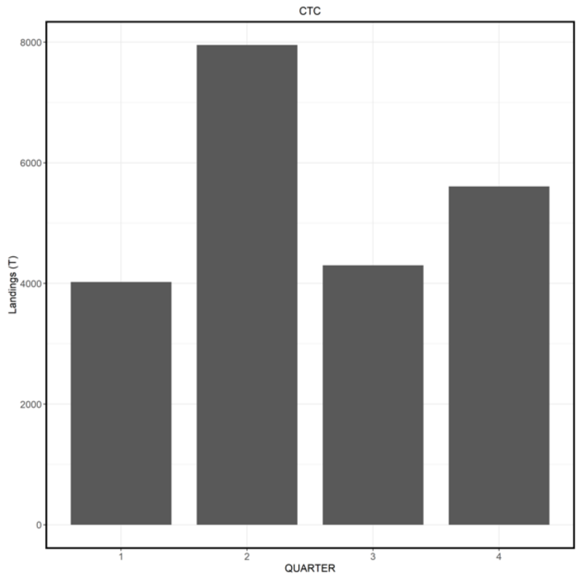


Figure 3-33 Landings of cuttlefish by year and quarter in the Eastern English Channel

Fishing activity

Cuttlefish is mainly caught as a bycatch by demersal trawlers in mixed fisheries. There is also a directed fishery for cuttlefish in the Western English Channel by Scottish seines and fykes.

Data collection

Information from scientific trawl surveys on cuttlefish abundance is available through the ICES DATRAS portal. The STECF FDI database comprises information on landings.

Stock assessment

A two-stage biomass model has been applied to the cuttlefish stock across the English Channel for the period 1992 - 2008. A high variability in abundance was observed over the time series, with a decline over the most recent years. There was no indication of overexploitation during that study period. No stock recruitment relationship was found, however, it appeared that recruitment was mainly driven by sea-surface temperature.

Fisheries management measures

There are no technical measures, specifically designed for cuttlefish management, at the European level.

Additional information, e.g. ecosystem knowledge

The spatial distribution of cephalopods is known to be affected by environmental drivers. Notably, sea water temperature is supposed to have a major effect causing an eastward shift of the stock (Schikele et al., 2021).

3.3.4 Factsheet cuttlefish *Celtic Sea (ICES div. 27.7f,g,h,j)*

Facts at a glance

Landings:

267 to 867 t y^{-1}

Value:

1892 thousand EUR

Assessment:

No

Countries:

FRA > BEL

Gears:

OTB > OTT > TBB

Target/Bycatch species:

Target (15%) / Bycatch (85%)

Data issues:

No info on discarding

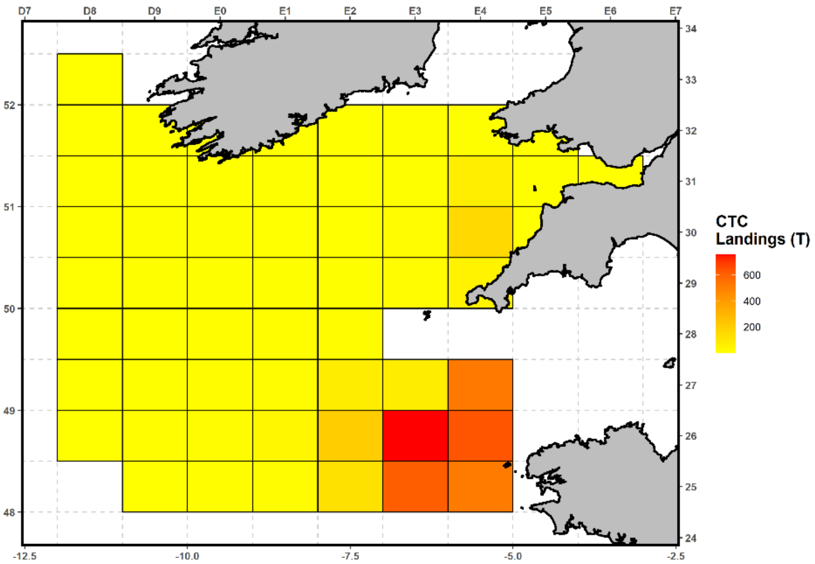


Figure 3-34 Landings of cuttlefish in the Celtic Sea by ICES rectangle

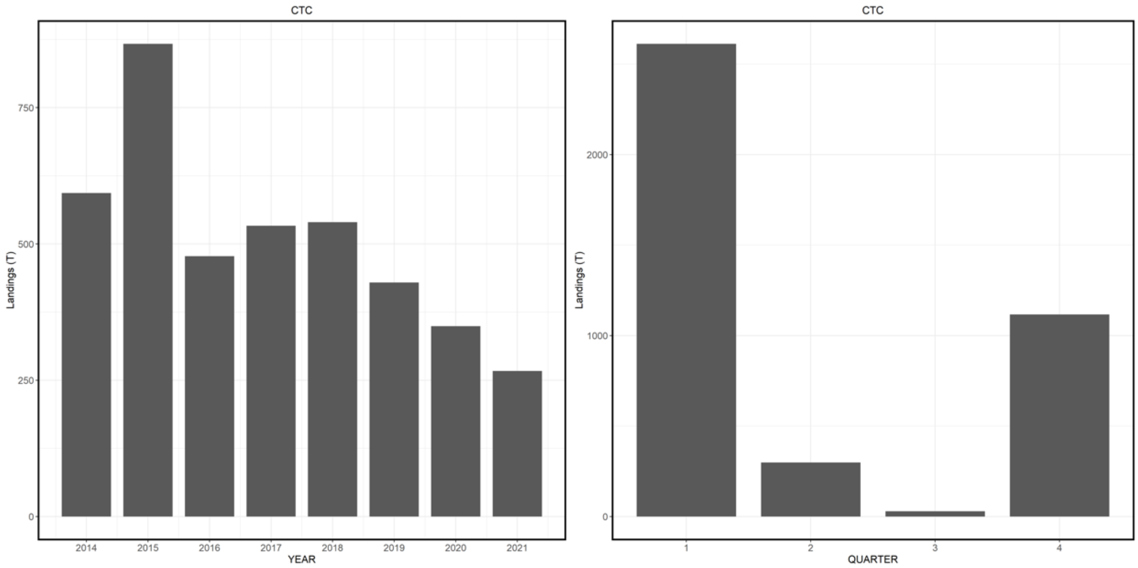


Figure 3-35 Landings of cuttlefish by year and quarter in the Celtic Sea

Fishing activity

Cuttlefish is mainly caught as a bycatch by demersal trawlers in mixed fisheries. There is also a directed fishery for cuttlefish in the Celtic Sea using fykes and Scottish seines.

Data collection

Information from scientific trawl surveys on cuttlefish abundance is available through the ICES DATRAS portal. The STECF FDI database comprises information on landings.

Stock assessment

To our knowledge, no assessments have been conducted for cuttlefish in the Celtic Sea.

Fisheries management measures

There are no technical measures, specifically designed for cuttlefish management, at the European level.

Additional information, e.g. ecosystem knowledge

The spatial distribution of cephalopods is known to be affected by environmental drivers. Notably, sea water temperature is supposed to have a major effect causing a northward shift of the stock (Schikele et al., 2021).

3.3.5 Factsheet cuttlefish West of Scotland (ICES div. 27.6a)

Facts at a glance

Landings:

0.005 to 0.146 t y^{-1}

Value:

39 EUR

Assessment:

No

Countries:

FRA

Gears:

GNS > OTB

Target/Bycatch species:

Bycatch

Data issues:

No info on discarding

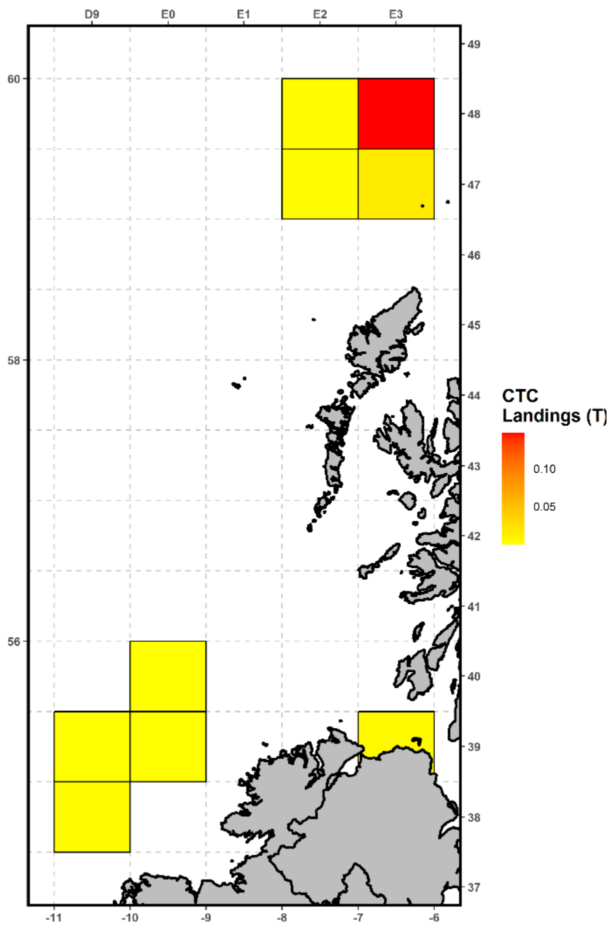


Figure 3-36 Landings of cuttlefish in the West of Scotland by ICES rectangle

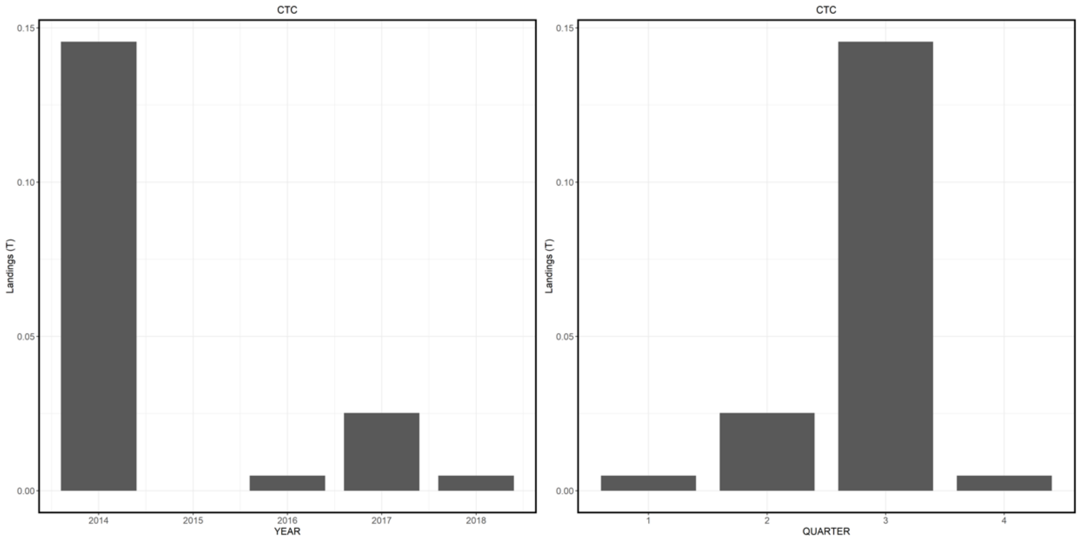


Figure 3-37 Landings of cuttlefish by year and quarter in the West of Scotland

Fishing activity

Cuttlefish landings are negligible in the West of Scotland.

Data collection

Information from scientific trawl surveys on cuttlefish abundance is available through the ICES DATRAS portal. The STECF FDI database comprises information on landings.

Stock assessment

To our knowledge, no assessments have been conducted for cuttlefish in the North Sea.

Fisheries management measures

There are no technical measures, specifically designed for cuttlefish management, at the European level.

Additional information, e.g. ecosystem knowledge

The spatial distribution of cephalopods is known to be affected by environmental drivers. Notably, sea water temperature is supposed to have a major effect causing a northward shift of the stock (Schikele et al., 2021).

References

Schickele, A., Francour, P. & Raybaud, V. 2021. European cephalopods distribution under climate-change scenarios. *Sci Rep,* 11: 3930. https://doi.org/10.1038/s41598-021-83457-w

Gras, M., Beatriz A. R., Coppin, F., Foucher, E. & J.-P. Robin, 2014. A two-stage biomass model to assess the English Channel cuttlefish (*Sepia officinalis* L.) stock. *ICES Journal of Marine Science*, 71 (9): 2457–2468. https://doi.org/10.1093/icesjms/fsu081

3.4 Factsheet red gurnard (*Chelidonichthys cuculus*, GUR), Grey gurnard (*Eutrigla gurnardus*, GUG), Tub gurnard (*C. lucerna*, GUU), "GUX", "SRA"

Facts at a glance

Landings:

6 400 to 11 200 t annually

Value:

Fishing areas:

North Sea, Eastern and Western Channel, Celtic Sea, Irish Sea, West of Scotland

Countries:

BEL, DEU, DNK, ESP, FRA, IRL, NLD, SWE

Gears:

OTB, TBB, SSC, OTM, SDN

Data issues:

Species misidentification and reporting of gurnard groups continues to be a problem in estimating the landings and discards of red, tub and grey gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

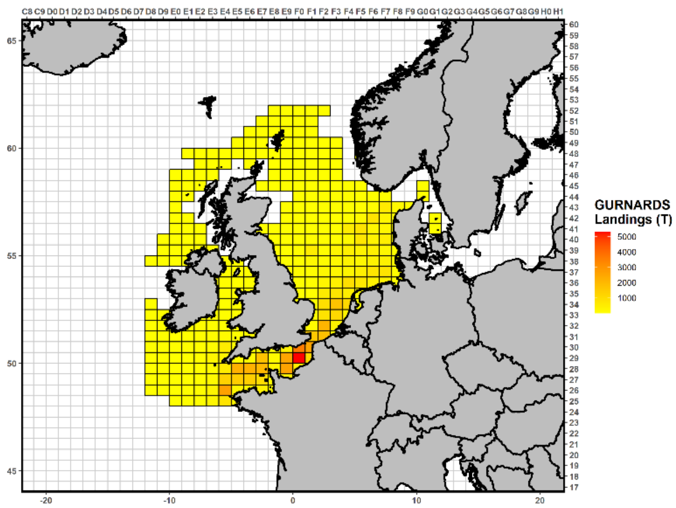


Figure 3-38 Landings of gurnards in the six sea basins by ICES rectangle

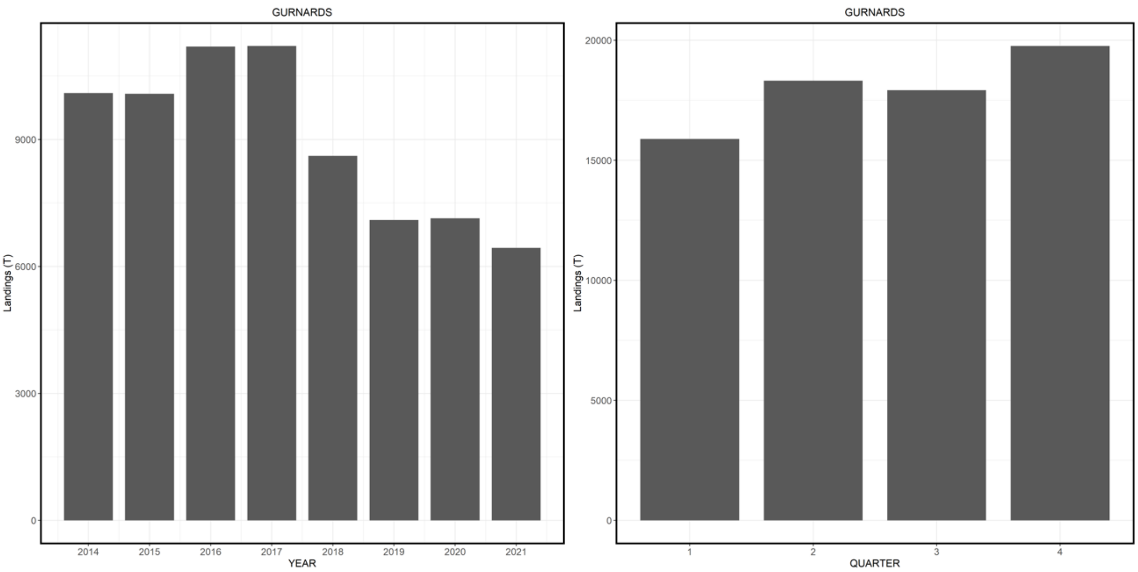


Figure 3-39 Landings of gurnard by year and quarter for all sea basins

Table 3-9 Landings of all gurnard species by ICES statistical rectangle. Data from AER

ICES rectangles	Live weight of landings	Landings value
27.4.a	25052	12388
27.4.b	6153606	5122673
27.4.c	4863422	7504268
27.6.a	140643	176241
27.7.a	62847	56492
27.7.d	7411260	10695742
27.7.e	5413224	4680326
27.7.f	471126	384035
27.7.g	256355	238868
27.7.h	1948337	1561542
27.7.j	63431	84377
27.7.j.2	4156	22558
Grand Total	26813458	30539510

Table 3-10 Landings of all gurnard species by country, including the UK. Data from AER.

Country	Live weight of landings			Landings value		
	2017	2018	2019	2017	2018	2019
Belgium	1539666	978171	827318	1947574	1221463	947737
Denmark	2138764	470948	332708	403772	136041	127198
France	3399597	3833465	3174940	3664548	3827982	3320480
Germany	162773	115483	127191	207448	130795	162663
Ireland	113024	109261	58777	140815	113045	43928
Netherlands	3841423	3071159	2419322	5625197	4601979	3811671
Spain	4170	14397	5552	22704	40168	19893
Sweden	7602	16435	51310	1532	3890	16987
EU Total	11207020	8609320	6997118	12013589	10075363	8450558
United Kingdom	2131766	2169969	2591653	2166283	2204898	2690589
Grand Total	13338786	10779289	9588771	14179872	12280261	11141147

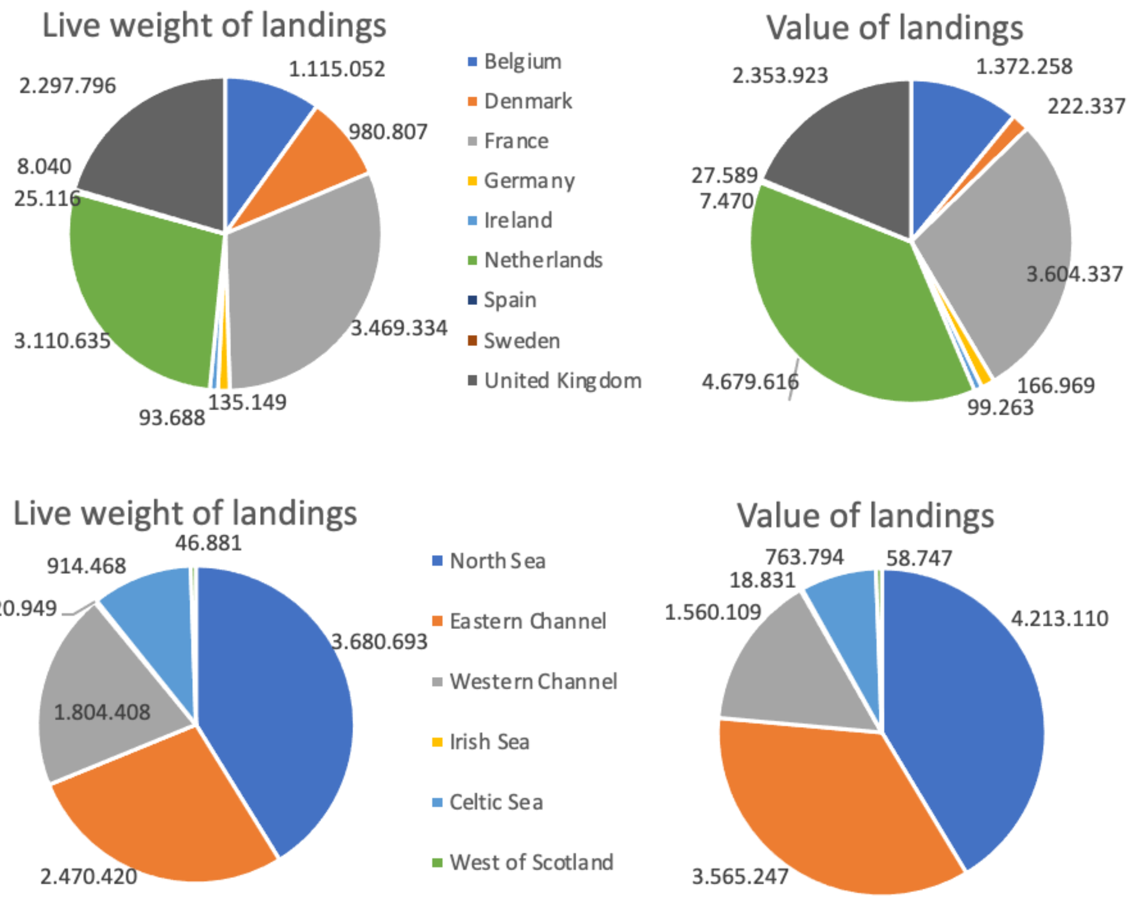


Figure 3-40 Live weight and value of landings of gurnard in the six sea basins and MS

Table 3-11 Main fleets landing all gurnard species combined. Data from AER.

Fleet	Live weight of landings	Value of landings
NLD NAO DTS2440	5,561,858	8,817,929
FRA NAO DTS2440	5,099,079	5,067,170
FRA NAO DTS1824	4,051,627	4,176,498
NLD NAO TBB40XX	2,912,303	3,991,450
BEL NAO TBB2440	2,230,604	2,266,549
BEL NAO DTS2440	707,842	1,359,352
NLD NAO TBB2440	598,464	852,663
FRA NAO DTS1218	403,511	552,510
BEL NAO TBB1824	405,592	488,649
DEU NAO TBB2440	268,772	330,368
Other	4,573,807	2,636,371
Total	26,813,458	30,539,510

Facts at a glance

Landings:
2 200 to 5 500 t annually

Value:
4213 thousand EUR

Assessment:
Yes (red gurnard, grey gurnard)

Countries:
BEL, DEU, DNK, FRA, IRL, NLD, SWE

Gears:
TBB, SSC, OTB, OTM

Target/Bycatch species:
Both

Threats:
Gurnards are potentially exerting a strong predation pressure on juveniles of … commercially exploited fish species (e.g. cod and whiting).

Data issues:
Species misidentification and reporting of gurnard groups continues to be a problem in estimating the landings and discards of red, tub and grey gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

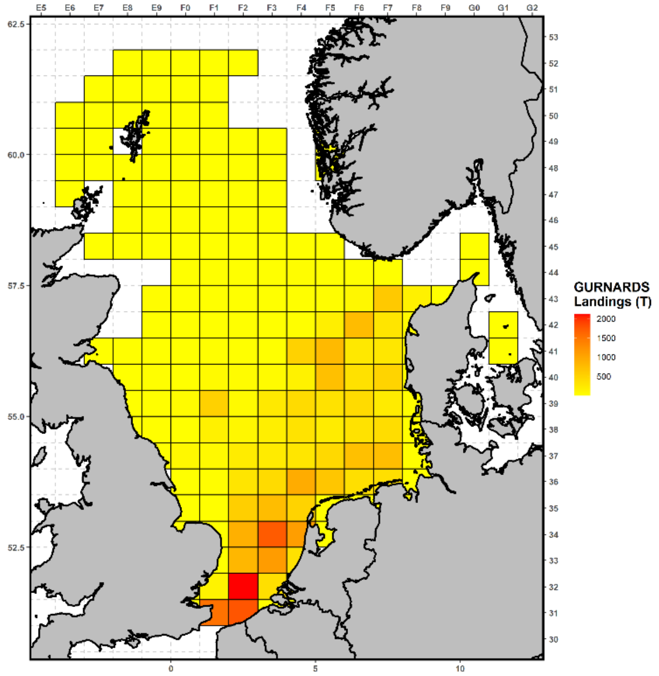


Figure 3-41 Landings of gurnards in the North Sea by ICES rectangle

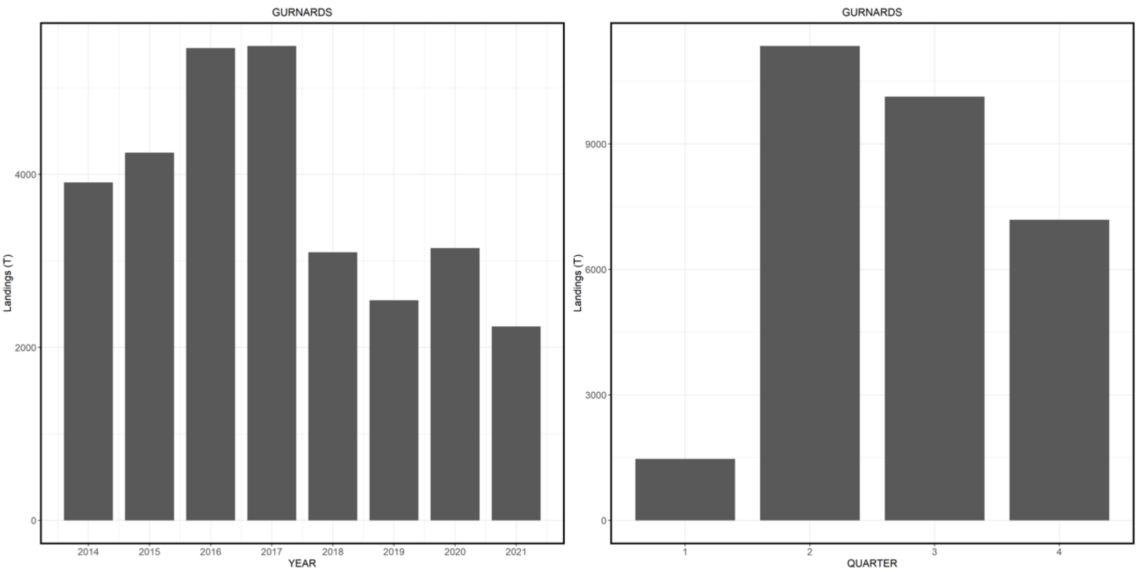


Figure 3-42 Landings of gurnards by year and quarter in the North Sea

Fishing activity

Gurnards are mainly caught as a by-catch by demersal trawlers in mixed fisheries.

Data collection

Information on gurnards abundance is available in DATRAS for the International Bottom Trawl Survey in quarters 1 and 3 (International Bottom Trawl Survey (NS-IBTS 1Q + 3Q) (ICES 2021b).

Stock assessment

Red gurnard

ICES cannot assess the stock and exploitation status relative to MSY and precautionary approach (PA) reference points because the reference points are undefined.

A biomass index (for ICES subareas 3 – 8) shows an increasing trend up to the mid-2000s, and since then it has fluctuated without trend. However, without accurate landings data resolved to species level and reliable information on discards it is not possible to provide catch scenarios (ICES 2021c).

Grey gurnard

ICES gives advice on fishing opportunities for this stock (in Subarea 4 and divisions 7.d and 3.a - North Sea, eastern English Channel, Skagerrak and Kattegat). A survey combined biomass index is used as an indicator of stock development. The advice is based on the ratio of the mean of the last two index values (index A) and the mean of the three preceding values (index B), multiplied by the recent catches, a biomass safeguard, and a precautionary multiplier. The discard rate (average 2019-2021) was 81% of the total catch (ICES Advice 2022, in prep).

Fisheries management measures

According to ICES (ICES 2021a), there is currently no technical measure specifically applied to red gurnard or other gurnard species. The exploitation of red gurnard is submitted to the general regulation in the areas where they are caught. There is no minimum landing size.

Additional information, e.g. ecosystem knowledge

The diet of larger specimens of grey gurnard is dominated by a variety of fish species (de Gee & Kikkert 1993, Floeter et al. 2005). The fish component of the diet largely consists of juveniles (0- and 1-group) of commercially exploited species such as cod, whiting, sandeel and sole. Off Jutland, grey gurnard appeared to be a major predator on pelagic 0-group cod during June July.

A multispecies virtual population analysis (MSVPA) in 1997 estimated grey gurnard to be responsible for approximately 60% of the total predation mortality on age-0 Atlantic cod (*Gadus morhua*). Further, it was shown that grey gurnard predation had a significant top-down effect on whiting (*Merlangius merlangus*) and potentially also on cod recruitment, which was linked to the spatial distribution of the three gurnard species (Floeter et al. 2005).

Facts at a glance

Landings:
1 500 to 3 200 t annually

Value:
3565 thousand EUR

Assessment:
Yes (red gurnard, grey gurnard)

Countries:
BEL, DEU, FRA, IRL, NLD

Gears:
SSC, OTB, TBB, SDN

Target/Bycatch species:
Both

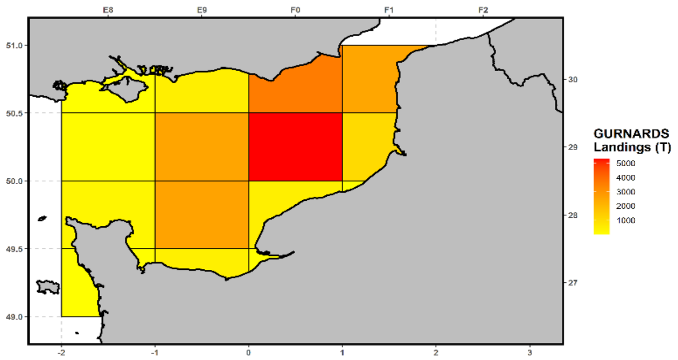


Figure 3-43 Landings of gurnards in the Eastern English Channel by ICES rectangle

Data issues:

Species misidentification and reporting of gurnard groups continues to be a problem in estimating the landings and discards of red, tub and grey gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

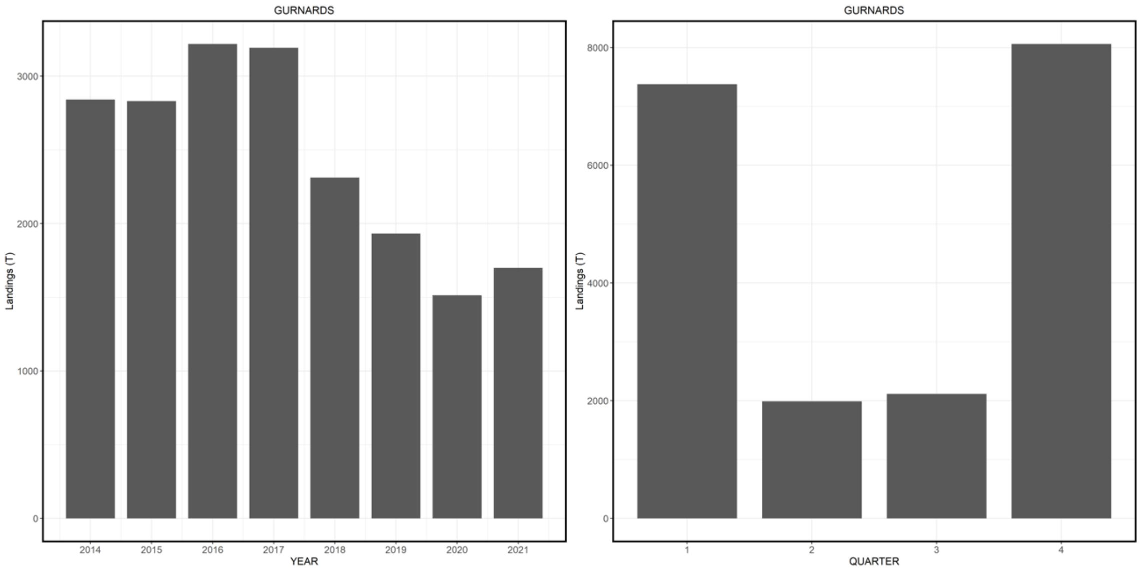


Figure 3-44 Landings of gurnards by year and quarter in the Eastern English Channel

Fishing activity

Gurnards are mainly caught as by-catch by demersal trawlers in mixed fisheries.

Data collection

The French Channel Groundfish Survey (CGFS) covers the eastern half of the Channel (Division 7d) (ICES 2021b).

Stock assessment

Red gurnard

ICES cannot assess the stock and exploitation status relative to MSY and precautionary approach (PA) reference points because the reference points are undefined.

A biomass index (for ICES subareas 3 – 8) shows an increasing trend up to the mid-2000s, and since then it has fluctuated without trend. However, without accurate landings data resolved to species level and reliable information on discards it is not possible to provide catch scenarios (ICES 2021c).

Grey gurnard

ICES gives advice on fishing opportunities for this stock (in Subarea 4 and divisions 7.d and 3.a - North Sea, eastern English Channel, Skagerrak and Kattegat). A survey combined biomass index is used as an indicator of stock development. The advice is based on the ratio of the mean of the last two index values (index A) and the mean of the three preceding values (index B), multiplied by the recent catches, a biomass safeguard, and a precautionary multiplier. The discard rate (average 2019-2021) was 81% of the total catch (ICES Advice 2022, in prep).

Fisheries management measures

NA

3.4.3 Fact Sheet gurnard complex Western English Channel (ICES div. 7d)

Facts at a glance

Landings:
1 500 to 2 100 t annually

Value:
1560 thousand EUR

Assessment:
Yes (red gurnard)

Countries:
BEL, ESP, FRA, IRL, NLD

Gears:
OTB, TBB, SSC

Target/Bycatch species:
Both

Data issues:

Species misidentification and reporting of gurnard groups continues to be a problem in estimating the landings and discards of red, tub and grey gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

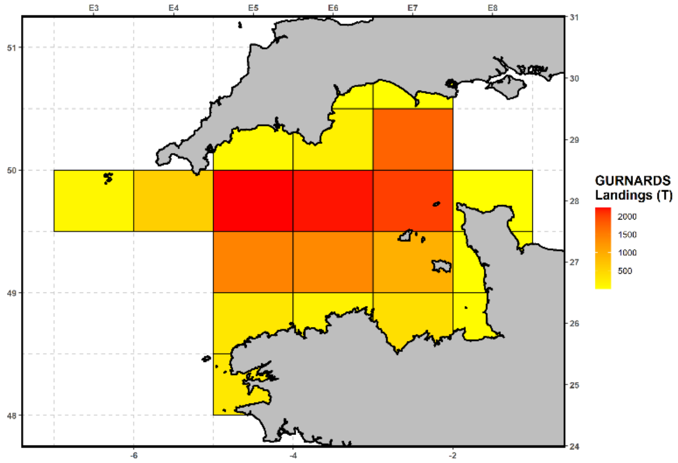


Figure 3-45 Landings of gurnards in the Western English Channel by ICES rectangle

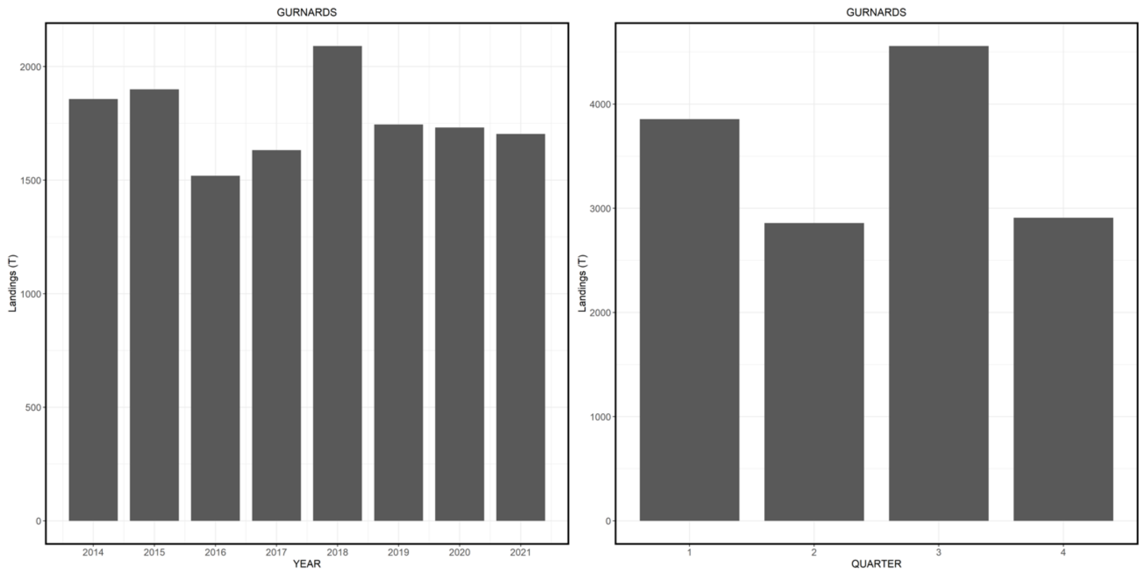


Figure 3-46 Landings of gurnards by year and quarter in the Western English Channel

Fishing activity

Gurnards are mainly caught as by-catch by demersal trawlers in mixed fisheries.

Data collection

Data exists on the abundance of red gurnard in the western English Channel in the English Channel Beam Trawl Survey series from 2006 to present, however it has not yet been processed in such a way that it can provide an index (ICES 2021b).

Stock assessment

ICES is assessing the stock status of red gurnard in the Northeast Atlantic (ICES subareas 3-8):

ICES cannot assess the stock and exploitation status relative to MSY and precautionary approach (PA) reference points because the reference points are undefined.

A biomass index shows an increasing trend up to the mid-2000s, and since then it has fluctuated without trend. However, without accurate landings data resolved to species level and reliable information on discards it is not possible to provide catch scenarios (ICES 2021c).

Fisheries management measures

NA

Additional information, e.g. ecosystem knowledge

NA

3.4.4 Fact Sheet gurnard complex Irish Sea (ICES div. 7a)

Facts at a glance

Landings:
7 to 29 t annually

Value:
18,831EUR

Assessment:
Yes (Red gurnard)

Countries:
BEL, FRA, IRL, NLD

Gears:
TBB, OTB, SSC

Target/Bycatch species:
Both

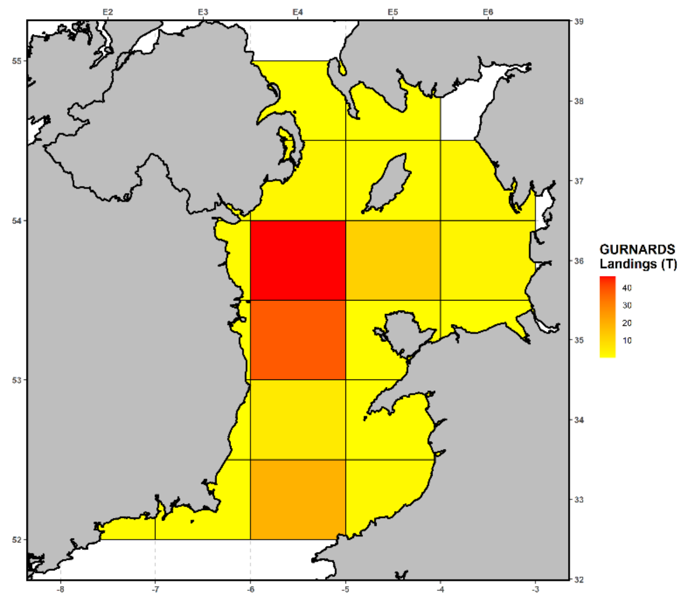


Figure 3-47 Landings of gurnards in the Irish Sea by ICES rectangle

Data issues:

Species misidentification and reporting of gurnard groups continues to be a problem in estimating the landings and discards of red, tub and grey gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

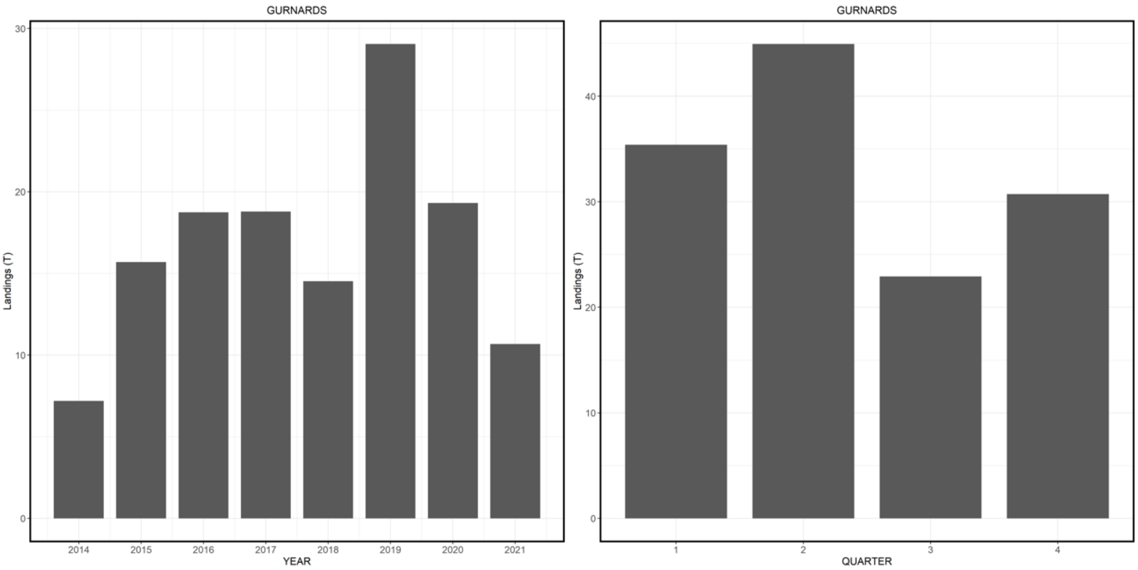


Figure 3-48 Landings of gurnards by year and quarter in the Irish Sea

Fishing activity

Gurnards are mainly caught as by-catch by demersal trawlers in mixed fisheries.

Data collection

Data exists on the abundance of red gurnard from the Beam Trawl Survey - Irish Sea (VIIa) and the Northern Irish ground fish survey (NIGFS) (ICES 2021b).

Stock assessment

ICES is assessing the stock status of red gurnard in the Northeast Atlantic (ICES subareas 3-8):

ICES cannot assess the stock and exploitation status relative to MSY and precautionary approach (PA) reference points because the reference points are undefined.

A biomass index shows an increasing trend up to the mid-2000s, and since then it has fluctuated without trend. However, without accurate landings data resolved to species level and reliable information on discards it is not possible to provide catch scenarios (ICES 2021c).

Fisheries management measures

NA

Additional information, e.g. ecosystem knowledge

NA

3.4.5 Fact Sheet gurnard complex   Celtic Sea (ICES div. 7f,g,h,j)

Facts at a glance

Landings:
710 to 1 500 t annually

Value:
763794 EUR

Assessment:
Yes (Red gurnard)

Biomass index based on several surveys

Countries:
BEL, DEU, ESP, FRA, IRL, NLD

Gears:
OTB, TBB, OTT

Target/Bycatch species:
Both

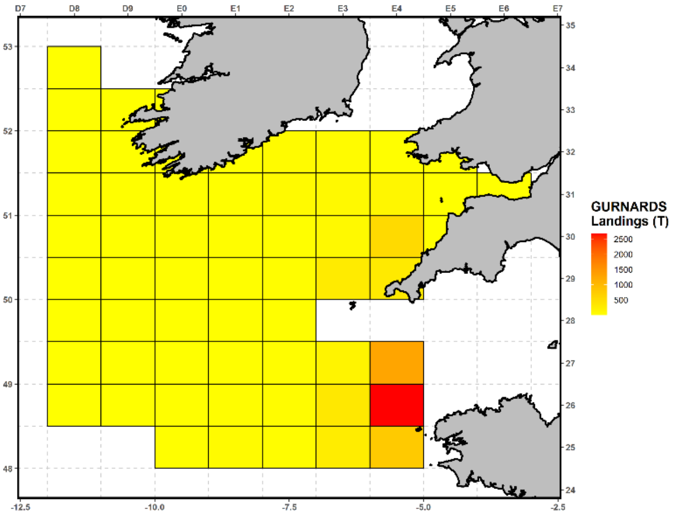


Figure 3-49 : Landings of gurnards in the Irish Sea by ICES rectangle

Data issues:
Species misidentification and reporting of gurnard groups continues to be a problem in estimating the landings and discards of red, tub and grey gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

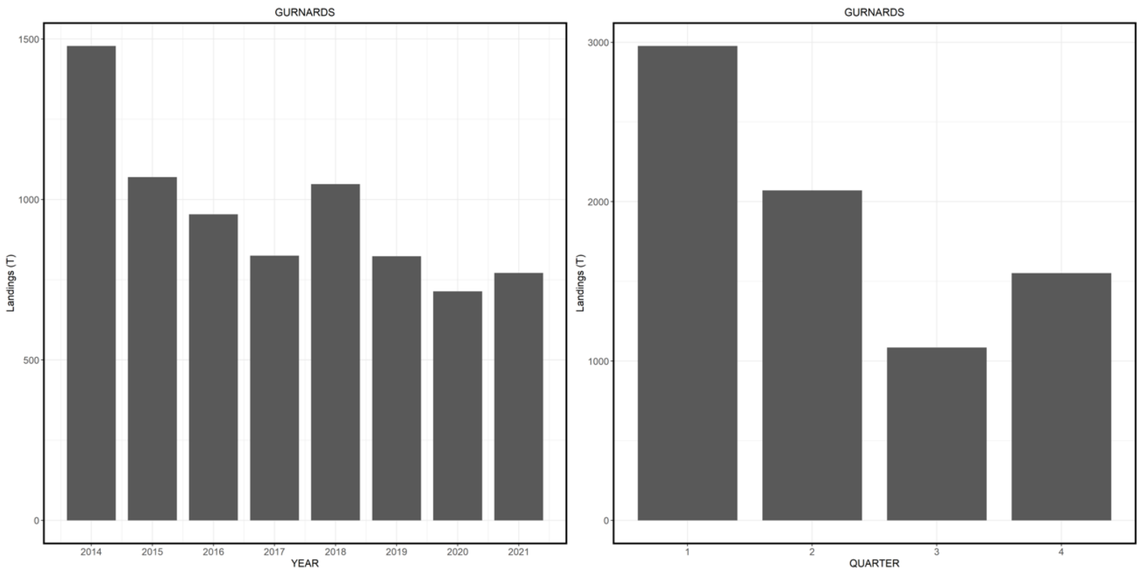


Figure 3-50 Landings of gurnards by year and quarter in the Celtic Sea

Fishing activity (including gear description)

Gurnards are mainly caught as by-catch by demersal trawlers in mixed fisheries.

Data collection

The French survey “Evaluation Halieutique Ouest de l'Europe” (EVHOE) is a bottom trawl survey which has covered the waters to the south of Ireland, southwest of the UK and down the west coast of France, annually, since 1998. Data are not available for 2017 due to disruption in the survey. This survey covers the core area from which landings are reported, and as such is probably the indicator which will correspond most closely to the “fished stock” (ICES 2021b).

Stock assessment

ICES is assessing the stock status of red gurnard in the Northeast Atlantic (ICES subareas 3-8):

ICES cannot assess the stock and exploitation status relative to MSY and precautionary approach (PA) reference points because the reference points are undefined.

A biomass index shows an increasing trend up to the mid-2000s, and since then it has fluctuated without trend. However, without accurate landings data resolved to species level and reliable information on discards it is not possible to provide catch scenarios (ICES 2021c).

Fisheries management measures

NA

Additional information, e.g. ecosystem knowledge

NA

3.4.6 *Fact Sheet gurnard complex* *West of Scotland (ICES div. 6a)*

Facts at a glance

Landings:

8 to 57 t annually

Value:

58,747 EUR

Assessment:

Yes (red gurnard)

Countries:

DEU, DNK, ESP, FRA, IRL, NLD

Gears:

PTM, OTM, OTB

Target/Bycatch species:

NA

Data issues:

Species misidentification and reporting of gurnard groups continues to be a problem in estimating the landings and discards of red, tub and grey gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

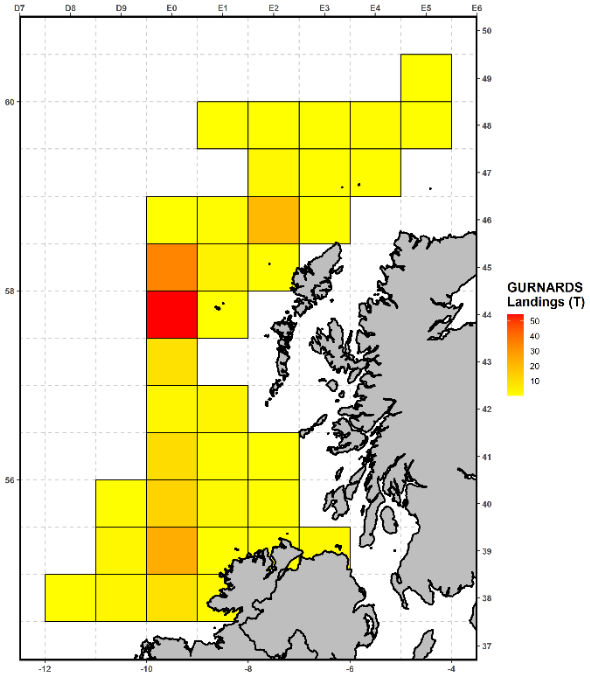


Figure 3-51 Landings of gurnards in the West of Scotland by ICES rectangle

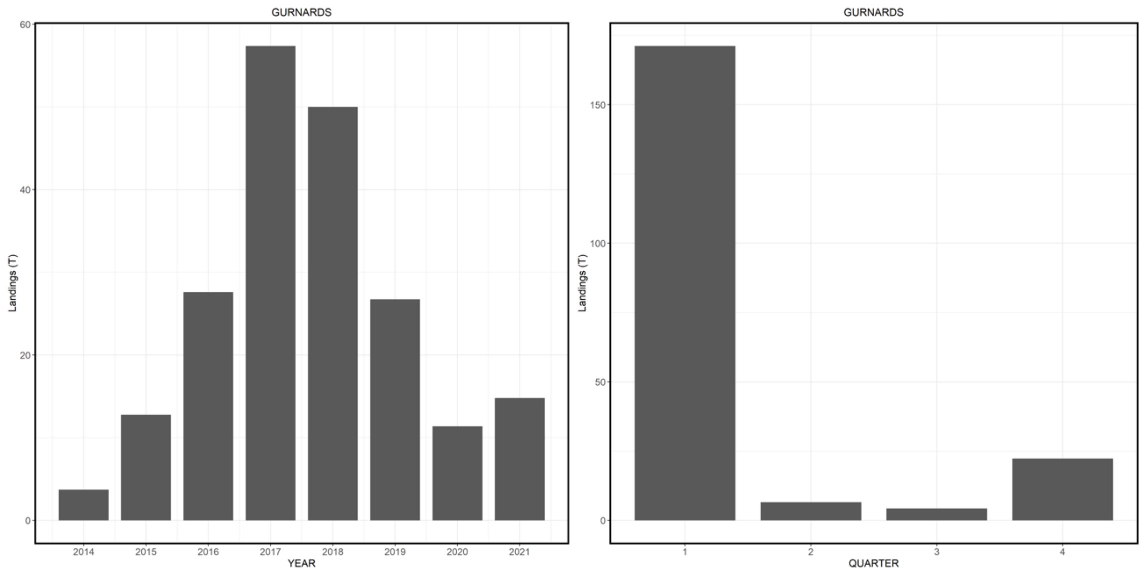


Figure 3-52 Landings of gurnard by year and quarter in the West of Scotland

Fishing activity (including gear description)

Gurnards are mainly caught as by-catch by demersal trawlers in mixed fisheries.

Data collection

The Scottish West Coast IBTS survey took place during quarter 1 of 1985–2010, and quarter 4 of 1990–2009. This survey was initially intended to cover the fishing grounds on the continental shelf to the west of Scotland; in 1996 the survey area was extended to include stations in the northern Irish Sea. This survey was replaced in both quarters from 2011 onwards by the Scottish West Coast Groundfish Survey (ICES 2021b).

Stock assessment

ICES is assessing the stock status of red gurnard in the Northeast Atlantic (ICES subareas 3-8):

ICES cannot assess the stock and exploitation status relative to MSY and precautionary approach (PA) reference points because the reference points are undefined.

A biomass index shows an increasing trend up to the mid-2000s, and since then it has fluctuated without trend. However, without accurate landings data resolved to species level and reliable information on discards it is not possible to provide catch scenarios (ICES 2021c).

Fisheries management measures

NA

Additional information, e.g. ecosystem knowledge

NA

References

Floeter, J., Kempf, A., Vinther, M., Schrum, C., & Temming, A. (2005). Grey gurnard (*Eutrigla gurnadus*) in the North Sea: an emerging key predator? Can. J. Fish. Aquat.: 62(8), 1853-1864. https://doi.org/10.1139/f05-108.

Gee, T. de, and Kikkert, A. (1993). Analysis of the grey gurnard (*Eutrigla gurnardus*) samples collected during the 1991 International Stomach Sampling Project. ICES CM 1993/G:14. 26 pp.

ICES (2021a). Working Group on Widely Distributed Stocks (WGWIDE). ICES Scientific Reports. 3:95. 874 pp. http://doi.org/10.17895/ices.pub.8298.

ICES (2021b). Benchmark Workshop on selected stocks in the Western Waters in 2021 (WKWEST). ICES Scientific Reports. 3:31. 504 pp. https://doi.org/10.17895/ices.pub.8137.

ICES (2021c). Red gurnard (*Chelidonichthys cuculus*) in subareas 3-8 (Northeast Atlantic). In Report of the ICES Advisory Committee, 2021. ICES Advice 2021, gur.27.3-8, https://doi.org/10.17895/ices.advice.7757.

3.5 Red gurnard (Chelidonichthys cuculus, "GUR")

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Facts at a glance

Landings:
2 400 to 4 100 t annually

Value:

Fishing areas:
North Sea, Eastern and Western Channel, Celtic Sea, Irish Sea, West of Scotland

Countries:
BEL, DEU, ESP, FRA, IRL, NLD

Gears:
OTB, TBB, SSC

Data issues:
Species misidentification and reporting of gurnard groups continues to be a problem in estimating the landings and discards of red gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

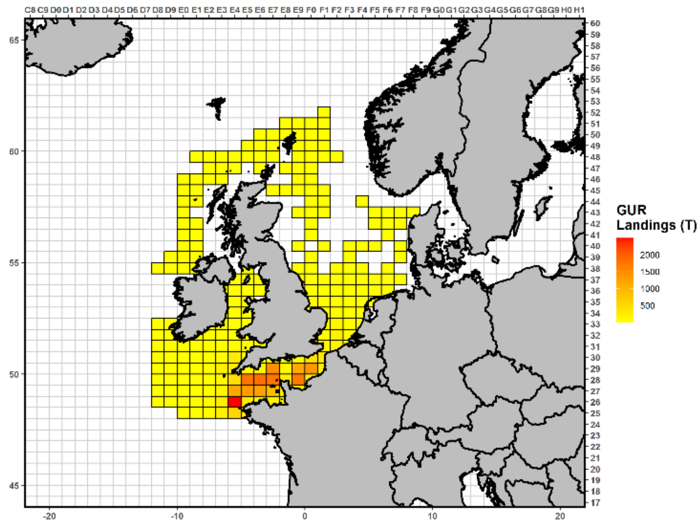

Figure 3-53 Landings of red gurnard in the six sea basins by ICES rectangle

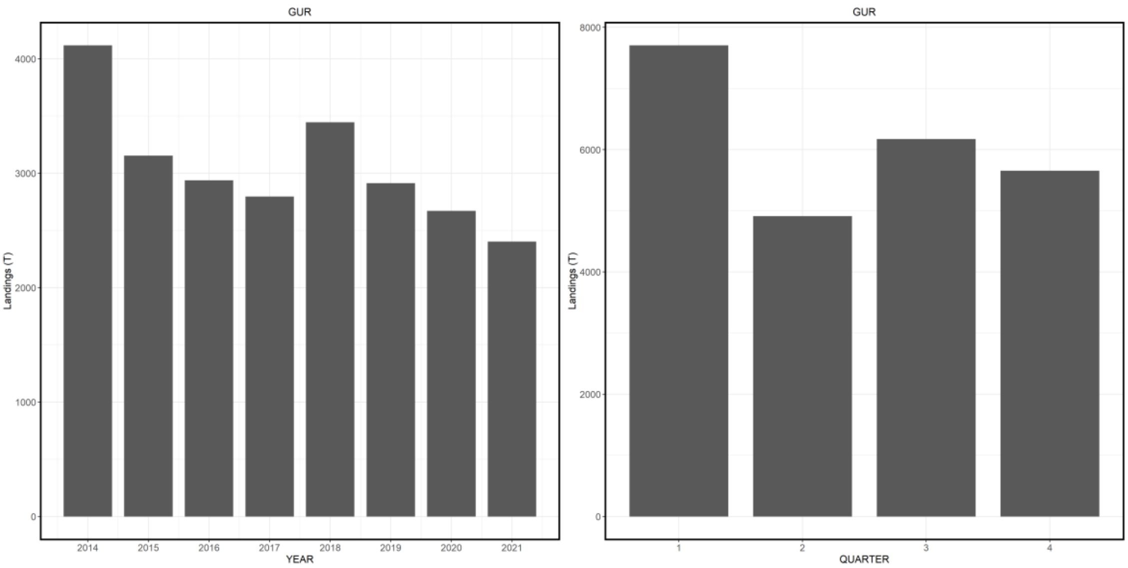

Figure 3-54 Landings of red gurnard by year and quarter for all sea basins

Table 3-12 Landings of red gurnard by ICES division. Data from AER.

ICES division	Live weight of landings	Landings value
27.4.a	3540	1886
27.4.b	4986	6492
27.4.c	246489	392732
27.6.a	7670	3769
27.7.a	23427	20401
27.7.d	2296867	2597797
27.7.e	4535096	3325813
27.7.f	314405	217200
27.7.g	88107	69610
27.7.h	1609786	1105862
27.7.j	10723	9459
27.7.j.2	316	585
Grand Total	9141414	7751606

Table 3-13 Landings of red gurnard in value and weight by country, including the UK. Data from AER.

Country	Live weight of landings			Landings value		
	2017	2018	2019	2017	2018	2019
Belgium	261524	307584	288393	175848	229064	187238
France	2299486	2820707	2371291	1973054	1942397	1896999
Ireland	8986	12955	8857	10593	3839	8867
Netherlands	226031	302348	231796	349104	531044	441368
Spain	316	1140		585	1607	
EU Total	2796343	3444734	2900336	2509184	2707951	2534471
United Kingdom	336810	347858	478476	412294	430067	480470
Grand Total	3133154	3792592	3378812	2921478	3138017	3014941

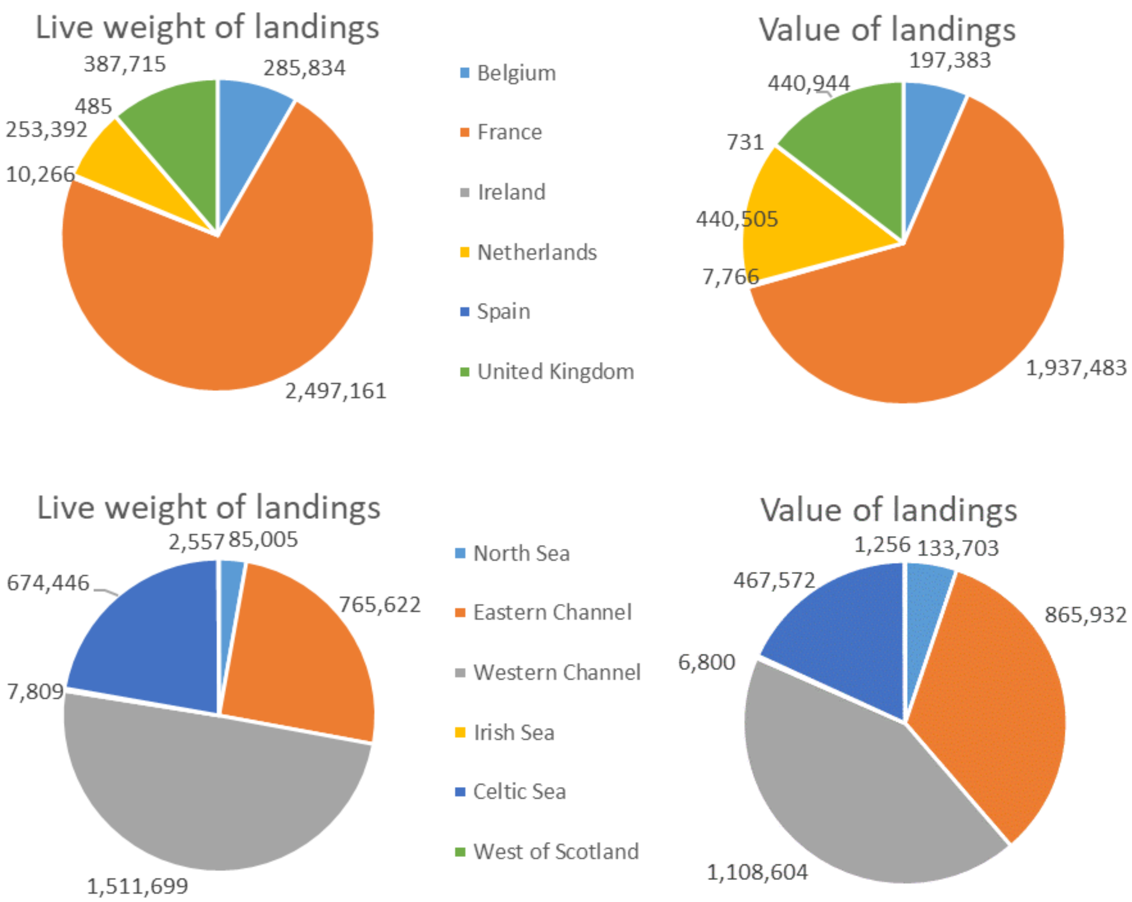

Figure 3-55 Landings of red gurnard in weight and value in the six sea basins

3.5.1 Fact Sheet red gurnard   North Sea (ICES div. 4a,b,c)

Facts at a glance

Landings:
34 to 115 t annually

Value:
133,703 EUR

Assessment:
Yes

Countries:
BEL, DEU, FRA, NLD

Gears:
TBB, SSC, SDN, OTB

Target/Bycatch species:
Both

Data issues:
Reporting by species continues to be a major problem in estimating the landings of all gurnards and thus also red gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

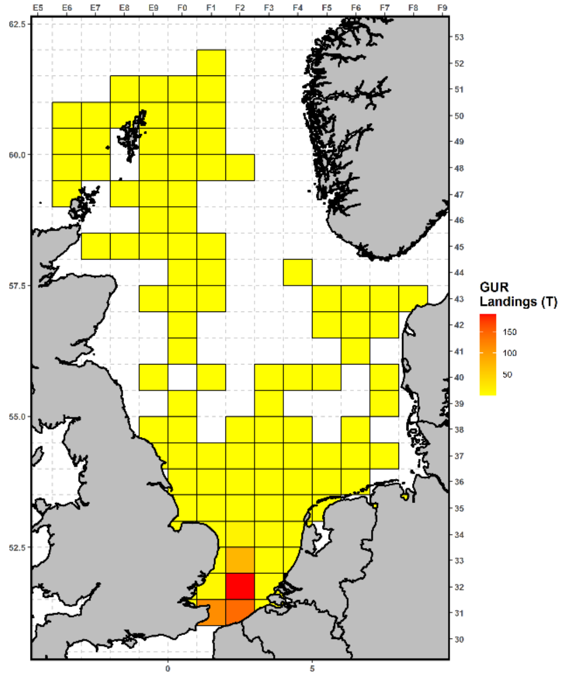

Figure 3-56 Landings of red gurnard in the North Sea by ICES rectangle

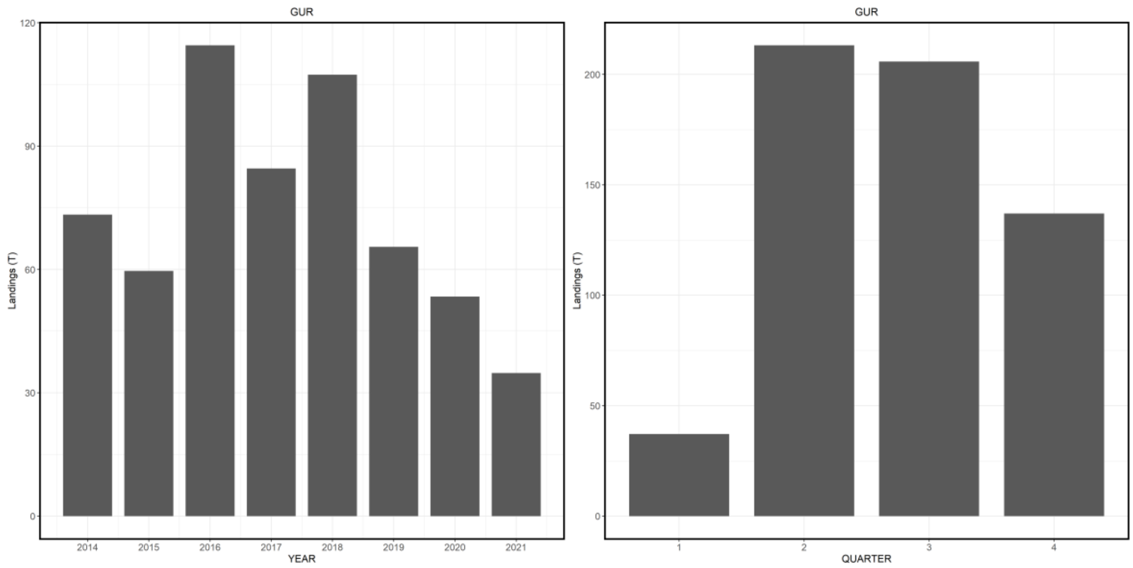

Figure 3-57 Landings of red gurnard by year and quarter in the North Sea

Fishing activity

Gurnards are mainly caught as by-catch by demersal trawlers in mixed fisheries.

Data collection

Information on gurnard abundance is available in DATRAS for the International Bottom Trawl Survey in quarters 1 and 3 (International Bottom Trawl Survey (NS-IBTS 1Q + 3Q) (ICES 2021b).

Stock assessment

ICES cannot assess the stock and exploitation status relative to MSY and precautionary approach (PA) reference points because the reference points are undefined.

A biomass index shows an increasing trend up to the mid-2000s, and since then it has fluctuated without trend. However, without accurate landings data resolved to species level and reliable information on discards it is not possible to provide catch scenarios (ICES 2021c).

Fisheries management measures

According to ICES (ICES 2021a), there is currently no technical measure specifically applied to red gurnard or other gurnard species. The exploitation of red gurnard is submitted to the general regulation in the areas where they are caught. There is no minimum landing size.

Facts at a glance

Landings:
511 to 1 200 t annually

Value:
765,622 EUR

Assessment:
Yes

Countries:
BEL, DEU, FRA, NLD

Gears:
OTB, SSC, TBB, SDN

Target/Bycatch species:
Both

Data issues:

Reporting by species continues to be a major problem in estimating the landings of all gurnards and thus also red gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

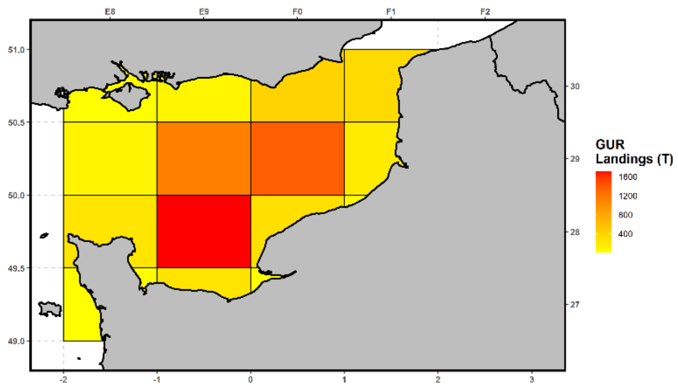

Figure 3-58 Landings of red gurnard in the Eastern English Channel by ICES rectangle

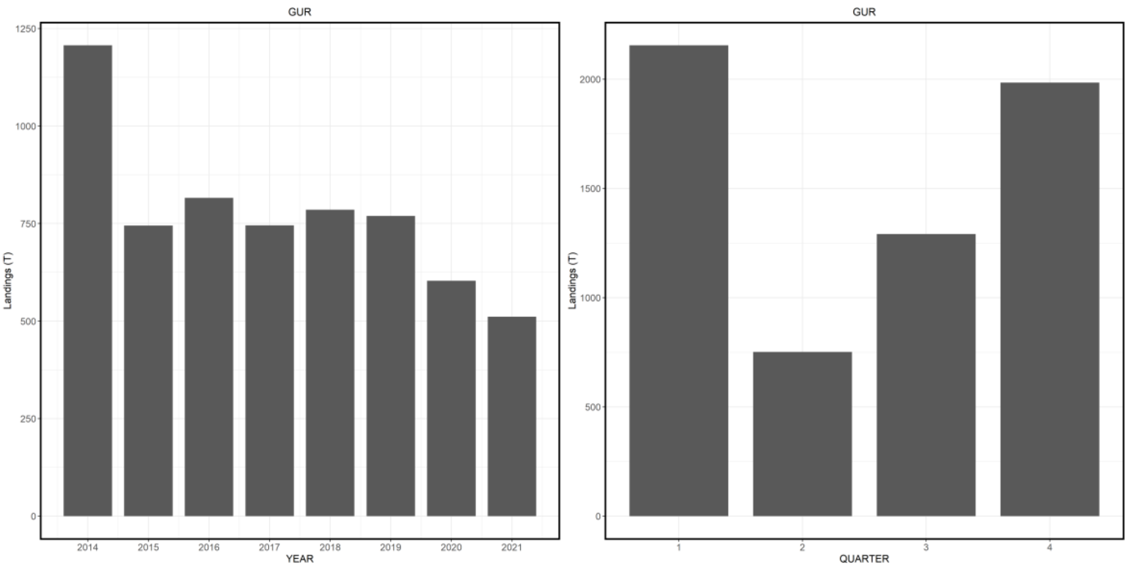

Figure 3-59 Landings of red gurnard by year and quarter in the Eastern English Channel

Fishing activity (including gear description)

Gurnards are mainly caught as by-catch by demersal trawlers in mixed fisheries.

Data collection

The French Channel Groundfish Survey (CGFS) covers the eastern half of the Channel (Division 7d) (ICES 2021b).

Stock assessment

ICES is assessing the stock status of red gurnard in the Northeast Atlantic (ICES subareas 3-8):

ICES cannot assess the stock and exploitation status relative to MSY and precautionary approach (PA) reference points because the reference points are undefined.

A biomass index shows an increasing trend up to the mid-2000s, and since then it has fluctuated without trend. However, without accurate landings data resolved to species level and reliable information on discards it is not possible to provide catch scenarios (ICES 2021c).

Fisheries management measures

NA

Additional information, e.g. ecosystem knowledge

NA

Fact Sheet red gurnard *Western English Channel (ICES div. 7d)*

Facts at a glance

Landings:
1 260 to 1 740 t annually

Value:
1 512 thousand EUR

Assessment:
Yes

Countries:
BEL, FRA, IRL, NLD

Gears:
OTB, TBB

Target/Bycatch species:
NA

Data issues:
Reporting by species continues to be a major problem in estimating the landings of all gurnards and thus also red gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

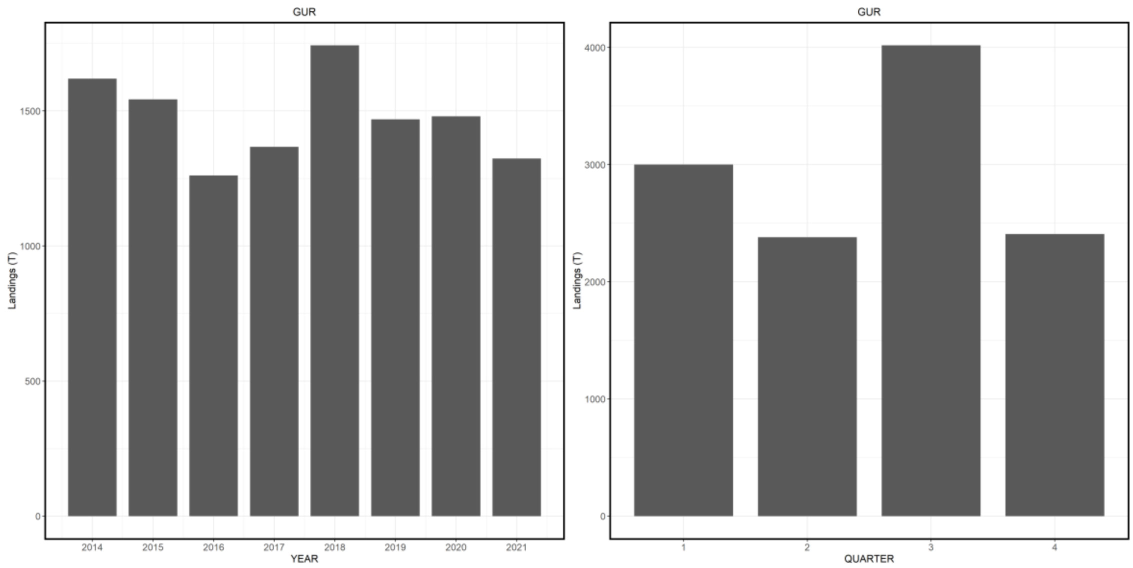

Figure 3-60 Landings of red gurnard by year and quarter in the Western English Channel

Fishing activity

Gurnards are mainly caught as by-catch by demersal trawlers in mixed fisheries.

Data collection

Data exists on the abundance of red gurnard in the western English Channel in the English Channel Beam Trawl Survey series from 2006 to present, however it has not yet been processed in such a way that it can provide an index (ICES 2021b) (ICES 2021b).

Stock assessment

ICES is assessing the stock status of red gurnard in the Northeast Atlantic (ICES subareas 3-8):

ICES cannot assess the stock and exploitation status relative to MSY and precautionary approach (PA) reference points because the reference points are undefined.

A biomass index shows an increasing trend up to the mid-2000s, and since then it has fluctuated without trend. However, without accurate landings data resolved to species level and reliable information on discards it is not possible to provide catch scenarios (ICES 2021c).

Fisheries management measures

NA

Additional information, e.g. ecosystem knowledge

The centre of abundance of this widely distributed species is focussed on the English Channel and the Celtic Sea. The eastern end of the channel (7d) is covered by the French CFGS, while the Celtic Sea (7h) is covered by the EVHOE surveys. This leaves an area of high abundance in 7e currently not covered by any survey. Data exists in the English

Channel Beam Trawl Survey series from 2006 to present, however it has not yet been processed in such a way that it can provide an index (ICES 2021b).

Facts at a glance

Landings:
2 to 9 t annually

Value:
7809 EUR

Assessment:
Yes

Countries:
BEL, FRA, IRL

Gears:
TBB, SSC, OTT

Target/Bycatch species:
Both

Data issues:
Reporting by species continues to be a major problem in estimating the landings of all gurnards and thus also red gurnard. Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

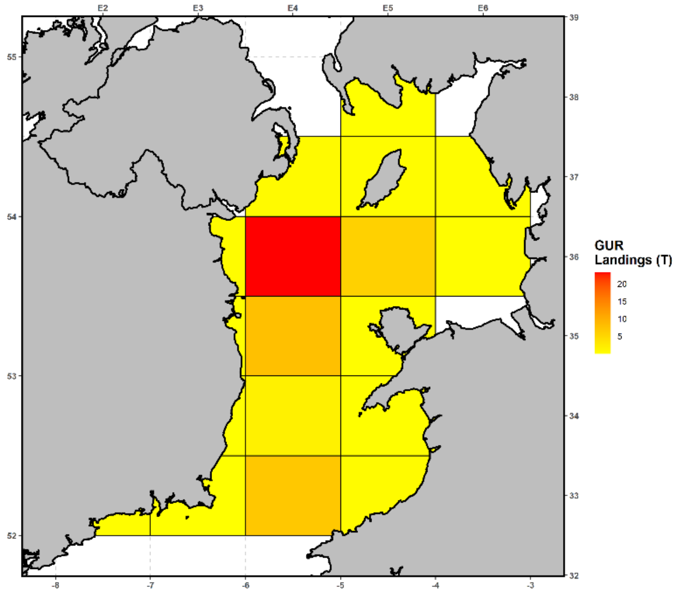

Figure 3-61 Landings of red gurnards in the Irish Sea by ICES rectangle

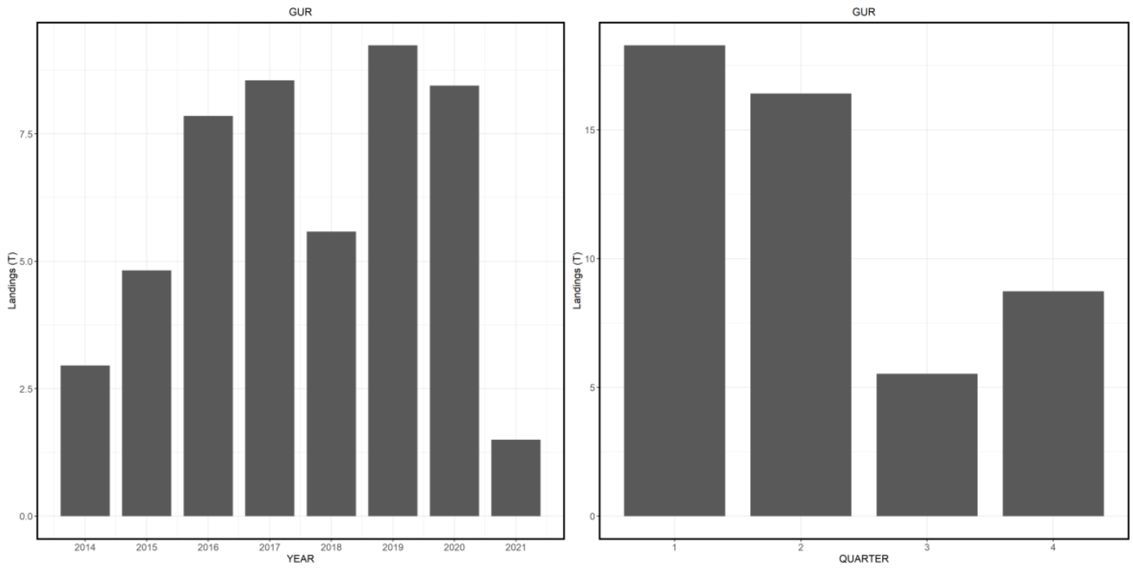

Figure 3-62 Landings of red gurnard by year and quarter in the Irish Sea

Fishing activity (including gear description)

Gurnards are mainly caught as by-catch by demersal trawlers in mixed fisheries.

Data collection

Data exists on the abundance of red gurnard from the Beam Trawl Survey - Irish Sea (VIIa) and the Northern Irish ground fish survey (NIGFS) (ICES 2021b).

Stock assessment

ICES is assessing the stock status of red gurnard in the Northeast Atlantic (ICES subareas 3-8):

ICES cannot assess the stock and exploitation status relative to MSY and precautionary approach (PA) reference points because the reference points are undefined.

A biomass index shows an increasing trend up to the mid-2000s, and since then it has fluctuated without trend. However, without accurate landings data resolved to species level and reliable information on discards it is not possible to provide catch scenarios (ICES 2021c).

Fisheries management measures

NA

Additional information, e.g. ecosystem knowledge

NA

Facts at a glance

Landings:
525 to 1 215 t annually

Value:
674,446 EUR

Assessment:
Yes

Countries:
BEL, ESP, FRA, IRL, NLD

Gears:
OTB, TBB

Target/Bycatch species:
Both

Data issues:
Reporting by species continues to be a major problem in estimating the landings of all gurnards and thus also red gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

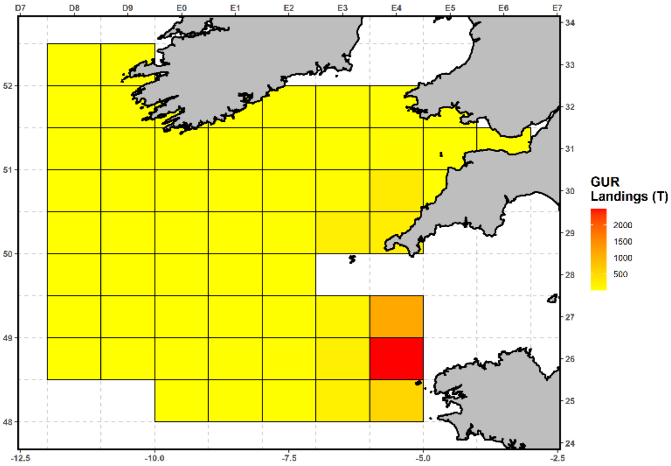

Figure 3-63 Landings of red gurnard in the Celtic Sea by ICES rectangle.

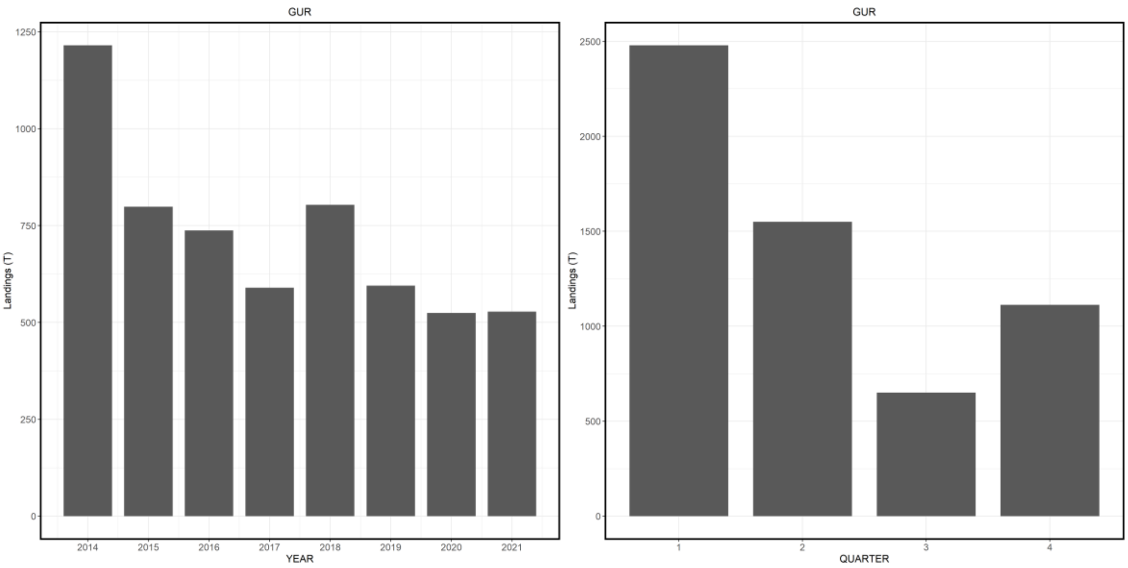

Figure 3-64 Landings of red gurnard by year and quarter in the Celtic Sea.

Fishing activity

Gurnards are mainly caught as by-catch by demersal trawlers in mixed fisheries.

Data collection

The French survey “Evaluation Halieutique Ouest de l'Europe” (EVHOE) is a bottom trawl survey which has covered the waters to the south of Ireland, southwest of the UK and down the west coast of France, annually, since 1998. Data are not available for 2017 due to disruption to the survey. This survey covers the core area from which landings are reported, and as such is probably the indicator which will correspond most closely to the “fished stock” (ICES 2021b).

Stock assessment

ICES is assessing the stock status of red gurnard in the Northeast Atlantic (ICES subareas 3-8):

ICES cannot assess the stock and exploitation status relative to MSY and precautionary approach (PA) reference points because the reference points are undefined.

A biomass index shows an increasing trend up to the mid-2000s, and since then it has fluctuated without trend. However, without accurate landings data resolved to species level and reliable information on discards it is not possible to provide catch scenarios (ICES 2021c).

Fisheries management measures

NA

Additional information, e.g. ecosystem knowledge

NA

Facts at a glance

Landings:
0.4 to 6 t annually

Value:
2557 EUR

Assessment:
Yes

Countries:
FRA, IRL, NLD

Gears:
OTM, OTB

Target/Bycatch species:
NA

Data issues:
Reporting by species continues to be a major problem in estimating the landings of all gurnards and thus also red gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

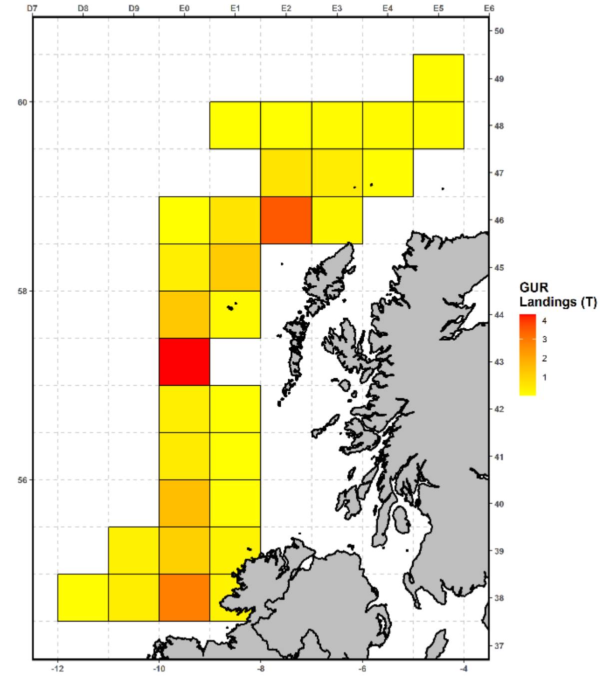

Figure 3-65 Landings of red gurnard in the West of Scotland by ICES rectangle

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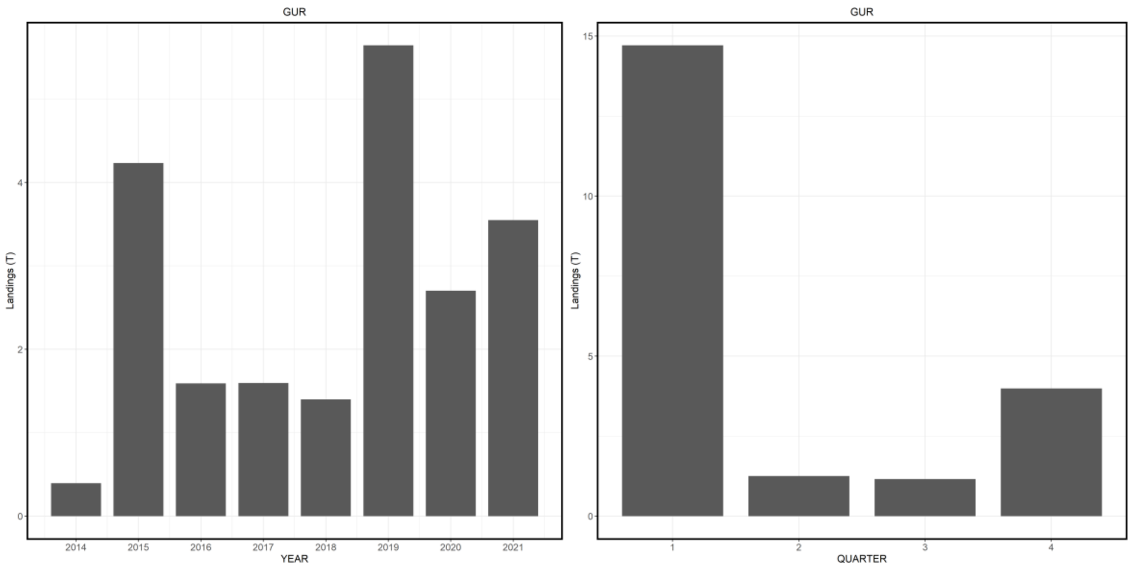

Figure 3-66 Landings of red gurnard by year and quarter in the West of Scotland

Fishing activity (including gear description)

Gurnards are mainly caught as by-catch by demersal trawlers in mixed fisheries.

Data collection

The Scottish West Coast IBTS survey took place during quarter 1 of 1985–2010, and quarter 4 of 1990–2009. This survey was initially intended to cover the fishing grounds on the continental shelf to the west of Scotland; in 1996 the survey area was extended to include stations in the northern Irish Sea. This survey was replaced in both quarters from 2011 onwards by the Scottish West Coast Groundfish Survey (ICES 2021b).

Stock assessment

ICES is assessing the stock status of red gurnard in the Northeast Atlantic (ICES subareas 3-8):

ICES cannot assess the stock and exploitation status relative to MSY and precautionary approach (PA) reference points because the reference points are undefined.

A biomass index shows an increasing trend up to the mid-2000s, and since then it has fluctuated without trend. However, without accurate landings data resolved to species level and reliable information on discards it is not possible to provide catch scenarios (ICES 2021c).

Fisheries management measures

NA

Additional information, e.g. ecosystem knowledge

NA

References

Floeter, J., Kempf, A., Vinther, M., Schrum, C., & Temming, A. (2005). Grey gurnard (*Eutrigla gurnadus*) in the North Sea: an emerging key predator? Can. J. Fish. Aquat., 62(8): 1853-1864. https://doi.org/10.1139/f05-108.

Gee, T. de, and Kikkert, A. (1993). Analysis of the grey gurnard (*Eutrigla gurnardus*) samples collected during the 1991 International Stomach Sampling Project. ICES CM 1993/G:14. 26 pp.

ICES (2021a). Working Group on Widely Distributed Stocks (WGWIDE). ICES Scientific Reports. 3:95. 874 pp. http://doi.org/10.17895/ices.pub.8298.

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ICES (2021c). Red gurnard (*Chelidonichthys cuculus*) in subareas 3-8 (Northeast Atlantic). In Report of the ICES Advisory Committee, 2021. ICES Advice 2021, gur.27.3-8, https://doi.org/10.17895/ices.advice.7757.

3.6 Fact Sheet Tub gurnard (*Chelidonichthys lucerna*, "GUU")

Copyright: Heessen, H.J.L.

Facts at a glance

Landings:
3 100 to 6 400 t annually

Value:

Fishing areas:
North Sea, Eastern and Western Channel, Celtic Sea, Irish Sea, West of Scotland

Countries:
BEL, DEU, DNK, ESP, FRA, IRL, NLD

Gears:
SSC, TBB, OTB, SDN

Data issues:

Species misidentification and reporting of gurnard groups continues to be a problem in estimating

the landings and discards of tub, red and grey gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

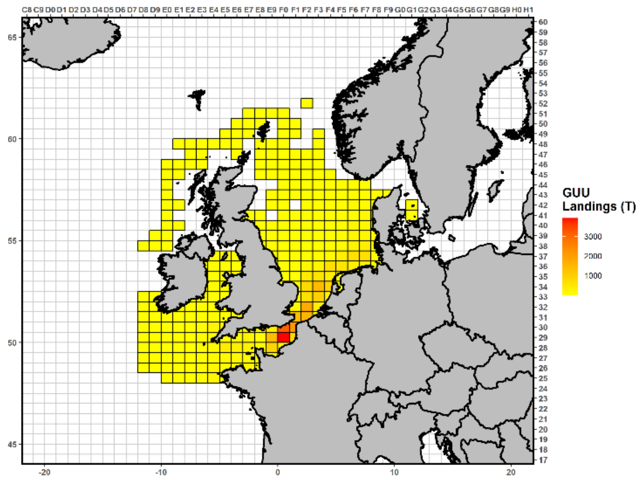


Figure 3-67 Landings of tub gurnard in the six sea basins by ICES rectangle

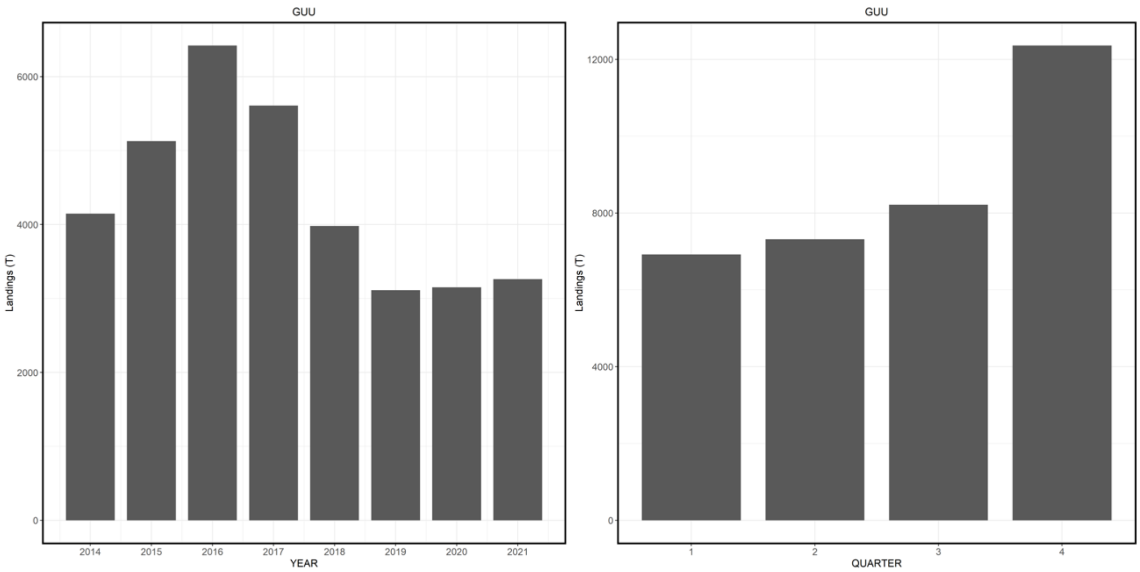


Figure 3-68 Landings of tub gurnard by year and quarter for all sea basins

Table 3-14 Landings of tub gurnard by ICES statistical rectangle. Data from AER

ICES rectangles	Live weight of landings	Landings value
27.4.a	2117	2979
27.4.b	2329884	4017774
27.4.c	3980016	6704986
27.6.a	2738	1434
27.7.a	19536	19836
27.7.d	5075054	8074276
27.7.e	793104	1311859
27.7.f	133907	158883
27.7.g	75400	90995
27.7.h	250044	378742
27.7.j	6955	9931
Grand Total	12668755	20771697

Table 3-15 Landings of tub gurnard in weight and value by country including the UK.

Country	Live weight of landings			Landings value		
	2017	2018	2019	2017	2018	2019
Belgium	1245069	632998	499502	1756413	979058	745963
Denmark	64568	10755	19069	76107	32116	44536
France	1032289	933700	744270	1642494	1834048	1386841
Netherlands	3287950	2406400	1792020	5136469	3924749	3212245
Spain			165			658
EU Total	5629876	3983853	3055026	8611482	6769972	5390243
United Kingdom	417699	210424	302086	651855	432796	550622
Grand Total	6047575	4194278	3357112	9263336	7202768	5940865

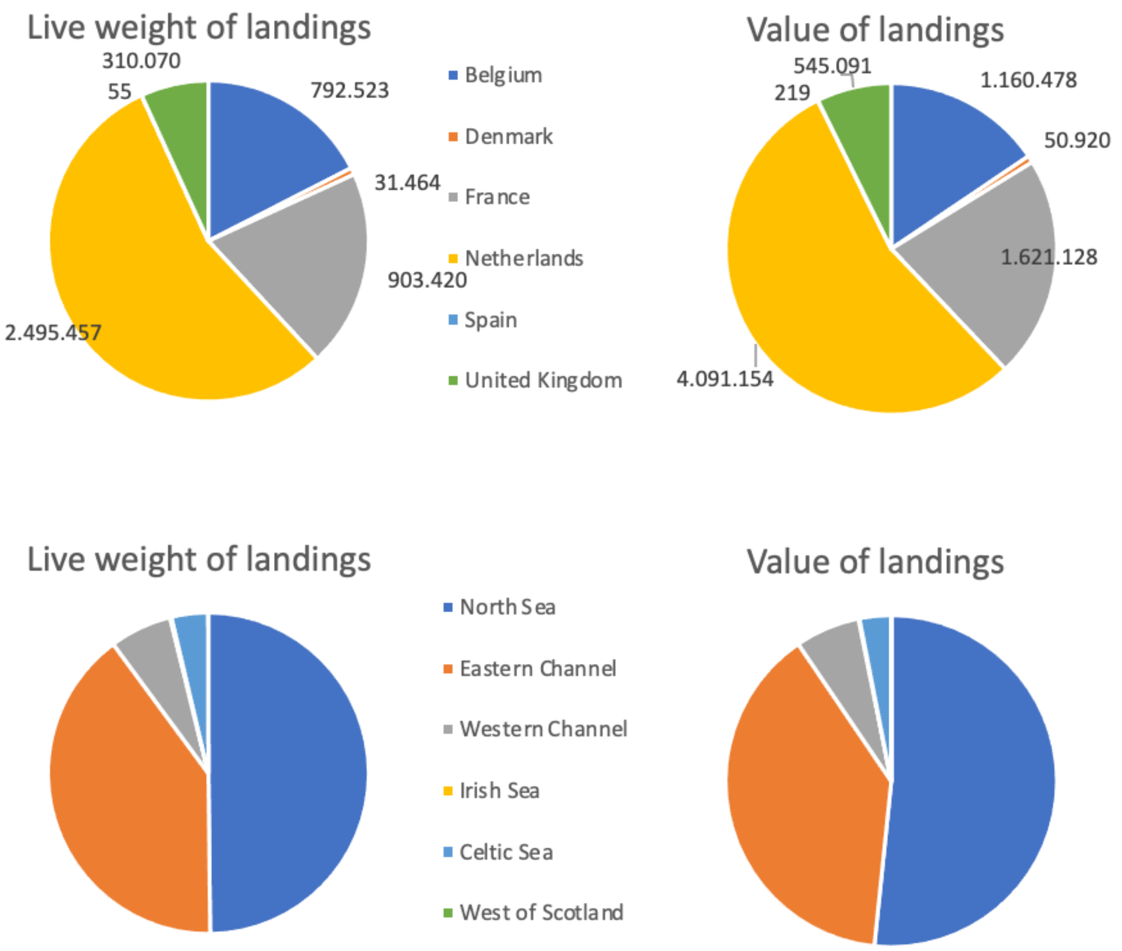


Figure 3-69 Landings of tub gurnard in weight and value in the MS and the six sea basins

Table 3-16 Main fleets landing tub gurnard. Data from AER

Fleet	Live weight of landings	Landings value
NLD NAO DTS2440	4,565,274	7,588,310
NLD NAO TBB40XX	2,195,459	3,517,182
FRA NAO DTS2440	1,104,200	2,204,541
FRA NAO DTS1824	1,152,632	1,968,876
BEL NAO TBB2440	1,393,651	1,715,814
BEL NAO DTS2440	598,907	1,285,309
NLD NAO TBB2440	512,508	813,634
BEL NAO TBB1824	384,133	478,373
FRA NAO DTS1218	165,900	271,283
NLD NAO TBB1824	122,997	205,653
Other	473,094	722,721
Total	12,668,755	20,771,697

3.6.1 Fact Sheet tub gurnard *North Sea (ICES div. 4a,b,c)*

Facts at a glance

Landings:
1 500 to 3 600 t annually

Value:
3575 thousand EUR

Assessment:
No

Countries:
BEL, DEU, DNK, FRA, NLD

Gears:
TBB, SSC, OTB

Target/Bycatch species:
Both

Data issues:
Reporting by species continues to be a major problem in estimating the landings of all gurnards and thus also tub gurnard.
Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

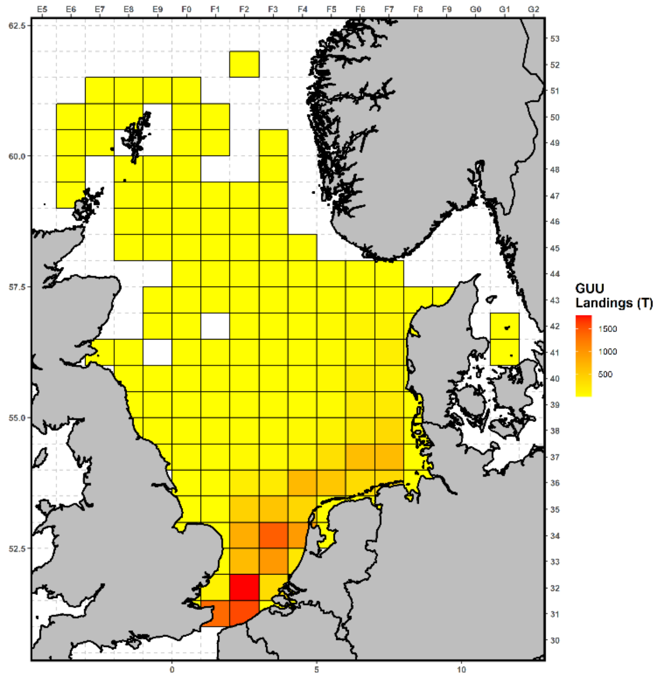
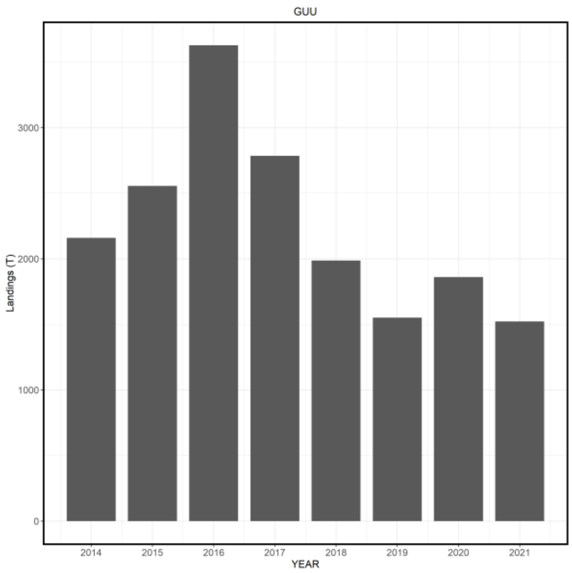


Figure 3-70 Landings of tub gurnard in the North Sea by ICES rectangle.



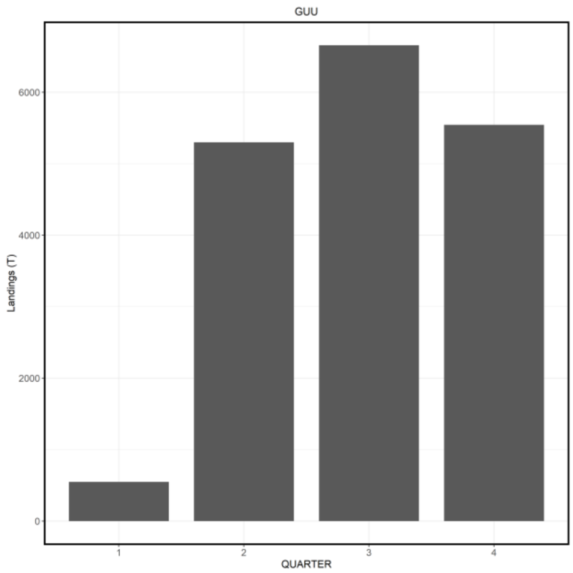


Figure 3-71 Landings of tub gurnard by year and quarter in the North Sea

Fishing activity (including gear description)

Gurnards are mainly caught as a by-catch by demersal trawlers in mixed fisheries.

Data collection

Information on gurnard abundance is available in DATRAS for the International Bottom Trawl Survey in quarters 1 and 3 (International Bottom Trawl Survey (NS-IBTS 1Q + 3Q) (ICES 2021b).

Stock assessment

There is no assessment of the tub gurnard stock(s) available.

Facts at a glance

Landings:
900 to 2 430 t annually

Value:
2691 thousand EUR

Assessment:
No

Countries:
BEL, DEU, FRA, NLD

Gears:
SSC, TBB, OTB, SDN

Target/Bycatch species:
Both

Data issues:
Reporting by species continues to be a major problem in estimating the landings of all gurnards and thus also tub gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

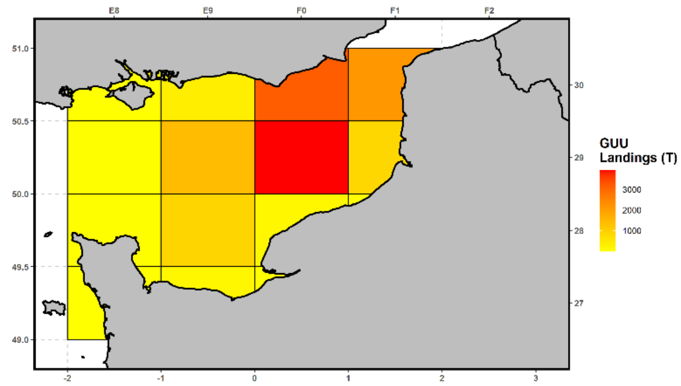


Figure 3-72 Landings of tub gurnard in the Eastern English Channel by ICES rectangle.

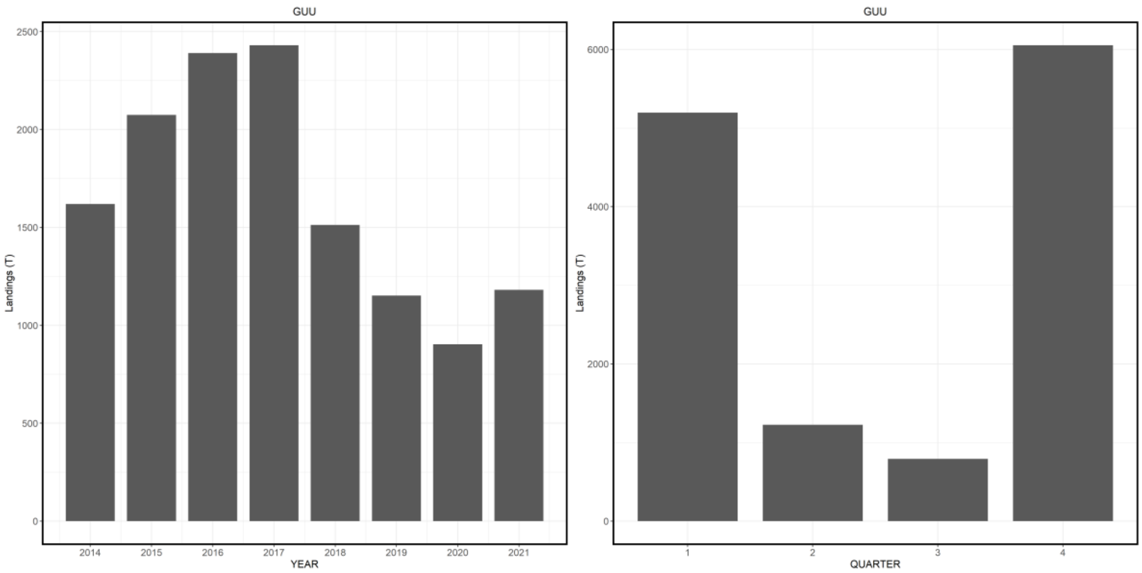


Figure 3-73 Landings of tub gurnard by year and quarter in the Eastern English Channel.

Fishing activity (including gear description)

Gurnards are mainly caught as a by-catch by demersal trawlers in mixed fisheries.

Data collection

The French Channel Groundfish Survey (CGFS) covers the eastern half of the Channel (Division 7d) (ICES 2021b).

Stock assessment

There is no assessment of the tub gurnard stock(s) available.

Facts at a glance

Landings:
225 to 370 t annually

Value:
437,286 EUR

Assessment:
No

Countries:
BEL, FRA, NLD

Gears:
OTB, TBB, SSC, GTR, SDN

Target/Bycatch species:
Both

Data issues:
Reporting by species continues to be a major problem in estimating the landings of all gurnards and thus also tub gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

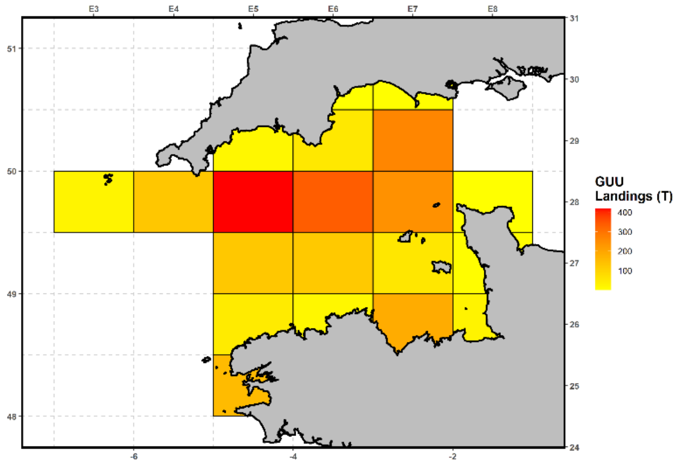


Figure 3-74 Landings of tub gurnard in the Western English Channel by ICES rectangle.

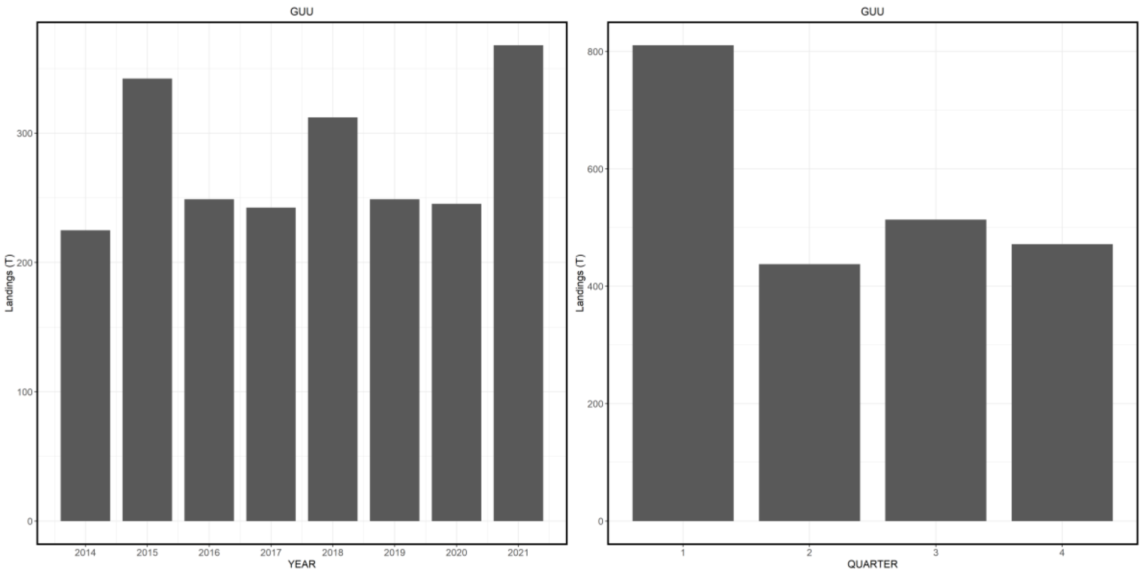


Figure 3-75 Landings of tub gurnard by year and quarter in the Eastern English Channel.

Fishing activity

Gurnards are mainly caught as by-catch by demersal trawlers in mixed fisheries.

Data collection

Data exists on the abundance of gurnard in the western English Channel in the English Channel Beam Trawl Survey series from 2006 to present, however it has not yet been processed in such a way that it can provide an index (ICES 2021b).

Facts at a glance

Landings:
2 to 14 t annually

Value:
6,612 EUR

Assessment:
No

Countries:
BEL, FRA, IRL, NLD

Gears:
TBB, OTB

Target/Bycatch species:
Both

Data issues:
Reporting by species continues to be a major problem in estimating the landings of all gurnards and thus also tub gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

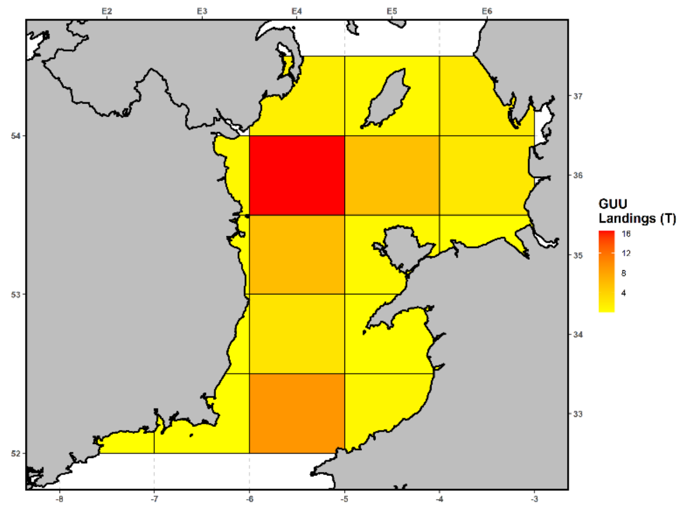


Figure 3-76 Landings of tub gurnard in the Irish Sea by ICES rectangle.

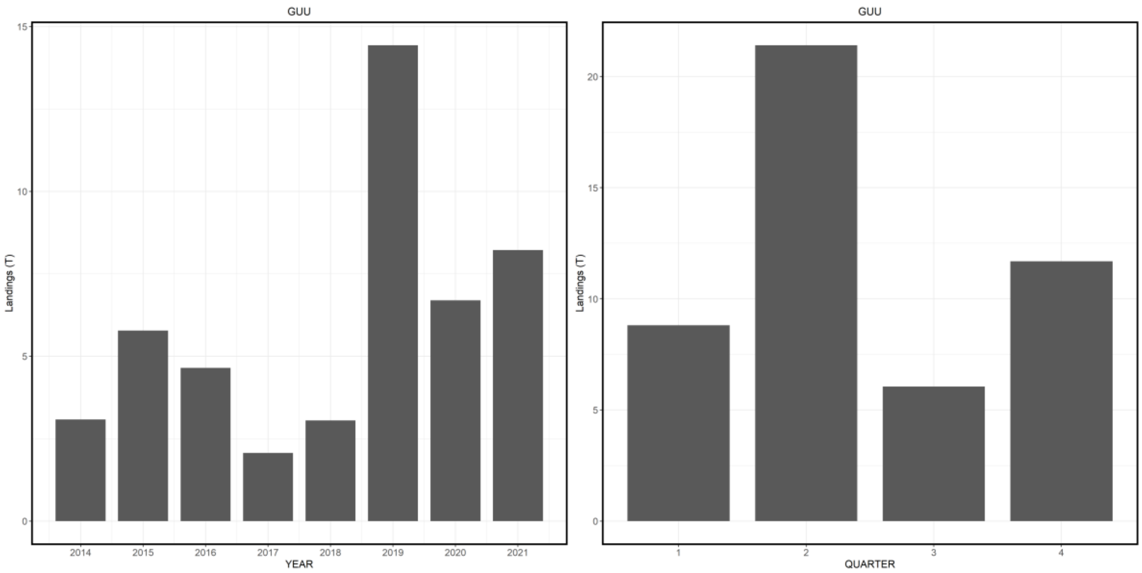


Figure 3-77 Landings of tub gurnard by year and quarter in the Irish Sea.

Fishing activity (including gear description)

Gurnards are mainly caught as by-catch by demersal trawlers in mixed fisheries.

Data collection

Data exists on the abundance of red gurnard from the Beam Trawl Survey - Irish Sea (VIIa) and the Northern Irish ground fish survey (NIGFS) (ICES 2021b).

Facts at a glance

Landings:
140 to 180 t annually

Value:
212,851 EUR

Assessment:
No

Countries:
BEL, ESP, FRA, NLD

Gears:
OTB, TBB, OTT

Target/Bycatch species:
Both

Data issues:
Reporting by species continues to be a major problem in estimating the landings of all gurnards and thus also tub gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c).

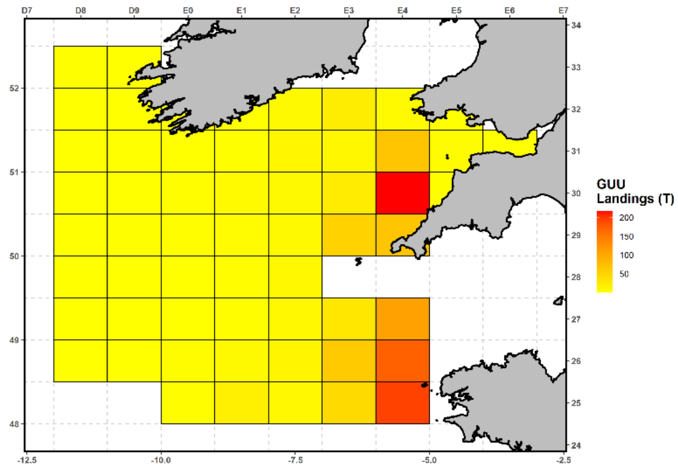


Figure 3-78 Landings of tub gurnard in the Celtic Sea by ICES rectangle.

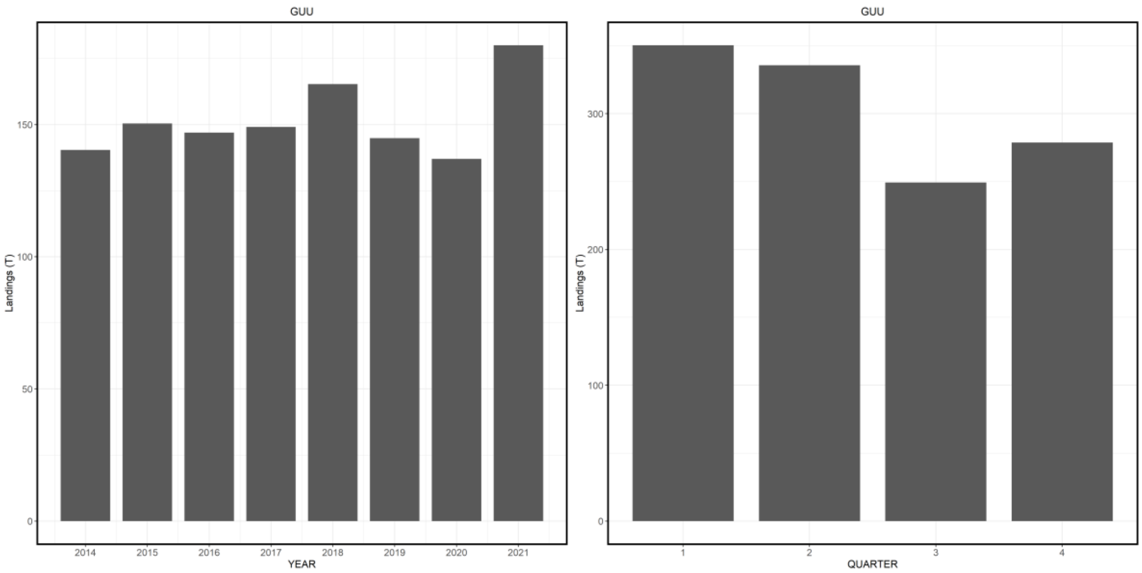


Figure 3-79 Landings of tub gurnard by year and quarter in the Celtic Sea.

Fishing activity

Gurnards are mainly caught as by-catch by demersal trawlers in mixed fisheries.

Data collection

The French survey "Evaluation Halieutique Ouest de l'Europe" (EVHOE) is a bottom trawl survey which has covered the waters to the south of Ireland, southwest of the UK and down the west coast of France, annually, since 1998. Data are not available for 2017 due to disruption to the survey. This survey covers the core area from which landings are reported, and as such is probably the indicator which will correspond most closely to the "fished stock" (ICES 2021b).

Facts at a glance

Landings:
0.1 to 1.5 t annually

Value:
478 EUR

Assessment:
No

Countries:
DNK, FRA, NLD

Gears:
OTM, OTB, OTT

Data issues:
Reporting by species continues to be a major problem in estimating the landings of all gurnards and thus also tub gurnard.

Discarding is estimated to be high in some fisheries. Reported discard rates range from 14% to 94% of the catches of specific fleets (ICES 2021c)

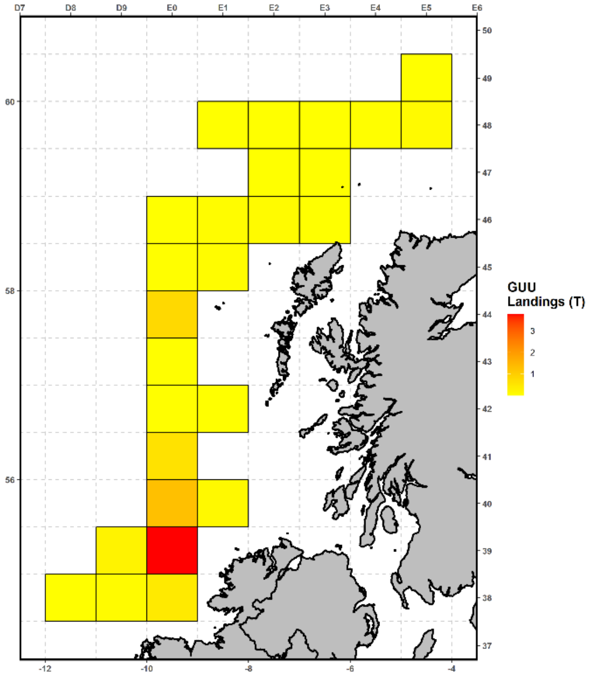


Figure 3-80 Landings of tub gurnard in the West of Scotland by ICES rectangle

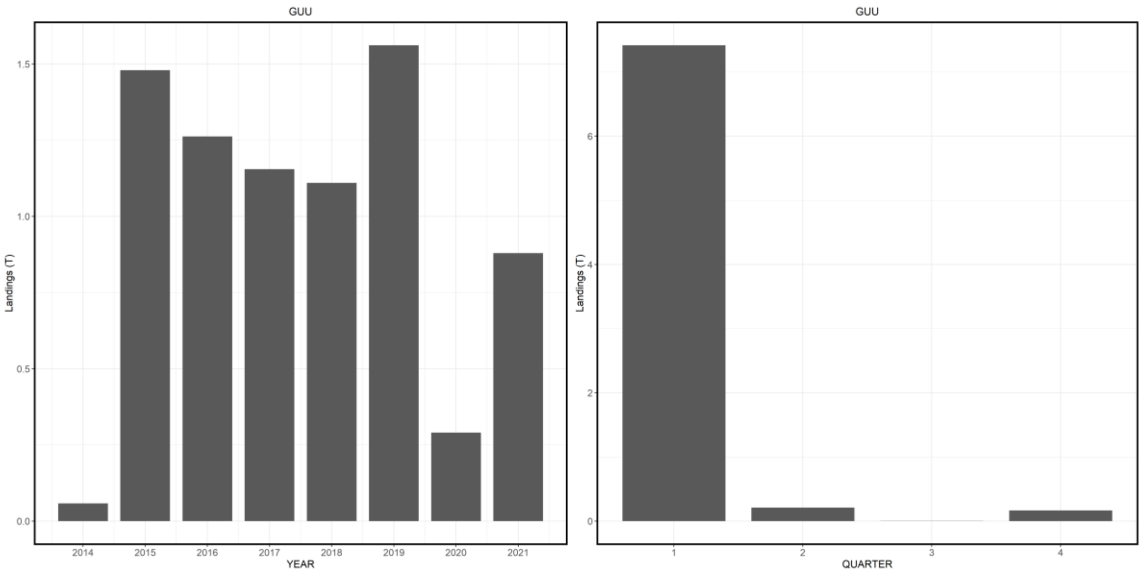


Figure 3-81 Landings of tub gurnard by year and quarter West of Scotland.

Fishing activity (including gear description)

Gurnards are mainly caught as by-catch by demersal trawlers in mixed fisheries.

Data collection

The Scottish West Coast IBTS survey took place during quarter 1 of 1985–2010, and quarter 4 of 1990–2009. This survey was initially intended to cover the fishing grounds on the continental shelf to the west of Scotland; in 1996 the survey area was extended to include stations in the northern Irish Sea. This survey was replaced in both quarters from 2011 onwards by the Scottish West Coast Groundfish Survey (ICES 2021b).

References

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ICES (2021b). Benchmark Workshop on selected stocks in the Western Waters in 2021 (WKWEST). ICES Scientific Reports. 3:31. 504 pp. https://doi.org/10.17895/ices.pub.8137.

ICES (2021c). Red gurnard (*Chelidonichthys cuculus*) in subareas 3-8 (Northeast Atlantic). In Report of the ICES Advisory Committee, 2021. ICES Advice 2021, gur.27.3-8, https://doi.org/10.17895/ices.advice.7757.

3.7 Fact Sheet King Scallop (*Pecten maximus*; SCE)

Facts at a glance

Landings:

25,000 to 40,000 tonnes increasing year on year (EU data only)

Value:

XY

Fishing areas:

North Sea, Eastern and Western Channel, Celtic Sea, Irish Sea, West of Scotland

Countries:

UK, IRL, FRA, BEL, NLD

Gears:

DRB (non-mechanized dredge). Insignificant catches in other gears

Data:

Effort data is not standardized. However, logbook and iVMS data in combination with knowledge of dredges carried by vessels of different lengths can provide high quality spatially distributed effort and stock status metrics. Inshore and offshore survey time series available in many areas. Port sampling (size/age), at sea observer sampling variously implemented.

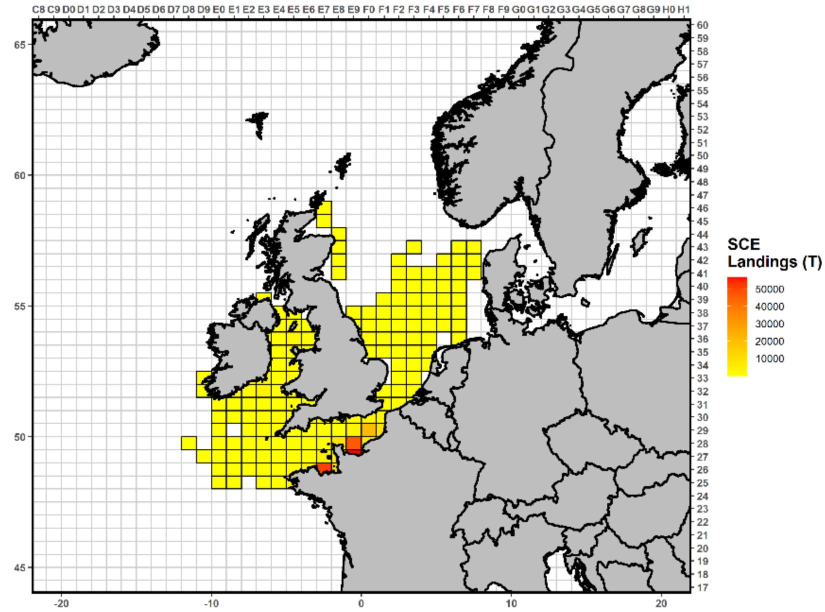

Figure 3-82 Landings of king scallop in the six sea basins by ICES rectangle

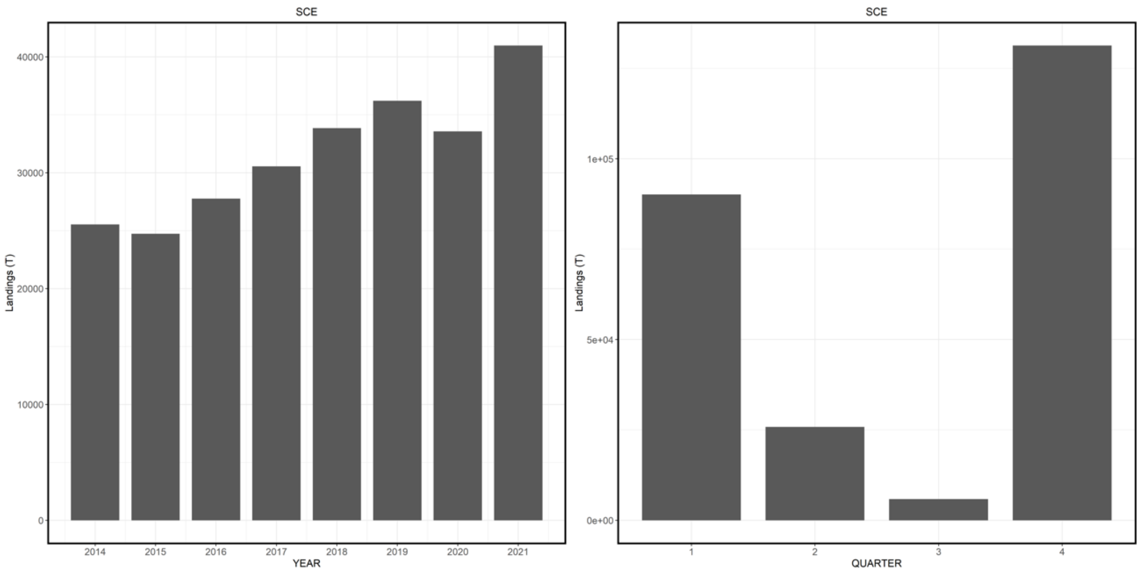

Figure 3-83 Landings of king scallop by year and quarter for all sea basins.

Biology: Scallops are benthic (living on seafloor) have very limited mobility and are associated with sand and gravel substrates. Within a given sea basin there may be many scallop beds interconnected through larval dispersal and that form a single stock or metapopulation. Growth and recruitment vary at fine geographic scale. Strong recruitment events may occur locally.

Fishery: Fishing occurs throughout the year in many offshore areas. Fleet movements between fishing areas is related to catch rate and reproductive condition of scallop. King scallop are important fisheries west of Scotland, Irish Sea, north east Celtic Sea and east and west English Channel. The species is important to both inshore (SSF) and offshore (LSF) fleets. The LSF is >18m in length. These larger vessels may carry 20-30 dredges each and fish in different sea basins on seasonal basis. Gear is similar in all areas; spring loaded new haven dredges. The LSF are specialised scallop dredgers and do not generally take part in other fisheries. SSF vessels may be polyvalent switching to and from scallop on a seasonal basis. Species may be locally important in aquaculture. Mortality due to dredge contact and discarding may be significant.

Assessment: Survey based time series of biomass estimates or indices for many inshore scallop beds are available in FR and UK. Fishery dependent catch rate indicators developed from logbook and VMS data have been developed. ICES WGScallop are exploring assessment methods.

Management: Scallop fisheries in EU waters outside of 12nm are managed by MCRS and Western Waters kwday limits. In waters inside 12nm TACs and seasonal closures apply in FR and IoM in particular. Small inshore stocks in coastal bays may have local management plans in place. There are some spatial restrictions in coastal Natura 2000 sites.

Table 3-17 Landings of king scallops by ICES statistical rectangle. Data from AER.

Row Labels	Live weight of landings	Landings value
27.4.a	41134	118790
27.4.b	125367	358839
27.4.c	26668	66990
27.7.a	1844914	13274619
27.7.d	69073581	213505336
27.7.e	26242992	64154515
27.7.f	215638	453064
27.7.g	3138520	16674005
27.7.h	45416	104868
27.7.j	73798	242788
27.7.j.2	367	1395
Grand Total	100828395	308955209

Table 3-18 Landings of king scallops in weight and value by country, including the UK. Data from AER.

Country	Live weight of landings			Landings value		
	2017	2018	2019	2017	2018	2019
Belgium	824261.67	696747.25	445368.96	2499180.49	1891946.44	885779.69
France	27265606.68	30947207.73	33457895.12	83245558.34	84761930.35	88179208.32
Ireland	2542457.84	2285036.89	2343223.26	6504947.734	16322475.44	24637595.01
Netherlands	1344	7975	10826	1679	9969	13536
Spain	367	78		1394.96	7.8	
EU Total	30634037.19	33937044.87	36257313.34	92252760.52	102986329	113716119
United Kingdom	26815494.7	26281029.4	25649085.2	77816871.25	74739606.19	64681804.31
Grand Total	57449531.89	60218074.27	61906398.54	170069631.8	177725935.2	178397923.3

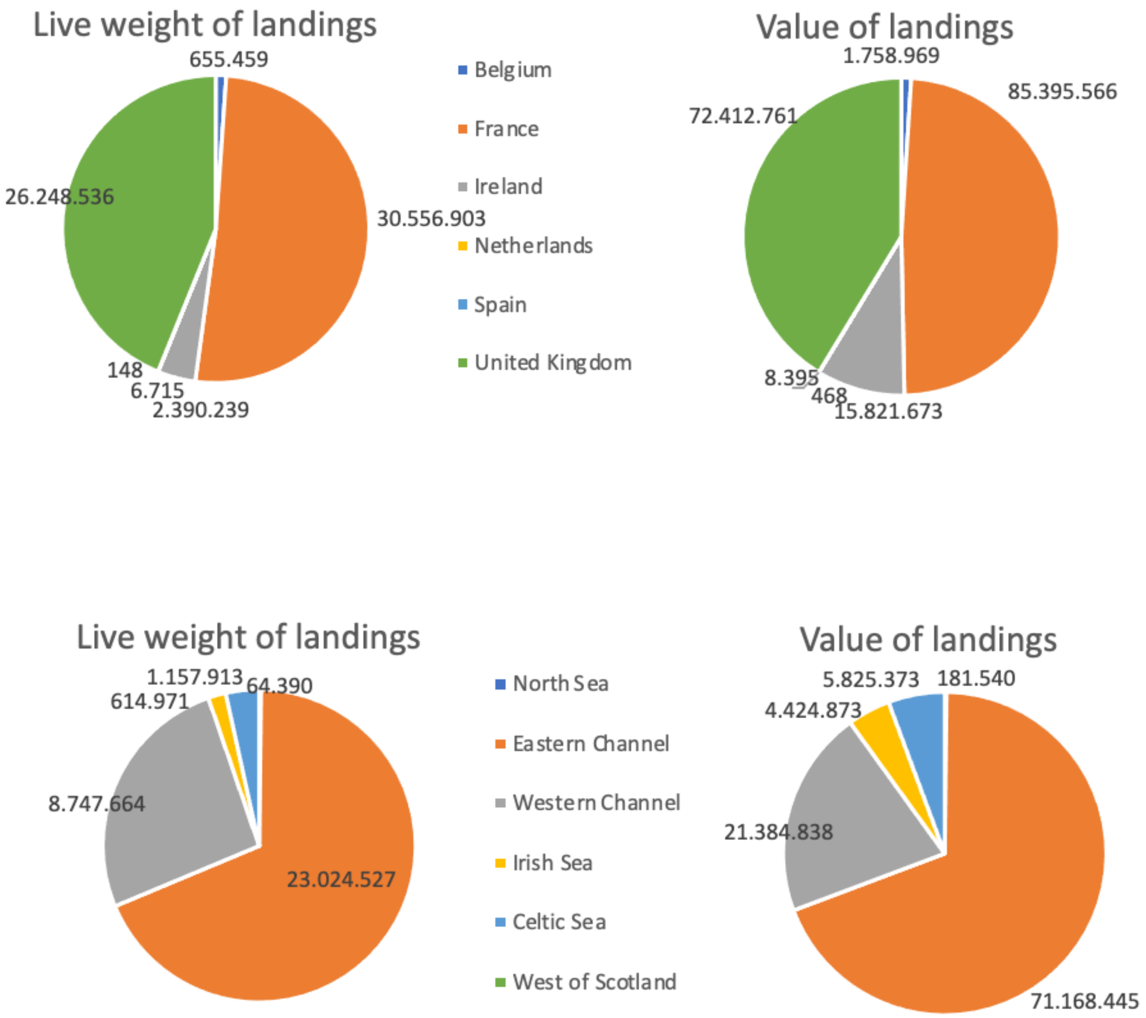

Figure 3-84 Live weight and value of lLandings of king scallop in the MS and the six sea basins.

Table 3-19 Main fleets landing king scallop. Data from AER.

Fleet	Live weight of landings	Landings value
FRA NAO DRB1218	31,886,862	93,980,959
IRL NAO DRB2440	6,821,300	44,807,022
FRA NAO DRB1012	12,130,800	32,683,899
FRA NAO MGP1218	8,891,477	25,947,576
FRA NAO DTS1218	8,291,448	23,550,877
FRA NAO DTS1012	7,875,216	20,344,826
FRA NAO MGP1012	6,977,529	19,874,503
FRA NAO PMP1012	4,544,048	11,587,286
FRA NAO DRB0010	3,656,586	9,106,198
FRA NAO PMP0010	1,387,609	3,502,701
Other	8,365,521	23,569,362
Total	100,828,395	308,955,209

Facts at a glance

Landings:
Increasing (EU data only)

Value:
181,540 EUR

Assessment:
Survey locally (UK)

Countries:
UK, BEL, NLD

Gears:
DRB (non-mechanised dredges)

Target/Bycatch species:
Target single species fishery

Recreational fisheries:
No

Data issues:
Data issues in 2017

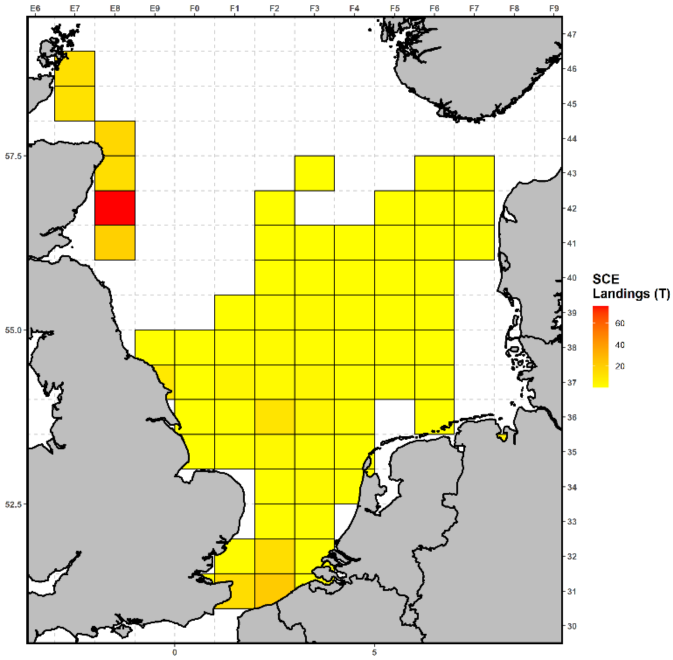

Figure 3-85 Landings of king scallop in the North Sea by ICES rectangle.

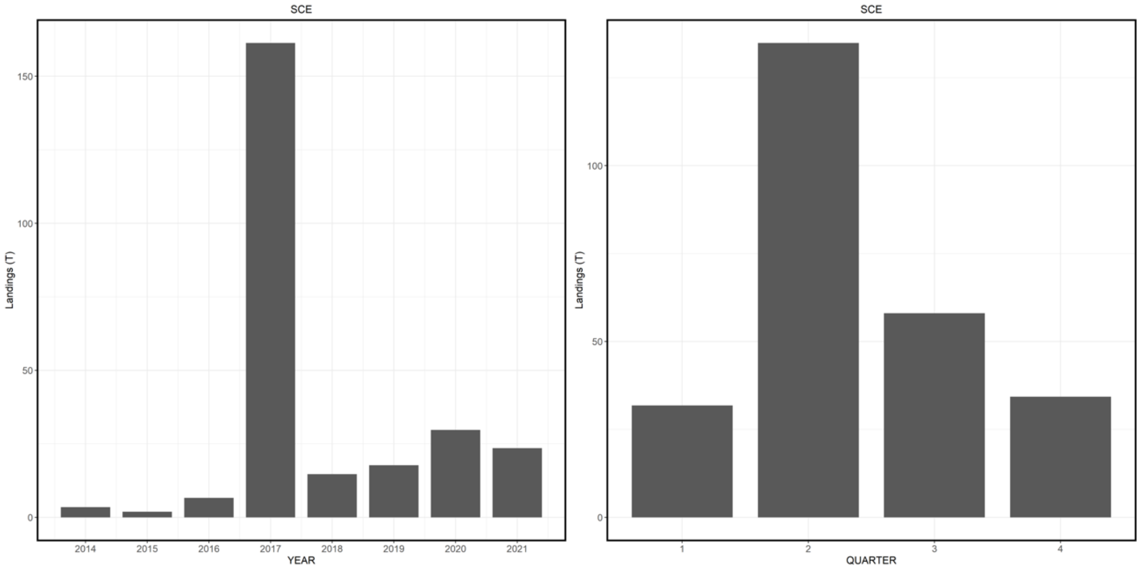

Figure 3-86 Landings of king scallop by year and quarter in the North Sea.

Facts at a glance

Landings:
Only one year available (EU data only)

Value:

Assessment:
Yes. Age based assessment in Scotland from research survey data since 1980s.

Countries:
UK, IRL

Gears:
DRB (non-mechanized dredge)

Target/Bycatch species:
Target single species fishery. Low by-catch of quota and non-quota species

Recreational fisheries:
No or very locally only

Threats:
Pressure of dredging on seafloor, no input or output control, biotoxins can cause closures.

Data issues:
UK data not shown here.

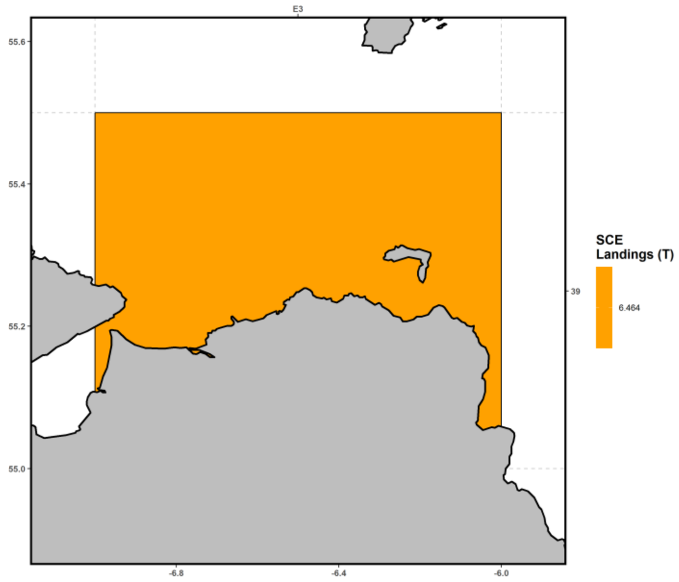

Figure 3-87: Landings of king scallop in the West of Scotland by ICES rectangle.

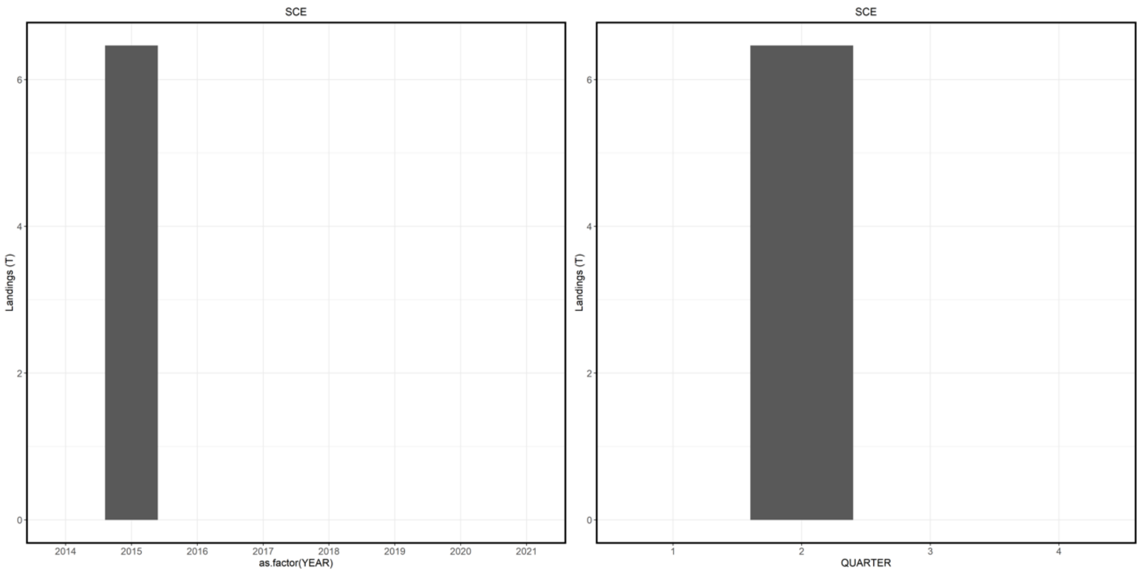

Figure 3-88 Landings of king scallop by year and quarter in the West of Scotland.

Data collection

Logbook and VMS data on landings and effort, survey time series, port sampling size data at ICES rectangle resolution.

Fisheries management measures

MCRS 100mm shell length, kwdays limits apply.

Facts at a glance

Landings:
Decrease except last two years (EU data only)

Value:
4,425 thousand EUR

Assessment:
Isle of Man waters, Welsh waters only. From survey data. Standardised catch rate indicators of stock status offshore from logbook and VMS data

Countries:
UK, IRL

Gears:
DRB (non-mechanized dredge). Minor catches in other gears

Target/Bycatch species: Target single species fishery. With queen scallop in IoM. Low by-catch of quota and non-quota species

Recreational fisheries No

Threats: Pressure of dredging on seafloor, no input or output control offshore, biotoxins can cause closures.

Data: LPUE indicators and size composition available offshore for IRL fleet. Logbook and VMS data on landings and effort, survey time series Isle of Man, Northern Ireland. Port sampling IRL to ICES rectangle resolution. Ad hoc observer at sea IRL in offshore fishery

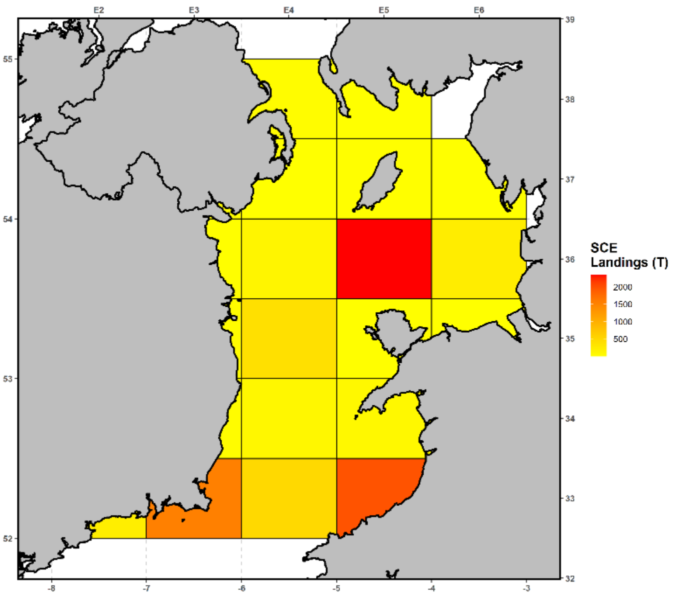

Figure 3-89 : Landings of king scallop in the Irish Sea by ICES rectangle.

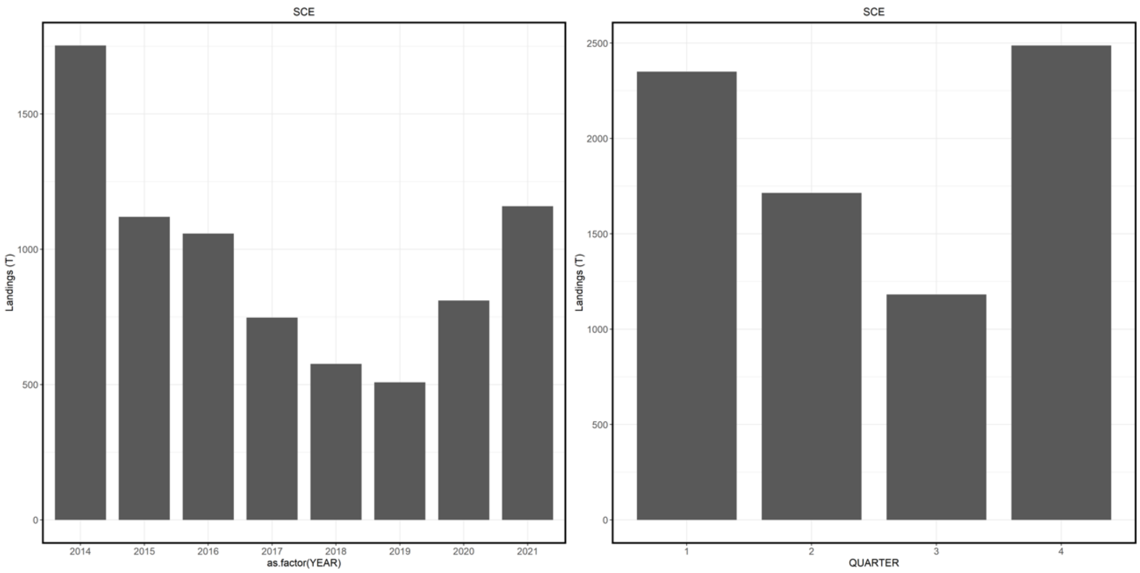

Figure 3-90 Landings of king scallop by year and quarter in the Irish Sea.

Fishing activity

SSCF activity inside 6nm or 12nm IRL, IoM, NI seasonally. LSF activity UK, IRL seaward of 12nm may occur throughout the year.

Fisheries management measures

Seasonal and spatial restrictions and TAC apply in IoM waters. MCRS 110mm. Spatial restrictions in coastal Natura sites in IRL waters.

Facts at a glance

Landings:

Decrease since 2017 (EU data only)

Value:

5,825 thousand EUR

Assessment:

Time series of standardized stock status indicators

Countries:

IRL, historically UK

Gears:

DRB (non-mechanized dredge). Minor catches in other gears.

Target/Bycatch species:

Target single species fishery. Low by-catch of quota and non-quota species

Recreational fisheries

No

Threats:

Pressure of dredging on seafloor, no input or output control offshore, biotoxins can cause fishery closure

Data*:*

Logbook and VMS data on landings and effort. Irregular surveys. Port sampling IRL of size and age composition at ICES rectangle resolution. Irregular observer at sea data IRL.

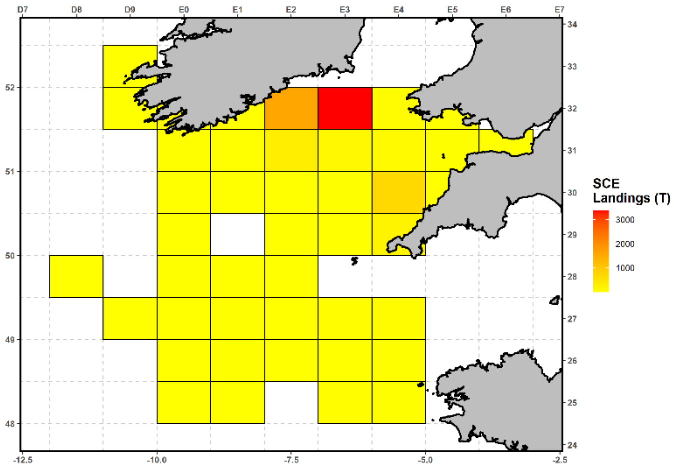

Figure 3-91 Landings of king scallop in the Celtic Sea by ICES rectangle.

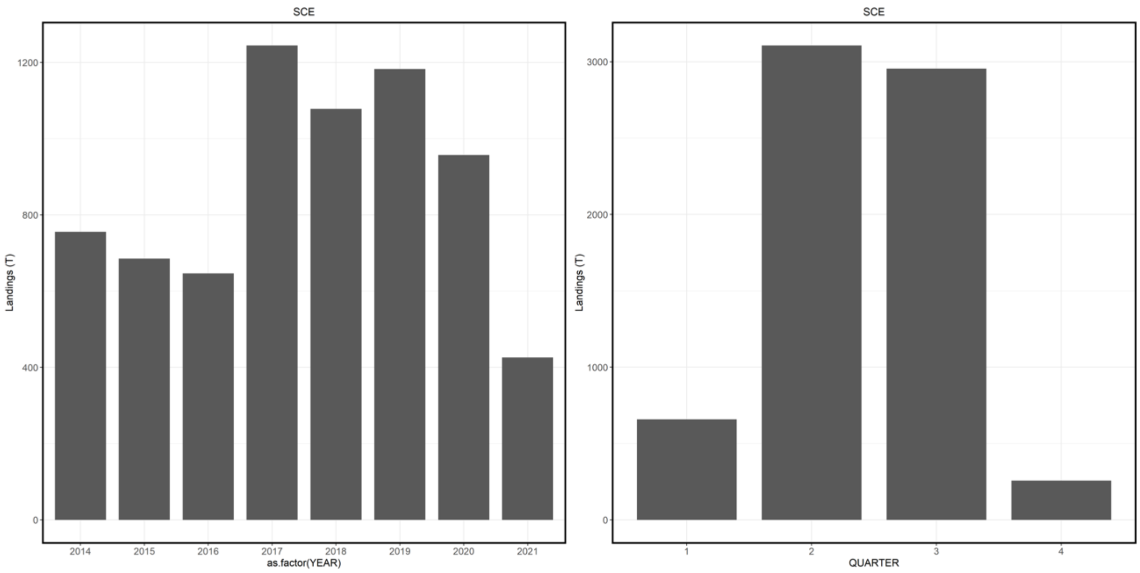

Figure 3-92 Landings of king scallop by year and quarter in the Irish Sea.

Fishing activity

Main fishery is in northeast Celtic Sea south of Ireland.

Fisheries management measures

MCRS 100mm shell length. Kwday limits ICES Area VII and BSA.

Facts at a glance

Landings:
increasing (EU data only)

Value:
71,168 thousand EUR

Assessment:
Biomass estimates or indices from survey in FRA waters and recently in UK and EU waters

Countries:
IRL, FRA, UK

Gears:
DRB (non-mechanized dredge). Minor catches in other gears.

Target/Bycatch species:
Target single species fishery. Low by-catch of quota and non-quota species

Recreational fisheries:
No

Threats:
Pressure of dredging on seafloor, no input or output control offshore, biotoxins can cause fishery closure

Data:
Logbook and VMS data on landings and effort. Survey time series FRA. Recent surveys by UK

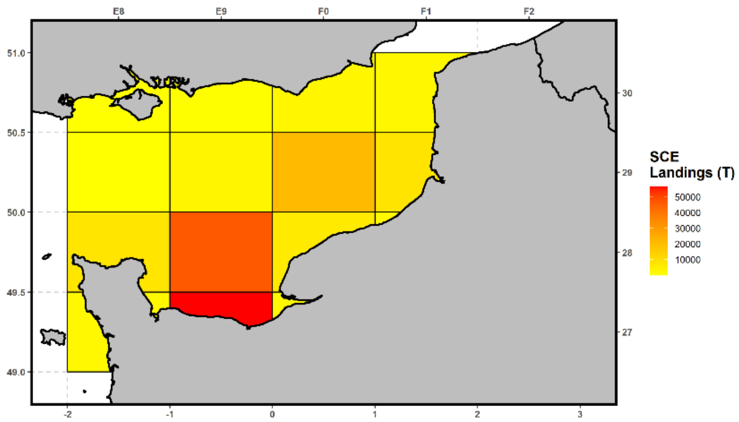

Figure 3-93 Landings of king scallop in the Eastern English Channel by ICES rectangle.

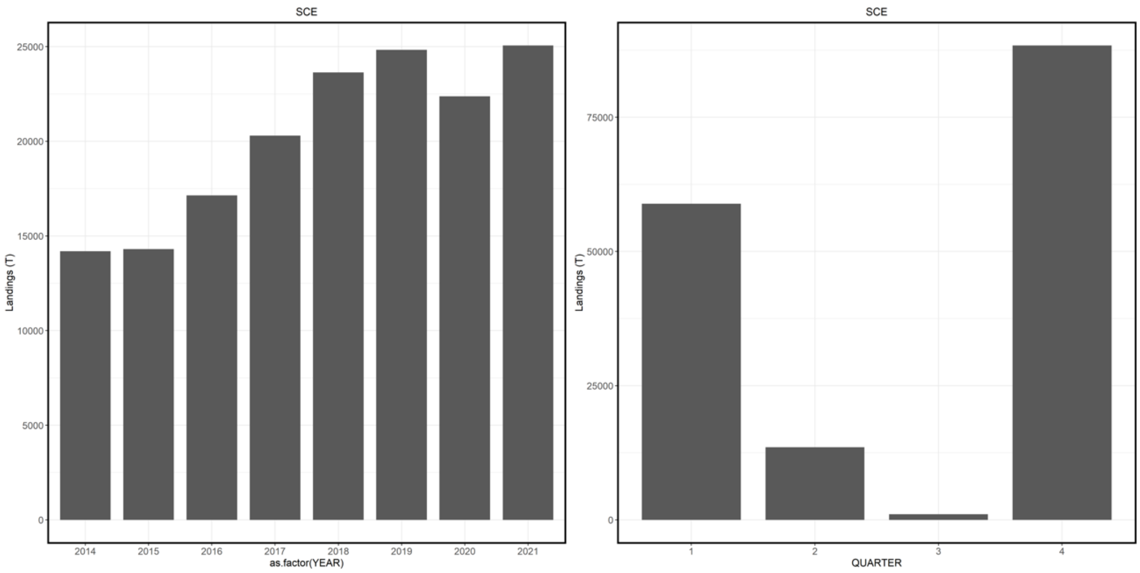

Figure 3-94 Landings of king scallop by year and quarter in the Eastern English Channel.

Fishing activity

Very important in FRA with high participation levels in seasonal fisheries.

Economic importance

High importance in FRA waters and for IRL in EU waters.

Fisheries management measures

MCRS 100mm shell length. Seasonal closures and TAC in FRA waters.

Facts at a glance

Landings:
Stable (EU data only)

Value:
21,384 thousand EUR

Assessment:
Biomass estimates from survey in FRA waters

Countries:
IRL, UK, FRA

Gears:
DRB (non-mechanized dredge). Minor catches in other gears

Target/Bycatch species:
Target single species fishery. Low by-catch of quota and non-quota species

Recreational fisheries:
No

Threats:
Pressure of dredging on seafloor, no input or output control offshore, biotoxins can cause fishery closure

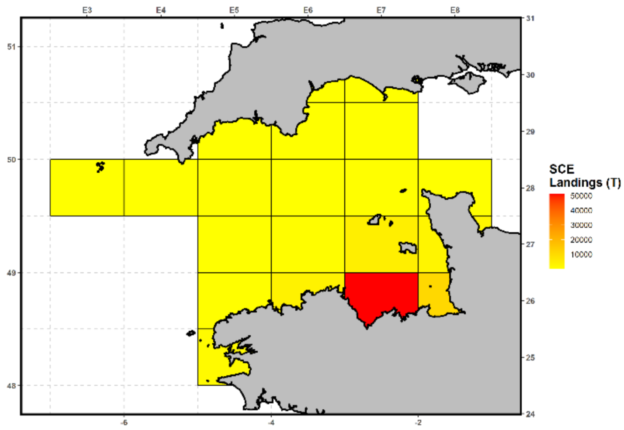

Figure 3-95 Landings of king scallop in the Western English Channel by ICES rectangle.

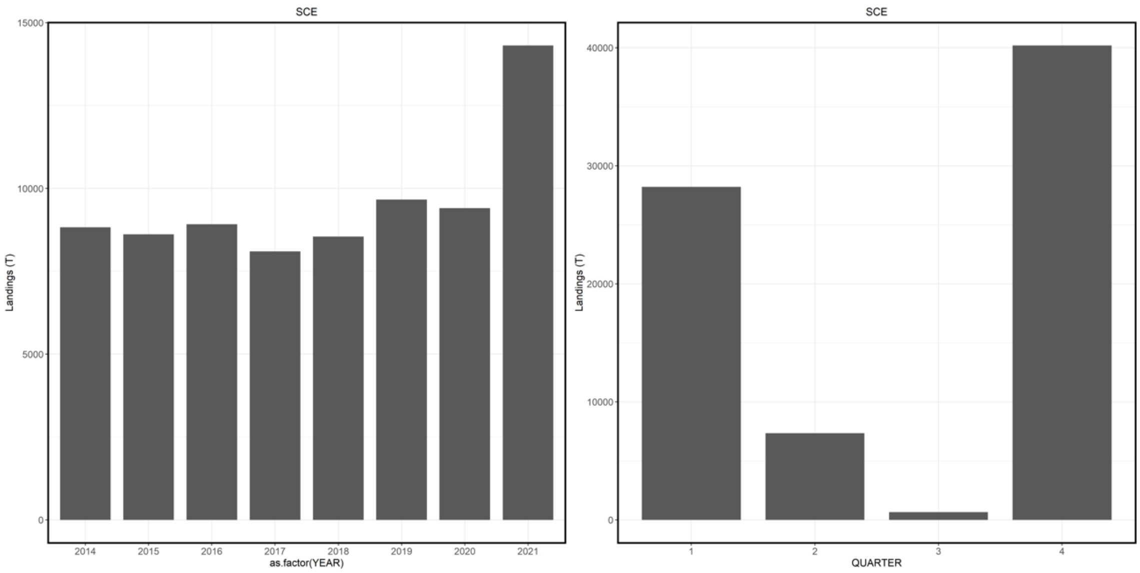

Figure 3-96 Landings of king scallop by year and quarter in the Western English Channel.

Data collection

Logbook and VMS data on landings and effort. Irregular surveys. Port sampling regular. Observer at sea irregular.

Economic importance

High importance in FRA waters and for IRL in EU waters.

Fisheries management measures

MCRS 100mm shell length. Seasonal closures and TAC in FRA waters.

Reference

ICES. 2021d. Scallop Assessment Working Group (WGScallop). ICES Scientific Reports. 3:114. 106 pp. https://doi.org/10.17895/ices.pub.9561

3.8 Fact Sheet spider crab (*Maja brachydactyla;* SCR)

Facts at a glance

Landings:

4000 to 8000 tonnes since 2014. Increasing year on year

Value:

32,193 thousand EUR

Fishing areas:

East Channel, West Channel, Celtic Sea, North Sea, West Scotland

Countries:

IRL, UK, FR

Gears:

FPO, GNS are main targeting gears

Data:

Landings, no census of effort. Locally, and usually inside 6nm, various data collection programmes on catch and effort at national level. No directed surveys. Catchability in IBTS is low.

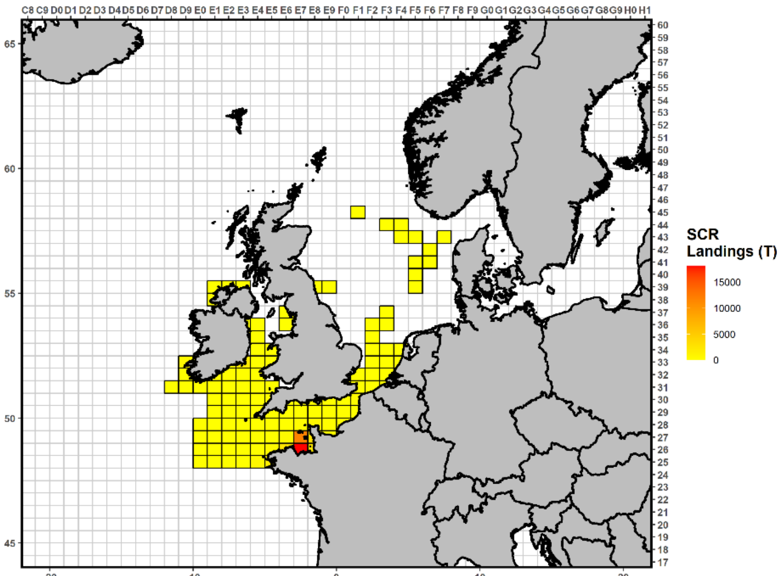

Figure 3-97 Landings of spider crab in the six sea basins by ICES rectangle.

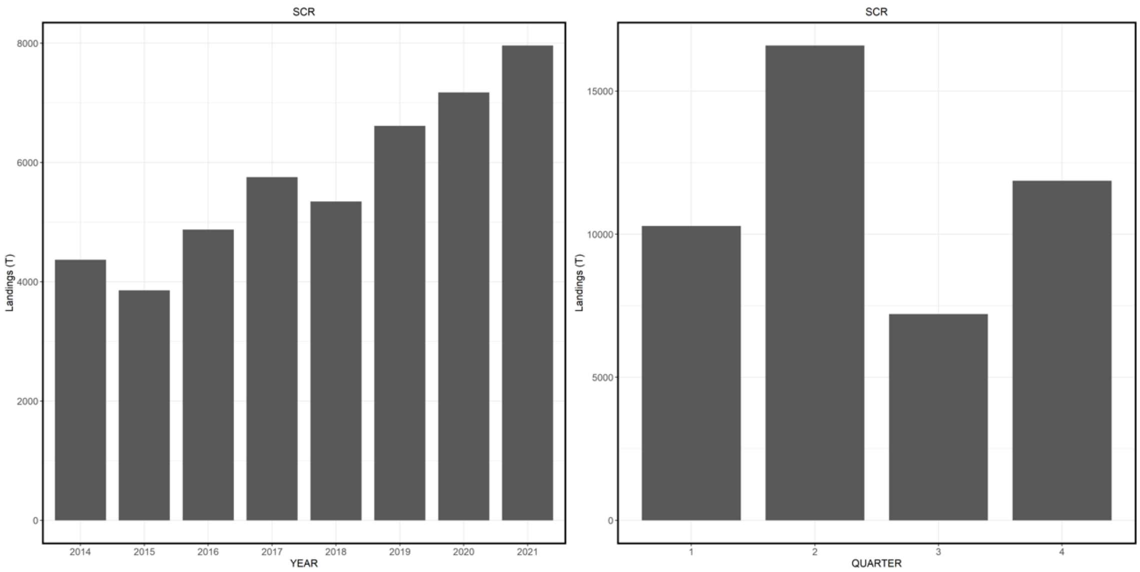

Figure 3-98 Landings of spider crab by year and quarter for all sea basins.

Biology: Spider crab have a southern distribution and may be expanding northwards. Pelagic larval phase although only two larval stages and short duration. Landings are increasing. Migration to inshore waters in spring and occur in deeper waters in autumn and winter. Have terminal moult so there is no growth beyond that point. Longevity limited after terminal moult.

Fishery: Fishery targets spider crab in coastal waters during inshore migration in spring. This is reflected in higher landings in Q2. Important pot (FPO) and set net (GNS, TNG) fisheries in northern France, Channel Islands and western Channel generally. Locally important south west Ireland. By-catch in target lobster pot fishery and in set net fisheries generally. Minor landings west of Scotland and North Sea. Market is for live crabs but increased processing activity in some areas. Condition and product quality varies seasonally. High grading occurs in pot fishery. Discard mortality in FPO is very low but much higher in GNS. Exploitation rate is probably high in local targeted fisheries as the species aggregates in coastal waters.

Assessment

No assessments. Length based approaches complicated by the terminal moult.

Management

MCRS 130mm male and 125mm female. Spider crab are included in the western waters Kwday effort limits

Table 3-20 Landings of spider crab by ICES divisions from AER

ICES division	Live weight of landings	Landings value
27.4.a	40	115
27.4.b	26	66
27.4.c	11581	27310
27.6.a	110	33
27.7.a	308179	179688
27.7.d	693696	1120088
27.7.e	16018076	29992814
27.7.f	3246	4046
27.7.g	34743	20805
27.7.h	297261	606146
27.7.j	204674	241676
Grand Total	17571633	32192788

Table 3-21 Landings by country over the years, including UK and EU totals.

Row Labels	Live weight of landings			Value of landings		
	2017	2018	2019	2017	2018	2019
Belgium	396	922	1805	36	610	2261
France	5590802	5245639	6177267	10215173	10168792	11341975
Ireland	111150	23975	408751	127686	21266	286982
Netherlands	1563	3059	6304	3827	8704	15477
EU Total	5703911	5273595	6594127	10346721	10199372	11646695
United Kingdom	369774	525084	661956	449637	656982	768830
Grand Total	6073685	5798679	7256083	10796357	10856353	12415526

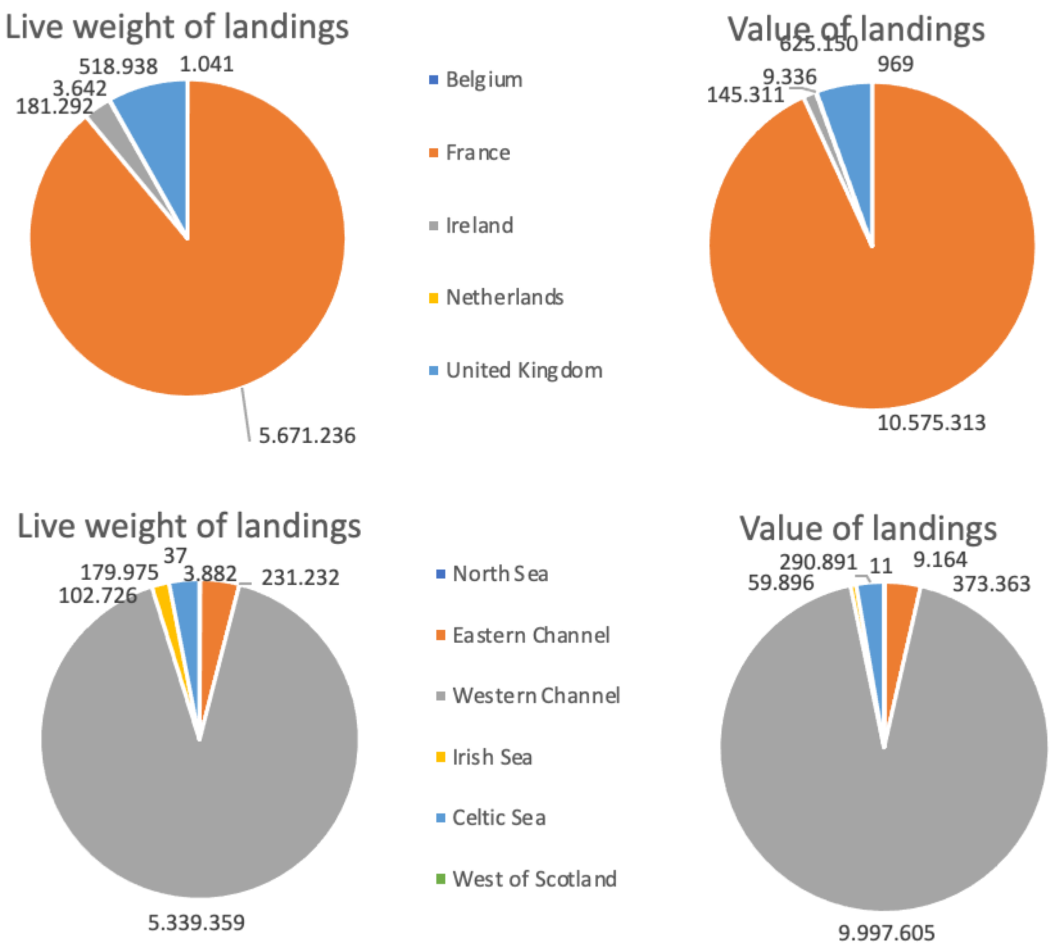

Figure 3-99 Live weight and value of lLandings of spider crab in the MS and the six sea basins .

Table 3-22 Main fleets landing spider crab

Fleet	Live weight of landings	Landings value
FRA NAO DFN1218	5,333,226	10,017,430
FRA NAO DFN1012	4,751,008	8,961,171
FRA NAO FPO0010	2,213,935	4,322,008
FRA NAO FPO1012	1,684,733	3,179,942
FRA NAO DFN0010	776,900	1,482,686
FRA NAO PMP1012	604,309	1,018,436
FRA NAO PMP0010	411,248	729,348
FRA NAO FPO1824	249,065	489,238
FRA NAO DTS1012	309,187	446,603
FRA NAO PGP1012	243,378	357,723
Other	994,646	1,188,202
Total	17,571,633	32,192,788

3.8.1 Fact Sheet spider crab North Sea (ICES div. 4a, b, c)

Facts at a glance

Landings:
Increase (but negligible)

Value:
9,164 EUR

Assessment:
No

Countries:
UK,

Gears:
FPO, GNS

Target/Bycatch species:
mainly by-catch

Recreational fisheries:
No

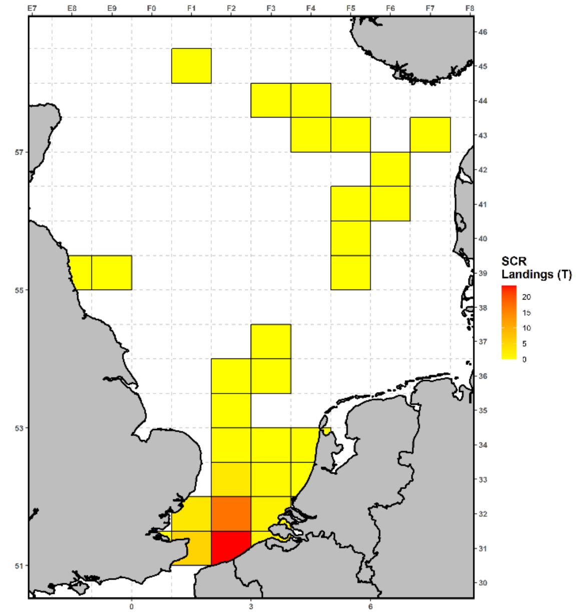

Fig. XX: Landings of spider crab in the North Seal by ICES rectangle

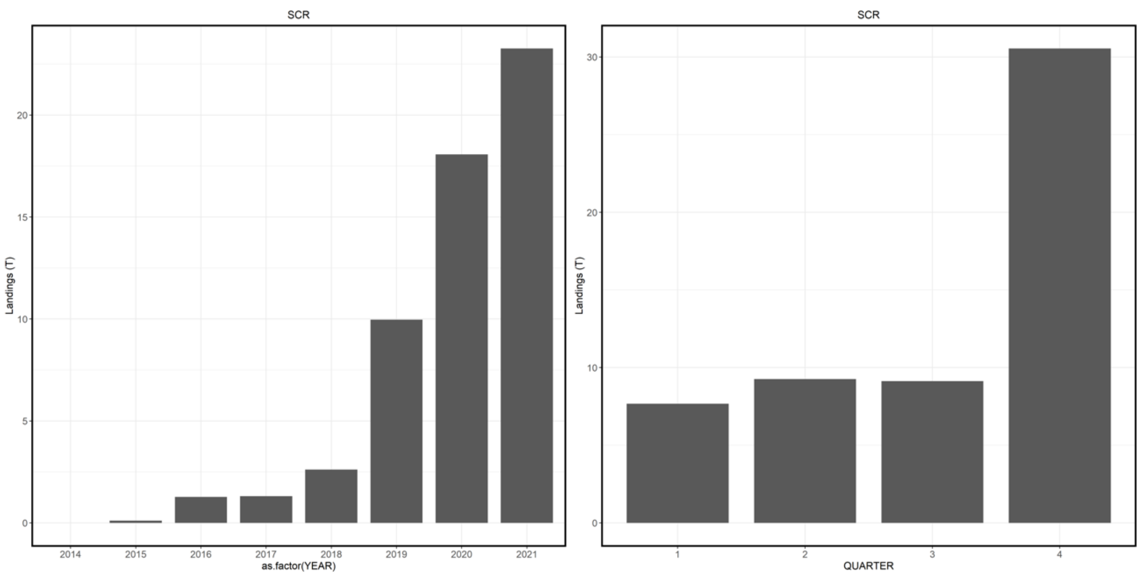

Figure 3-100 Landings of spider crab by year and quarter in the North Sea.

Stock assessment: No

Economic importance: Minor

Facts at a glance

Landings:
Negligible

Value:
11 EUR

Assessment:
No

Countries:
IRL, UK

Gears:
FPO

Target/Bycatch species:
non target species in FPO fisheries for lobster and brown crab.

Recreational fisheries:
No

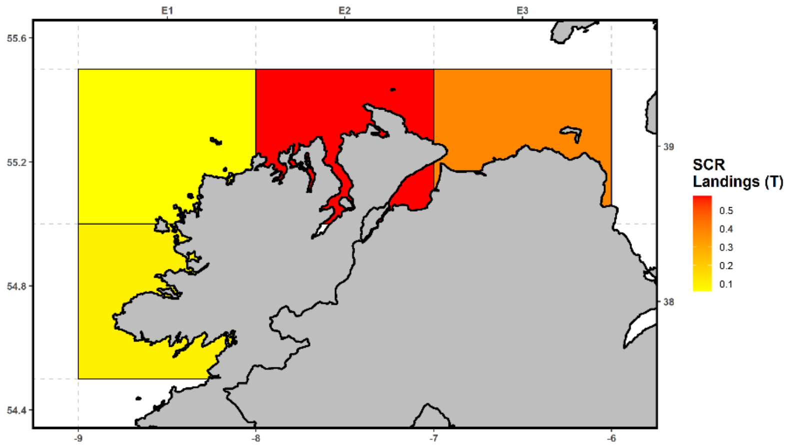

Figure 3-101 Landings of spider crab in the West of Scotland by ICES rectangle.

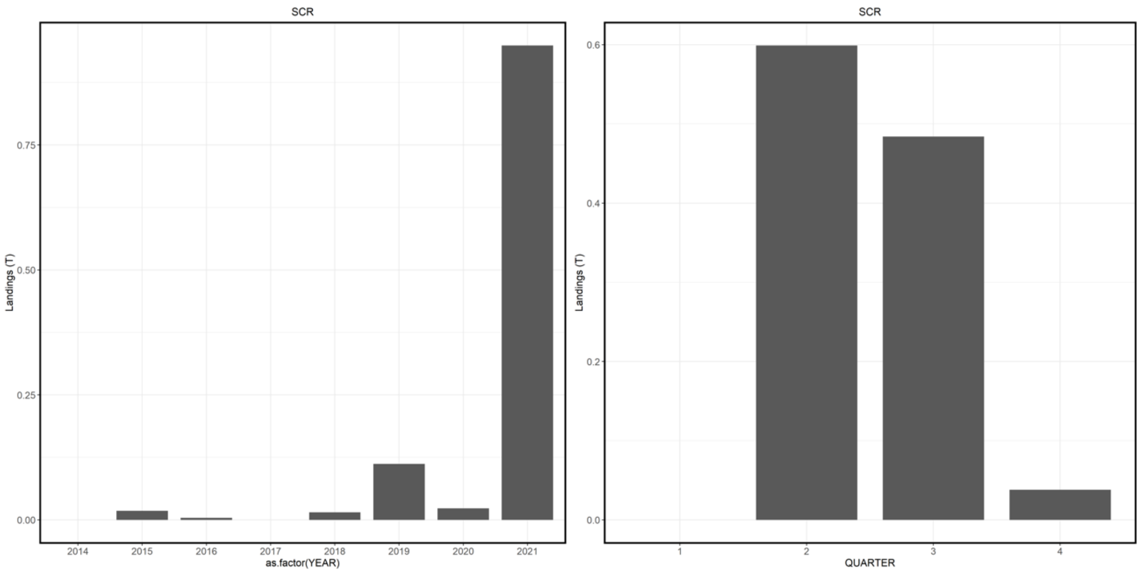

Figure 3-102 Landings of spider crab by year and quarter in the West of Scotland.

Data collection

Self-sampling and observer data on by-catch in lobster and crab fishery.

Economic importance

Low but may increase as the species expand northwards.

Fisheries management measures

MCRS. Western Waters kw days regulation apply in combination with brown crab (CRE).

Facts at a glance

Landings:
250 tonnes recent years

Value:
59,896 EUR

Assessment:
No

Countries:
IRL, UK

Gears:
FPO, GNS

Target/Bycatch species:
Usually non-target in FPO fisheries for lobster and crab

Recreational fisheries:
No

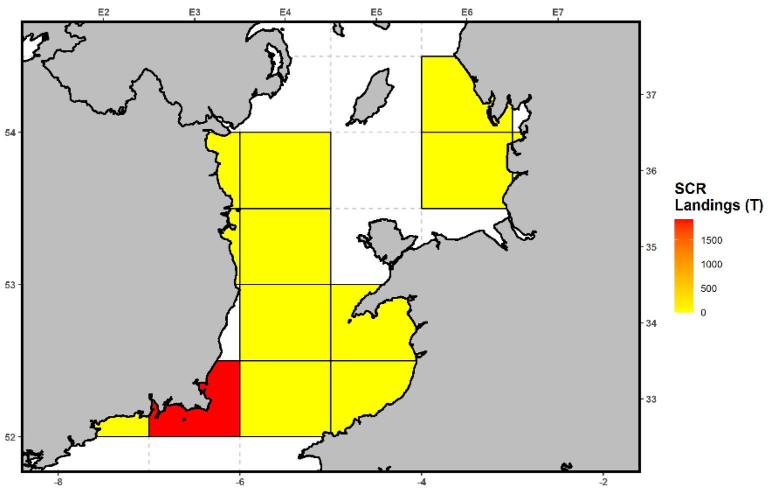

Figure 3-103 Landings of spider crab in the Irish Sea by ICES rectangle.

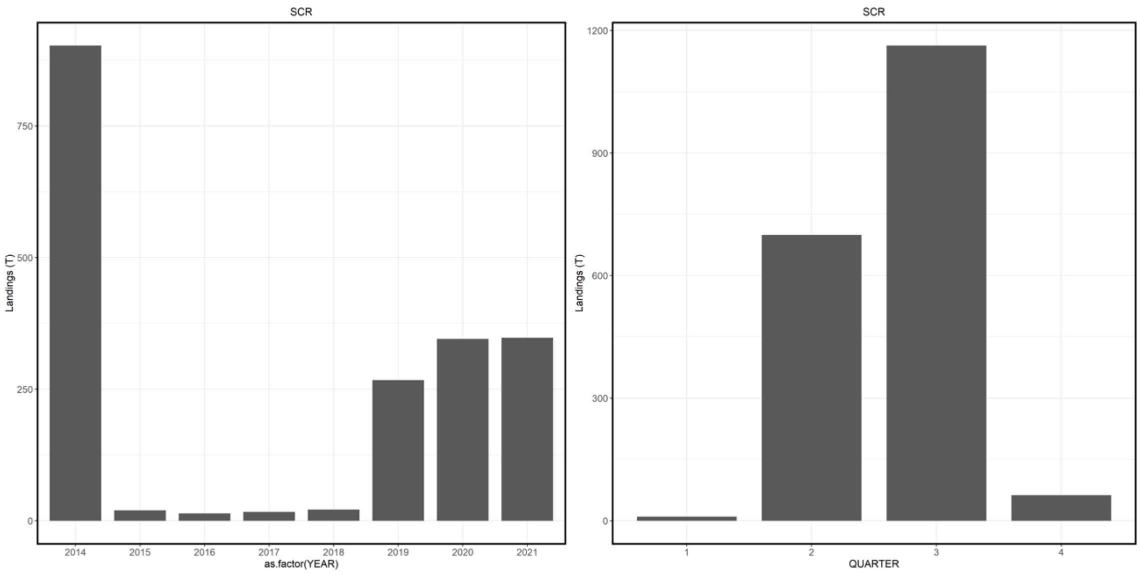

Figure 3-104 Landings of spider crab by year and quarter in the Irish Sea.

Data collection: *Self-sampling and observer data on by-catch in lobster and crab fishery.*

Economic importance: Low.

Fisheries management measures: MCRS, Western Waters kwdays regulation apply in combination with brown crab (CRE).

Facts at a glance

Landings:
Stable

Value:
290,891 EUR

Assessment:
No

Countries:
IRL, UK, FR

Gears:
FPO, GNS

Target/Bycatch species:

Target locally; IRL FPO southwest coast, FR FPO/GNS Brittany

Recreational fisheries:
No

Data issues:
Landings seem to be underestimated

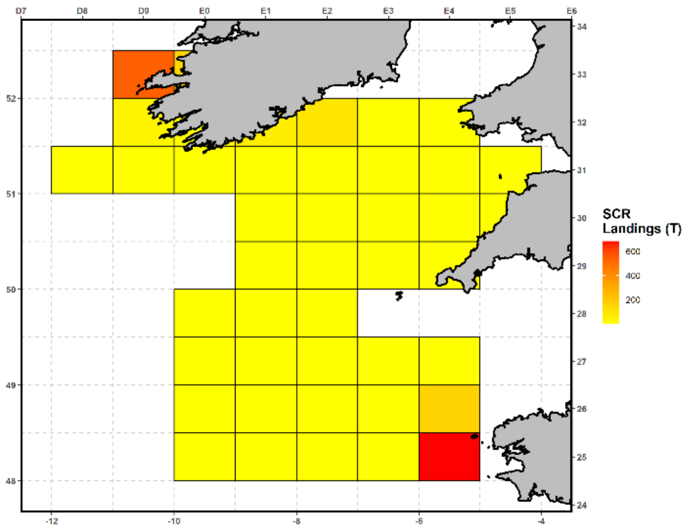

Fig. XX: Landings of spider crab in the Celtic Sea by ICES rectangle

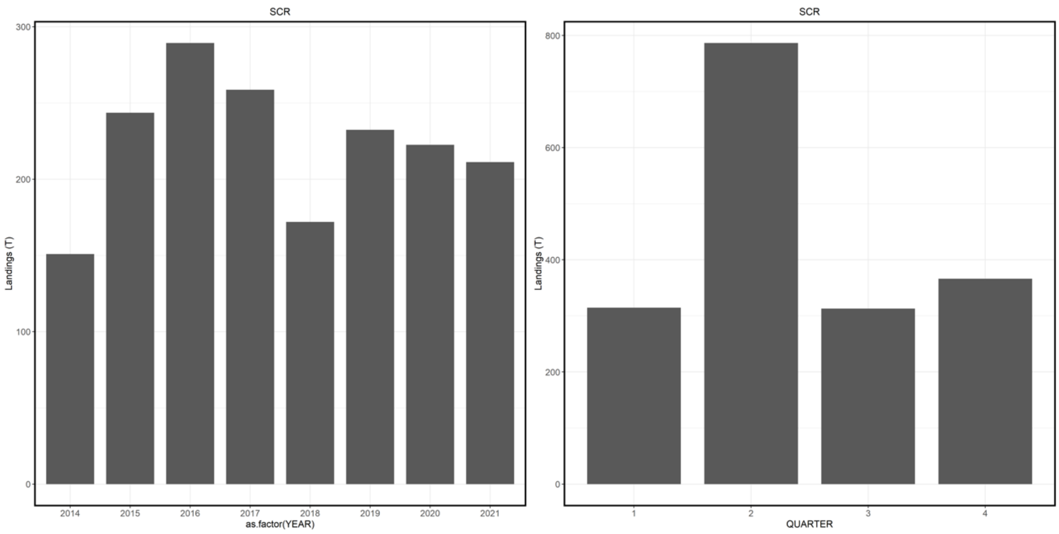

Figure 3-105 Landings of spider crab by year and quarter in the Celtic Sea.

Fishing activity

Targeted activity in local coastal waters

Data collection

Catch and effort indices in target fisheries IRL

Economic importance

Locally important

Fisheries management measures

MCRS, Western Waters kwdays regulation apply in combination with brown crab (CRE)

Facts at a glance

Landings:
Increase

Value:
373,363 EUR

Assessment:
No

Gears:
FPO, GNS

Target/Bycatch species:
Target locally also by-catch in FPO GNS fisheries generally

Recreational fisheries:
No

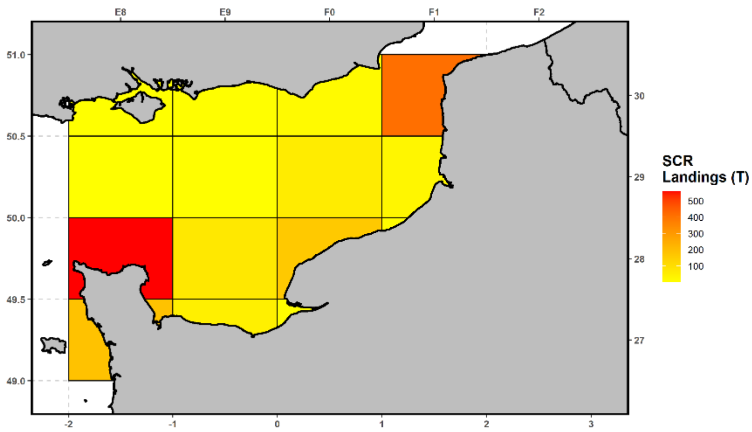

Figure 3-106 Landings of spider crab in the Eastern English Channel by ICES rectangle.

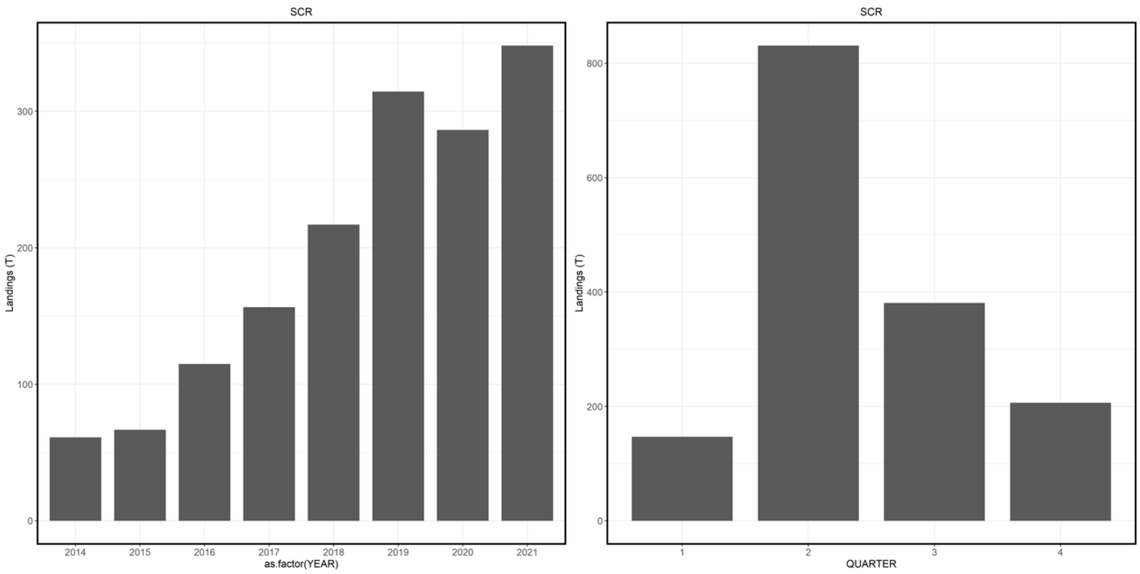

Figure 3-107 Landings of spider crab by year and quarter in the Eastern English Channel.

3.8.6 Fact Sheet spider crab *Western English Channel (ICES div. 7e)*

Facts at a glance

Landings:
3000 to 6000 tonnes and increasing year on year

Value:
9,998 thousand EUR

Assessment:
No

Countries:
FR, UK

Gears:
FPO, GNS

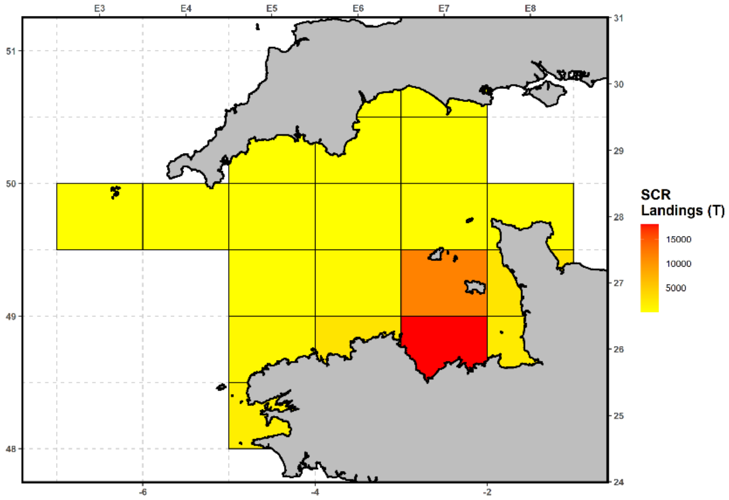

Figure 3-108 Landings of spider crab in the Western English Channel by ICES rectangle.

Target/Bycatch species: :
Target locally also by-catch in FPO GNS fisheries generally

Recreational fisheries:
No

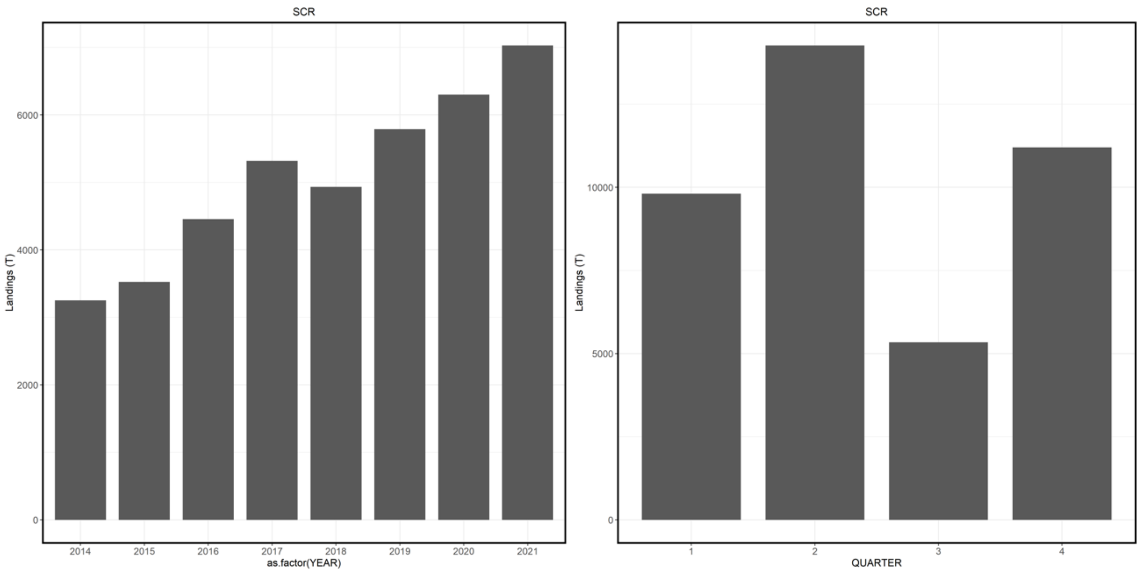

Figure 3-109 Landings of spider crab by year and quarter in the Western English Channel.

3.9 Fact Sheet Small-spotted catshark (*Scyliorhinus canicula*, SYC)

Facts at a glance

Landings:
4 000 t annually

Value:
6,411 thousand EUR

Fishing areas:
North Sea, Eastern and Western Channel, Celtic Sea, Irish Sea, West of Scotland

Countries:
France, Belgium, Ireland, Netherlands, Spain, Denmark, Germany

Gears:
OTB, TBB, GTR, OTT, others

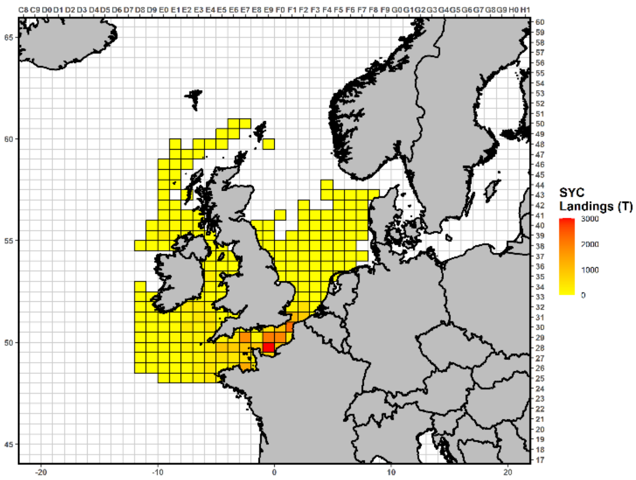

Figure 3-110: Landings of small-spotted catshark in the six sea basins by ICES rectangle.

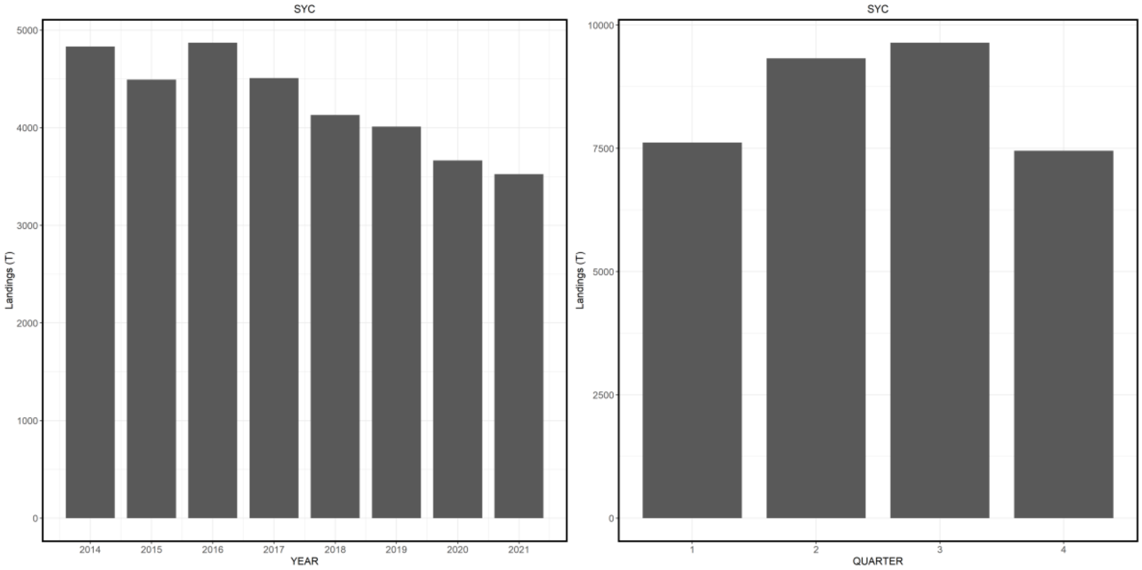

Figure 3-111 Landings of small-spotted catshark by year and quarter for all sea basins

Table 3-23 Landings of small spotted catshark by ICES division. Data from AER

ICES division	Live weight of landings	Landings value
27.4.a	22	13
27.4.b	42157	21087
27.4.c	1210703	473099
27.6.a	426681	313776
27.7.a	272712	142702
27.7.d	5146977	2741983
27.7.e	3332384	1534943
27.7.f	337125	150124
27.7.g	1033240	619536
27.7.h	789196	361160
27.7.j	86194	44838
27.7.j.2	12150	8339
Grand Total	12689542	6411599

Table 3-24 Landings of small-spotted catshark. Data from AER.

Country	Live weight of landings			Landings value		
	2017	2018	2019	2017	2018	2019
Belgium	552332	486129	521577	270303	230560	243552
Denmark			97			23
France	3316585	3087484	3034323	1693919	1534817	1523344
Ireland	499783	358748	238947	381336	250163	95595
Netherlands	147402	190308	215560	46643	56043	55149
Spain	12544	21243	6480	8584	16491	5078
EU Total	4516102	4122669	4010505	2392201	2071583	1917662
United Kingdom	1362115	1922472	1803478	361335	532181	538706
Grand Total	5890761	6066384	5820462	2762120	2620255	2461446

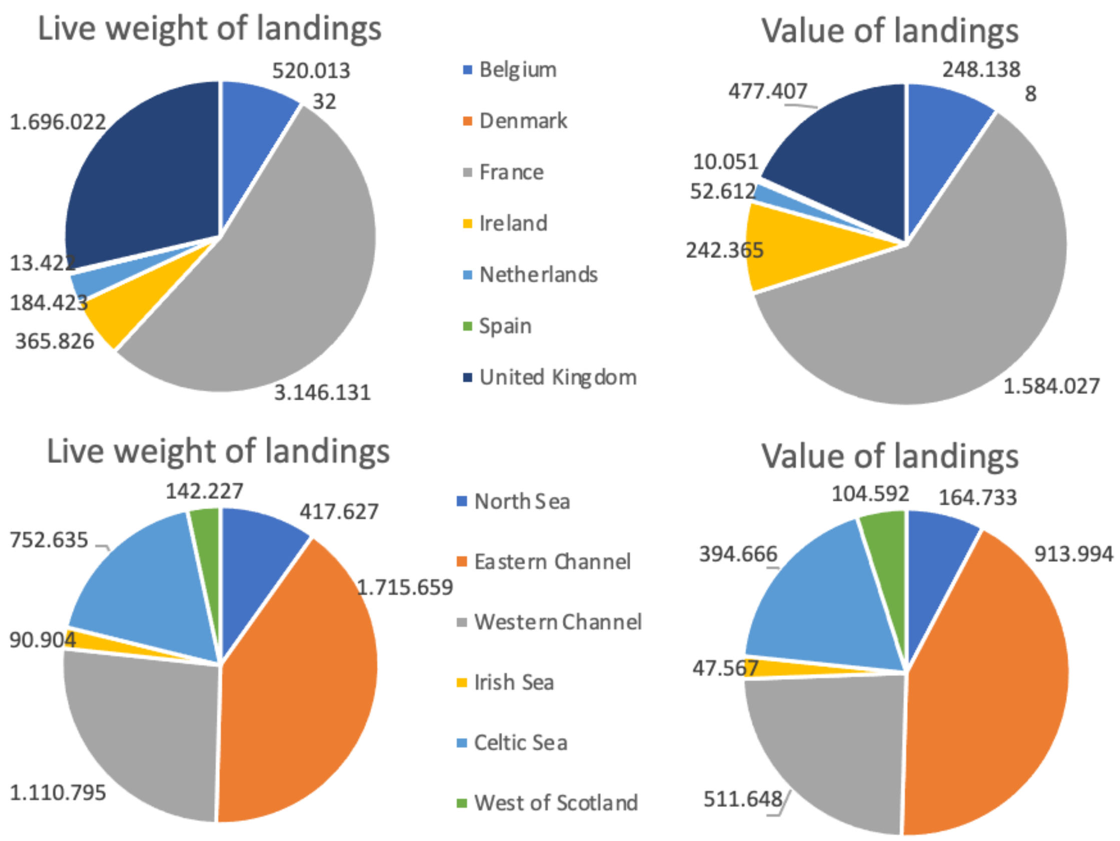

Figure 3-112 Landings in weight and value of small-spotted catshark in the MS and the six sea basins

Table 3-25 Main fleets landing small-spotted catshark

Fleet	Live weight of landings	Landings value

FRA NAO DTS1824	4,177,343	2,103,364
FRA NAO DTS2440	1,660,261	784,720
BEL NAO TBB2440	1,040,168	517,156
FRA NAO DFN1012	935,324	487,209
IRL NAO DTS2440	426,131	320,850
FRA NAO DTS1218	583,427	296,627
IRL NAO TBB2440	419,419	289,232
FRA NAO DTS1012	450,532	216,064
BEL NAO TBB1824	336,306	141,106
NLD NAO TBB40XX	461,681	129,556
Other	2,198,951	1,125,716
Total	12,689,542	6,411,599

3.9.1 Fact Sheet small-spotted catshark *North Sea (ICES div. 4a,b,c)*

Facts at a glance

Landings:
350t annually

Value:
164,733 EUR

Assessment:
Yes; Biomass index based on several surveys

Countries:
Netherlands, France, Belgium, others

Gears:
OTB, TBB, GTR, others

Target/Bycatch species:
Bycatch (either/or)

Recreational fisheries
-

Data issues:
A discard survival of >90% has been estimated for the beam-trawl fisheries in this area

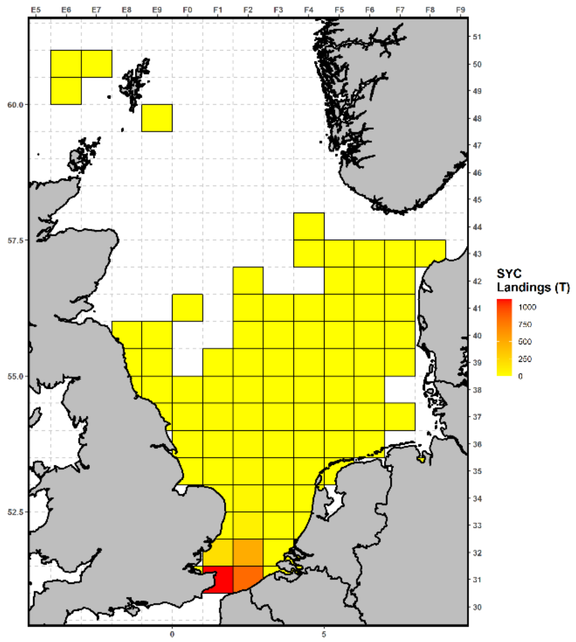

Figure 3-113 Landings of small-spotted catshark in North Sea by ICES rectangle.

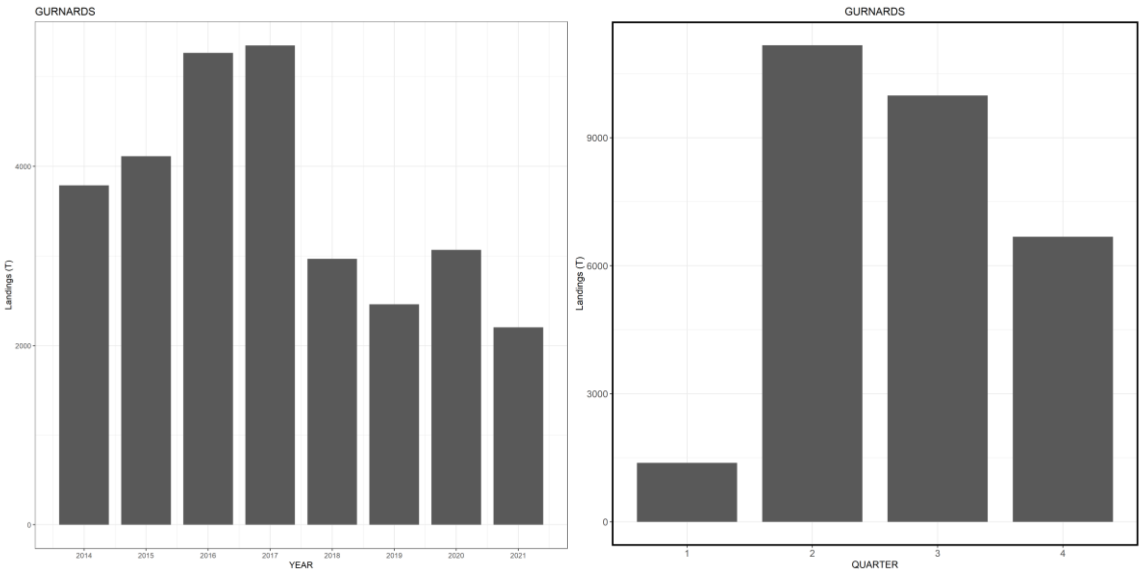

Figure 3-114 Landings of small-spotted catshark by year and quarter in the North Sea.

Fishing activity

Mainly caught by bottom trawl (61%) and beam trawl (18%).

Data collection

Surveys: NS–IBTS–Q1, NS–IBTS–Q3, CGFS–Q4, and UK(E&W)–BTS–Q3.

Stock assessment

ICES does provide advice based on the precautionary approach making use of survey data.

Fisheries management measures

These species are not subject to fisheries management in EU waters.

Additional information, e.g. ecosystem knowledge

S. canicula is an abundant species occurring on a range of substrates (from mud to rock) on the European continental shelves, from coastal waters to the upper continental slope, but is most abundant on the shelf. Its distribution ranges from Norway and the British Isles to the Mediterranean Sea and Northwest Africa (Ebert and Stehmann, 2013). ICES currently consider 4 stock units for this species: (i) North Sea ecoregion (Subarea 4 and divisions 3.a and 7.d), (ii) Celtic Seas and west of Scotland (Subarea 6 and divisions 7.a–c and 7.e–j), (iii) northern Bay of Biscay (divisions 8.a–b and 8.d), and (iv) Atlantic Iberian waters (divisions 8.c and 9.a).

Fact Sheet small-spotted catshark *Eastern English Channel (ICES div 7d)*

Facts at a glance

Landings:
1,750t annually

Value:
913,994 €

Assessment:
Yes; Biomass index based on several surveys

Countries:
France, Belgium, others

Gears:
OTB, TBB, GTR, others

Target/Bycatch species:
Bycatch

Target/Bycatch species:
Bycatch

Recreational fisheries:
-

Data issues:
A discard survival of >90% has been estimated for the beam-trawl fisheries in this area

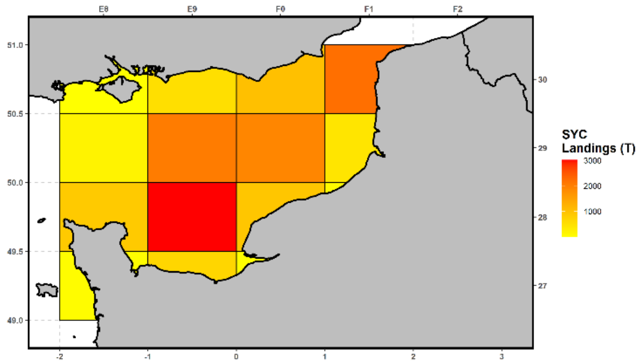

Figure 3-115 Landings of small-spotted catshark in the Eastern English Channel by ICES rectangle.

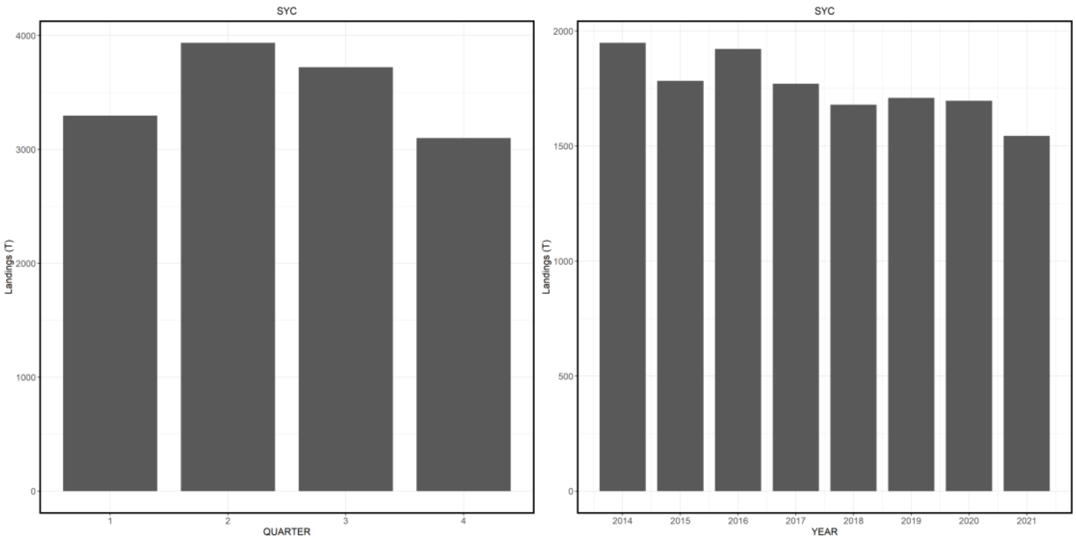

Figure 3-116 Landings of small-spotted catshark by year and quarter in the Eastern English Channel

Fishing activity

Mainly caught by bottom trawl (61%) and beam trawl (18%).

Data collection

Surveys: NS–IBTS–Q1, NS–IBTS–Q3, CGFS–Q4, and UK(E&W)–BTS–Q3.

Stock assessment

ICES does provide advice based on the precautionary approach making use of survey data.

Fisheries management measures

These species are not subject to fisheries management in EU waters.

Additional information, e.g. ecosystem knowledge

S. canicula is an abundant species occurring on a range of substrates (from mud to rock) on the European continental shelves, from coastal waters to the upper continental slope, but is most abundant on the shelf. Its distribution ranges from Norway and the

British Isles to the Mediterranean Sea and Northwest Africa (Ebert and Stehmann, 2013). ICES currently consider 4 stock units for this species: (i) North Sea ecoregion (Subarea 4 and divisions 3.a and 7.d), (ii) Celtic Seas and west of Scotland (Subarea 6 and divisions 7.a–c and 7.e–j), (iii) Northern Bay of Biscay (divisions 8.a–b and 8.d), and (iv) Atlantic Iberian waters (divisions 8.c and 9.a).

3.9.2 Fact Sheet small-spotted catshark Western English Channel (ICES div 7e)

Facts at a glance

Landings:
1,000t annually

Value:
511,648 EUR

Assessment:
Yes; Biomass index based on several surveys

Countries:
France, others

Gears:
OTB, others

Target/Bycatch species:
Bycatch

Recreational fisheries:
-

Data issues:
A discard survival of >90% has been estimated for the beam-trawl fisheries in this area

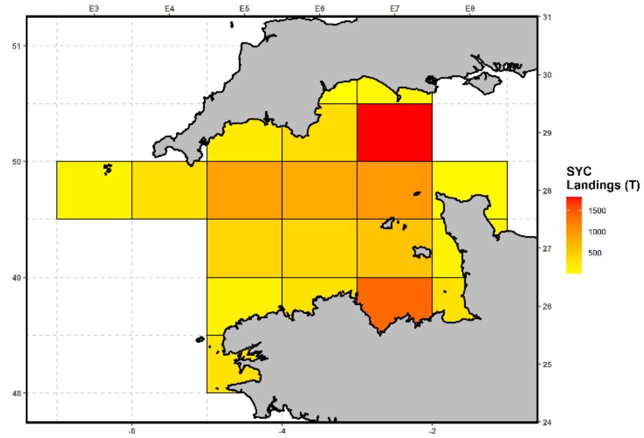

Figure 3-117 Landings of small-spotted catshark in the Western English Channel by ICES rectangle.

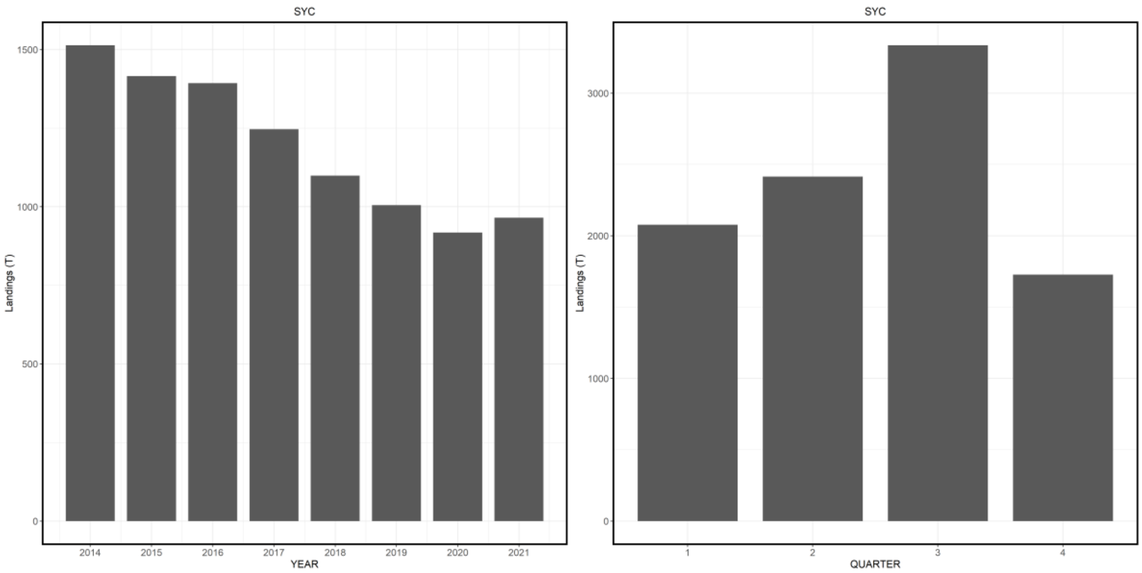

Figure 3-118 Landings of small-spotted catshark by year and quarter in the Western English Channel.

Fishing activity

Mainly caught by bottom trawl (78%)

Data collection

Surveys: NS–IBTS–Q1, NS–IBTS–Q3, CGFS–Q4, and UK(E&W)–BTS–Q3.

Stock assessment

ICES does provide advice based on the precautionary approach making use of survey data.

Fisheries management measures

These species are not subject to fisheries management in EU waters.

Additional information, e.g. ecosystem knowledge

S. canicula is an abundant species occurring on a range of substrates (from mud to rock) on the European continental shelves, from coastal waters to the upper continental slope, but is most abundant on the shelf. Its distribution ranges from Norway and the British Isles to the Mediterranean Sea and Northwest Africa (Ebert and Stehmann, 2013). ICES currently consider 4 stock units for this species: (i) North Sea ecoregion (Subarea 4 and divisions 3.a and 7.d), (ii) Celtic Seas and west of Scotland (Subarea 6 and divisions 7.a–c and 7.e–j), (iii) Northern Bay of Biscay (divisions 8.a–b and 8.d), and (iv) Atlantic Iberian waters (divisions 8.c and 9.a).

Facts at a glance

Landings:
700t annually

Value:
394,666 EUR

Assessment:
Yes; Biomass index based on several surveys

Countries:
France, Belgium, Ireland, Spain, others

Gears:
OTB, OTT, TBB, others

Target/Bycatch species:
Bycatch

Recreational fisheries:
-

Data issues:
A discard survival of >90% has been estimated for the beam-trawl fisheries in this area

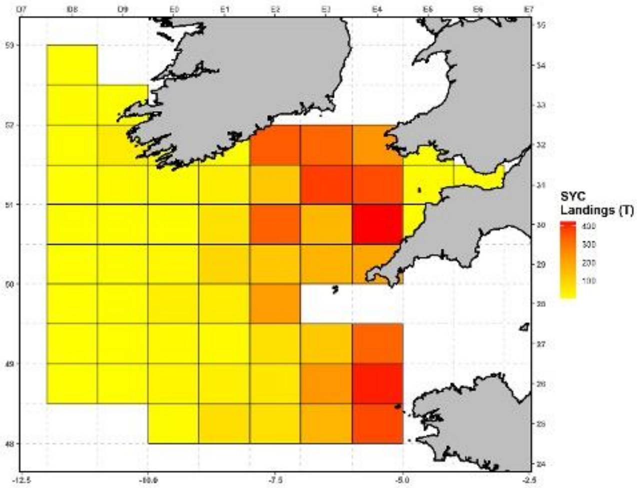

Figure 3-119 Landings of small-spotted catshark in the Celtic Seas by ICES rectangle.

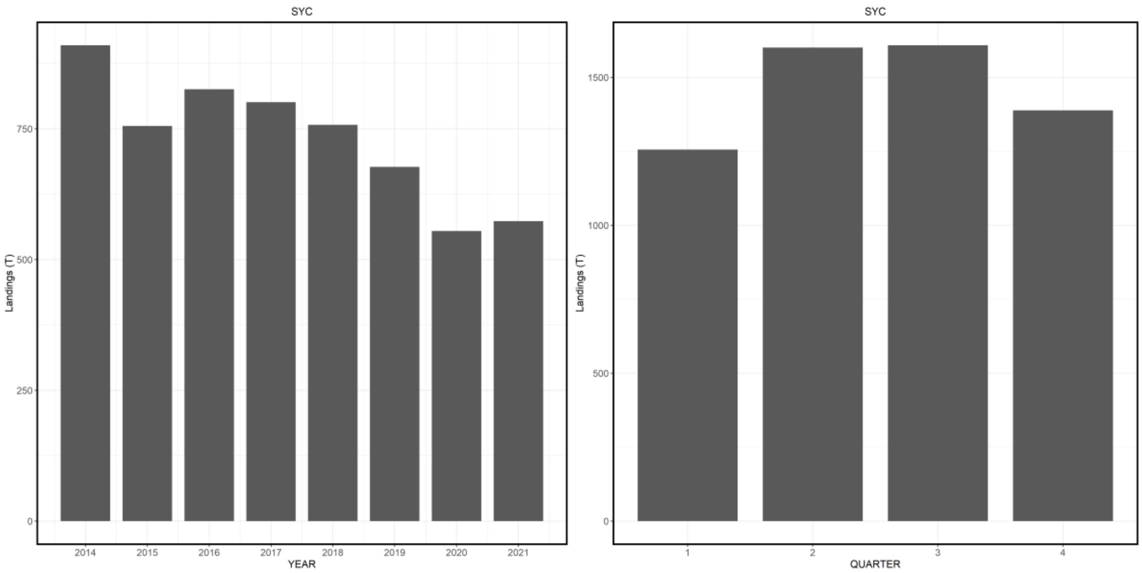

Figure 3-120 Landings of small-spotted catshark by year and quarter in the Celtic Sea.

Fishing activity

Mainly caught by bottom trawl (78%).

Data collection

Surveys: EVHOE-WIBTS-Q4, IE-IGFS-WIBTS-Q4, SP-PORC-WIBTS-Q3, UK(E&W)-BTS-Q3.

Stock assessment

ICES does provide advice based on the precautionary approach making use of survey data.

Fisheries management measures

These species are not subject to fisheries management in EU waters.

Additional information, e.g. ecosystem knowledge

S. canicula is an abundant species occurring on a range of substrates (from mud to rock) on the European continental shelves, from coastal waters to the upper continental slope, but is most abundant on the shelf. Its distribution ranges from Norway and the British Isles to the Mediterranean Sea and Northwest Africa (Ebert and Stehmann, 2013). ICES currently consider 4 stock units for this species: (i) North Sea ecoregion (Subarea 4 and divisions 3.a and 7.d), (ii) Celtic Seas and west of Scotland (Subarea 6 and divisions 7.a–c and 7.e–j), (iii) Northern Bay of Biscay (divisions 8.a–b and 8.d), and (iv) Atlantic Iberian waters (divisions 8.c and 9.a).

Fact Sheet small-spotted catshark *Irish Sea (ICES div 7a)*

Facts at a glance

Landings:
85t annually

Value:
47,567 EUR

Assessment:
Yes; Biomass index based on several surveys

Countries:
Ireland, others

Gears:
TBB, others

Target/Bycatch species:
Bycatch

Recreational fisheries:

-

Data issues:
A discard survival of >90% has been estimated for the beam-trawl fisheries in this area

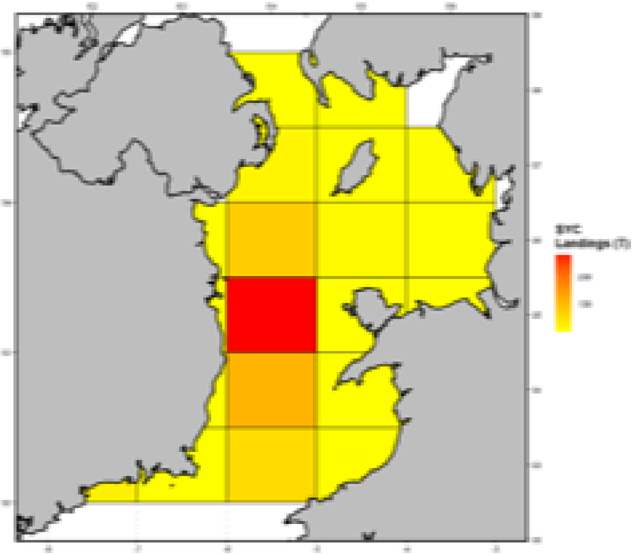

Figure 3-121 Landings of small-spotted catshark in the Irish Sea by ICES rectangle.

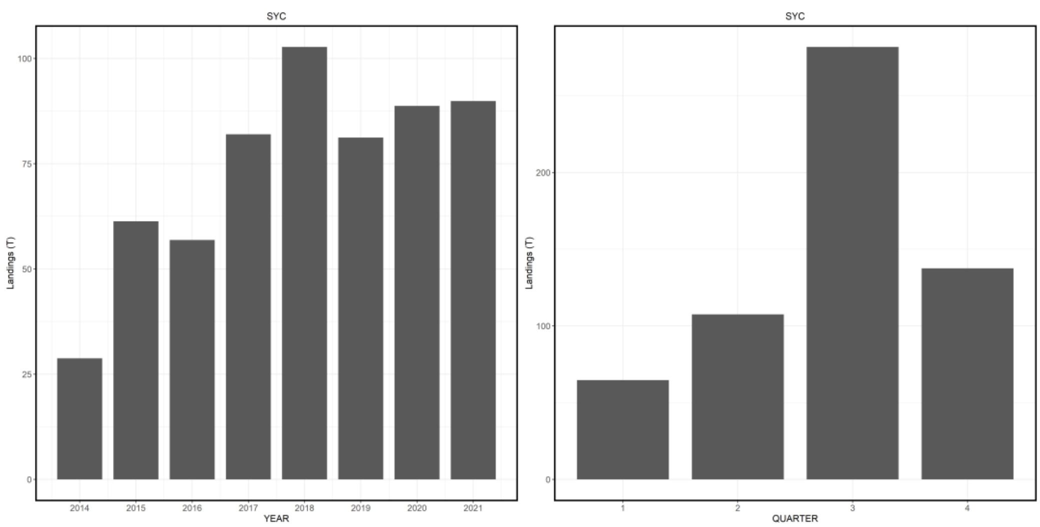

Figure 3-122 Landings of small-spotted catshark by year and quarter in the Irish Sea

Fishing activity

Mainly caught by bottom trawl (78%).

Data collection

Surveys: EVHOE-WIBTS-Q4, IE-IGFS-WIBTS-Q4, SP-PORC-WIBTS-Q3, UK(E&W)-BTS-Q3.

Stock assessment

ICES does provide advice based on the precautionary approach making use of survey data.

Fisheries management measures

These species are not subject to fisheries management in EU waters.

Additional information, e.g. ecosystem knowledge

S. canicula is an abundant species occurring on a range of substrates (from mud to rock) on the European continental shelves, from coastal waters to the upper continental slope, but is most abundant on the shelf. Its distribution ranges from Norway and the British Isles to the Mediterranean Sea and Northwest Africa (Ebert and Stehmann, 2013). ICES currently consider 4 stock units for this species: (i) North Sea ecoregion (Subarea 4 and divisions 3.a and 7.d), (ii) Celtic Seas and west of Scotland (Subarea 6 and divisions 7.a–c and 7.e–j), (iii) Northern Bay of Biscay (divisions 8.a–b and 8.d), and (iv) Atlantic Iberian waters (divisions 8.c and 9.a).

Fact Sheet small-spotted catshark *West of Scotland (ICES div 6a)*

Facts at a glance

Landings:
60t annually

Value:
104,592 EUR

Assessment:
Yes; Biomass index based on several surveys

Countries:
Ireland, others

Gears:
OTB, others

Target/Bycatch species:
Bycatch

Recreational fisheries:
-

Data issues:
A discard survival of >90% has been estimated for the beam-trawl fisheries in this area

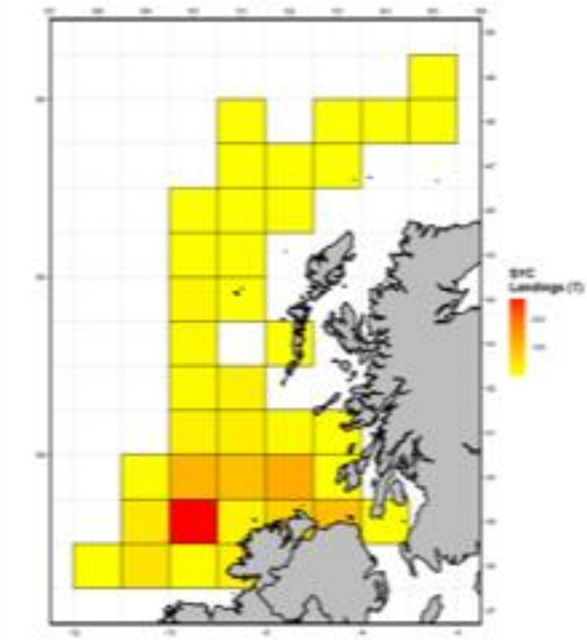

Figure 3-123 Landings of small-spotted catshark in the West of Scotland by ICES rectangle.

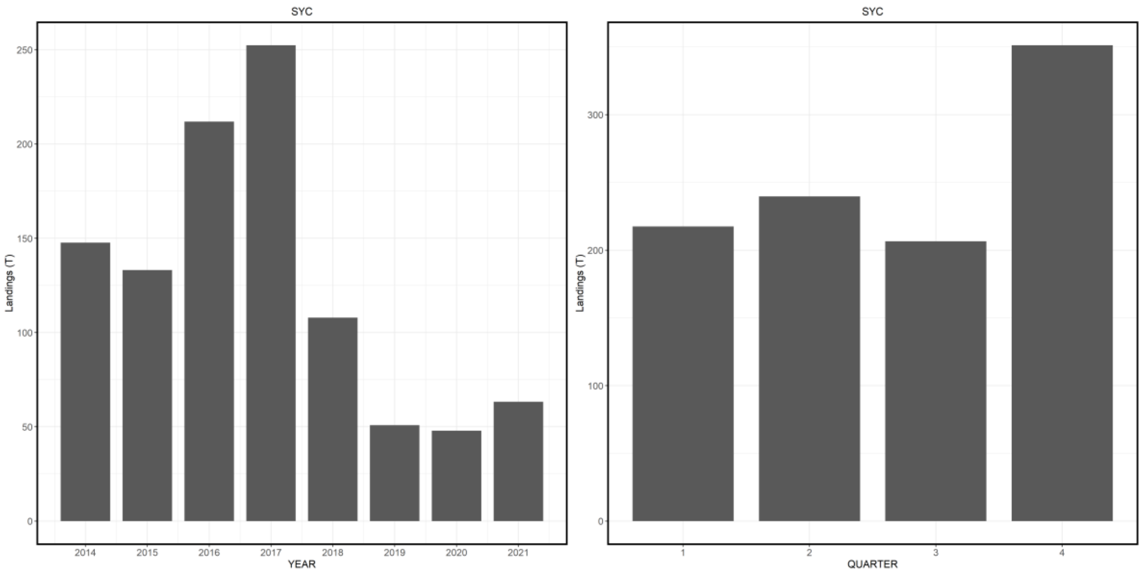

Figure 3-124 Landings of small-spotted catshark by year and quarter in the West of Scotland.

Fishing activity

Mainly caught by bottom trawl (78%).

Data collection

Surveys: EVHOE-WIBTS-Q4, IE-IGFS-WIBTS-Q4, SP-PORC-WIBTS-Q3, UK(E&W)-BTS-Q3.

Stock assessment

ICES does provide advice based on the precautionary approach making use of survey data.

Fisheries management measures

These species are not subject to fisheries management in EU waters.

Additional information, e.g. ecosystem knowledge

S. canicula is an abundant species occurring on a range of substrates (from mud to rock) on the European continental shelves, from coastal waters to the upper continental slope, but is most abundant on the shelf. Its distribution ranges from Norway and the British Isles to the Mediterranean Sea and Northwest Africa (Ebert and Stehmann, 2013). ICES currently consider 4 stock units for this species: (i) North Sea ecoregion (Subarea 4 and divisions 3.a and 7.d), (ii) Celtic Seas and west of Scotland (Subarea 6 and divisions 7.a–c and 7.e–j), (iii) Northern Bay of Biscay (divisions 8.a–b and 8.d), and (iv) Atlantic Iberian waters (divisions 8.c and 9.a).

Facts at a glance

Landings:

Stable at ~18000t a year (only EU data). Mostly Q2

Value:

76,423 thousand EUR

Fishing areas:

Channel, Irish Sea, North Sea

Countries:

FRA, IRL, UK, NLD, BEL

Gears:

FPO

Data issues:

Limited data. No directed known surveys and no available alternative independent data sources (low catchability in surveys). Time series of CPUE in certain areas. High spatial variability in biology and growth parameters. Data for sentinel fleets, self-sampling schemes, observer data, port sampling data available in some areas. Catch and effort data for under 10 vessels available in some areas from national logbook schemes.

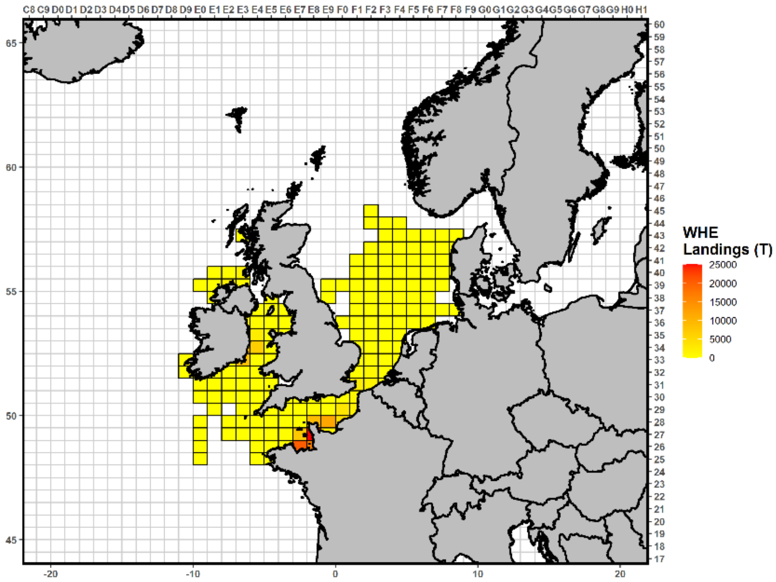

Figure 3-125 : Landings of whelk in the six sea basins by ICES rectangle.

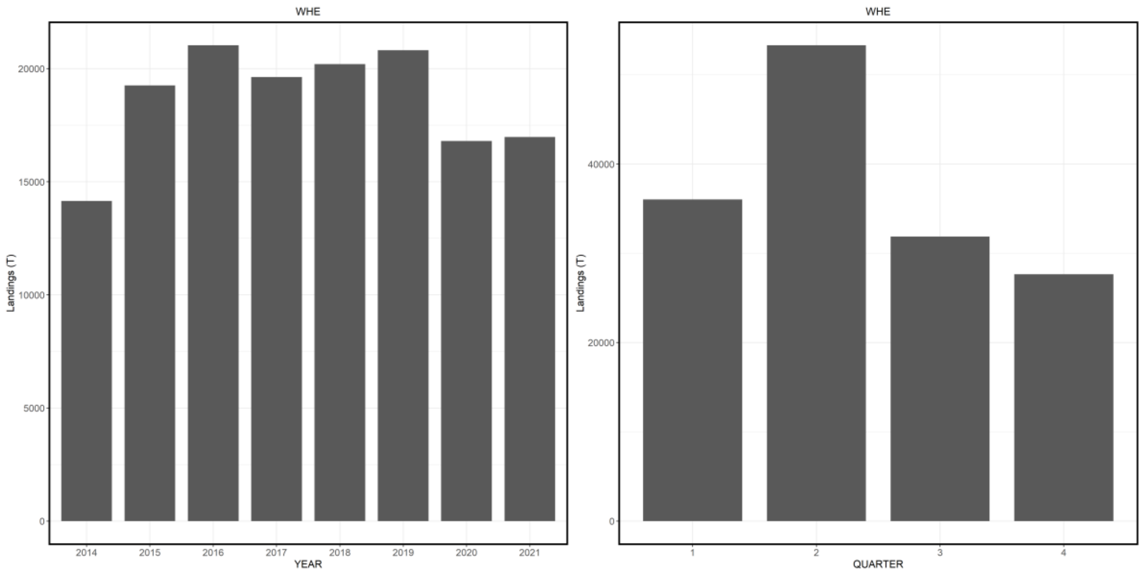

Figure 3-126 Landings of whelk by year and quarter in all six sea basins

Biology: The common whelk is a subtidal carnivorous mollusc distributed across most of the Northern Atlantic and adjacent areas, in depths up to 1000m. Breeding in European population occurs during autumn and winter and is significantly influenced by local temperatures. Eggs are laid on hard ground, after which larvae enter directly a benthic phase. The lack of pelagic stage, and limited movement of adult individuals limits connectivity across populations, generating high spatial growth and biological variability across regions with consequent implications in assessment and management.

Fishery: Mainly a single species targeted trap fishery although caught as bycatch in other pot fisheries such as crab and lobsters. Historically caught using specialized dredges in the North Sea.

Assessment: No known assessment or directed survey is conducted in European waters. Biological and growth parameters are available at regional level or could be estimated from port sampling data on landings. Abundance trends are derived in certain regions from fisheries dependent data (CPUE), although time series available are short. The high spatial variability of this species in terms of biology and growth suggest regionalized assessment and management is required.

Management: Management measures are generally limited to MCRS of 45mm in shell length. Some regional exemptions may apply. Size at onset of maturity has been estimated to be higher than the current MCRS in many regions, therefore offering insufficient protection to the spawning stock.

Table 3-26 Landings of whelk by ICES division. Data from AER

ICES division	Live weight of landings	Landings value
27.4.a	579	1548
27.4.b	778082	1029102
27.4.c	2321026	5475415
27.6.a	1171875	1610136
27.7.a	11210009	21158692
27.7.d	15668975	35411268
27.7.e	28063957	58496502
27.7.f	3781	4956
27.7.g	65810	101557
27.7.h	3133	4579
27.7.j	21038	38667
Grand Total	59308266	123332422

Table 3-27 Landings of whelk over years by country, including UK. Data from AER.

Country	Live weight of landings			Landings value		
	2017	2018	2019	2017	2018	2019
Belgium	53848	41613	270455	76035	67891	508601
Denmark	346943	293998	89752	399239	395113	116216
France	14443019	15402818	15364213	30993264	32335997	34065439
Ireland	5177684	2342245	4860582	7647896	4649017	10486518
Netherlands	165953	208341	246803	434330	554560	602306
EU Total	20187447	18289015	20831804	39550765	38002578	45779080
United Kingdom	21122740	19795186	20447614	26408346	27361934	30653895
Grand Total	41310187	38084201	41279419	65959111	65364512	76432974

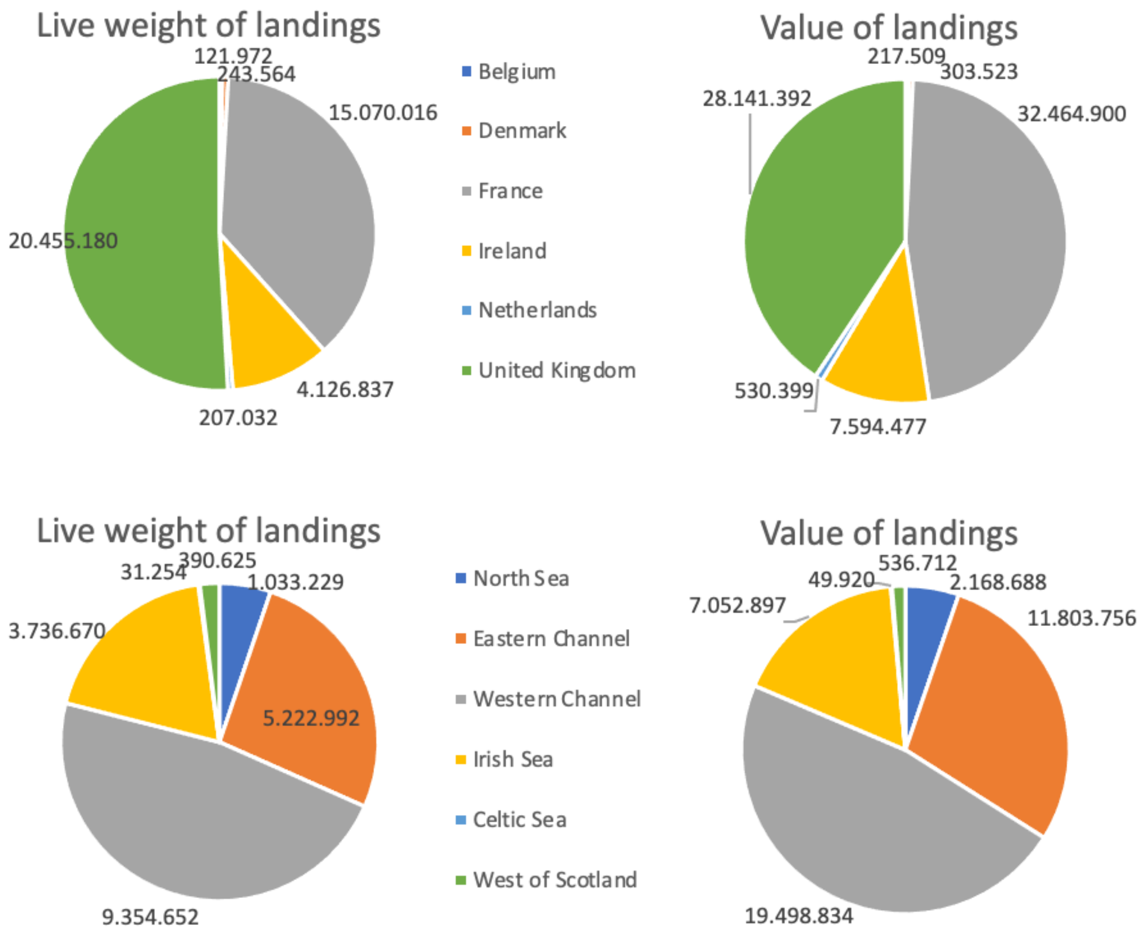

Figure 3-127 Landings of whelk in weight and value in the MS and the six sea basins

Table 3-28 Main fleets landing whelk. Data from AER.

Fleet	Live weight of landings	Landings value
FRA NAO FPO1012	19,519,026	42,501,974
FRA NAO FPO0010	18,131,584	41,665,868
IRL NAO FPO1012	5,154,210	9,949,467
FRA NAO FPO1824	2,802,703	6,419,777
IRL NAO FPO0010	3,297,512	5,569,454
IRL NAO FPO1218	1,730,249	3,211,698
FRA NAO PMP1012	2,619,144	3,195,765
IRL NAO DFN0010	961,238	1,727,024
NLD NAO TBB40XX	544,589	1,409,572
IRL NAO DTS0010	663,085	1,222,474
Other	3,884,927	6,459,349
Total	59,308,266	123,332,422

Facts at a glance

Landings:
Increasing (exception 2021; only EU data)

Value:
2,168 thousand EUR

Assessment:
No; Local CPUE trends (UK; Peverly and Stewart, 2021)

Countries:
NLD, BEL, FRA, UK

Gears:
FPO

Target/Bycatch species:
Target but also caught as bycatch in other potting fisheries for crab and lobster

Recreational fisheries:
No

Threats:
Lack of data and stock status information across the distribution, unregulated fishery

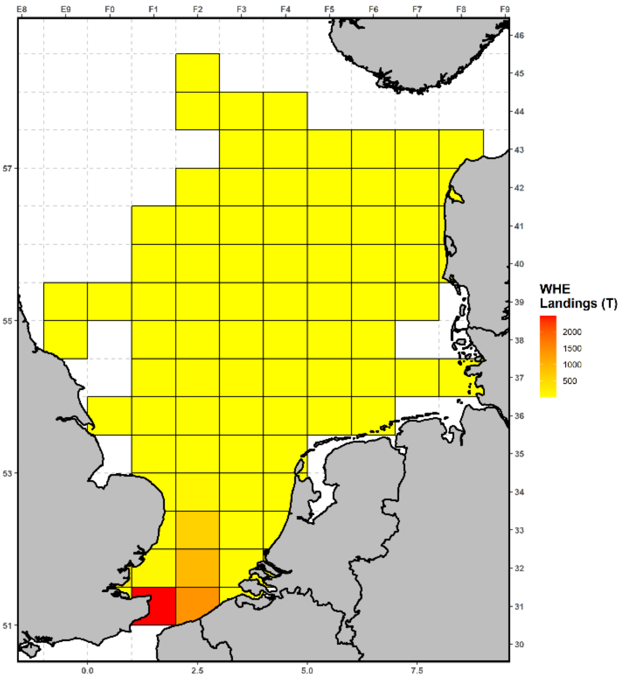

Figure 3-128 Landings of whelk in the North Sea by ICES rectangle

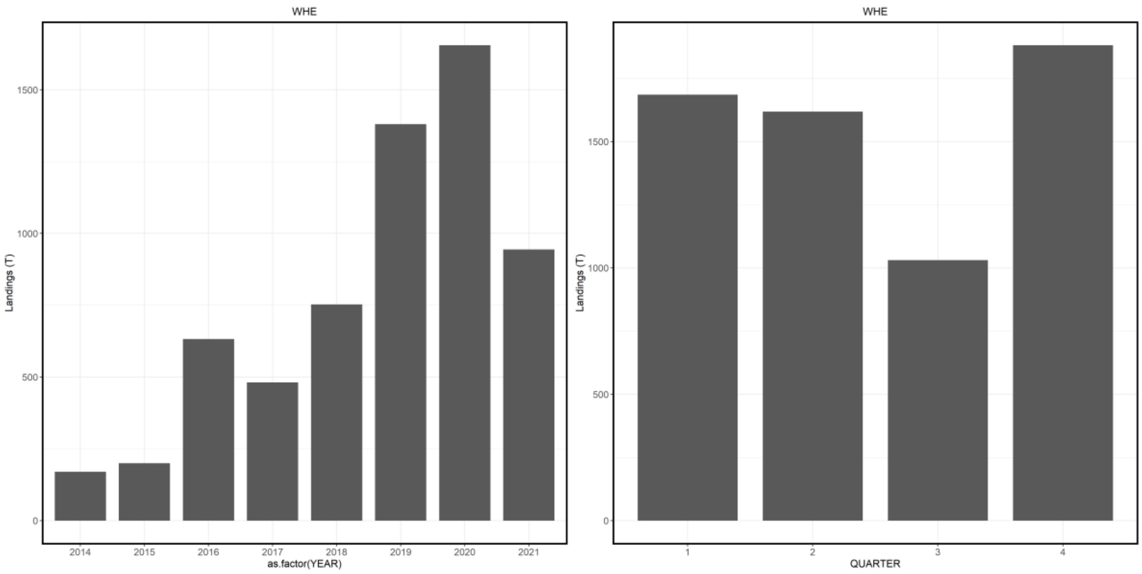

Figure 3-129 Landings of whelk by year and quarter in the North Sea.

Data collection

Logbook and VMS data on landings and effort (>10m), sales notes (<10m), port sampling size data at ICES rectangle resolution, self-sampling scheme on haul by haul basis on landings, discards and effort.

Fisheries management measures

- EU: MLS of 45mm along the long axis.
- UK: a general MLS of 45mm but local management regimes in place including license limits, increased MLS and number of pot restrictions (MRAG, 2018).

Facts at a glance

Landings:
Variable but less than 1000t per year (only EU data)

Value:
536,712 EUR

Assessment:
No

Countries:
IRL, UK

Gears:
FPO

Target/Bycatch species:
Target but also caught as bycatch in other potting fisheries for crab and lobster

Recreational fisheries:
No

Threats:
Lack of data and stock status information across the distribution, unregulated fishery

Data issues:
Incomplete landings for <10m vessels. No census of effective effort

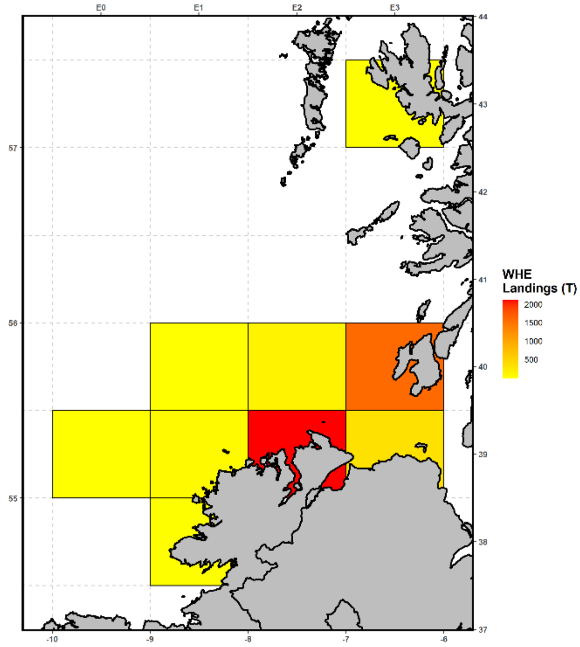

Figure 3-130 Landings of whelk in the West of Scotland by ICES rectangle.

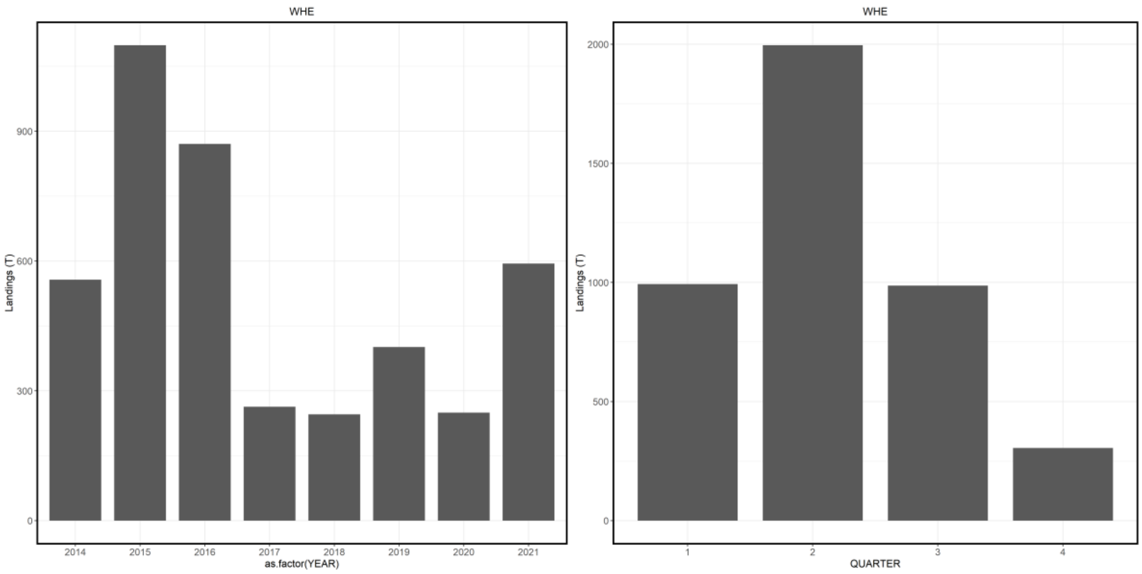

Figure 3-131 Landings of whelk by year and quarter West of Scotland.

Data collection

Logbook and VMS data on landings and effort (>10m), sales notes (<10m), port sampling size data at ICES rectangle resolution, self-sampling scheme on haul by haul basis on landings.

Fisheries management measures

- EU: MLS of 45mm in shell length

3.10.3Fact Sheet whelk Irish Sea (ICES div. 7a)

Facts at a glance

Landings:

Stable at ~5000t a year (only EU data)

Value:

7,052 thousand EUR

Assessment:

No; Local growth and biological information

Countries:

IRL, UK

Gears:

FPO

Target/Bycatch species:

Target but also caught as bycatch in other potting fisheries for crab and lobster

Recreational fisheries:

No

Threats:

Lack of data and stock status information across the distribution, unregulated fishery

Data issues:

Incomplete landings for <10m vessels. No census of effective effort

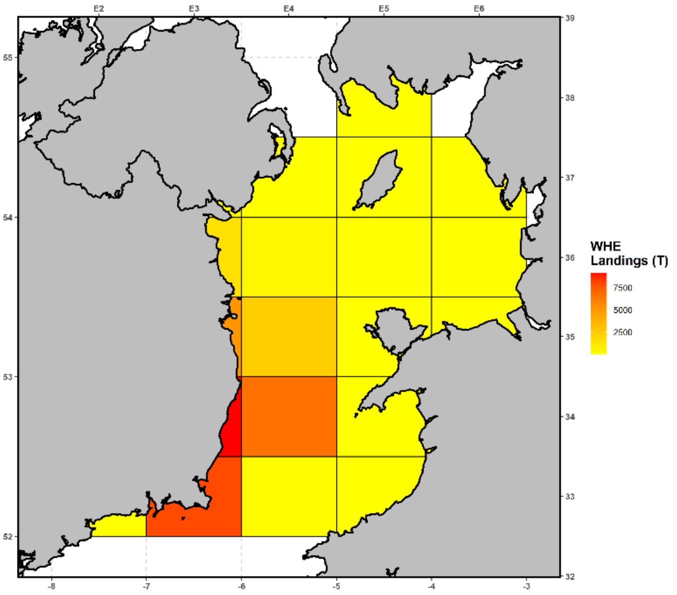

Figure 3-132: Landings of whelk in the Irish Sea by ICES rectangle.

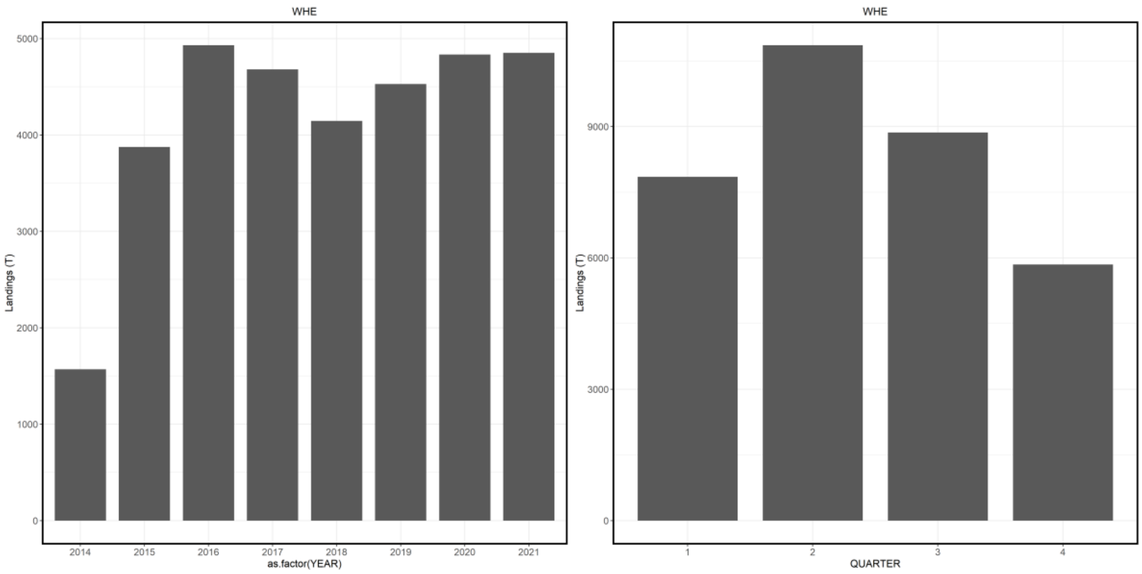

Figure 3-133: Landings of whelk by year and quarter in the Irish Sea.

Data collection

Logbook and VMS data on landings and effort (>10m), sales notes (<10m), port sampling size data at ICES rectangle resolution, self-sampling scheme on haul by haul basis on landings, discards and effort.

Fisheries management measures:

- EU: MLS of 45mm in shell length
- UK: a general MLS of 45mm but local management regimes in place including license limits, increased MLS and number of pot restrictions (MRAG, 2018)

Facts at a glance

Landings:

Negligible (only EU data)

Value:

49,920 EUR

Assessment:

No

Countries:

IRL, UK, BEL

Gears:

FPO

Target/Bycatch species:

Target but also caught as bycatch in other potting fisheries for crab and lobster

Recreational fisheries:

No

Threats:

Lack of data and stock status information across the distribution, unregulated fishery

Data issues:

Incomplete landings for <10m vessels. No census of effective effort

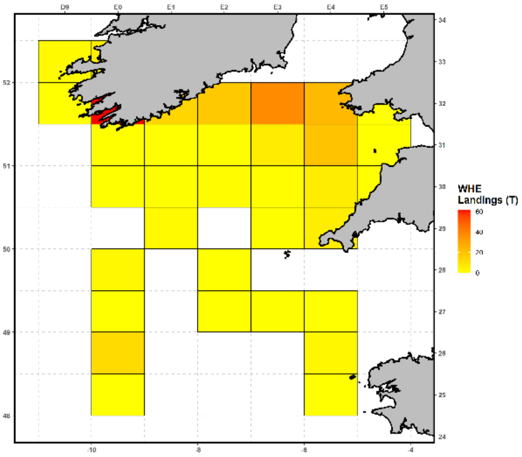

Figure 3-134 Landings of whelk in the Celtic Sea by ICES rectangle.

Fig. XX:

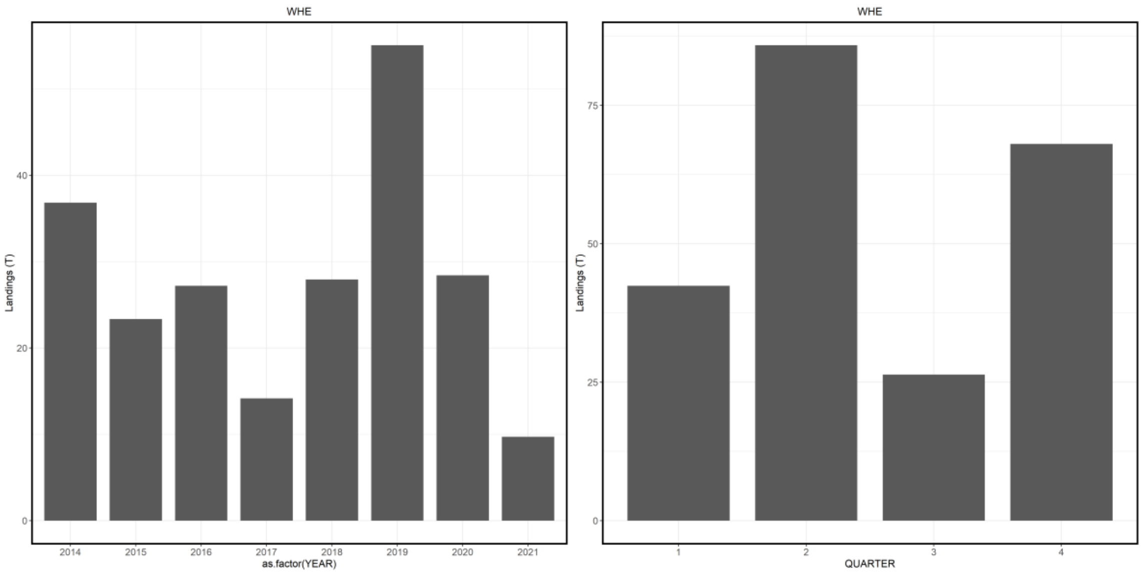

Figure 3-135 Landings of whelk by year and quarter in the Celtic Sea.

Data collection:

Logbook and VMS data on landings and effort (>10m), sales notes (<10m), port sampling size data at ICES rectangle resolution, self-sampling scheme on haul by haul basis on landings, discards and effort.

Fisheries management measures:

- EU: MLS of 45mm in shell length
- UK: a general MLS of 45mm but local management regimes in place including license limits, increased MLS and number of pot restrictions (MRAG, 2018)

Facts at a glance

Landings:
Stable between 3000-5000t a year (only EU data)

Value:
11,804 thousand EUR

Assessment:
No; Local growth and biological information

Countries:
FRA, BEL, UK

Gears:
FPO

Target/Bycatch species:
Target but also caught as bycatch in other potting fisheries for crab and lobster

Recreational fisheries:
No

Threats:
Lack of data and stock status information across the distribution, unregulated fishery

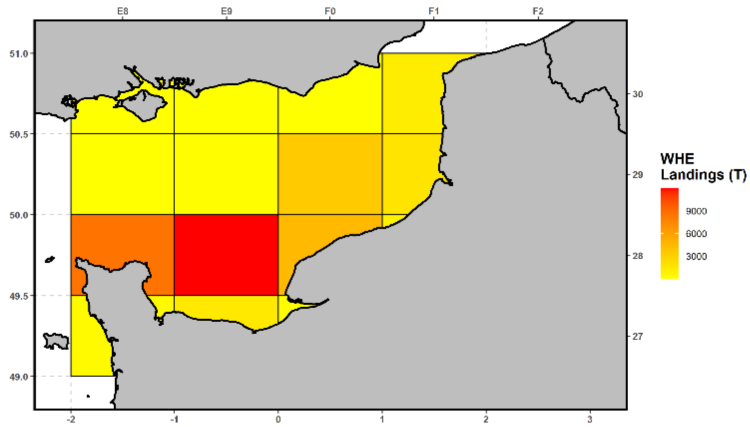

Figure 3-136 Landings of whelk in the Eastern English Channel by ICES rectangle.

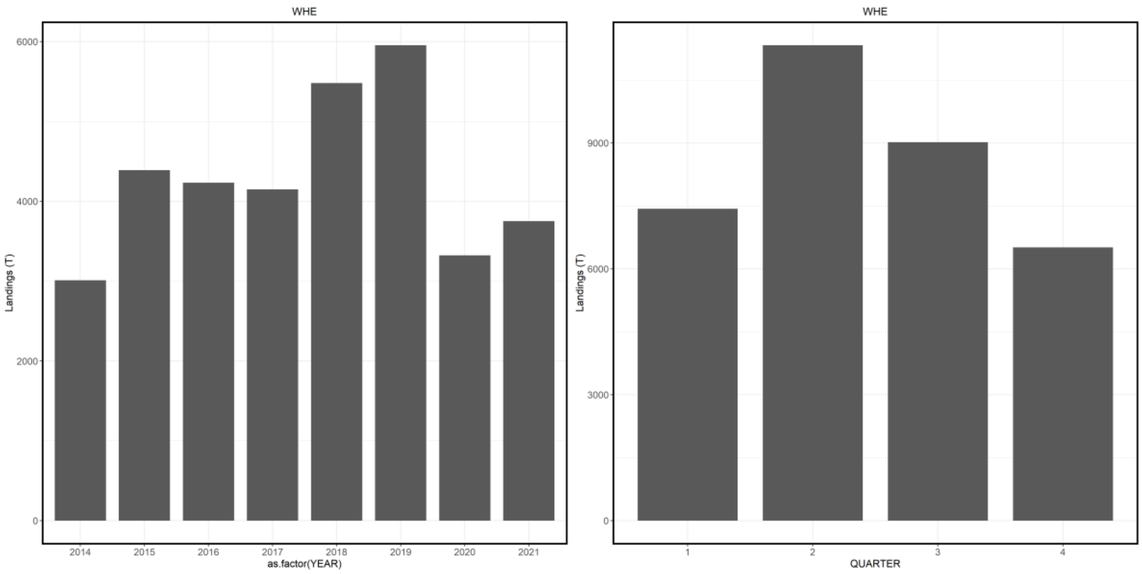

Figure 3-137 Landings of whelk by year and quarter in the Eastern English Channel.

Data collection:

Logbook and VMS data on landings and effort (>10m), sales notes (<10m), port sampling size data at ICES rectangle resolution, self-sampling scheme on haul by haul basis on landings, discards and effort.

Fisheries management measures:

- EU: MLS of 45mm in shell length
- UK: a general MLS of 45mm but local management regimes in place including license limits, increased MLS and number of pot restrictions (MRAG, 2018)

3.10.6 Fact Sheet whelk   Western English Channel (ICES div. 7e)

Facts at a glance

Landings:
Decreasing since 2016 (only EU data)

Value:
19,499 thousand EUR

Assessment:
No; LPUE trends from self-sampling and bi-annual observer schemes (FRA)

Countries:
FRA, UK

Gears:
FPO

Target/Bycatch species:
Target but also caught as bycatch in other potting fisheries for crab and lobster

Recreational fisheries:
No

Threats:
Lack of data and stock status information across the distribution, unregulated fishery

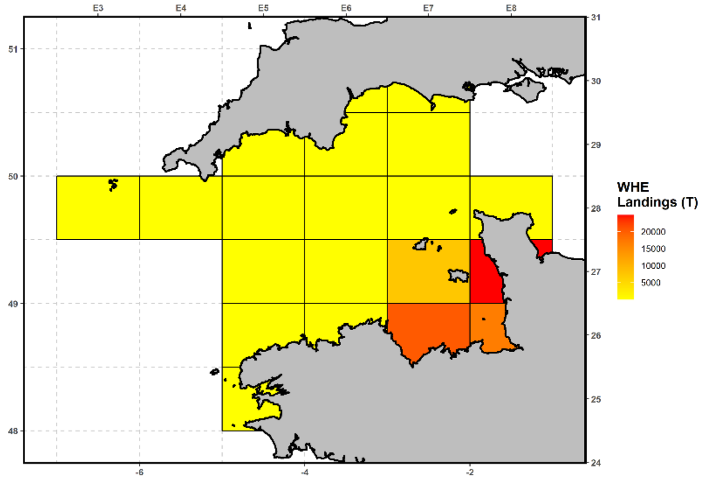

Figure 3-138 Landings of whelk in the Western English Channel by ICES rectangle.

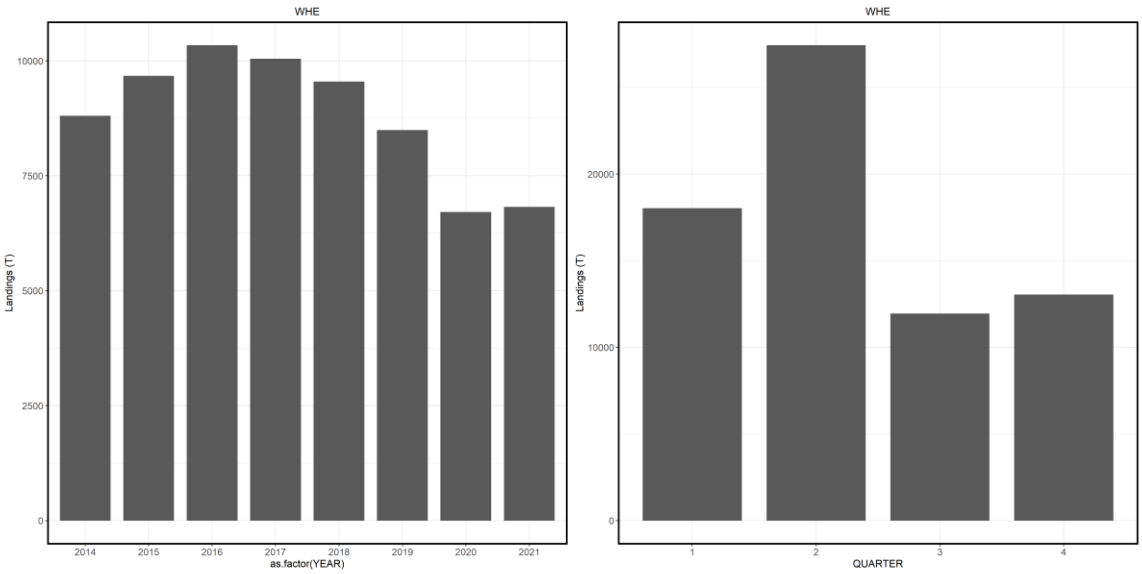

Figure 3-139 Landings of whelk by year and quarter in the Western English Channel.

Data collection:

Logbook and VMS data on landings and effort (>10m), sales notes (<10m), port sampling size data at ICES rectangle resolution, self-sampling scheme on haul by haul basis on landings, discards and effort.

Fisheries management measures:

- EU: MLS of 45mm in shell length
- UK: a general MLS of 45mm but local management regimes in place including license limits, increased MLS and number of pot restrictions (MRAG, 2018)

References

MRAG, 2018. Management recommendations for English non-quota fisheries: Common Whelk.

Peverley, M. and Stewart, J.E. (2021). Fisheries Research & Management Plan: Common Whelk in the North of Devon and Severn IFCA's District. Devon and Severn Inshore Fisheries and Conservation Authority & North Devon Biosphere. 44 pp + appendices.

MSC, 2020. Marine Stewardship Council (MSC) 2nd Surveillance Audit Report on Basse Normandie Granville Bay Whelk fishery. https://fisheries.msc.org/en/fisheries/basse-normandy-granville-bay-whelk/@@assessments

4 ECONOMIC IMPORTANCE OF NON-QUOTA SPECIES

In this section, we only use data from the STECF's 2021 Annual Economic Report (AER 2021). The AER uses data collected under the data collection framework (DCF) (European Commission, 2008). The 2021 fleet economics data call requested data for the years 2008 to 2019, and some preliminary data for 2016. Hence, in this section it is only used the latest three years of official data, i.e., the period 2017-2019.

The AER data covers transversal (capacity, landings and effort) and economic data (income, costs, employment, enterprises, capital value and investment). Monetary variables reported as nominal values in the AER. Data in the AER is reported aggregated at fleet segment level, and so it shows the evolution of a similar group of vessels[2].

The area of analysis consists of the North Sea (ICES div 4a,b,c), Eastern Channel (div 7d), Western Channel (div 7e), Irish Sea (div 7a), Celtic Sea (div 7f,g,h,j) and West of Scotland (div 6a).

As quota species (full area) are considered the following species, which are only available under quotas in the area of analysis: ALB, ANF, ANG, ANK, ARU, BAM, BET, BFT, BHY, BSH, BUM, BYD, BZB, BZM, CJM, COD, DGS, DHG, FRF, HAD, HER, HKE, HMC, HMG, HMM, HMZ, HOM, JAA, JAD, JAX, JDP, JFV, JRS, JRU, JRV, JRX, LDB, LEZ, LIN, MAC, MEG, MNZ, MON, MPO, MYL, NEP, ORY, PJM, PLE, POK, QMT, RAJ, RBY, RJA, RJB, RJC, RJE, RJF, RJG, RJH, RJI, RJK, RJM, RJN, RJO, RJR, RJS, RJU, RJY, RRW, RSC, RTU, SAI, SFV, SKA, SMA, SPG, SRX, STT, SWO, TUD, WHB, WHG, WHM, and YFT.

As hybrid species are considered the following species, which are available both under quotas and without quotas in the area of analysis: ALF, API, APQ, APV, APX, ASE, BLI, BLL, BOC, BOR, BSF, BXD, BYS, CEA, CFB, CPL, CSQ, CYO, CYP, ETX, GAM, GHL, GSK, GUP, GUQ, LEM, NOP, POL, PRA, REB, RED, REG, RHG, RNG, SAN, SBL, SBR, SCK, SOL, SPR, SYR, TUR, USK, and WIT.

Hence, in order to identify the non-quota species, we subtract to the AER 2021 landings, the landings from quota species (full area) and hybrid species.

4.1 Economic importance by country

According to AER 2021 (STECF) data, an annual average of 1,585 thousand tonnes were caught in the North Sea (ICES div 4a,b,c), Eastern Channel (div 7d), Western Channel (div 7e), Irish Sea (div 7a), Celtic Sea (div 7f,g,h,j) and West of Scotland (div 6a).

An annual average of 869 thousand tonnes were caught of quota species, and 425 thousand tonnes were caught of the hybrid-quota species in the area of analysis.

[2] A fleet segment is the combination of a particular fishing technique category and a vessel length category for a given country, supra-region (e.g. Mediterranean, North Atlantic) and specific distinctions (e.g. to differentiate between outermost regions, specific fisheries, or specific gears).

Hence, according to AER 2021 (STECF) data, an annual average of 291.1 thousand tonnes were caught of non-quota species in the area of analysis.

Out of the 21.9 thousand tonnes caught by Belgium in the area, 12.1 thousand tonnes were from quota species, 3.5 thousand tonnes were from hybrid species and 6.3 thousand tonnes were from non-quota species (see Table 1).

Table 4-1: Landings weight (kg) annual average (2017-2019) in the area of analysis by country. Source: own estimation from AER 2021 data.

Country	All spp.	Quota spp.	Hybrid spp.	Non-quota spp.
Belgium	21,973,367	12,112,004	3,535,192	6,326,171
Denmark	604,837,848	201,063,117	344,961,836	58,812,895
France	276,219,078	128,223,999	7,442,957	140,552,121
Germany	132,095,934	108,131,553	11,326,700	12,637,680
Ireland	162,472,465	131,854,432	13,258,797	17,359,236
Netherlands	293,379,961	227,501,503	12,820,976	53,057,482
Poland	15,525,276	15,311,347	-	213,929
Portugal	66,022	65,992	-	30
Spain	25,863,263	23,302,402	451,860	2,109,002
Sweden	53,041,101	21,556,831	31,431,174	53,097
TOTAL EU-27	**1,585,474,316**	**869,123,179**	**425,229,493**	**291,121,644**
United Kingdom	600,491,855	460,387,105	14,383,173	125,721,576
TOTAL	**2,185,966,171**	**1,329,510,285**	**439,612,666**	**416,843,220**

According to AER 2021 (STECF) data, an annual average of 1,757 million euro in landings value were caught in the North Sea (ICES div 4a,b,c), Eastern Channel (div 7d), Western Channel (div 7e), Irish Sea (div 7a), Celtic Sea (div 7f,g,h,j) and West of Scotland (div 6a).

An annual average of 902 million euro were caught of quota species, 316 million euro were caught of the hybrid-quota species, and 539.2 million euro were caught of non-quota species in the area of analysis.

Out of the 80.4 million euro caught by Belgium in the area, 30.9 million euro were from quota species, 32.9 million euro were hybrid species and 16.6 million euro were from non-quota species (see Table 2).

Table 4-2 Landings value (euro) annual average (2017-2019) in the area of analysis by country. Source: own estimation from AER 2021 data.

Country	All spp.	Quota spp.	Hybrid spp.	Non-quota spp.
Belgium	80,428,397	30,881,402	32,898,469	16,648,526
Denmark	290,411,255	173,116,331	85,485,751	31,809,173
France	546,665,125	233,245,862	50,160,450	263,258,812
Germany	136,837,602	75,083,506	13,802,974	47,951,122

Ireland	210,875,232	144,440,580	10,248,202	56,186,451
Netherlands	379,327,147	147,087,871	114,877,007	117,362,269
Poland	-	-	-	-
Portugal	223,638	223,564	-	74
Spain	91,709,678	84,376,959	1,499,147	5,833,573
Sweden	20,599,949	13,200,463	7,267,859	131,627
TOTAL EU-27	**1,757,078,024**	**901,656,538**	**316,239,859**	**539,181,627**
United Kingdom	1,037,101,921	660,947,981	50,778,568	325,375,372
TOTAL	**2,794,179,945**	**1,562,604,519**	**367,018,427**	**864,556,999**

According to AER 2021 (STECF) data, the Netherlands and France are the EU countries fishing more in the area of analysis with 293 and 276 thousand tonnes, of which 53.1 and 140.6 thousand tonnes, respectively, are from non-quota species (Table 1).

In economic terms, France and the Netherlands are also the EU countries fishing more in the area of analysis with 546 and 379 million euro in landings value, of which 263.3 and 117.4 million euro, respectively, are from non-quota species (Table 2).

France is also the most dependent country on the share of landings coming from non-quota species, with 51% in weight (i.e., 140.6 thousand tonnes of non-quota species from total landings of 276 thousand tonnes) and 48% in value (i.e., 263.3 million euro of non-quota species from a total of 546 million euro in landings value). France is followed by Germany (with 35% in value and 10% in weight), the Netherlands (with 31% in value and 18% in weight), and Ireland (with 27% in value and 11% in weight).

According to AER 2021 (STECF) data, the EU-27 landings weight of the non-quota species from the area of analysis represents the 70% of the landings of these species in the area; while the United Kingdom represents the remaining 30% of the landings. The EU-27 value of landings of the non-quota species from the area of analysis represents the 62% of the landings of these species in the area; while the United Kingdom represents the remaining 38% of the landings. The AER has no information on third country landings in the area.

According to AER 2021 (STECF) data, an annual average of 291.1 thousand tonnes were caught of non-quota species in area of analysis. Out of these 291.1 thousand tonnes, 6.3 thousand tonnes were caught by Belgium (see Table 3). France is the top country with 140.6 thousand tonnes (48% of the EU total), followed by Denmark and the Netherlands.

Out of the annual average of almost 539 million euro landings value from non-quota species, Belgium landed 16.6 million euro. France is again the top country with 263.3 million euro (49% of the total), followed by the Netherlands, Ireland and Germany.

Table 4-3 Landings weight (kg), value (euro) and price (euro/kg) annual average (2017-2019) by country. Source: own estimation from AER 2021 data.

Country	Live weight of landings	Landings value	Average price	Weight share on EU landings	Value share on EU landings

	weight				
Belgium	6,326,171	16,648,526	3.66	2.2%	3.1%
Denmark	58,812,895	31,809,173	0.48	20.2%	5.9%
France	140,552,121	263,258,812	1.98	48.3%	48.8%
Germany	12,637,680	47,951,122	1.04	4.3%	8.9%
Ireland	17,359,236	56,186,451	1.30	6.0%	10.4%
Netherlands	53,057,482	117,362,269	1.29	18.2%	21.8%
Poland	213,929	-	-	0.1%	-
Portugal	30	74	3.39	0.0%	0.0%
Spain	2,109,002	5,833,573	3.55	0.7%	1.1%
Sweden	53,097	131,627	0.39	0.0%	0.0%
TOTAL EU-27	**291,121,644**	**539,181,627**	**1.11**	**100%**	**100%**
United Kingdom	125,721,576	325,375,372	1.73		
TOTAL	**416,843,220**	**864,556,999**	**1.28**		

4.2 Economic importance by species

According to AER 2021 (STECF) data on the top ten species in terms of landings weight, there are six quota species, two hybrid species and two non-quota species (see Table 4). The top 10 species in landings weight in the area of analysis represents 73% of the total landings in the area for the EU-27.

Table 4-4: Top 10 species landings in weight (kg) annual average (2017-2019) for the EU-27 in the area of analysis. Source: own estimation from AER 2021 data.

Species	Live weight of landings	Landings value	Average Price	Share in weight	Category
HER	301,054,049	136,803,440	0.45	19%	Quota
SAN	223,046,181	41,958,441	0.19	14%	Hybrid
MAC	159,521,303	138,624,063	0.87	10%	Quota
SPR	148,186,003	34,642,819	0.23	9%	Hybrid
WHB	135,450,506	39,680,590	0.29	9%	Quota
PLE	44,733,779	96,560,641	2.16	3%	Quota
HKE	40,571,880	132,321,966	3.26	3%	Quota
MUS	39,211,381	6,960,730	0.18	2%	Non-quota
HOM	38,760,909	19,961,855	0.51	2%	Quota
SCE	33,609,465	102,985,070	3.06	2%	Non-quota
TOTAL	**1,585,474,316**	**1,757,078,024**	**1.11**	**73%**	

Of the top ten species in terms of landings value, there are also six quota species, two hybrid species and two non-quota species (see Table 5). The top 10 species in value of landings in the area of analysis represents 59% of the total landings in value in the area for the EU-27.

Table 4-5 Top 10 species landings in value (euro) annual average (2017-2019) for the EU-27 in the area of analysis,. Source: own estimation from AER 2021 data.

Species	Landings weight	Landings value	Average Price	Share in value	Category
SOL	146,179,465	13,005,231	11.24	8%	Hybrid
MAC	138,624,063	159,521,303	0.87	8%	Quota
HER	136,803,440	301,054,049	0.45	8%	Quota
HKE	132,321,966	40,571,880	3.26	8%	Quota
CSH	131,732,695	33,105,364	3.98	7%	Non-quota
SCE	102,985,070	33,609,465	3.06	6%	Non-quota
PLE	96,560,641	44,733,779	2.16	5%	Quota
MNZ	57,805,238	13,212,023	4.38	3%	Quota
NEP	56,297,840	9,213,126	6.11	3%	Quota
SAN	41,958,441	223,046,181	0.19	2%	Hybrid
TOTAL	**1,757,078,024**	**1,585,474,316**	**1.11**	**59%**	

According to AER 2021 (STECF) data, the top 10 non-quota species in weight of landings in the area of analysis represents 70% of the non-quota landings in the area for the EU-27 (see Table 6).

The main non-quota species in terms of weight of landings for the EU-27 in the area of analysis are blue mussel (MUS), king scallop (SCE), common shrimp (CSH) and tangle (LQD).

Table 4-6: Top 10 non-quota species landings in weight (kg) annual average (2017-2019) for the EU-27 in the area of analysis. Source: own estimation from AER 2021 data.

Species	Value of landings	Landings value	Average Price	Share in weight
MUS	39,211,381	6,960,730	0.18	13%
SCE	33,609,465	102,985,070	3.06	12%
CSH	33,105,364	131,732,695	3.98	11%
LQD	27,938,133	1,173,402	0.04	10%
WHE	19,769,422	41,110,807	2.08	7%

PIL	19,101,595	10,302,394	0.54	7%
CRE	10,045,041	25,837,537	2.57	3%
LAH	8,424,616	336,985	0.04	3%
COC	7,340,683	5,102,198	0.70	3%
EQE	6,042,067	9,064,204	1.50	2%
TOTAL	**291,121,644**	**539,181,627**	**1.85**	**70%**

The top 10 non-quota species in value of landings in the area of analysis represents the 75% of the non-quota value of landings in the area for the EU-27 (see Table 7).

The main non-quota species in terms of value of landings for the EU-27 in the area of analysis are common shrimp (CSH), king scallop (SCE), and whelk WHE), followed by edible crab, inshore squids nei, common cuttlefish, European lobster, John dory, surmullet and spinous spider crab.

Table 4-7 Top 10 non-quota species landings in value (euro) annual average (2017-2019) for the EU-27 in the area of analysis. Source: own estimation from AER 2021 data.

Species	Landings value	Live weight of landings	Average Price	Share in value
CSH	131,732,695	33,105,364	3.98	24%
SCE	102,985,070	33,609,465	3.06	19%
WHE	41,110,807	19,769,422	2.08	8%
CRE	25,837,537	10,045,041	2.57	5%
SQZ	23,970,966	3,383,307	7.09	4%
CTC	23,354,783	5,927,963	3.94	4%
LBE	15,853,112	898,699	17.64	3%
JOD	14,536,473	1,532,509	9.49	3%
MUR	12,836,060	2,624,946	4.89	2%
SCR	10,730,929	5,857,211	1.83	2%
TOTAL	**539,181,627**	**291,121,644**	**1.85**	**75%**

4.3 Economic importance by fleet segment

The top 20 fleet segments based on the value of landings from non-quota species for the EU-27 in the area of analysis caught 74% of the non-quota value of landings in the area for the EU-27 (see Table 8).

The fleet segment Dutch beam trawlers between 18 and 24 meters caught an average annual value of landings of 60.3 million euro from non-quota species in the area of analysis, representing 11% of the total EU ladings of non-quota species in the area of analysis non-quota species in the area of analysis.

Table 4-8: Top 20 fleet segments based on landings value (in euro) of non-quota species for the EU-27 in the area of analysis, annual average (2017-2019). Source: own estimation from AER 2021 data.

Fleet segment	Landings value	Live weight of landings value	Share of value of landings
NLD NAO TBB1824	60,330,235	17,420,810	11%
FRA NAO DRB1218	39,402,108	17,636,471	7%
FRA NAO DTS1824	35,637,050	11,989,958	7%
FRA NAO DTS2440	26,174,563	8,520,731	5%
FRA NAO FPO0010	24,539,381	8,176,367	5%
DEU NAO TBB1218	23,510,003	5,566,044	4%
DEU NAO TBB1824	21,354,367	4,979,997	4%
NLD NAO DTS2440	20,732,146	5,546,946	4%
FRA NAO FPO1012	19,726,810	8,056,658	4%
IRL NAO DRB2440	14,935,674	2,273,767	3%
FRA NAO DTS1218	14,887,651	6,204,823	3%
NLD NAO TBB1218	14,473,252	9,111,250	3%
FRA NAO DRB1012	14,114,297	10,101,754	3%
DNK NAO DRB1218	11,534,729	45,563,015	2%
FRA NAO DTS1012	10,722,880	4,072,267	2%
IRL NAO FPO1218	10,675,444	4,102,609	2%
FRA NAO MGP1218	10,662,546	4,292,502	2%
FRA NAO MGP1012	9,046,160	18,423,566	2%
IRL NAO FPO1012	8,527,161	3,554,418	2%
FRA NAO DFN1012	7,992,478	4,062,429	1%
TOTAL	**539,181,627**	**291,121,644**	**74%**

Note: The fleet segment name consists of the 3-letter country code, NAO for North Atlantic Ocean, the following 3-letters refer to the fishing technique (as defined in Table 9), and the 4 numbers represent the vessel length.

Table 4-9: Abbreviation codes for the fishing techniques of the fleet segments.

Code	Description
DFN	Drift and/or fixed netters
DRB	Dredgers
DTS	Demersal trawlers and/or demersal seiners

FPO	Vessels using pots and/or traps
HOK	Vessels using hooks
INACTIVE	Non active vessels
MGO	Vessel using other active gears
MGP	Vessels using polyvalent active gears only
PG	Passive Gears
PGO	Vessels using other passive gears
PGP	Vessels using polyvalent passive gears only
PMP	Vessels using active and passive gears
PS	Purse seiners
TBB	Beam trawlers
TM	Pelagic trawlers

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4.4 Economic importance of non-quota species

Next, we compare the landings value from non-quota species in the area of analysis with all landings value in the North Atlantic Ocean for these top 20 fleet segments. We can see that on average, 70% of the overall value of landings from these fleets come from non-quota species in area of analysis.

Table 4-10 Top 20 fleet segments fishing non-quota species in the area of analysis, annual average (2017-2019). Source: own estimation from AER 2021 data.

Fleet segment	Non-quota species in area of analysis	all species in NAO	Proportion
DEU NAO TBB1218	23,510,003	23,515,692	100%
DEU NAO TBB1824	21,354,367	22,383,456	95%
DNK NAO DRB1218	11,534,729	11,582,881	100%
FRA NAO DFN1012	7,992,478	43,038,213	19%
FRA NAO DRB1012	14,114,297	16,400,091	86%
FRA NAO DRB1218	39,402,108	41,688,083	95%
FRA NAO DTS1012	10,722,880	40,793,149	26%
FRA NAO DTS1218	14,887,651	77,844,708	19%
FRA NAO DTS1824	35,637,050	140,348,220	25%
FRA NAO DTS2440	26,174,563	104,938,090	25%
FRA NAO FPO0010	24,539,381	31,084,324	79%
FRA NAO FPO1012	19,726,810	23,091,285	85%
FRA NAO MGP1012	9,046,160	16,502,819	55%
FRA NAO MGP1218	10,662,546	13,798,222	77%

IRL NAO DRB2440	14,935,674	14,935,674	100%
IRL NAO FPO1012	8,527,161	9,681,916	88%
IRL NAO FPO1218	10,675,444	11,140,040	96%
NLD NAO DTS2440	20,732,146	38,203,200	54%
NLD NAO TBB1218	14,473,252	14,534,967	100%
NLD NAO TBB1824	60,330,235	73,889,324	82%
TOTAL	539,181,627	769,394,356	70%

Table 11 reports the main socio-economic indicators for the top 20 EU fleet segments based on the value of landings from non-quota species in the area of analysis. According to AER 2021 (STECF) data, these 20 fleets comprise an average of 1,838 vessels, employing almost 5,500 persons, being almost 4,175 in Full Time Equivalents (FTE). These fleets land a value of about 770 million euro, generating 416.4 million euro of GVA and 133.2 million euro of operating profits.

Table 4-11: Main socio-economic indicators for the top 20 fleet segments fishing non-quota species in the area of analysis, annual average (2017-2019). Source: own estimation from AER 2021 data.

Fleet segment	Number of vessels	Employment	Employment in FTE	GVA	Operating profits
DEU NAO TBB1218	107	164	127	14,573,424	5,179,091
DEU NAO TBB1824	68	142	114	13,039,765	5,146,873
DNK NAO DRB1218	30	56	31	8,287,793	5,286,761
FRA NAO DFN1012	157	494	295	25,847,280	6,657,419
FRA NAO DRB1012	84	210	88	11,158,789	3,615,944
FRA NAO DRB1218	92	377	218	28,124,189	8,730,570
FRA NAO DTS1012	175	392	245	24,848,361	7,687,063
FRA NAO DTS1218	148	504	439	40,123,889	9,718,074
FRA NAO DTS1824	136	685	680	63,600,413	15,724,555
FRA NAO DTS2440	59	436	433	41,682,859	11,903,064
FRA NAO FPO0010	299	480	228	16,198,856	5,026,019
FRA NAO FPO1012	75	235	167	15,158,951	4,877,960
FRA NAO MGP1012	52	133	77	10,670,205	3,803,481
FRA NAO MGP1218	33	129	87	10,123,460	3,157,577
IRL NAO DRB2440	7	47	45	14,847,284	12,933,288
IRL NAO FPO1012	83	181	146	5,960,265	1,738,853
IRL NAO FPO1218	27	124	117	6,256,681	756,312

NLD NAO DTS2440	29	173	159	16,543,273	5,050,065
NLD NAO TBB1218	23	75	76	10,191,884	5,015,445
NLD NAO TBB1824	155	443	401	39,150,615	11,195,591
TOTAL	**1,838**	**5,481**	**4,174**	**416,388,236**	**133,204,006**

Where:

GVA is calculated as Value of landings + Other income - Energy costs - Other variable costs - Other non-variable costs - Repair & maintenance costs.

Operating profit is calculated as Value of landings + Other income - Personnel costs - Value of unpaid labour - Energy costs - Other variable costs - Other non-variable costs - Repair & maintenance costs - Consumption of fixed capital.

Next, in Table 12 the main socio-economic indicators of the top 20 fleet segments reported in Table 11 are weighted by the proportions for each fleet estimated in Table 10. These new indicators provide an estimate of the importance of non-quota species for these 20 fleets.

Hence, it is estimated that the non-quota species caught in the area of analysis are providing work to about 1,138 vessel-equivalents in these 20 fleets segments, employing about 3,075 persons and are generating 233.6 million euro of GVA and 83.5 million euro of operating profits.

Table 4-12: Main socio-economic indicators of the top 20 fleet segments fishing non-quota species in the area of analysis, annual average (2017-2019). Source: own estimation from AER 2021 data.

Fleet segment	Number of vessels	Employment	Employment in FTE	GVA	Operating profits
DEU NAO TBB1218	107	164	127	14,569,898	5,177,838
DEU NAO TBB1824	65	135	109	12,440,257	4,910,244
DNK NAO DRB1218	30	55	31	8,253,339	5,264,783
FRA NAO DFN1012	29	92	55	4,800,009	1,236,326
FRA NAO DRB1012	72	181	76	9,603,511	3,111,964
FRA NAO DRB1218	87	357	206	26,581,993	8,251,828
FRA NAO DTS1012	46	103	64	6,531,636	2,020,620
FRA NAO DTS1218	28	96	84	7,673,617	1,858,563
FRA NAO DTS1824	34	174	173	16,149,340	3,992,760
FRA NAO DTS2440	15	109	108	10,396,898	2,968,965
FRA NAO FPO0010	236	379	180	12,788,114	3,967,769
FRA NAO FPO1012	64	200	143	12,950,243	4,167,225
FRA NAO MGP1012	29	73	42	5,848,963	2,084,911

FRA NAO MGP1218	25	100	67	7,822,881	2,440,011
IRL NAO DRB2440	7	47	45	14,847,284	12,933,288
IRL NAO FPO1012	73	159	129	5,249,389	1,531,461
IRL NAO FPO1218	26	119	112	5,995,746	724,770
NLD NAO DTS2440	16	94	86	8,977,718	2,740,574
NLD NAO TBB1218	23	75	75	10,148,610	4,994,150
NLD NAO TBB1824	126	362	327	31,966,266	9,141,139
TOTAL	**1,138**	**3,075**	**2,240**	**233,595,712**	**83,519,189**

Considering that these top 20 fleets caught 74% of the non-quota species in the area of analysis, we raised the values obtained in Table 12 to the total of the non-quota species caught in the area of analysis by the EU fishing fleets.

Hence, EU landings of non-quota species in the area of analysis allow the work of about 1,538 vessel-equivalents, employing about 4,155 persons (3,027 in FTE), and producing 291.1 thousand tonnes of fish and shellfish. These landings are valued 539.2 million euro, and generate 315.7 million euro of GVA and 112.9 million euro of operating profits. Without these landings of non-quota species, the EU would lose that part of its fishing sector, to maintain current economic performance levels.

It is also expected that part of the 425 thousand tonnes of the hybrid-quota species caught in the area of analysis are caught without being bound by quotas. However, during the EWG, the information of the proportion of hybrid-quota species landings from non-quotas was not made available, therefore, this could not be estimated.

Knowing that the total of the hybrid-quota species caught in the area of analysis were valued 316 million euro (see Table 2), which is equivalent to around 59% of the value of the non-quota species caught in the area of analysis (i.e., 316 million euro divided 539.2 million euro). Then, assuming similar fleets also catching the hybrid-quota species, we would be considering about 902 vessels-equivalents, employing 2,435 persons (1,774 in FTE), generating 185 million euro of GVA and 66.1 million in operating profits, when 100% of the hybrid-quota species caught in the area of analysis were from the non-quota part (which is not realistic). **Hence, to obtain complete estimates it is essential to know the value of landings from the non-quota part of the hybrid-quota species by species.**

5 MANAGEMENT MEASURES FOR NQS

5.1 Introduction

A centralized fisheries management system has a 40-year history in the EU. The first basic regulation of the Common Fisheries Policy (CFP) came into force in 1982 and included already the main management instruments still in place today: Total Allowable Catch (TAC) and Technical Conservation Measures (TCM), to name two of the general management categories. EWG 22-04 is requested to discuss possibilities for multi-year management strategies for non-quota species.

The document is structured as follows: the first chapter is an outline of some general aspects regarding fisheries management in the EU. Then specific management measures are discussed, input, output, ecosystem-based and governance/economic measures. In the final part some conclusions for the EWG meeting are summarised.

5.2 General aspects regarding EU fisheries management

In this chapter some general aspects of EU fisheries management are discussed and are mentioned when discussing the functioning of the CFP.

5.2.1 CFP objectives

The basic regulation of the CFP includes several objectives in Art. 2. There is the objective to manage stocks following Maximum Sustainable Yield (MSY) but there are also the objectives of the implementation of the ecosystem-based approach to fisheries management (EAFM) or the gradually elimination of discards. The CFP also includes the requirement to implement measures to fulfil the objectives of the Marine Strategy Framework Directive (MSFD) or the Habitat and Birds Directives (designating Natura 2000 sites). Objectives regarding social or economic aspects are rather vague like achieving 'a viable fishing sector' (Goti-Aralucea et al. 2018). The incorporation of social and economic objectives into the specific management arrangements for fisheries to ensure ongoing economic viability and relevance to coastal communities is therefore, if not poorly considered, at least poorly implemented. Imbalances between fishing opportunity and fleet capacity are common. In the case of NQS, which tend to be more important for small scale fisheries, maintaining viability is very important.

For the management of NQS, the general principles of the CFP and the objectives of achieving high and sustainable yields also apply even though for many of these stocks analytical assessments are not available. MSY or proxies of MSY can be achieved with a variety of management approaches and measures including operational input and output controls and use of technical measures. Maintaining viability and socio-economic value for NQS can be achieved by combinations of measures that deal with control of access to fisheries at the appropriate geographic (stock distribution) scale.

5.2.2 CFP and Governance

Analyses of the functioning of certain articles in the CFP reveal that in this multi-level governance system the instruments are not sufficient or were not consequently implemented and that the policy is, therefore, not achieving its objectives (e.g. Belschner et al. 2018, Penas Lado 2016, Daw and Gray 2005). A new factor after the last CFP reform in 2012 is the objective to use fisheries regulation to help achieving the objectives of the environmental regulations (especially

MSFD, see Hoof & Kraus 2017). Many NQS are or will be affected by fisheries regulations to fulfil the MSFD or Natura 2000 requirements, as many NQS overlap with the coastal Natura 2000 network and which is more developed than the offshore MPA network at this point

From the CFP mainly three types of measures can be distinguished: input, output and governance/economic measures (see unpublished report from the CINEA/EMFF/2018/011-Lot 1 specific contract, forthcoming). There are less obvious categories like ecosystem-based management measures where the objective is not directly to manage fisheries but, for example, to fulfil obligations from environmental regulations in the EU.

5.2.3 Technical Measures

Some TCM regulations are in place in EU coastal waters for some time and/or were adjusted several times since the first basic regulation in 1982. That category of measures was not specifically developed for the CFP. Already several centuries ago, fisheries were regulated by an allowed maximum length of nets or number of gears. The effectiveness and efficiency of individual TCM depend a lot on the fishery, area or species. Therefore, there is a substantial discussion how to implement TCM, in a more top-down management approach or something like co-management with specific rules in fisheries/regions. Even after the last reform of the TCM the regulation is very detailed and often criticised for being still often an inflexible top-down management approach.

5.2.4 Incentives

Fish stocks are seen as a Common Pool Resource. Fishers have no individual, private property right to a stock or part of the stock and in the past there was open access to the fishing grounds at least outside the territorial waters (12 nm). Economists therefore claim that overexploitation is the result of the "Tragedy of the Commons" where an increasing number of fishers lead to overfishing (originally from Hardin 1968, critical regarding fisheries Ostrom 1990).

Fisheries economists have long argued that we are not managing fish stocks or ecosystems but fishers. Fisheries management needs to take account of human behaviour and what influences human behaviour. Therefore, the 'right' incentives play a huge role in the discussion on the preferable management measures and economists often criticise the measures of the CFP due to wrong incentive structures forcing fishers basically to ignore or go around rules (e.g. Hanna 1998, Costello et al. 2010, but also Lubchenco et al. 2018). Therefore, in the discussions to introduce measures it could be favourable that, for example, stakeholders, scientists and managers elaborate together what are the objectives of the management and what impacts certain measures would have also regarding the incentives for the fishers.

5.2.5 Co-management

An alternative to a top-down management approach is the development of measures from the bottom up (an example for measures in the Western waters Le Floc'h et al. 2015). There are many examples of management measures which were adopted in a co-management approach between all stakeholders, the fishing sector, NGOs and the management authorities (see examples from MS below). Having the possibilities to have a say in the implementation of measures usually improves the acceptance of the rules by the fishers (see Linke & Bruckmeier 2015 for co-management experience in the EU).

Co-management schemes have been catalogued in five types, with a possible evolution among them. The categories defined by Sen and Raakjaer (1996) and updated by Hegland et al (2012) are as follows:

1) 'Top-down hierarchical management by the state': EU/national governments make the decisions, with minimum information exchange with stakeholders.

2) 'Co-management by consultation': all decisions are still made by EU/national governments, but with extensive consultation and feedback with stakeholders.

3) 'Co-management by partnership': cooperation in decision-making exist between EU/national governments and stakeholders in some aspects of management.

4) 'Co-management by delegation'; where EU/national governments have devolved de facto decision-making power to stakeholders in several aspects of management.

5) 'Industry self-management with reversal of the burden of proof'; where the management authority is widely devolved to the stakeholders, who must demonstrate compliance in return.

According to Hegland et al (2012): "Traditionally, stakeholder involvement within the CFP has primarily been variations of the two top categories, in other words the least ambitious".

The stronger involvement of small-scale fisheries in the management of non-quota species also presents a challenge for co-management, because the participation of these fishers in the CFP high level co-management mechanisms has diminished with the changed role of the Advisory Councils in the regionalisation of the CFP (Eliasen et al 2013).

The management of NQS involves new co-management interactions between actors, now in different roles. When building co-management structures or new management measures to be used inside a co-management structure it is important to consider collective action arrangements, and the principles of collective action can be useful. Collective action is either initiated as grassroots or by external initiative, from civil society or supported by government (Jentoft and Finstad 2018) and it is possible "unless there is "community failure"; internal conflict, normlessness – or "anomie" as Durkheim called it (McCay and Jentoft 1998)". Collective action is both a prerequisite and a result of co-management. Several principles for collective action were empirically developed by Ostrom (1990) and updated by Cox et al (2010):

1A User boundaries: Clear boundaries between legitimate users and nonusers must be clearly defined.

1B Resource boundaries: Clear boundaries are present that define a resource system and separate it from the larger biophysical environment.

2A Congruence with local conditions: Appropriation and provision rules are congruent with local social and environmental conditions.

2B Appropriation and provision: The benefits obtained by users from a common-pool resource (CPR), as determined by appropriation rules, are proportional to the amount of inputs required in the form of labor, material, or money, as determined by provision rules.

3 Collective-choice arrangements: Most individuals affected by the operational rules can participate in modifying the operational rules.

4A Monitoring users: Monitors who are accountable to the users monitor the appropriation and provision levels of the users.

4B Monitoring the resource: Monitors who are accountable to the users monitor the condition of the resource.

5 Graduated sanctions: Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and the context of the offense) by other appropriators, by officials accountable to the appropriators, or by both.

6 Conflict-resolution mechanisms: Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.

7 Minimal recognition of rights to organize: The rights of appropriators to devise their own institutions are not challenged by external governmental authorities.

8 Nested enterprises: Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.

There are already management structures in place in different countries that may facilitate co-management at regional and local level. Ireland has regional Inshore Fisheries Forums, France has the Comités des Pêches, the Cofradías in Spain, and Portugal has recently adopted the possibility for co-management in their national fisheries law. There is a lot of scope to develop co-management and use it to agree transnational measures at regional level. There are also challenges, in that the EU is not legally able to engage in politico-administrative structures with decision-making powers between the EU level and the member states (Hegland et al 2012). Or that the acceptance of co-management arrangement and their results requires process legitimacy, that is, where "dispersal of authority, power, responsibility or related measures of influenced across actors and institutions is (perceived as) more legitimate/fair or just than an alternative distribution" (Hegland et al 2012).

5.2.6 (Long-term) management plans

The EU adopted the instrument of species-specific long-term management plans with the basic regulation of the CFP in 2002. With the CFP reform in 2012 the instrument was kept as there were a lot of positive experiences with the instrument (see STECF 2014 for an example of the evaluation of a management plan), but were modified to consider a regional approach to fisheries management. All management plans include objectives, management measures to reach the objectives and indicators to assess the functioning of the plan.

Long-term management plans (including measures which are described below) could be a useful approach also for the management of NQS. In the past, Advisory Councils have proposed management plans and it could be also a good instrument for a co-management approach with the sector and other stakeholders (as happened in the past with several LTMP, see Stange et al. 2015).

5.3 Input Measures

This is the most common category of management measures for NQS, as all measures directly influencing the use of fishing gear are included in this category (opposite to output measures which regulate mainly the quantity of fish caught). There is one regulation in the European Union on technical conservation measures (Regulation (EU) 2019/1241) which includes input measures. Those measures can be gear or area based. In addition, the EU has regulations on direct effort restrictions or fleet reduction measures aiming at reducing overcapacity in fleet segments.

5.3.1 Technical Measures

5.3.1.1 Gear based Technical Measures

Gear based Technical Measures (TM) aim at improvement of the selectivity of fishing gear. Depending on the fishery those measures regulate size selectivity or species selectivity. They are also applied in multi-species or mixed fisheries (EU 2019). A large selection of gear based TM and of their use is provided by O'Neill & Mutch (2017), see also Catchpole & Revill (2008).

Gear based TCMs are not very relevant or necessary for species such as crustaceans and molluscs were discarding, or contact (at the gear head) mortality is very low. Catching and discarding in these fisheries does not generally cause additional mortality. Nevertheless, gear-based measures might improve sorting time on board and reduce fishing costs, and improve unwanted catch of other species.

Table 5-1 Pros and Cons of gear based TCM.

Pro	Contra
Easy controllable	Some measures problematic in mixed fisheries (e.g. mesh sizes when there are different sizes of catch)
May reduce the choke risk if unwanted catches in mixed fisheries can be reduced	Strict rules can be costly with high losses of marketable catch
Minimum size can limit mortality if discard survival is high	
Minimum size can be an incentive for size selection or changes in fishing ground	

5.3.1.2 Size selectivity

A main problem in fisheries is the bycatch of small specimens especially below commercial or legal-size limits. Selectivity is expressed in terms of the length at 50% retention, L50, and the range between 25 and 75% retention, SR. We focus here on trawl fisheries, while passive gears are discussed below.

STECF has looked specifically into the selectivity in cod fisheries due to many fisheries where cod is or could be a choke species. The latest report is on the Celtic Sea (STECF 2021). Two examples for meta studies are Fryer et al. (2016) and O'Neill et al. (2020).

There are several possible modifications to the cod end with changes in the geometry of the meshes, e.g. square meshes (MacBeth et al. 2012) or T90 (a normal diamond mesh is turned by 90° to keep the meshes open, Cheng et al. 2020), restrictions on twine thickness, restrictions on the circumference of cod end, restrictions on the use of netting materials, structure and attachment of cod ends, permitted devices to reduce wear and tear, permitted devices to limit the escape of catches (O'Neill et al. (2020); Hermann et al. (2019)).

There can also be netting changes in the rest of the net including extension (Robert et al. 2020), main body, and wings (Kynoch et al. 2011), top (Ingolfsson 2011) and belly (Bayse et al. 2015) of the net.

There was some research on specific escape devices. The most common is the Square Mesh Panel (SMP) (O'Neill et al. 2006) or devices that allow fish to escape from the net, e.g. flatfish in a cod fishery (see also below on sorting grids, Santos et al. 2020).

5.3.1.3 Species selectivity

Many non-quota stocks are unwanted catches or even include species that may be protected. There are many gear modifications and bycatch excluding devices that can be added to gears, but have often also effects on the catches of other species, particularly smaller species, but this is usually not the intention.

5.3.1.4 Sorting grids and sorting panels

Sorting grids and sorting panels are usually used in trawl fisheries. A well-known example of a sorting grid to release unwanted catch is the Turtle Excluder Device (TED) (Vasapollo et al. 2019). In Europe, a widely used approach is the Swedish grid, which is an adaptation of the Nordmøre grid developed to reduce fish by-catch in shrimp trawls. It is used in Nephrops trawl to guide unwanted catch out of the net (Madsen et al. 2017). Other variants have been developed to retain valuable species, or reduce target catch losses, also to reduce mud clogging in the grid.

Another device are separator panels fitting a horizontal panel mainly in the main body of the trawl gear. Depending on the species behaviour, fish may go above (e.g., haddock or whiting) or below the panel (e.g., cod and anglerfish, Santos et al. 2020), and into two different cod ends (Fryer et al. 2017; Cosgrove et al. 2018). The two cod ends may have different meshes, or one may be open to allow escapes. Another trawl example is a cutaway headline or "topless" trawl design which works on the same basis as the separator panel design. The removal of the top panel allows some species to escape (Revill et al. 2006; Krag et al. 2015).

Benthos release panels (BRPs) are a special case of escape window (Fonteyne & Polet 2002; Revill & Jennings 2005). This is seen more as an ecosystem measure as it is mounted in the underside of beam trawls to release unwanted benthos and debris. Raised footrope trawls are also designed to lift the ground gear or fishing line away from the seabed (see also STECF 2021 for the Celtic Sea cod avoidance measures). This is achieved by replacing weights on the ground gear with "drop chains" which allow the net to "fly" off the seabed (He 2007). This works as a species selective measure, as some species will then go under the fishing line and escape capture, while others will still be caught if they swim higher off the seabed, while also reducing the gear bottom footprint.

5.3.1.5 Mesh or hook size

Active gears, such as trawl and seiners, can be regulated by limitations in mesh format and size also. For passive gears, such as gillnets, tangle and trammel nets, the main focus of species selectivity is on different mesh sizes. Mesh sizes for passive gear would be related to size and species selectivity. Research on gillnets suggested that they are already very selective (Lucchetti et al. 2020 with an overview on available studies) while additional net design management measures include height, length and hanging ratio (He and Pol 2010). Altering the design or using redesigned trammel net has also been shown to reduce bycatch of thornback rays (Ford et al. 2020).

In longline fisheries the number and size of hooks is often regulated. Hook size, shape, depth and distance to the sea floor of hooks and type of bait are also important (Løkkeborg et al. 2010; Reinhardt et al. 2018). Time of the day, type of bait, effective time of fishing (soaking duration) and type of sea floor also influence catch composition and are species selective.

For trap and pot fisheries, trap size, mesh size, net and pot material, as well as depth of deployment and number of allowed traps and pots per set are regulated in several MS.

5.3.1.6 Spatial and Temporal Measures

A broad category of TM involves some form of restricted fishing in a particular area or period, sometimes both (Humphreys & Herbert 2018). They are described by FAO as Area and Time Restrictions. In many cases they are considered as Marine Protected Areas with some sort of restrictions at least seasonal or short-term closures. There are several forms of regulations, from "no take areas" where fishing is not allowed (Sala & Giokoumi 2017) to seasonal closures (to protect spawning aggregations or juveniles) or restrictions for the use of certain gear types. In areas where bottom habitats shall be protected there may not be the necessity to ban pelagic trawls or static gears.

Table 5-2 Pros and Cons of spatial and temporal measures.

Pro	Contra
Useful for benthic dependent stocks exploited by towed gears and to protect sensitive habitats	High resolution VMS data needed to implement spatial controls. For some species this would need to include vessels under 12m LOA
Spatial and temporal measures could be used to protect hot spot recruitment events to optimise future yields	Maybe more problematic for SSF than for large vessels due to limited mobility of the coastal fleet
Spawning and juvenile aggregations can be protected by spatial-temporal measures	Risk of over complexity in the spatial control measures leading to displacement of effort potentially to sensitive areas.

	Also increasing interaction with other sectors such as offshore renewable industries
Potential to control other sources of mortality besides fishing	Difficult to assess fishing activities and effort for static gears
Can reduce fishing mortality subject to conditions on a case-by-case basis: e.g. sufficient extent of the closure	

5.3.1.7 Permanent Spatial Measures - Marine Protected Areas

In EU waters several categories of MPAs must be distinguished. There are Natura 2000 areas for the protection of habitats and species (including seabirds which fall under nature conservation regulations) while the regulations of fisheries, where several MS are affected, fall under the CFP (a MS can only regulate its own fishers or all fishers out to 12 nm). The EU adopted a TCM regulation (EU 2019) where spatial measures are included but some measures are also included in the CFP (e.g. Art. 8 on establishing fish stock recovery areas). There was a lot of research on the effects of MPAs and they are seen as a valuable tool for conservation, but not a panacea to solve all fisheries management problems (for example, Pendleton et al. 2018; Hilborn 2016; Tregarot et al. 2020). There is a lot of literature on MPAs (Selig et al 2017 or Liu et al. 2017 only as two examples). In the North Sea the long-standing 'plaice box' is a good example where the measure may have not worked (Beare et al. 2020) but may have other positive effects (e.g. preserving small-scale fisheries). Spatial measures and the link to Marine Spatial Planning is reviewed in Reed et al. (2020). Ehler (2020) provides a valuable recent review of MSP linked to Ecosystem Based Management. Spatial measures for the purpose of fisheries management may or may not be considered as MPAs in the 'true sense'. Such measures are often defined as 'other effective conservation measures' because the primary objective is fisheries conservation and management rather than environmental protection per se.

MPAs will be more useful for stocks that have limited mobility, such as molluscs and to a lesser extent crustaceans, or for species which are connected to the seabed during particular stages of their life cycle (e.g. herring spawning grounds). Spatial measures are important for stocks which provide important ecosystem services, such as food source for seabirds, or in the case of exploited species which provide structural habitat for other species. The benefits include the re-building of stocks within the MPA and beneficial spill over effects to surrounding fishable areas. The net benefit to fisheries however needs to be evaluated on a case-by-case basis.

5.3.1.8 Temporary Spatial Measures

Many fisheries management measures are adopted to preserve certain species life stages from fishing pressure. Closed seasons or temporally closed areas are used for some time to achieve that. They may be dynamic (i.e., triggered by an event) or seasonal (Dunn et al. 2011). Examples include spawning closures or seasonal closures to protect juveniles. A specific measure is the Real Time Closure (RTC) which is usually triggered by high catches of juveniles or specific species. An example is the protection of cod in the North Sea with RTCs (Little et al. 2015). The closure will usually be only for a short time e.g., two weeks in case of the North Sea. However, with dynamic closures high level of at-sea monitoring is a pre-condition to achieving its conservation objectives, which was not the case in the North Sea cod RTC scheme.

For species with spatially variable recruitment and where recruitment 'hot-spots' may occur, such as scallops, the protection of these areas from growth overfishing and to enable delayed harvest to optimise yields is potentially useful.

There are other specific spatial-temporal measures such as move on rules (Dunn et al. 2014) in case of, for example, a proportion of a bycatch species is present in the catch. The vessels have then to move fishing grounds. Germany has, for example, a voluntary agreement in the Western Baltic Sea that fishers move fishing grounds in case of high seabird densities. As with dynamic closures, move on rules require high levels of at-sea monitoring. Another example is alternate opening and closing of areas for sandeel fisheries in the Norwegian EEZ (Johannessen & Johnsen 2015). Within six nautical miles local authorities may have also authority to regulate (e.g. so-called byelaws by Inshore Fishing Authority in England) and implement temporal, permanent or emergency closures. Measures could be: prohibition/restriction of resources, requirements of permits, restrictions of methods, gears and vessels, protections of fisheries and monitoring of exploitation of resources.

Moving on measures to avoid by-catch are difficult to implement in small-scale fisheries as 'moving on' is practically difficult in the case of small vessels. Also where by-catch of PET species occurs and where the status of such species is critically endangered spatial or spatio-temporal measures with exclusion of fisheries may be necessary.

5.3.1.9 Territorial User Rights

TURFs are a rights-based management measure and operate as a spatial form of property rights, in which fishers are granted access privileges and fishing rights to exploit fisheries resources within a designated area or sometimes specific species in an area (for an overview on TURFs Thi Quynh et al. 2017). It can also be seen as access and effort control measure and is mostly used for small-scale fisheries (Aceves-Bueno et al. 2020). This instrument belongs, therefore, to some extent to several management categories. It is a spatial management approach, can limit effort in a specific area and/or specific species, and can increase the quality of the property right to fishers depending on how and if any secondary measures are planned within the territory (comparable to ITQ (see below) in a fishery with a TAC). It is described as a good instrument that may give fishers some kind of stewardship role and incentives to manage the resources sustainably (Lester et al 2017).

5.3.2 Capacity and effort control measures

5.3.2.1 Capacity control measures

Capacity or access control is a primary input control measure. Limiting entry to specific fisheries avoids the problem of over-capitalization and provides increased security of tenure and quality of fishing rights to participants. It is important in the development of co-management arrangements as the 'group' (of licence holders) is readily identifiable and collective action and agreement is thereby facilitated. Entry exit rules to ensure renewal are important and can be used to management the costs of entry. Entry costs to small scale fisheries are currently very high and prohibitive. At least some increased certainty with respect to access is required for potential participants in NQS fisheries

Capacity control measures have been implemented in the EU in the past at a 'generic' high level, while effort control can be applied presently in the EU-UK context.

Table 5-3 Pros and Cons of capacity and effort control measures.

Pro	Contra
Capacity control important in balancing available resource and fishing opportunity.	These measures are usually attempting to control fishing mortality indirectly. There is an unclear often non-linear relationship between effort control and control of landings (and fishing mortality).
Licencing policy that limits entry is an important aspect of balancing available resource and fishing opportunity and provides security of tenure for licence holders.	
Effort control in terms of amount of effort at sea is easy to monitor and control if the effort metric days at sea.	Technological creep, increase in capacity and fishers know how, can all increase fishing efficiency and they are difficult to control.
New technologies however such as high resolution VMS and data analytics can be used to monitor effective effort.	There may be a shift of effort to a targeted fishery on NQS.
No incentive to misreport catches and applicable to mixed fisheries.	

5.3.1.10 Fishing Effort Control Measures

At a coarse resolution or definition Fishing Effort Controls can be defined as the product of capacity and usage and can be expressed as kilowatt hours (kWh). STECF however has expressed concerns regarding this measure (e.g. STECF 2018, see also Davie & Lordan 2011; Danielsen & Agnarsson 2018).

Effort control can be defined in other units of measurement and could be used for management of exploitation of single species but could also be used as an ecosystem-based management approach to reduce wider ecosystem impacts. Less fishing effort should theoretically lead to less ecosystem impacts. Lower effort also suggests better economic return as maximum economic yields (MEY) occur at effort levels that are lower and stock biomass levels that are higher than those at MSY. MEY is in that sense more precautionary than MSY.

5.4 Output Control Measures

5.4.1 Catch fishing limits (TAC, quotas)

The control of outtake or landings through catch or landings limits (e.g. a total allowable annual catch - TAC, seasonal catch limits, vessel catch limits, etc.) is the common method used to manage the exploitation of many EU fish stocks. The method is usually based on the MSY principle which aims to maintain high levels of productivity in stocks that will result in high long-term yields on average. It is a method of directly managing fishing mortality (F).

Catch limits are usually estimated based on annual stock assessments and advice produced by ICES. The EU TACs, estimated for each species at stock level and/or at geographic sea area level, are distributed as annual quotas to EU Member States and third countries in some cases. The proportional distribution across Member States is fixed under relative stability rules. The national quotas are distributed to licenced fishing vessels by the national fisheries administrations or authorities according to national policies although the CFP also provides policy in this respect. Access to quota at a national level, therefore, reflects the fishery licencing policy in the respective country. Catch limits can also be set at national or regional level and can be distributed seasonally, weekly and/or by vessels according to national or regional policies.

The Landing Obligation or the discard ban (see on discard bans Karp et al. 2019) was adopted with the last basic regulation for managed stocks in the EU (TAC in the Atlantic waters and MCRS in the Mediterranean). This can be seen as an output measure or at least as an instrument to move from a landings quota to a catch quota, which may help to limit fishing mortality (with knowledge about all catches). This measure has been deployed in Norway and Iceland among others.

Application of output control such as catch limits to NQS would also be possible, but the following issues arise

1. Data availability and in particular the time series of data available is usually limited for many of the NQS. A significant proportion of the landings of NQS of some species may be taken by vessels under 10m in length and data quality from this sector may be particularly poor.
2. Scientific assessment of NQS may be poorly developed or undertaken at national level rather than at ICES. Countries may take different approaches to monitoring and assessment even for the same species and stock.
3. The biology of some NQS and in particular the crustaceans and molluscs suggest that different approaches to assessment and management may be needed:
   a. Usually there is no age data for these species.
   b. The species are sedentary or benthic and spatially explicit approaches to assessment are needed.
   c. There can be high spatial variability in biological characteristics such as growth rate and local environmental conditions influence growth and survival. Estimation of biological parameters for stock assessment is therefore difficult.

Table 5-4 Pros and Cons of output measures.

Pros	Cons
Directly limits fishing mortality rates particularly for species that survive discarding	Imbalances between quota availability and fishing capacity may arise especially when TAC advice fluctuates significantly between years
Potentially easy to control subject to species identification (e.g. gurnards) and subject to high levels of at-sea monitoring	The MSY objective behind the TAC advice cannot be achieved for all species simultaneously. Multi-species and ecosystem approaches to assessment need further development.
	Discard (unseen) mortality can be an issue in some species and in mixed species fisheries

5.5 Governance instruments

With the description of measures so far, we have already discussed some aspects of governance or management processes in general (e.g. incentives or co-management). We decided to add in this chapter a few more aspects of alternative governance or management approaches to the mainly top-down management approach in the EU. Those alternative instruments, or management approaches, to implement the CFP include co-management, results-based management, or self-management.

Table 5-5 Pros and Cons of governance and economic instruments.

Pro	Contra
Governance and management arrangements should be scaled to the distribution of the NQS (at stock level)	Overreliance on technical measures are an economic disincentive and reduce profitability
Stock boundaries should be defined	Balance of access of small and large vessels is important in some NQS and especially in benthic or sedentary stocks such as scallops

5.5.1 Co-management

Fisheries management in the European Union is often criticized for its micro-management approach or its lack of taking stakeholders sufficiently into account in the decision making (Raakjaer et al. 2012). With the last reform of the CFP a partly regionalized approach to decision making was included in the basic regulation and Advisory Councils (AC) were strengthened including a wide variety of stakeholders. Nevertheless, this is far from a real co-management or co-governance system (Symes et al. 2012, Symes & Phillipson 2019).

Very detailed measures are implemented (especially technical measures and recent exemptions to the LO) without taking different conditions in fisheries or economic conditions of fishing companies sufficiently into account. For a long time, not only economists have argued that bringing the fishers into the management process in a co-management or even some kind of self-management system (like community-based-management, Ostrom 1990) would improve fisheries management. The expectation is that management measures implemented together with the fishing sector will lead to a much better compliance than a top-down management approach (Jentoft 2000).

5.5.2 Results-based-management

A "results-based-management approach" (Nielsen et al. 2017) needs to be distinguished from co-management. In this case the regulation includes only the objectives in the regions (see regionalization in the CFP), fisheries managers, fishers and other stakeholders try to find management approaches which fulfil the objectives.

5.5.3 Self-Management

Self-management, i.e. without the involvement of fisheries management authorities, in a fishery is very rare in Europe. There are still fisheries where the fishers decide on e.g., the level of effort themselves (e.g., Germany Döring et al. 2020). They may have to follow other regulations, like security requirements on board, but the fishery itself is not limited. Depending on the system this can be seen as community-based management to a certain extent.

5.6 Economic instruments

Economic instruments are not direct management measures but can be used to incentivise various approaches to governance and management. There is, for example, the European Maritime, Fisheries and Aquaculture Fund (EMFAF) which includes funding schemes for fishing companies for certain payments or investments on fishing vessels. This can also be new approaches like paying fishers for services (e.g. fishing for litter). Governments can also influence behaviour, by introducing taxes on, for example, landings.

Economists propose mainly one instrument to end the 'race to fish', Individual Transferable Quotas' (ITQ), although there are several other instruments to do that. However, ITQs require also high levels of at-sea monitoring as to avoid the associated high incentive to discard and maximise profits of the available ITQ.

5.6.1 European Maritime, Fisheries and Aquaculture Fund

With the European Maritime, Aquaculture and Fisheries Fund (EMFAF, Regulation (EU) 2021/1139) the European Union has introduced a funding scheme to support companies in the fishing sector. There is a wide variety of possible measures MS can introduce to get funding, and MS have developed operational programs which after adoption by the EC clarify the individual funding schemes. The budget of the programs has to be co-financed by MS. The following two instruments have been included in some MS operational programs.

5.6.2 Funding alternative fishing gears and new technologies

Many technical conservation measures or spatial/temporal measures require fishers to change fishing practices. In some areas only certain fishing gear are allowed and governments can decide to help the fishing sector by funding the use of those fishing gear. Governments may help fishers to reduce their ecological impacts by helping them to voluntarily introduce less impacting fishing gear. Governments can also fund the purchasing of new technologies to allow for the collection of at-sea fishery-dependent data or for compulsory monitoring and control purposes (e.g. VMS/GPS, catch logs apps, etc.).

That could be also a possibility for management measures introduced for long-term strategies between EU and UK, where MSs issue specific programs to allow fishers to adapt to the new circumstances as a positive incentive and to improve acceptance of measures.

5.6.3 Payments for ecological services

There are some specific programs in MS operational programs which belong to a certain group of measures which could be characterized as 'payments for ecological service' (Bladon et al. 2014). In fisheries this is an instrument which is not applied very often compared to agriculture where those agro-environmental schemes are implemented regularly. Fishers/farmers are paid for certain practices to improve biodiversity conservation, reduce nutrient inflows etc. (Batáry et al. 2015, Zimmermann & Britz 2016). One example is fishing for litter where fishers receive payments to collect litter at sea and bring it back to shore. Another example could be monitoring trips in Natura 2000 sites.

The problem is that fishers could be paid for certain practices, but they don't have that strong property rights as farmers who own a specific piece of land. This limits the possibilities for governments to pay fishers (farmers have strong property rights on an area and if a government limits their actions, they need to compensate the farmer).

5.6.4 Taxes

Countries could introduce taxes on, for example, landings which would increase costs for consumers and that may reduce demand for certain fish species (for an overview on fiscal policies Porras 2019). Now fishers pay no fuel taxes in all MS and in many of the third countries in Europe. Reducing the exemption and introducing a tax would also increase costs for operations and that may limit fishing effort.

5.6.5 Subsidies

There is a long discussion on subsidies in fisheries as payments to fishers decrease their costs or allow them to invest in more efficient fishing vessels which increases effort (Sakai 2017, Sumaila et al. 2019). One of the main reasons for overcapacity are and were subsidies. In the past, fishers received subsidies to invest in new vessels. The result was a larger fleet than would have been without the subsidies. The tax exemptions for fuel allow fishers to fish with lower costs and employ higher effort.

The WTO interprets also payments for ecosystem services or payments from the EMFAF for more selective fishing gear as subsidies, although usually those measures only cover at least partly increasing costs for the fishing vessels.

5.6.6 Individual Transferable Quota (ITQ)

Several MS in the EU have introduced ITQs for fisheries exploiting TAC managed stocks. This is not a specific management measure but a way to allocate fishing opportunities within a TAC regulated fishery. The allocation system to distribute the share of the overall EU-TAC to the fishers of that country is with the MS responsibility. Fishers receive a share of the quota of the MS (usually a percentage) which is tradeable. The expectation is that less efficient fishers sell their quota share to fishers who fish more efficiently. The overall goal is to fish the quota with the least costs.

The expectation is that fishers with a strong property right, in this case their quota share, have a strong incentive to be able to fish at higher stock levels and are, therefore, in favour of a sustainable exploitation of the resource. At the same time however, ITQs constitute a huge incentive to discard, as the need to maximise profits of a quota share is also very high. This can be a perverse incentive that can undermine the whole TAC system, and the ITQ system itself. The solution is that ITQ system needs to be accompanied with high levels of at-sea monitoring and control.

In countries where no ITQs are introduced fishers receive nevertheless individual quota which is, for example in Germany, attached to the vessel (Doering et al. 2020). Problem in all those fisheries is that it is not easy for incoming fishers to get access to a fishing quota.

5.6.7 Tradeable effort quota or markets for fishing capacity

So far, the EU or MS have not introduced an official tradeable effort quota system. At the moment only few fisheries are regulated with effort limitations (although limiting fishing licenses can limit fishing effort without limiting effort directly). In the Western Mediterranean demersal fisheries, the EU introduced an effort management system limiting the vessels of the MS in their activities. However, that effort is not tradeable between vessels.

The EU has for a long time a system to limit fleet capacities. Although there is no direct system to limit fishing capacity anymore (as in the multi-annual guidance plans in the past) there are still requirements to limit capacity in the MS and especially new entries into the fleets. MS have a capacity ceiling and any new vessels coming in the fleet needs to have to have 'capacity' within that ceiling. In praxis this means that other vessels must go out of the fleet and the capacity of those vessels will then be available. In many countries fishers must 'buy' capacity, basically have to pay the owners of existing vessels (in most cases they have to buy the old vessels, see Germany (Doering et al. 2020)), for getting their capacity. This also limits the possibilities for newcomers in the fisheries.

Table 5-6 Pros and Cons of economic instruments.

Pro	Contra
EMFAF	
Can provide the fishers with the right incentives (e.g., fish with less harmful	Dependence on the availability of public funds

fishing gear)	
Fishers receive money not just for fishing but for actions fulfilling societal goals (like, for example, conservation of biodiversity in case of payments for ecosystem services)	Funding of individual projects and not adjustments of whole fleets/fleet segments to new conditions
Taxes/Subsidies	
Could decrease overcapacity and overfishing (especially reducing of subsidies)	Taxes or reduction of subsidies could increase economic pressure especially on small-scale fishers in the short term
Tradeable quotas	
Possible efficiency gains (fish quota with least costs)	In tradeable quota system (but not only) a concentration of fishing rights in fewer hands can be observed
Clear property rights, fishers may have stronger incentives for higher stock levels	New entry is problematic as fishers must invest in vessels and quota
	Transfer of wealth from society to a small group of fishing companies
	High incentive to discard catch to maximise profits, only contravened by high at-sea monitoring levels.

5.7 Summary and outlook regarding management measures

This chapter provides an overview of available management measures and management approaches for NSQ. This includes factors which are important from a management standpoint (such as CFP objectives and fisheries management incentives) and process-related considerations. In many cases it may not be that important which exact measures will be implemented, but how far stakeholders may have been involved in the decision-making and how far measures are accepted by the fishing sector.

The largest part of the management measures description covers the so-called TCM, which are in many cases more relevant than output measures for fisheries on NQS. However, in output (quota) managed fisheries NQS can be bycatch species or some of the NQS today may be managed by quotas in the future. Therefore, we also describe in some detail the main output measure, a catch limit system with or without ITQ.

Input management measures are in many cases very specific measures regulating gears, fishing seasons, allowed size of the specimens in the catch or seasonal or total area closures. Input measures have the advantage that they can be implemented relatively quickly in the short- or medium-term and in some cases are relatively easy to control (a total fishing ban in an MPA, for example). On the other hand, the regulation needs to be very specific in many cases to fit to the conditions in a regional sea basin or fishery and that may need some time to be negotiated and adopted. So it could be that it is not as quickly implementable in many cases.

A closed area for fishing may not have a significant impact on larger vessels because they may be able to fish in other areas, while for some small-scale vessels fishing in other areas might not be possible due for example to limited vessel autonomy or to increase sailing costs.

The EWG also discussed governance approaches and economic instruments. It is important to be aware of the processes behind decisions for certain management measures. A top-down management approach may be less successful (regarding compliance with the rules) than a co-management approach, where the measures are developed and proposed sometimes by the stakeholders themselves (like long-term management plans which were proposed by Advisory Councils). A co-management approach takes time to develop and as such it may be more a mid- to long-term approach.

Management plans for NQS should include, for example, the following elements[3]:

- Clear management objectives
- TCM implemented for certain fisheries (including links with regulated fisheries within mixed fisheries regulated with output measures like TACs)
- Indicators to be able to measure success in reaching the objectives
- Instruments for long-term stability and predictability for fishers

There are a few instruments which could only be considered in a more long-term approach. Adaptive management (e.g. real-time closures) are very data-demanding and especially for fisheries with a high participation of small-scale vessels the data for such a management approach is not available yet. However, new technology tools for data collection and transmission are already available and could be implemented on small vessels, also beyond the upcoming new reporting obligations under the review of the EU Control Regulation.

[3] See https://www.consilium.europa.eu/en/policies/eu-fish-stocks/multiannual-management-plans/

6 EWG SUMMARY AND CONCLUSIONS

The EWG 22-04 report includes an overview on available data on NQS and more specific information on a list of 10 species provided as factsheets. The EWG was requested to look at NQS in six sea basins (North Sea, Western channel, Eastern channel, Celtic Sea, Irish Sea and West of Scotland) which include coastal waters of Belgium, France, Ireland and The Netherlands. The factsheets include information for a species in all sea basins combined and separately for each sea basin. As those specific factsheets per sea basin should be a stand-alone document some of the information is repeated for each one.

The fact sheets are not comprehensive overviews of the state of knowledge of these stocks. They report the basic landings, effort and value data and the geographic distribution of landings. There are many data collection programmes and stock assessments for NQS at national level and these are not detailed in the fact sheets. The job of bringing that information together is significant but may be more important at a later stage in the development of MYS for specific species in specific sea basins. This work is already progressing in ICES WGCrab and WGScallop for those NQS species.

The EWG 22-04 report also includes an overview on available management measures for NQS. The EWG lists specific measures like, for example, mesh sizes or spatial closures but also discusses management processes like co-management which may help to develop multi-year strategies or improve acceptance of the fishing sector for management measures.

For some time, the EWG 22-04 chairs tried to attract experts to the meeting. This was especially relevant for this EWG as the experts should look particularly at six sea basins and the management measures in coastal waters of four MS. Specific expertise was required as many management measures are introduced on MS level and not via EU regulations. Expertise was not available in the EWG from all MS (especially France).

EWG 22-04 was the first expert working group to report landings and effort data and discuss management measures/strategies for the management of non-quota species. The respective stocks are not managed by fishing quotas for a variety of reasons; scientific assessments are poorly developed, there are legacy issues why some of these species have not received more management attention, the history of fishing may be short relative to traditionally important species, no requests have been made to ICES to provide quota advice, etc. For most of the NQS there are management measures in MS but no direct regulations at EU level (like a TAC). Management measures can, therefore, vary in coastal waters of different MS. After Brexit, vessels of the UK are now vessels of a third country which want to fish in EU waters and vice versa. Following the TCA, the EU and the UK will start discussing multi-year strategies for NQS including measures to regulate access to coastal waters.

It was not possible for EWG 22-04 to give a general picture on all NQS in EU waters and a comprehensive overview on available data for those stocks, due to the limited time during the EWG and the low number of experts. The EWG was requested to analyse data from a data call to MS specifically issued for the EWG. Some of that data is not available in existing databases or needed to be provided in a different format. It took longer than expected to check the data and to decide what we do with the data. This is the first time that data was delivered in such a specific data call for NQS and not unexpectedly the EWG participants found a lot of data issues. DG Mare will make MS aware of those issues and MS can re-submit data so that for the next EWG meeting the data should be available in an improved form.

For EWG 22-04 it was unclear how to deal with the data checks, as there was no time to resubmit the data and check it again. The data checks were also quite technical and, therefore, the EWG participants could not give an overview on data which is missing or maybe even not collected. The EWG had to use data submitted in the first data call and the analysis of the data must come with caveats. For other EWGs of STECF it is possible to do data checks before the meeting (via JRC or in a specific preparatory meeting (for balance report)) and this could be also a possibility for the next EWG.

The participants of EWG 22-04 had to decide what analyses were possible after the data checks. It was decided to concentrate on the species list provided by DG MARE as there was also a misunderstanding how important that list should be for the EWG outcome. DG MARE needs to provide a list of species for each sea basin, as some species are quota species in one area while being a NQS in another. The EWG participants were aware that the provided list of DG MARE this time did not include the 10 most important species regarding catches and values, but it was not possible to extract those list from the delivered data from the MS. The selected species, however, represent a wide variety of species and show possible issues which may occur in discussions on management measures.

EWG 22-04 could not provide an overview on fishing effort by sea basin and species. The MS delivered effort data in different formats which made an aggregation on sea basin level not possible. Before the next EWG meeting, DG MARE could organise a workshop to agree on a common approach for the effort calculation for NQS. This is especially important as data on small-scale vessels are only partly available while this segment is very relevant for NQS.

For EWG 22-04 a sea basin analysis was not possible with the provided data. In case this should be done at the next meeting this would require more spatial information from logbooks and VMS data. Increasing the details on fishing locations and haul composition would allow to assess the activities within the sea basin rather than by ICES statistical rectangle proxy. It might be of interest to look at the bathymetric composition of sea basins and the catch locations.

The EWG 22-04 observes that there is a lot of data on NQS available from ICES and that ICES has several expert groups on NQS sometimes even for individual species. There are data other than landings and effort in various MS. Without a clear picture of what data is available in ICES it was not possible to, for example, extract specific data for certain species as extra information on those species. STECF will never be able to integrate all the information in EWG meetings on NQS. Therefore, only ICES may be able to answer some of the questions while STECF answers others. A meeting between ICES and STECF before the next EWG may help to clarify this.

It was not possible to give information on all NQS or all management measures existing in the EU. For the next EWG, criteria should be developed with the aim to prioritize species and/or areas. In this EWG report it is only possible to provide limited information on some stocks and areas, while there are much more NQS within EU waters.

EWG 22-04 is aware that desk officers of DG MARE cannot be fully available during the week of the EWG meeting. However, for next year’s meeting it is necessary to ensure that questions answered are the most important for the purpose of DG MARE. Especially important is Monday morning when the TOR for the meeting will be discussed with the experts.

EWG suggestions

EWG 22-04 suggests that the next EWG should be organised as early as possible in 2023. This is important to avoid (again) the time of the year when a lot of ICES meetings are working on the ICES advice for regulated stocks (to be published July 1st). STECF bureau and DG MARE should discuss in which form preparatory work like data checks are possible (e.g. a specific preparatory meeting as for the balance report) to avoid time consuming data checks during the EWG week. It would also allow MS a resubmission before the EWG meeting.

EWG 22-04 suggests that for next year's EWG, factsheets for another 10 species should be requested for the report while the existing factsheets could be updated. STECF bureau, EWG chairs and DG Mare should discuss again about the structure of the report and the specific contents of the factsheets.

For autumn 2022 EWG 22-04 suggests organising a meeting between ICES and STECF on the NQS to look at available data, the work of ICES on NQS and what could be possible TOR for ICES and for STECF next year.

EWG 22-04 suggests discussing criteria to prioritize species and/or areas for next year's EWG. It could allow a deeper analysis for certain species if the number of species is still limited.

EWG 22-04 suggests that DG MARE organises a workshop with experts and representatives from MS familiar with the data collection to discuss a harmonisation of the effort calculation especially for small-scale vessels. This could also include a discussion on how the EWG can get access to VMS and logbook data for improved analyses regarding sea basins.

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8 TABLE OF FIGURES

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10 CONTACT DETAILS OF EWG-22-04 PARTICIPANTS

[1] - Information on EWG participant's affiliations is displayed for information only. In any case, Members of the STECF, invited experts, and JRC experts shall act independently. In the context of the STECF work, the committee members and other experts do not represent the institutions/bodies they are affiliated to in their daily jobs. STECF members and experts also declare at each meeting of the STECF and of its Expert Working Groups any specific interest which might be considered prejudicial to their independence in relation to specific items on the agenda. These declarations are displayed on the public meeting's website if experts explicitly authorized the JRC to do so in accordance with EU legislation on the protection of personnel data. For more information: http://stecf.jrc.ec.europa.eu/adm-declarations

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11 LIST OF ANNEXES

Electronic annexes are published on the meeting's web site on:
http://stecf.jrc.ec.europa.eu/web/stecf/ewg08

List of electronic annexes documents:

None

12 LIST OF BACKGROUND DOCUMENTS

Background documents are published on the meeting's web site on:
http://stecf.jrc.ec.europa.eu/web/stecf/ewg2204

List of background documents:

EWG-22-04 – Doc 1 - Declarations of invited and JRC experts (see also section 8 of this report – List of participants)

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