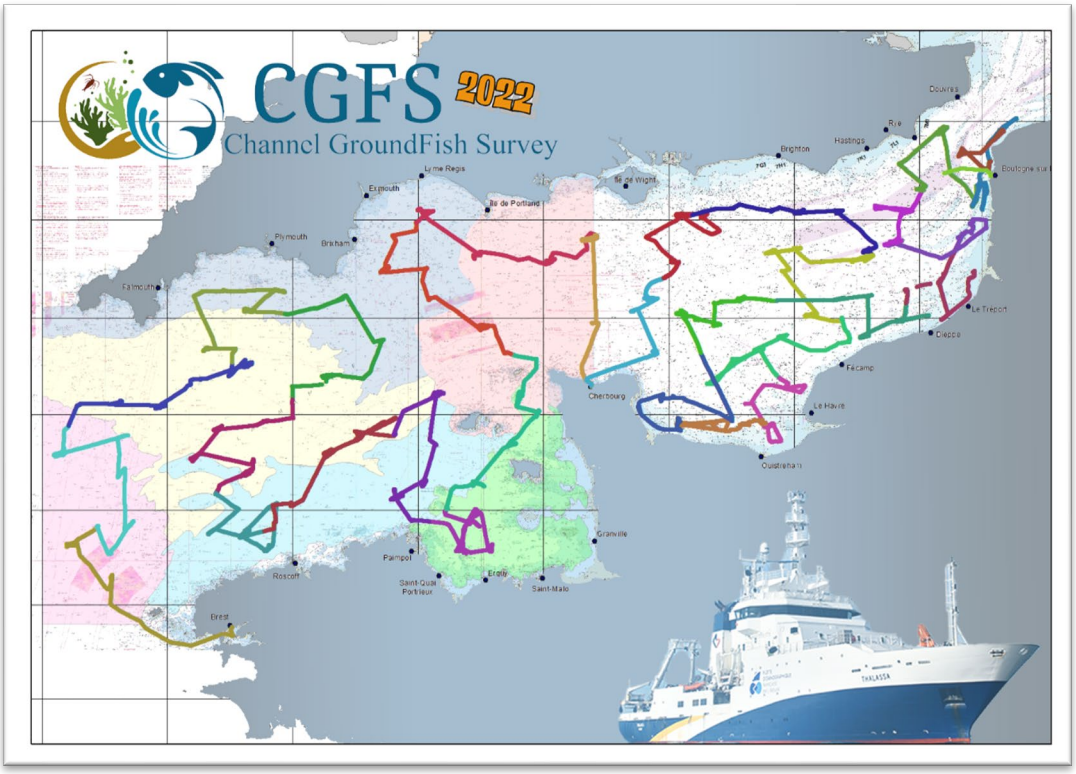
Ifremer
Système d'Informations Halieutiques

Preliminary Survey Report
CGFS 2022
R/V Thalassa



RBE-HALGO-LBH / RBE-HMMN-LRHPB / RBE-HMMN-LRHBL
LE ROY Didier • MARTIN-BAILLET Victor • GIRALDO Carolina
Date: March 2023

Information sheet

Title of the report : Survey report CGFS 2022 on R/V Thalassa

Internal reference :
PDG-RBE-HALGO-LBH/ RBE-HMMN-LRHBL

Diffusion :
☒ Free (internet)

☐ Restricted (intranet) – date of lifting of the embargo : AAA/MM/JJ

☐ Forbidden (confidential) – date of lifting of the confidentiality : AAA/MM/JJ

Date of publication : DD/MM/2023

Version : 1.0.0

Cover illustration reference :
photo credit/title/date

Language(s) :
English

Résumé/ Abstract :
Survey report CGFS 2022 on R/V Thalassa

Mots-clés/ Key words :
Fisheries campaign, Channel, preliminary results

How to cite this document :
Le Roy Didier, Martin-Baillet Victor, Giraldo Carolina (2022). **Survey report CGFS 2022 on R/V Thalassa**. PDG-RBE-HALGO-LBH / RBE-HMMN-LRHBL

Availability of research data :

DOI :
[1] https://doi.org/10.17600/18001250
[2] https://doi.org/10.18142/11

Sponsor's report :

Name / contract reference :
☒ Middle report (Bibliographic. ref : XXX)
☐ Final report (Intern. ref **of middle report** : R.DEP/UNIT/LABO AN-NUM/ID ARCHIMER)

Projects in which this report is based (european program, campaign, etc.) :

Author(s) / email address	Affiliation / Management / Department, Laboratory
LE ROY Didier / Didier.Le.Roy@ifremer.fr	PDG-RBE-HALGO-LBH
MARTIN-BAILLET Victor / Victor.Martin.Baillet@ifremer.fr	IFREMER / PDG-RBE-HMMN-LRHPB
GIRALDO Carolina / Carolina.Giraldo@ifremer.fr	IFREMER / PDG-RBE-HMMN-LRHBL

Framework(s) :

Recipient :

Validated by :

Table des matières

Introduction **6**
Organisation 6
Additional work 7
Partnership with the Laboratory of Oceanology and Geosciences of Wimereux (62) 7
FISHOWF collaborative project 8
APECS (Association for the study and conservation of selachians) : 8
RECCRU (Crustacean Recruitment) Project - IFREMER - Roscoff Marine Station: 9
MEGASCOPE monitoring 10
Samples for the European University Institute of the Sea (IUEM) 10
Sampling of small spotted catshark for the University of Caen 10
CleanAtlantic 10
Global analysis **11**
Eastern Channel 11
The fish component 11
The benthos component 13
The Western Channel 14
The fish component 14
The benthos component 16
Analysis by species **17**
The Eastern Channel 17
Sea bass (*Dicentrachus labrax*) 17
Whiting (*Merlangius merlangus*) 18
Plaice (*Pleuronectes platessa*) 19
Red mullet (*Mullus surmuletus*) 20
Cuttlefish (*Sepia officinalis*) 21
Other important species in the area (size distribution and geographical distribution of abundance) 22
The Western Channel 24
Haddock (*Melanogrammus aeglefinus*) 24
Whiting (*Merlangius merlangus*) 25
John Dory (*Zeus faber*) 26
Other important species in the area (size distribution and geographical distribution of abundance) 27
ANNEXE 1 : traw stations characteristics **29**
Eastern Channel 29
Weastern Channel 31
ANNEXE 2 : Dominance of the top 20 fish species **33**

Eastern Channel 33
Western Channel 33
ANNEXE 3 : Percentage occurrences (>10%) 34
ANNEXE 4: Percentage occurrences of benthos (>10%) 35
ANNEXE 5 : Summary table works : 36
Hydrological samples 36
Trawling and sampling stations to support research programmes 36
Bathymetric acquisitions: 36
MEGASCOPE Monitoring : 36
ANNEXE 6 : MEGASCOPE Monitoring 37
Effort and observation conditions 38
Data collected during CGFS 2022 39
ANNEXE 7 : Maps of the samplings carried out 41
ANNEXE 8 : France – East English Channel Quarter 4 FRCGFS 44

Introduction

The Channel Ground Fish Survey (CGFS) is part of the European Fisheries Monitoring Programme, which provides a set of biological data on exploited stocks. The time series initiated in 1988 (N/O Gwen-Drez) is used each year by ICES European stock assessment groups to infer the health of the main commercial species. Initially focused on the Eastern Channel, the CGFS now covers the entire Channel on a recurrent basis (from 2018 onwards N/O Thalassa). The CGFS allows for wider sampling and better knowledge of the entire ecosystem, meeting the demands of marine ecosystem monitoring (MSFD) and the implementation of an ecosystem approach to fisheries. Additionally, specific studies allow for a more detailed analysis of the structure of the food web and its spatial variability, which helps to ensure fishing remains a sustainable activity and takes into account the limits of the resource and its effect on the environment.

The survey can be broken down into two parts, with the use of a different trawl nets for the Eastern and Western parts of the Channel :

- In the Western Channel, 48 trawling stations are carried out with a GOV 36/49 trawl equipped with a 400 mm diameter "diabolos" bead in the middle and a fork rig. The sampling plan is based on a stratified random selection of 48 stations out of the 79 trawl available.
- In the Eastern Channel, 74 stations were retained out of the 115 historical stations of the CGFS, allowing the historical series to be consistent. These stations are carried out every year with a GOV 36/47 trawl (standard for IBTS surveys), with a modified bead (diabolos with a diameter of 250 mm in the middle).

Organisation

The CGFS 2022 was conducted on the N/O Thalassa from September 16th to 29th for the western part and from October 1st to 16th for the eastern part. Authorization to work in British waters was granted at the beginning of the survey, with the restriction not to work within 6 nautical miles of British waters. This access restriction affects 5 trawling stations, which are crucial for the indices of plaice (*Pleuronectes platessa*), whiting (*Merlangius merlangus*), sea bass (*Dicentrachus labrax*), sole (*Solea solea*), and thornback ray (*Raja clavata*), as these stations are located in coastal nursery areas.

During the CGFS 2022, 52 trawl stations were carried out in the Western Channel, of which 2 were invalid due to damage. Furthermore, 9 additional trawls with the addition of a scraper were tested to evaluate the differences in catch compared to the standard trawl. In the Eastern Channel, we validated 68 trawl stations out of the 74 planned. Five stations were located within 6 nautical miles of British waters, and one station could not be carried out due to the construction of a wind farm off Fécamp (see Fig.1, Ann.1). Throughout the survey, we only experienced three days of bad weather, which led to the cancellation of some plankton and microplastic net sampling. Otherwise, the mild weather conditions enabled us to carry out all the work under favorable conditions.

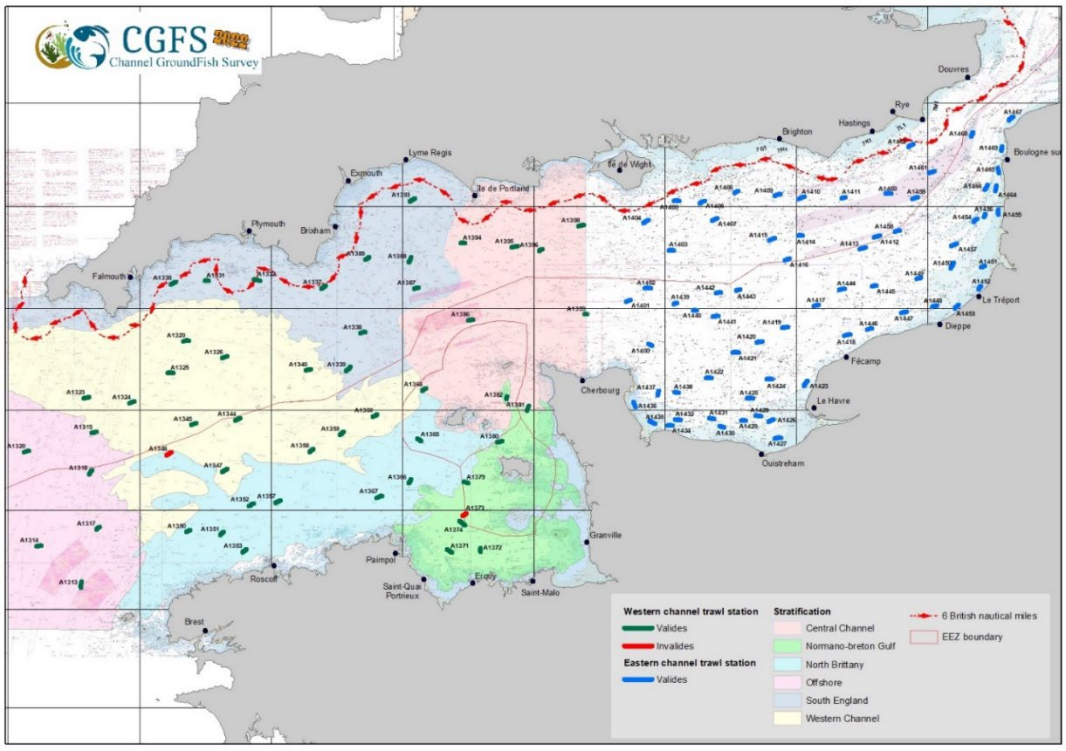


Figure 1: Distribution of trawl stations for the Eastern (bleue) and Western (green) English Channel during the CGFS2022.

Additional work

At each trawl, we sorted and weighed the catch by species and measured a representative sample. We also took biological samples from the catches for subsequent analysis on land. Every year, we collaborate with other IFREMER laboratories, universities, or research institutes to allow for additional sampling and studies to be carried out during the campaign :

Partnership with the Laboratory of Oceanology and Geosciences of Wimereux (62)

The objective of our participation in the CGFS 2022, as with previous surveys since CAMANOC 2014 survey (see publication Louchart et al., 2021), is to study the fine variability of the spatial distribution of phytoplankton communities. We will analyze continuously pumped surface waters and niskin profiles with automated characterization and analysis devices. This includes counting and estimation of size classes, pigment classes, and biomass of phytoplankton cells/colonies, as well as photosynthetic parameters and primary production estimates. This work is a continuation of the marine environment observation work initiated several years ago as part of the INTERREG DYMAPHY project (2010-2014), the "Hauts de France" MARCO CPER (2016-2020), work in connection with the MSFD monitoring program, and the continuation of the automated phytoplankton observatories set up by the European research consortium JERICO-NEXT (2015-2019) in the form of the European project JERICO-S3 (2020-2024). The aim is also to consolidate the integrated technical observation platform of the CPER IDEAL project (2021-2027) to prepare for the recently accepted PPR Ocean projects starting in 2023.

To carry out this work, we installed an automated CytoSense Flow Cytometer and a Fast FRepetition Rate Fluorometer (FRRf-Fast Act-2) on the bypass of the water intake feeding the FerryBox, which collects subsurface water. We coupled our measurements with those of the Thalassa FerryBox, which includes information on temperature, salinity, pigment group biomass estimates, raw LED data acquired by the Algae Online Analyser (AOA) benchtop multispectral fluorometer, and

other available parameters. During CTD profiles, we sampled surface water for chlorophyll pigment filtration, automated acquisition, and image analysis.

FISHOWF collaborative project

Participation in the CGFS2022 is part of the FISHOWF project coordinated by France Energies Marines. The objective of this 3-year project is to evaluate habitat use and fish population movements within offshore wind farms using passive acoustic telemetry at multiple spatial scales. The objective of the work planned during the CGFS survey is to capture individuals of different elasmobranch species in the vicinity of the St Brieuc and Courseulles-sur-Mer offshore wind farm areas for acoustic tagging (internal for sharks; external for skates). The tagged individuals will then be released near the offshore wind farms. The presence/absence and movements of individuals within and around the farms will be studied using the acoustic receiver network set up in 2022 as part of the FISH INTEL Interreg project and the FISHOWF project.

This work allowed the marking of:

- ✓ 33 small spotted catshark (*Scyliorhinus canicula*) in the Western Channel and 13 in the Eastern Channel
- ✓ 7 large spotted catshark (*Scyliorhinus stellaris*) in the Western Channel
- ✓ 11 brown skates (*Raja undulata*) in the Western Channel and 5 in the Eastern Channel
- ✓ 15 spotted emissaries (*Mustelus asterias*) in the Eastern Channel
- ✓ 10 thornback rays (*Raja clavata*) in the Eastern Channel

APECS (Association for the study and conservation of selachians) :

Each year, a member of this association embarks on a mission to collect biological and biometric information on certain species of selachians, and to carry out tagging to improve knowledge of the movements of three specific species: the spotted emissola (*Mustelus asterias*), the basking shark (*Galeorhinus galeus*), and the Thornback rays (*Raja clavata*). During the CGFS2022 campaign, the APECS team successfully tagged 117 spotted sharks, 12 basking sharks, and 46 Thornback rays. Additionally, the APECS team is recovering the capsules of the rays and sharks found in catches, in order to estimate the spawning areas throughout the region.

RECCRU (Crustacean Recruitment) Project - IFREMER - Roscoff Marine Station:

The RECCRU project has a specific goal of providing critical information on the recruitment of various crustacean species with significant commercial value. This includes species like lobster (*Homarus gammarus*), edible crab (*Cancer pagurus*), spider crab (*Maja brachydactylus*), and red lobster (*Palinarus elephas*), which are heavily targeted by fishing fleets. The project aims to develop recruitment indices that will enable effective management of the fisheries for these species. To achieve this objective, the focus is primarily on studying the larval and juvenile phases of these crustaceans. By assessing recruitment levels, the project can provide a better understanding of the potential future of these fisheries. The project's specific aim is to collect scyllarid and palinurid larvae, and this is done by dragging the MIK net for 25 minutes. In 2022, a total of 47 stations were sampled at night (Fig 2).

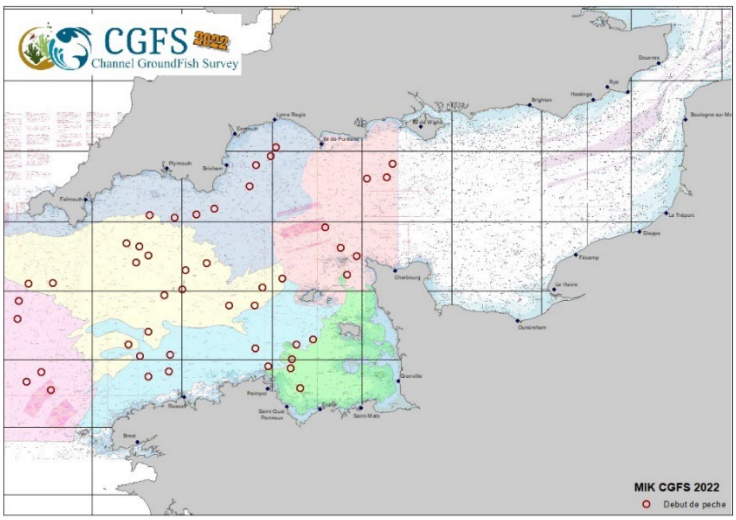


Figure 2: Distribution of MIK nets in the Western Channel as part of the RECCRU project.

MEGASCOPE monitoring

MEGASCOPE is an annual monitoring program carried out on select vessels of the French oceanographic fleet in partnership with IFREMER. The program utilizes a common protocol called MEGASCOPE to gather data on the distribution and relative abundance of marine megafauna. The observations and data collected are summarized in Ann.5, page 33. Acoustic data collected in the Channel area is particularly valuable for methodological developments in seabed characterization due to several factors. First, the area has many field truths, including CGFS video and grab samplers from the Marine Geosciences Unit, which allow for physical models of the seabed to be readjusted based on the angular reflectivity curve of the seabed. Second, the shallow depths in the area make it possible to use the two Thalassa ME70 and ME20-40 multibeam echosounders at two different frequencies to better describe the sediment structure, as was done in 2018. The program continues to provide acoustic coverage of trawling areas, with the goal of studying the direct correlation between the species trawled and the acoustic response. Encouraging results have been seen in the Bay of Biscay and the Celtic Sea. The program also aims to link the acoustic response with the description of the sediment through video and/or sampling.

Samples for the European University Institute of the Sea (IUEM)

Freezing of whole fish (*Trisopterus minutus*) for diet analysis. Provision of practical dissection work for 80 UBO undergraduate students (Biological Functions and Vital Cycles in Marine Organisms).

Sampling of small spotted catshark for the University of Caen

Work for the doctoral theses of Mr Fabian JEANNE (Normandie University) on the endocrine and neuroendocrine regulation of spermatogenesis in small spotted catshark and of Ms Bérénice BICHON (Sorbonne University) on the study of the caudal neurosecretory system of dogfish. On board, 40 males and 20 females of small live spotted catshark (*Scyliorhinus canicula*) were kept alive in a water tank. These animals were landed in Cherbourg by Pascal Sourdaine from the University of Caen.

CleanAtlantic

The objective is to collect waste colonised by marine species in order to determine their presence and possibly detect whether non-indigenous species are introduced to our coasts via waste, whatever its nature. This manipulation is part of the MSFD link D2 (ENI) / D10 (marine litter), which is still very poorly developed and for which we have very little data.

For this purpose, bottom wastes colonised by benthic species of interest due to their diversity and/or specificity were frozen on board, in bags or pillboxes. These samples will be analysed a posteriori at the ODE-DYNECO-LEBCO laboratory and the data collected will be integrated into the Q²/DALI database (ODE/VIGIES service) dedicated to marine waste. They will be used to feed reports and articles on the link between waste and colonising species, for which there is still very little literature.

Global analysis

The preliminary report presented here shows the evolution of **raw data** collected during the CGFS survey. At this stage, we do not have standardized data by surface, which would allow for a more detailed comparison of the observations. For some species, a comparison with data collected over the last five years is presented. It is important to note that in 2020, the CGFS survey was unable to sample English waters due to lack of authorization, making it difficult to compare with other years. In 2022, the ban on trawling in the 6 nautical miles of British waters, where smaller size classes were previously collected, could impact the abundances and/or biomasses of certain species of interest as these are nursery areas.

Eastern Channel

The fish component

The present study reports on the abundance and biomass of fish caught per haul during the CGFS2022. The average abundance of fish per haul was found to be 4433 individuals, while the average biomass was 394 kg. These values represent a significant decrease of 70% and 9%, respectively, when compared to the previous year's results in 2021.

Among the fish species caught, pelagic species such as horse mackerel (*Trachurus trachurus*), sardine (*Sardina pilchardus*), and mackerel (*Scomber scombrus*) were found to be highly dominant in terms of both abundance and biomass, accounting for more than 70% of the total number of individuals caught. Additionally, cephalopods such as squid (Loligo vulgaris) were found to constitute a significant proportion of the total catch, accounting for around 5%. Regarding demersal species, black seabream (*Spondyliosoma cantharus*) was identified as the most abundant, accounting for 1.75% of the overall abundance. In terms of weight dominance, small spotted catshark (*Scyliorhinus canicula*), thornback ray (*Raja clavata*), and sea bass (*Dicentrachus labrax*) were found to represent 5.42%, 4.98%, and 1.73% of the total biomass, respectively.

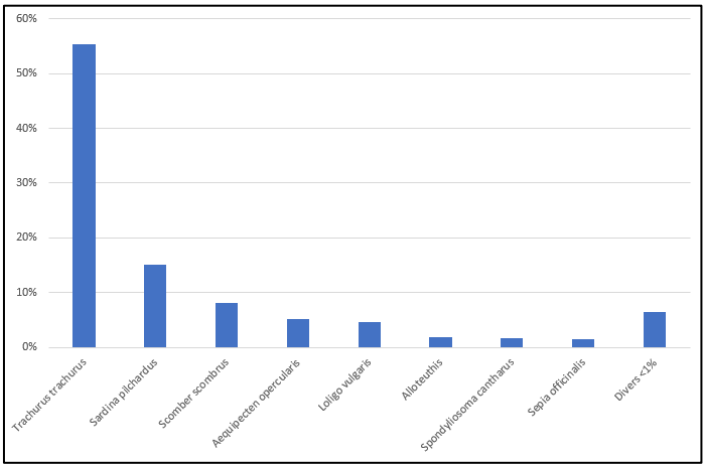


Figure 3a: Relative abundances of the main species (>1%) in the Eastern English Channel

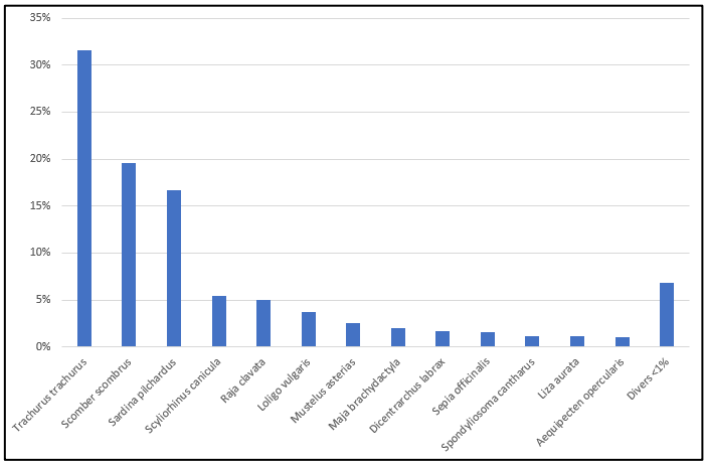


Figure 3b: Distribution of biomass dominance in the Eastern English Channel (>1%)

Overall, there is a strong correlation between the geographical distribution of fish abundances and biomasses (as shown in Fig. 4a and 4b). The most significant concentrations of fish are found along the coast from Authie Bay to Dieppe, in the Seine Bay, and offshore to the east of the traffic separation scheme (TSS). Additionally, there are several areas off the Bay of Seine, near the limits of English waters, where horse mackerel, sardines, curly skate, and small dogfish are particularly abundant. However, in the Bay of Veys, Bay of Seine, and off Dieppe up to the Bay of Authie, there is a discrepancy between the abundance and biomass due to the capture of small-sized individuals.

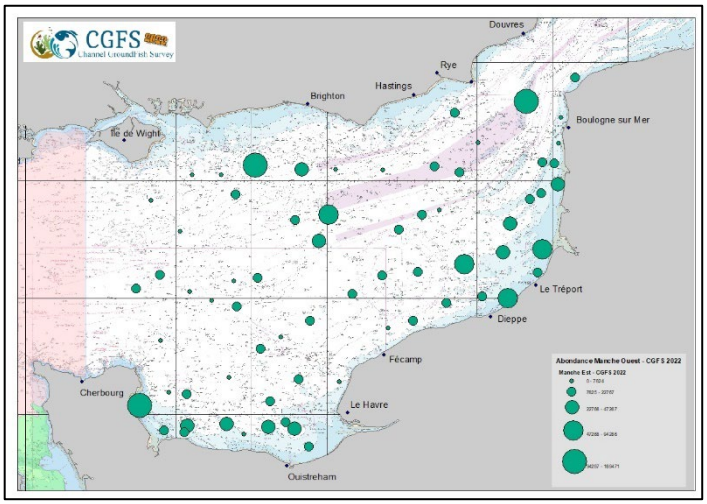


Figure 4a: Global abundance of fish (number of fish per haul)

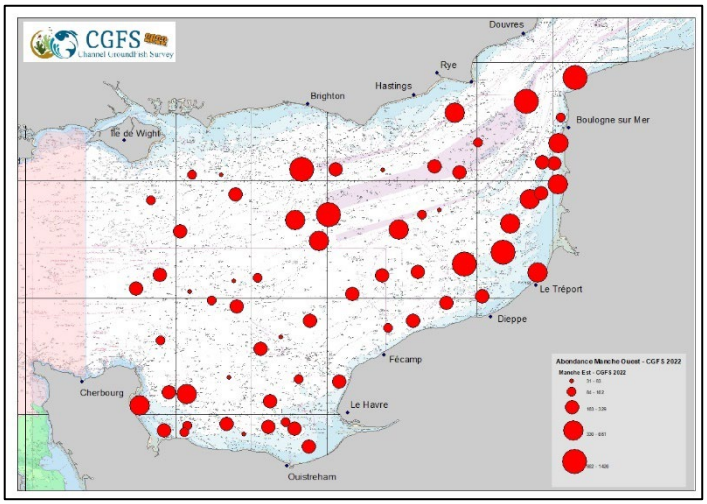


Figure 4b:Global fish Biomass (kg)

Eighty-six fish species were identified during the 2022 CGFS in the eastern English Channel. The highest species richness was found mainly along the coastline (Fig. 5).

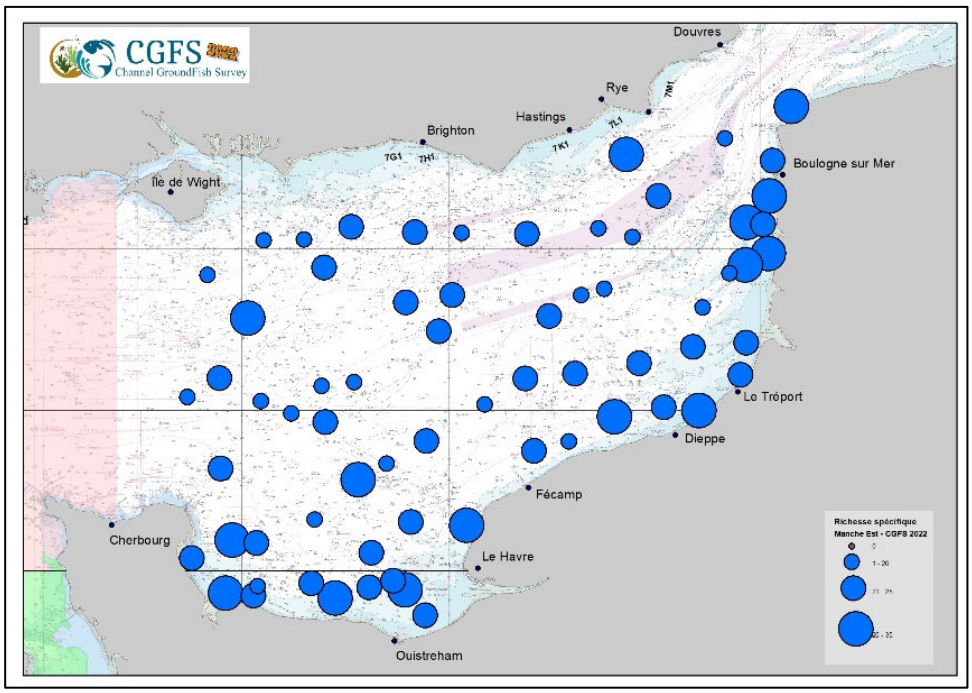


Figure 5: Species richness distribution

Among the most widely distributed fish species, those with a strong dominance include horse mackerel and mackerel, as well as demersal fish such as the small spotted catshark (*Scyliorhinus canicula*), red mullet (*Mullus surmuletus*), thornback ray (*Raja clavata*), and red gurnard (*Chelidonichthys cuculus*). In terms of cephalopods, the common squid (*Loligo vulgaris*) and cuttlefish (*Sepia officinalis*) are present at almost all trawling stations, with an occurrence rate of 100% and 98.53%, respectively. Additionally, in 2021, there was a significant occurrence of spider crab (*Maja brachydactyla*) and John Dory (*Zeus faber*), present in 77.94% and 63.24% of the hauls, respectively (Ann. 3).

The benthos component

During the CGFS 2022 survey in the eastern Channel, a total of 91 species were identified. The highest biomasses of benthos were observed in the Seine Bay and opposite Dieppe, as shown in Figure 6. Four species, namely starfish (*Asterias rubens*), green sea urchins (*Psammechinus miliaris*), crepidula (*Crepidula fornicata*), and brittle stars (*Ophiothrix fragilis*), represent 75% of the total biomass of benthic invertebrates caught in the eastern Channel, with 23%, 20%, 19%, and 13%, respectively. In terms of the most widely distributed species in the sampled area for 2022, the green sea urchin (*Psammechinus miliaris*), starfish (*Asterias rubens*), Inchus (*Inachus dorsettensis*), and Ascidians (*Ascidia sp*) have an occurrence rate of 82%, 75%, 73%, and 72%, respectively (Ann. 4).

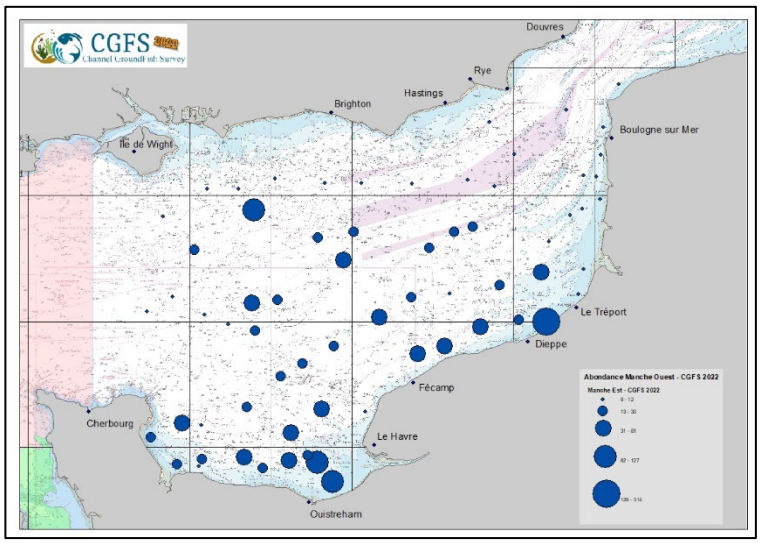


Figure 6: Global benthos biomass (in kg)

The Western Channel

The fish component

In 2022, the average abundance per tow was 5109 individuals and the average biomass was 186 kg, which represents a decrease of 34% and 30%, respectively, compared to 2021. Overall, we observed a lower relative abundance of pelagic species than in 2021, except for horse mackerel (*Trachurus trachurus*), which was the most dominant species in terms of numbers, accounting for 39% of the total catch. However, we did not find the same abundance of sprat (*Sprattus sprattus*) and sardines (*Sardina pilchardus*; 6%), and above all, anchovies (*Engraulis encrasicolus*; 26% in 2021). This year, we noted the great abundance of salps, which accounted for 11% of the relative abundance. The small pout (*Trisopterus minutus*) was the second dominant species in number, representing 20% of the total catch and the first demersal species (Fig. 7a).

Regarding biomass, the dominance was mainly by pelagic species, with horse mackerel and mackerel representing 24% and 22%, respectively, and sardines accounting for 7%. The leading demersal species was the small pout, accounting for 6%. Whiting represented only 2% of the dominance by weight, compared to 6% in 2021. We also observed a higher dominance of small spotted catshark and grey mullet, which represented 4% of the total biomass, compared to the previous year (Fig. 7b).

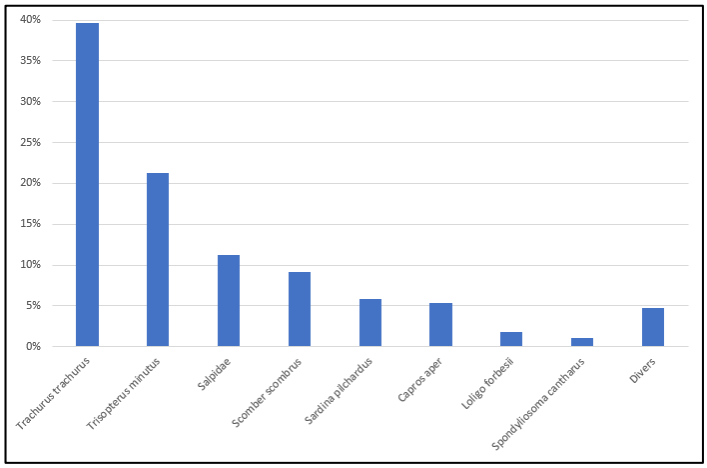


Figure 7a: Relative abundances of the main species (>1%) in the Western Channel

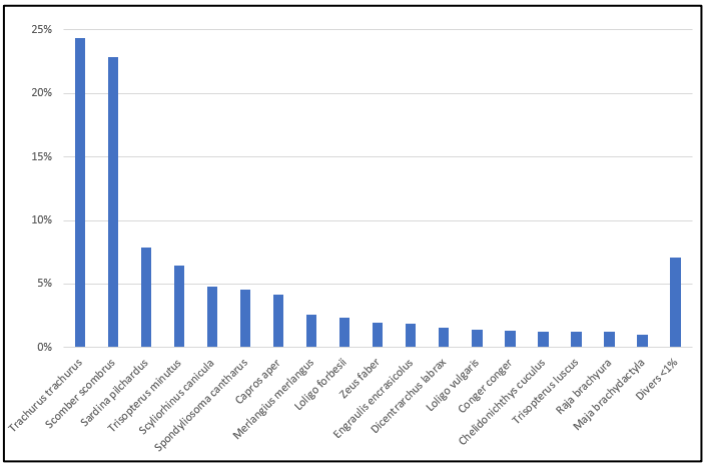


Figure 7b: Distribution of biomass dominance (>1%)

The distribution of abundance in the western Channel is generally in line with that of biomass. There has been a shift in the highest catches compared to 2021, with a more central distribution in the Channel and lower values in the west of the area and on the English coast. This is likely due to the lower catches and sightings of pelagic species, as well as low numbers of whiting (*Merlanguis merlangus*) and haddock (*Melanogrammus aeglefinus*) observed this year. (See Figure 8a and 8b for more details.)

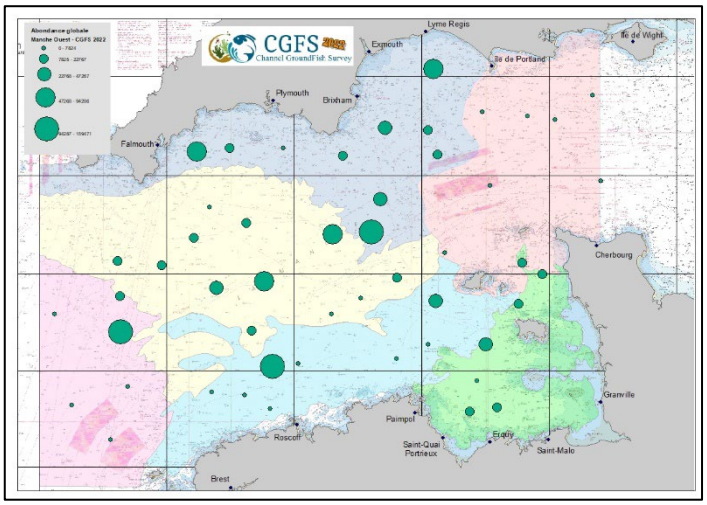


Figure 8a: Global abundance of fish (in number of fish)

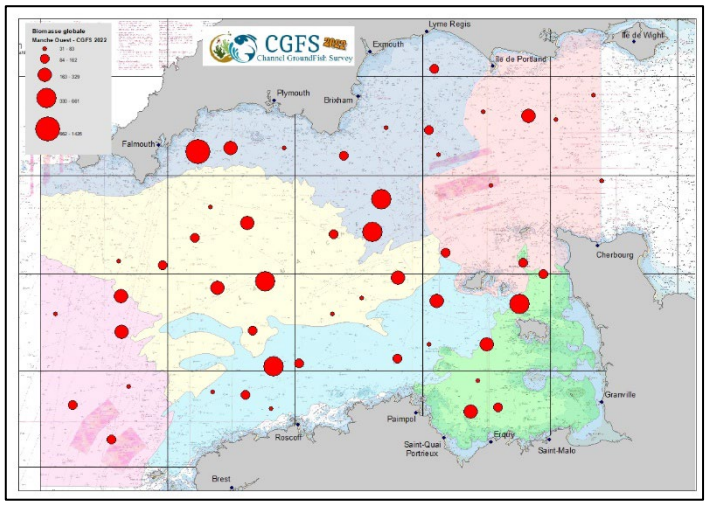


Figure 8b: Global fish biomass (in kilos)

Eighty-two species of fish, cephalopods, crustaceans, gelatinous animals and selachians were identified during the CGFS 2022 in the western Channel. This year, the species richness seems to be quite homogeneous over all the features with a slightly higher diversity in the western part of the area (Fig. 9).

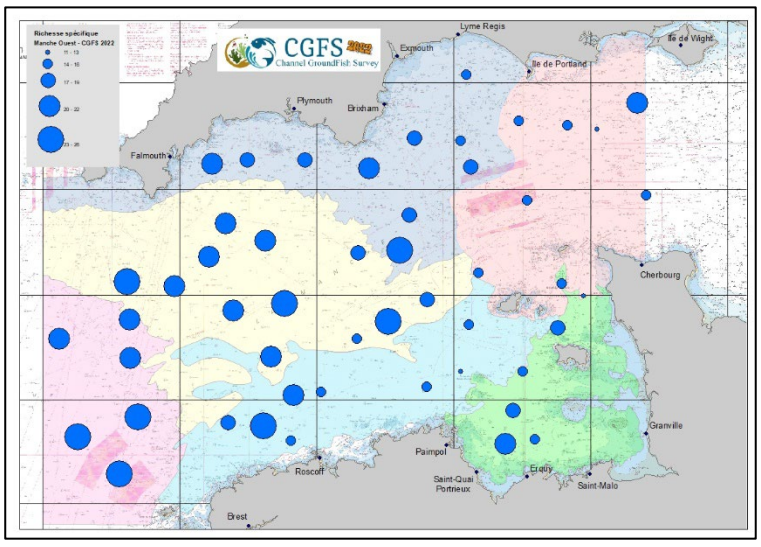


Figure 9: Species richness distribution

Fifty-three species were identified during the CGFS 2022 survey in the western part of the Channel. The highest biomasses of benthos are observed in the north of Finistère up to the limit of English waters (Fig. 10). The globular sea urchin (*Echinus esculentus*) is largely dominant, representing 35% of the abundance and 72% of the overall biomass. The other species most represented in biomass are the ascidians and the spiny star (*Marthasterias glacialis*) with a dominance by weight of 16 and 4% respectively (Ann.4).

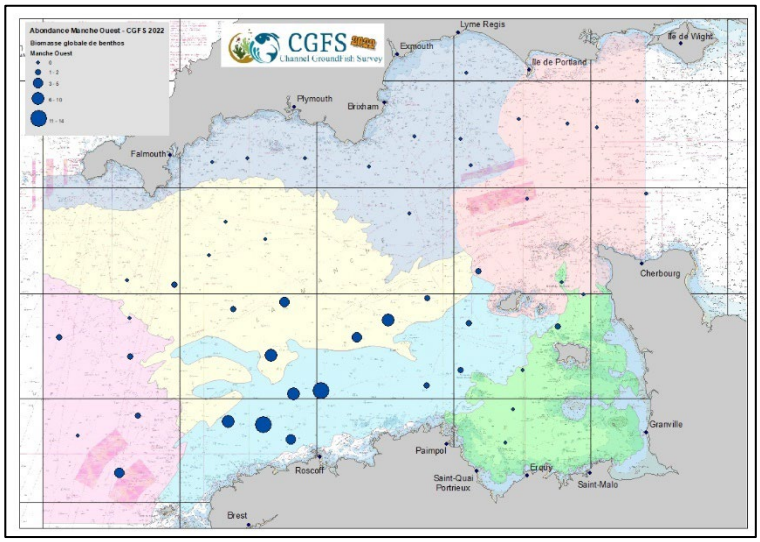


Figure 10: Global benthos biomass (in kg)

Analysis by species

The Eastern Channel

Sea bass (*Dicentrachus labrax*)

The geographical distribution of whiting is primarily coastal, as observed throughout the entire survey. During the CGFS 2022, this species was predominantly caught in the region stretching from Cape Gris-nez to the Authie Bay, as well as around the St Marcouf islands. The size distribution of whiting was found to be similar to that of the previous year, with two distinct patterns. The first pattern includes individuals ranging from 13 to 19 cm, which were relatively less abundant than in previous years, while the second pattern includes individuals ranging from 23 to 29 cm (Fig.12). In comparison to 2021, there has been a significant reduction in the biomass of whiting throughout the surveyed sector.

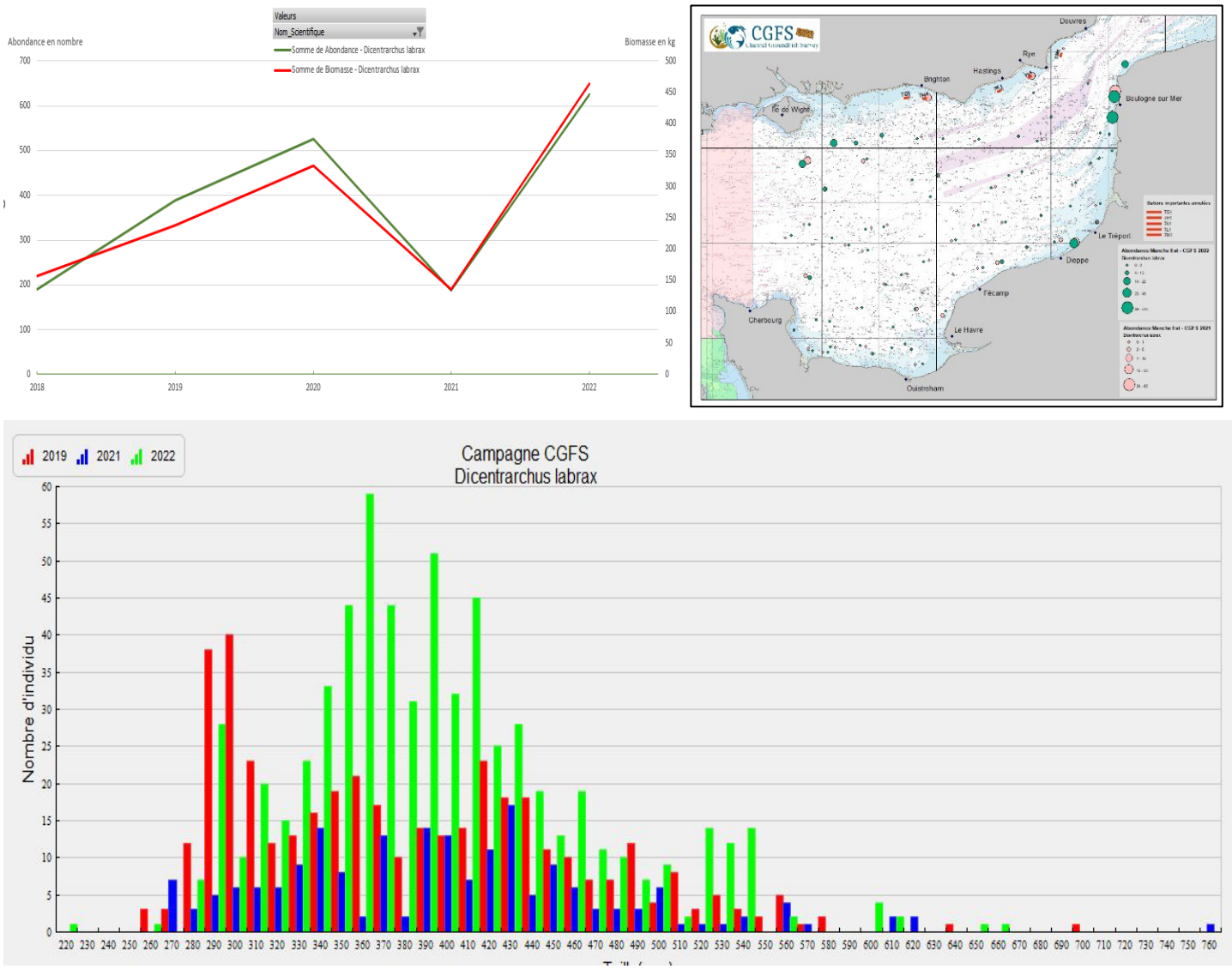


Figure 11 : Top right : Abundance (number of fish per haul) and biomass (kg) of seabass collected during the CGFS (N/O Thalassa) from 2018 to 2022. Size distribution (bottom) and geolgraphical distribution (top left) of sea bass in 2019, 2021 and 2022.

Whiting (*Merlangius merlangus*)

The geographical distribution of whiting is very coastal. As for the whole series, during the CGFS 2022, this species is mainly caught from Cape Gris-nez to the Authie Bay as well as in the area of the St Marcouf islands. The size distribution is almost the same as last year, with two distinct patterns. The first concerns individuals from 13 to 19 cm with a relatively lower abundance than in previous years and the second for individuals from 23 to 29 cm (Fig.12). Compared to 2021, there has been a significant decrease in the biomass of whiting throughout the sector.

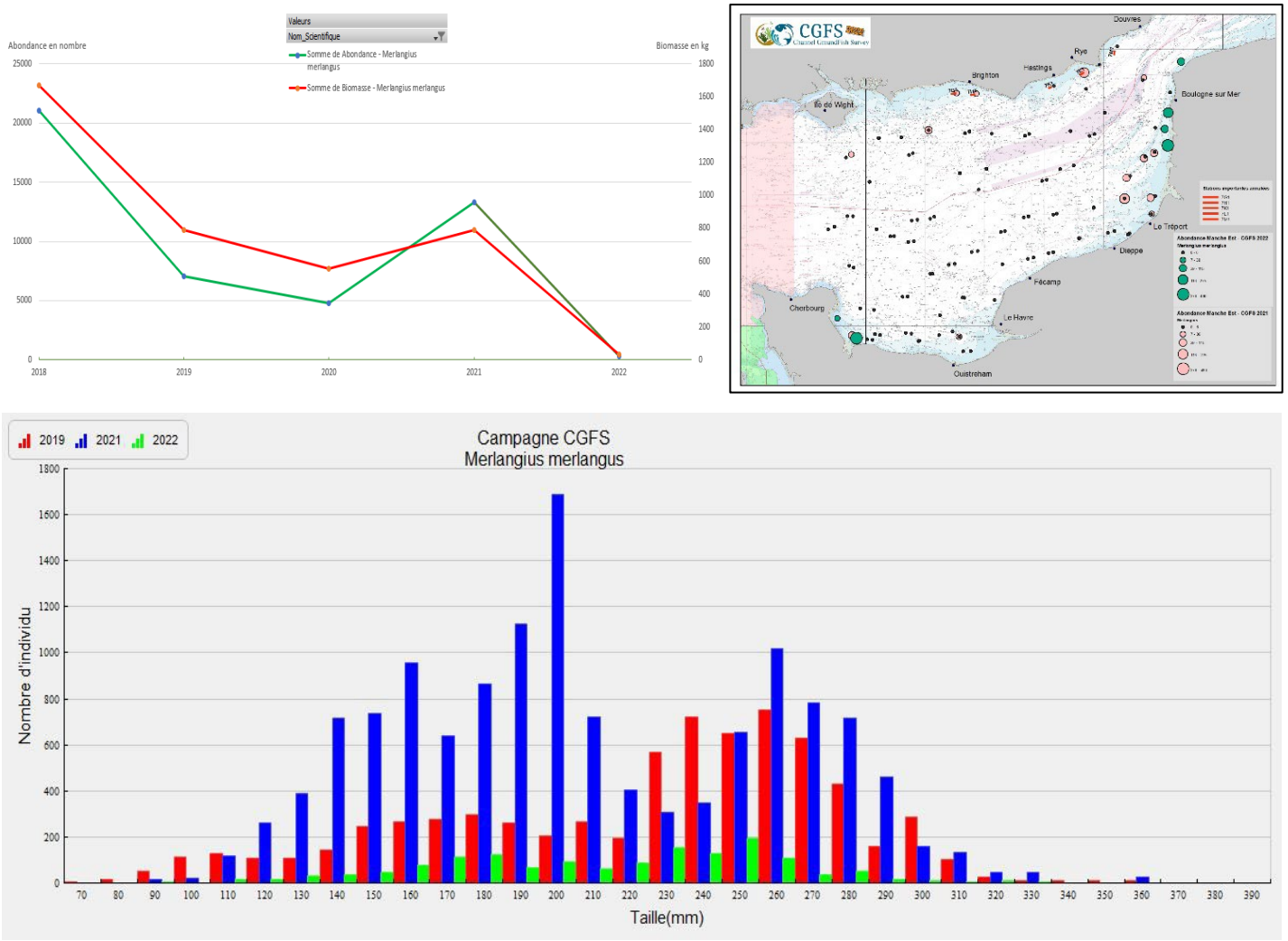


Figure 12 : Top right : Abundance (number of fish per haul) and biomass (kg) of seabass collected during the CGFS (N/O Thalassa) from 2018 to 2022. Size distribution (bottom) and geolgraphical distribution (top left) of whiting in 2019, 2021 and 2022.

Plaice (*Pleuronectes platessa*)

The geographical distribution of plaice is mainly coastal, with the species being caught from Cap Gris Nose to the Bay of the Authie, in front of Dieppe, and in the Bay of the Seine for the French part during the CGFS 2022 survey. However, due to the absence of English authorisations to fish within the 6-mile limit, there is a sampling bias, and no data is available for the coastal strip from Brighton to Rye. In 2021, this area was found to have a high abundance of plaice. The size spectrum of the species is slightly smaller than in previous years, with three modes observed, one around 20 cm, one at 26 cm, and a less pronounced one at 30 cm. The abundance within this mode is also much lower than in other years (Fig.13).

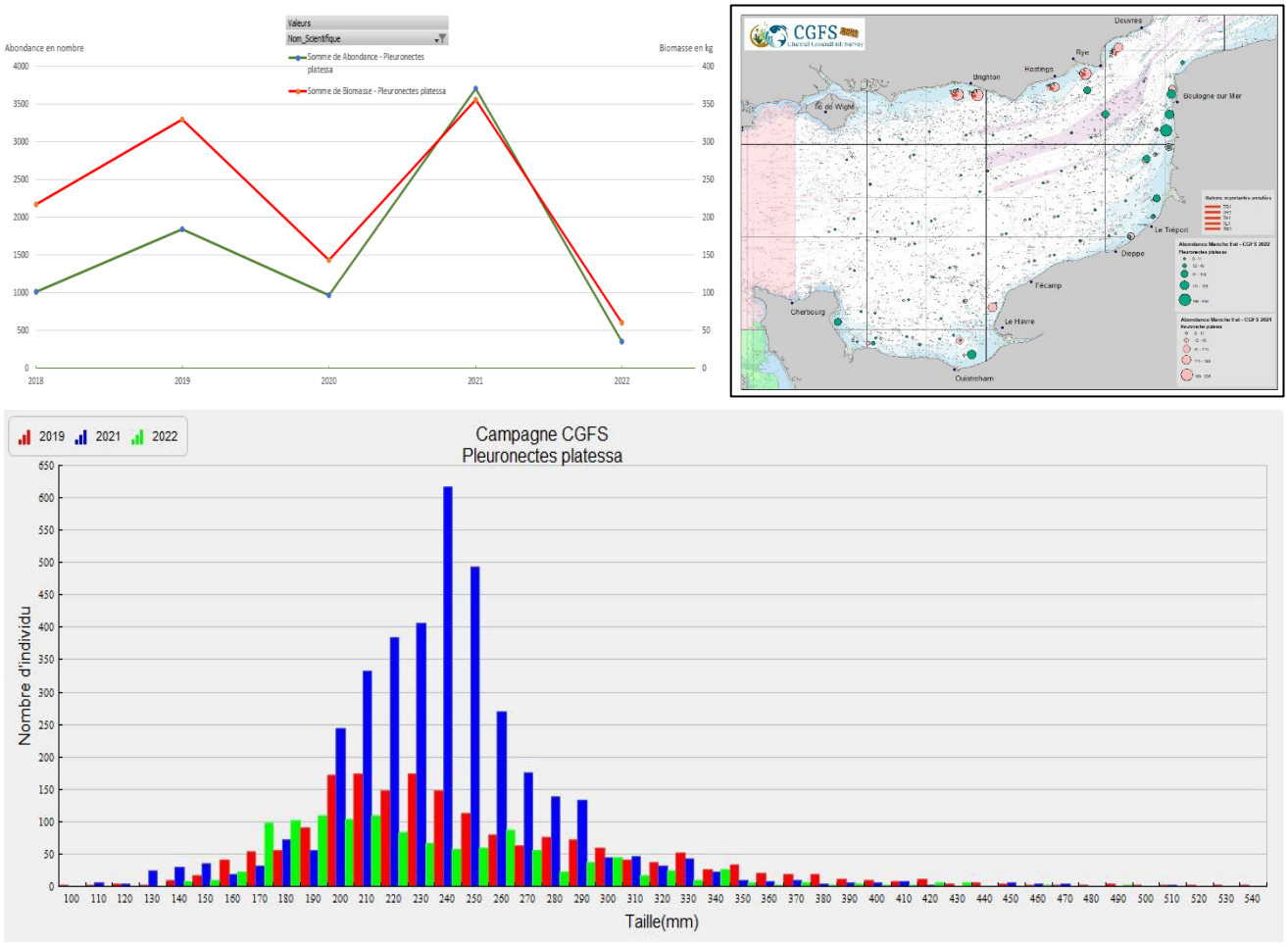
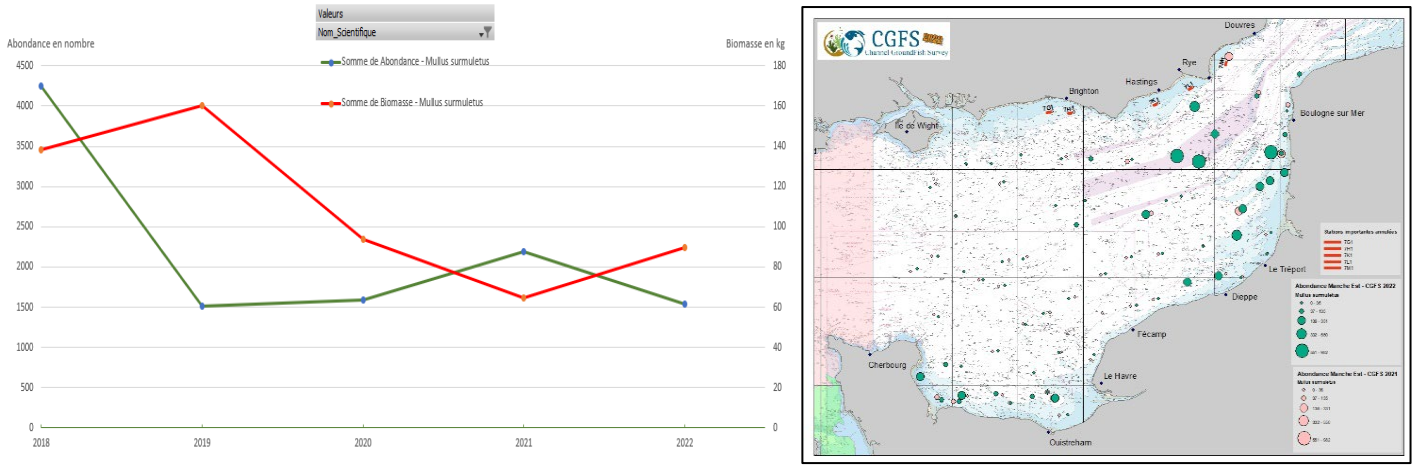


Figure 13: Top right : Abundance (number of fish per haul) and biomass (kg) of seabass collected during the CGFS (N/O Thalassa) from 2018 to 2022. Size distribution (bottom) and geolgraphical distribution (top left) of plaice in 2019, 2021 and 2022.

Red mullet (*Mullus surmuletus*)

The distribution of red mullet in the eastern Channel in October is widespread, with an occurrence of 82.35%. Similar to previous years, the CGFS 2022 survey found that this species is primarily caught in the north-eastern part of the study area, specifically in the Bay of Seine and the Bay of Veys, as well as in the central region of the eastern channel at the DST. Compared to 2021, there is a clear increase in the density of red mullet, with a more significant mode for sizes between 10 and 14 cm and a second, less pronounced mode for sizes between 17 and 24 cm. The survey also found a better representation of individuals between 21 and 24 cm compared to 2021, which explains the relative increase in biomass (Fig.14).



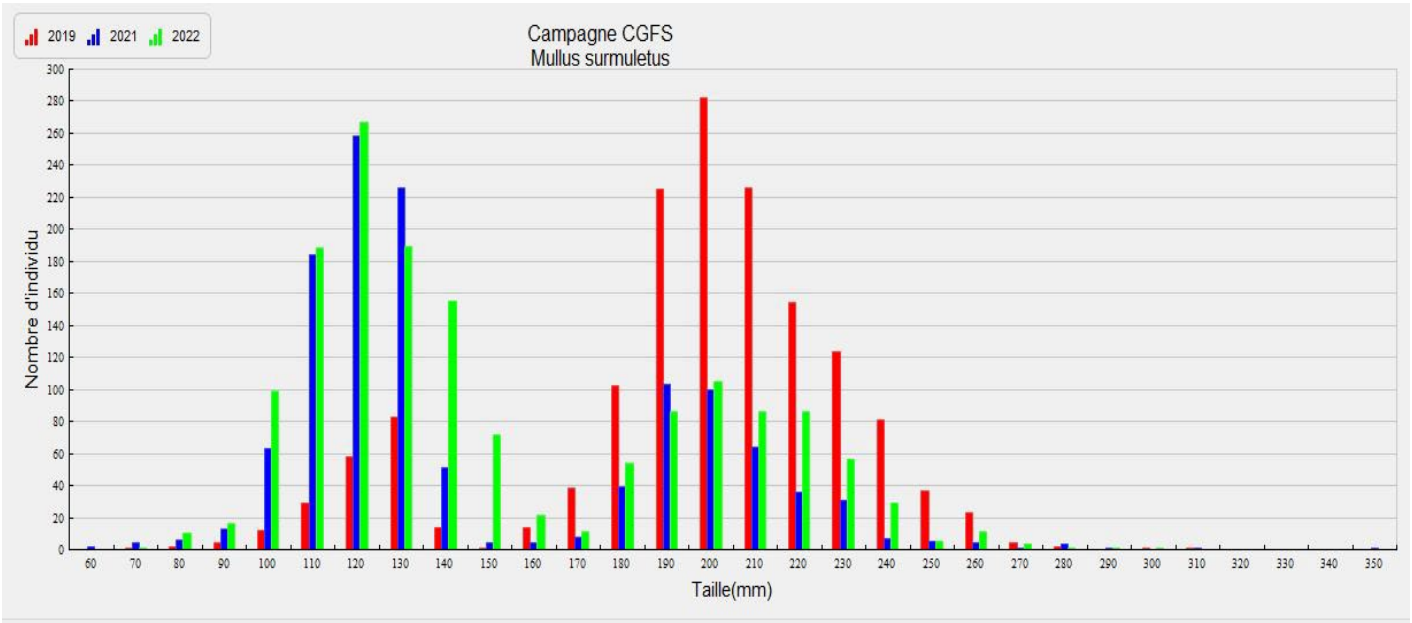


Figure 14: Top right : Abundance (number of fish per haul) and biomass (kg) of seabass collected during the CGFS (N/O Thalassa) from 2018 to 2022. Size distribution (bottom) and geolgraphical distribution (top left) of red mullet in 2019, 2021 and 2022.

Cuttlefish (*Sepia officinalis*)

Cuttlefish are very present in the eastern Channel in October with an occurrence of 98.53% this year. This species is mainly caught in the Seine Bay and also, offset from the coast, between Dieppe and the north of the Authie Bay. The size spectrum is shifted compared to 2019 and 2021, characterised by a strong dominance of small cuttlefish with a cephalothoracic length of between 3 and 10 centimetres. A second size range appears on the graph, representing the largest individuals between 17 and 24 cm. However, there is a strong increase in the abundance of small individuals compared to previous years (Fig.15)

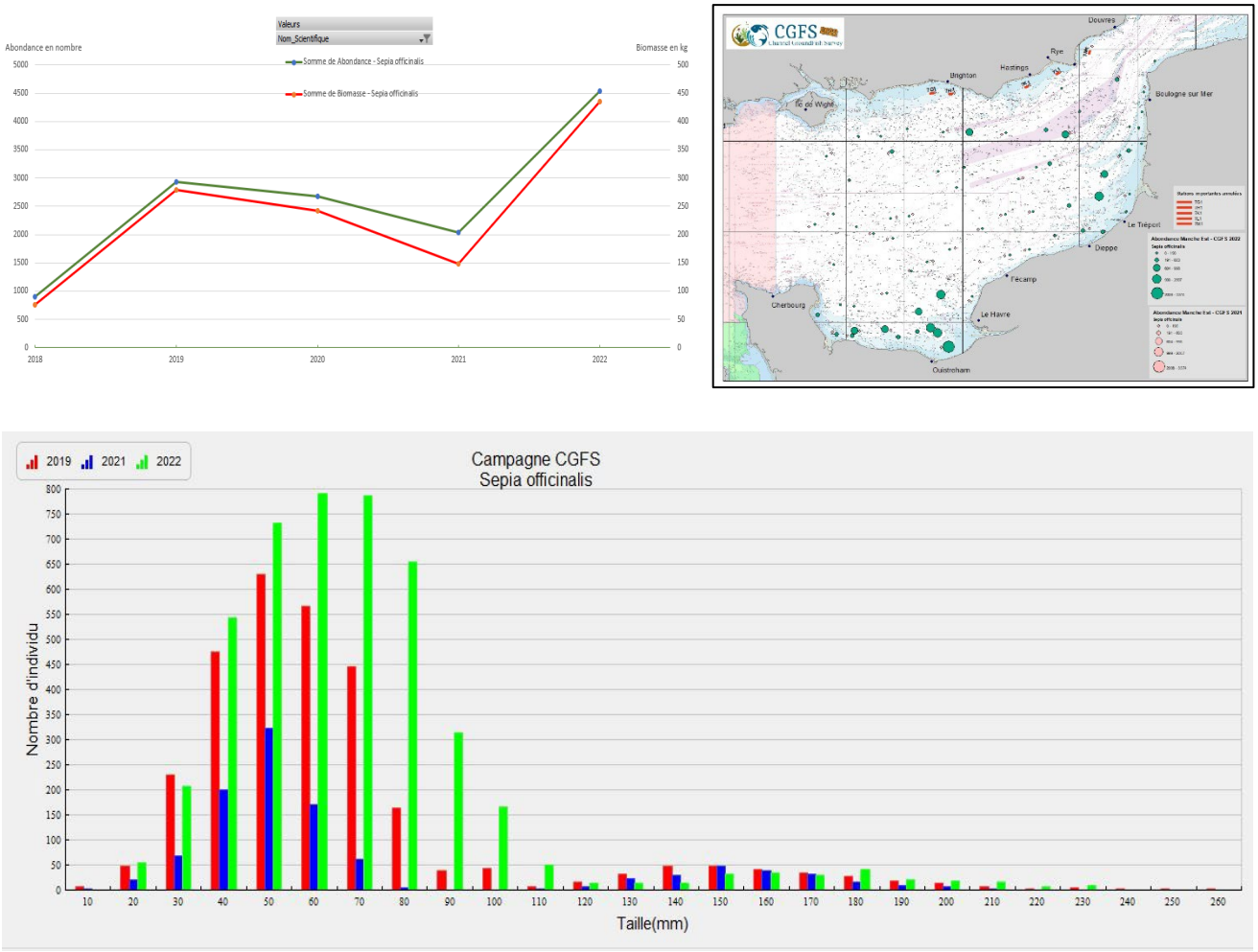
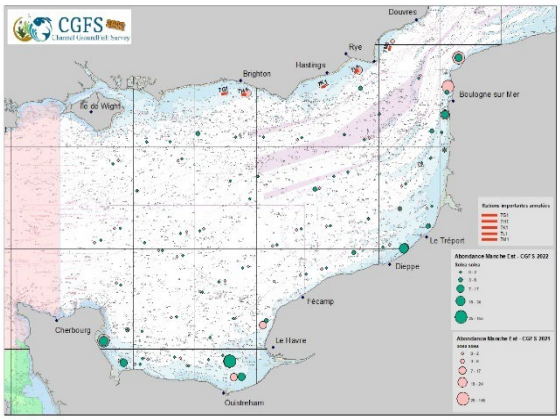
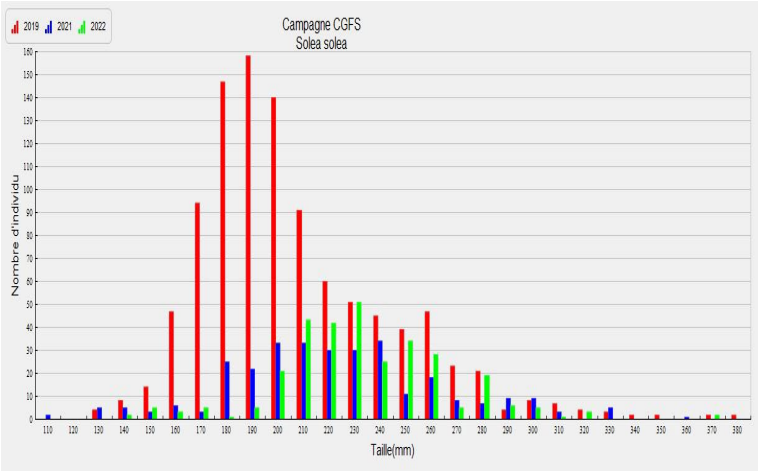


Figure 15: Top right : Abundance (number of fish per haul) and biomass (kg) of seabass collected during the CGFS (N/O Thalassa) from 2018 to 2022. Size distribution (bottom) and geolgraphical distribution (top left) of cuttlefish in 2019, 2021 and 2022.

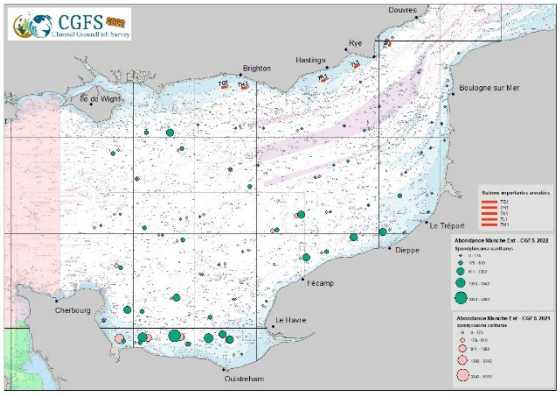
Other important species in the area (size distribution and geographical distribution of abundance)

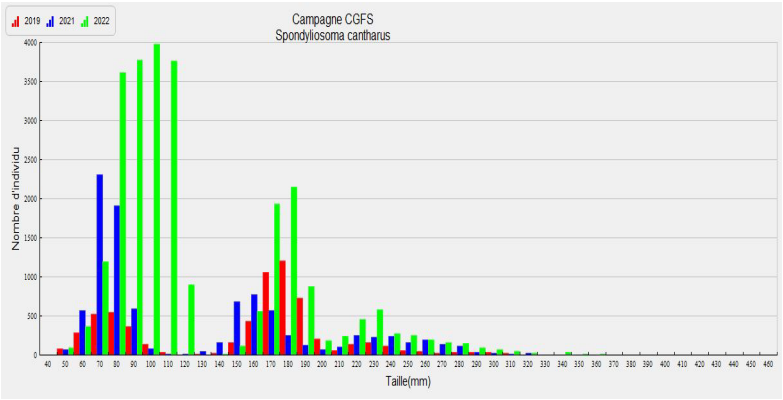
Sole (*Solea solea*)



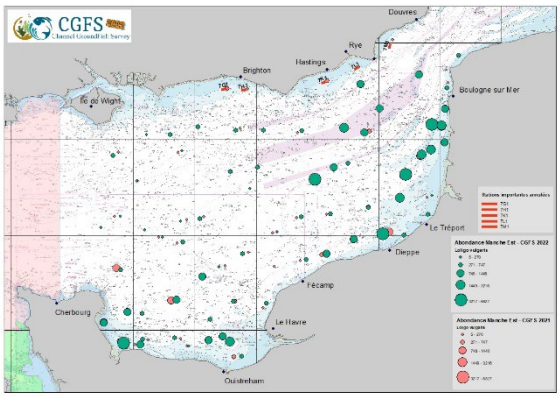


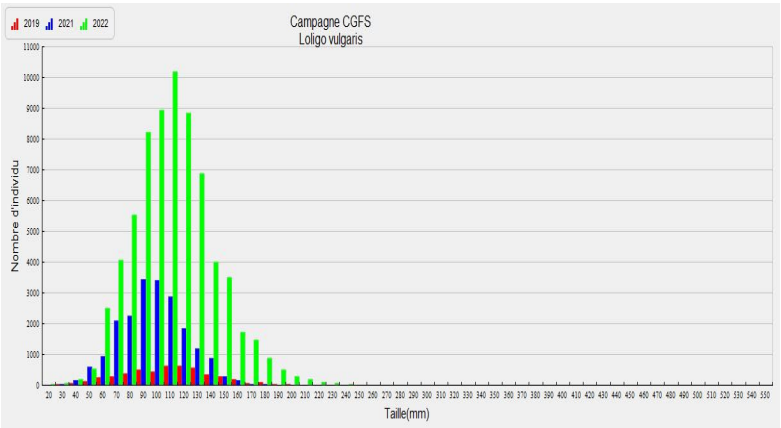
Black seabream (*Spondyliosoma cantharus*)



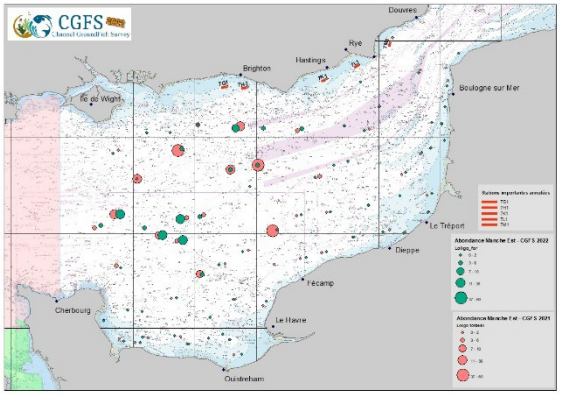


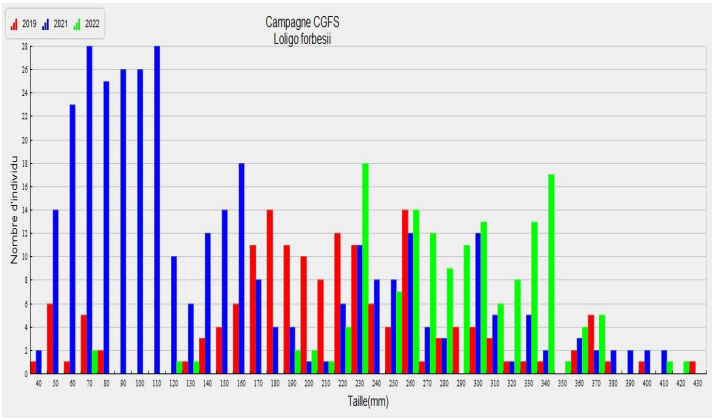
Common squid (*Loligo vulgaris*)



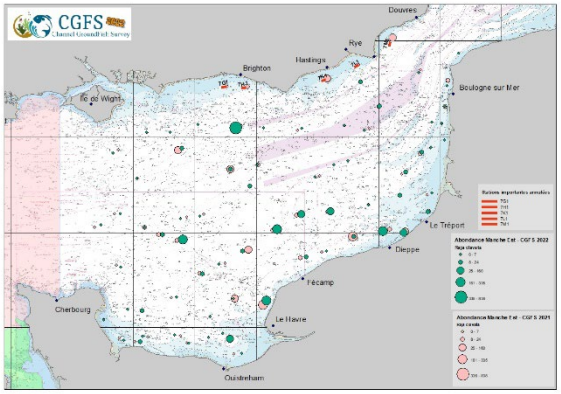


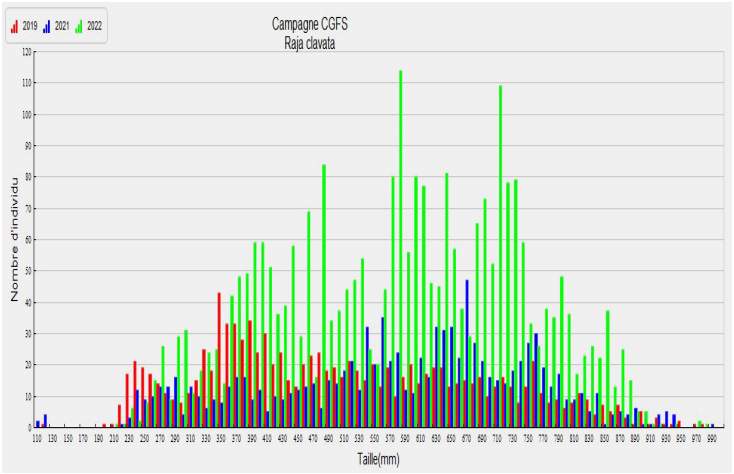
Veined squid (*Loligo forbesii*)



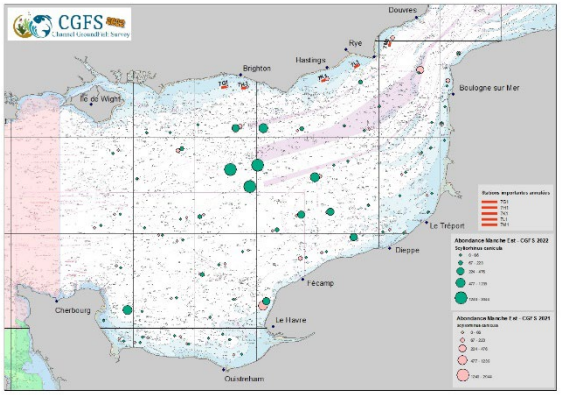


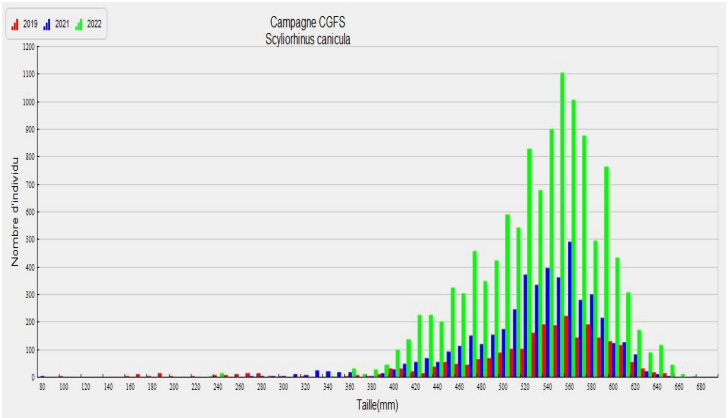
Thornback ray (*raja clavata*)





Small-spotted catshark (*Scyliorhinus canicula*)





The Western Channel

Haddock (*Melanogrammus aeglefinus*)

Haddock is mainly found in the western and central parts of the Western Channel, as shown in Figure 16. The occurrence of this species during CGFS 2022 was 16%, which is 8% lower compared to 2021, indicating a slightly narrower distribution. The abundance and biomass of haddock have significantly decreased, with only 56 individuals caught, weighing 28 kg. In 2021, the overall abundance was 360 individuals, representing an 80% drop from 2019, and the biomass was 193 kg, a 72% decrease from 2019. This sharp drop in catches is clearly reflected in the size distribution, with haddock this year being found in size classes ranging from 25 to 36 cm, with some larger individuals between 45 and 50 cm.

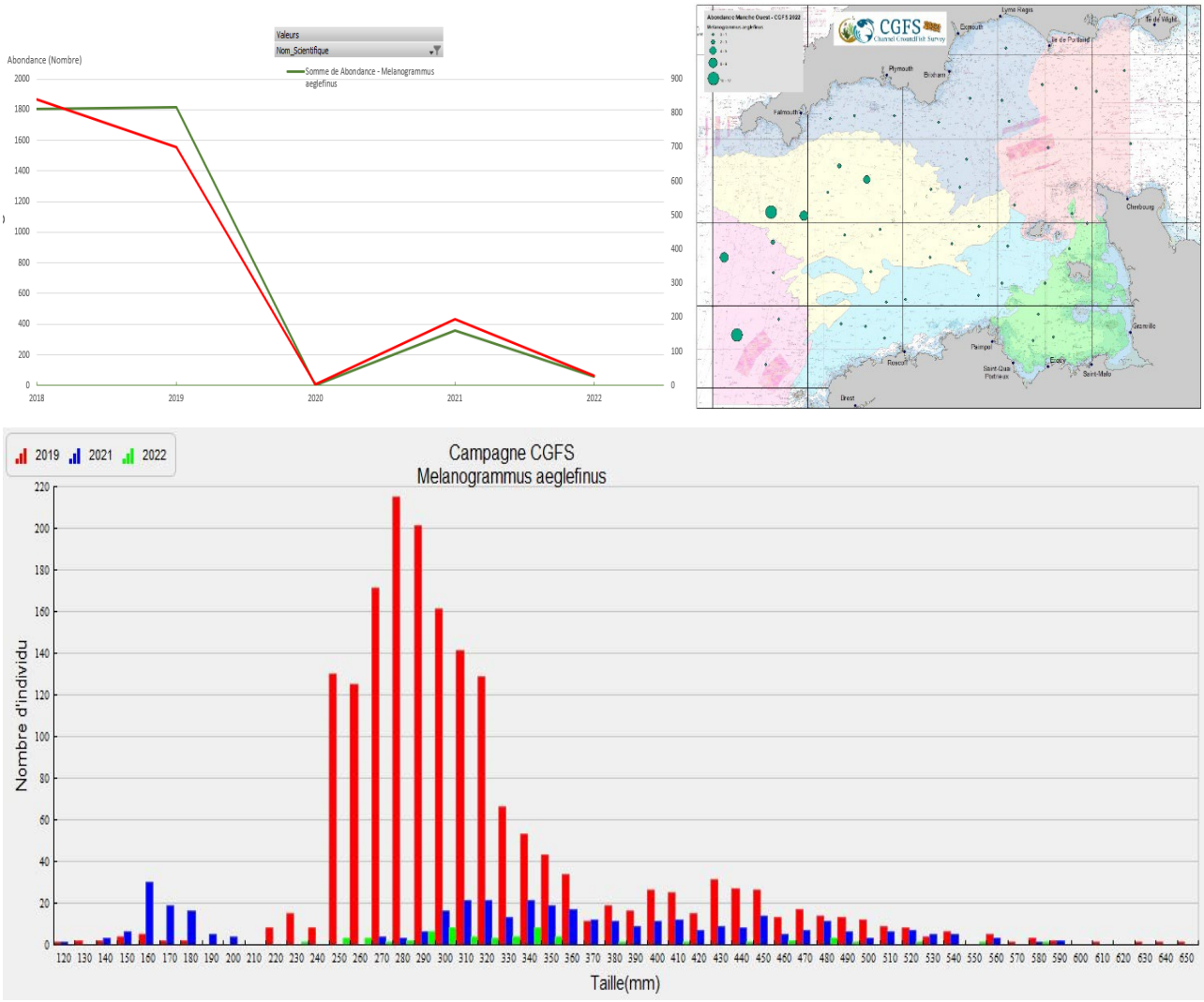


Figure 16 : Top right : Abundance (number of fish per haul) and biomass (kg) of seabass collected during the CGFS (N/O Thalassa) from 2018 to 2022. Size distribution (bottom) and geolgraphical distribution (top left) of haddock in 2019, 2021 and 2022.

Whiting (*Merlangius merlangus*)

Whiting are usually distributed along the English coast, with higher abundance found in Plymouth and Lyme bays. However, this year they were found more in the center of the area. Whiting was observed on 38% of the stations, compared to 54% in 2021. There was a significant drop in both abundance and biomass this year, with a -94% decrease (1109 individuals) and a -70% decrease (241 kg) compared to last year. The size distribution confirms that the decrease in catches mainly affected small individuals between 10 and 18 cm. The size distribution is bimodal, with the first mode between 23 and 25 cm, and the second mode for the largest individuals between 27 and 33 cm (Fig. 17).

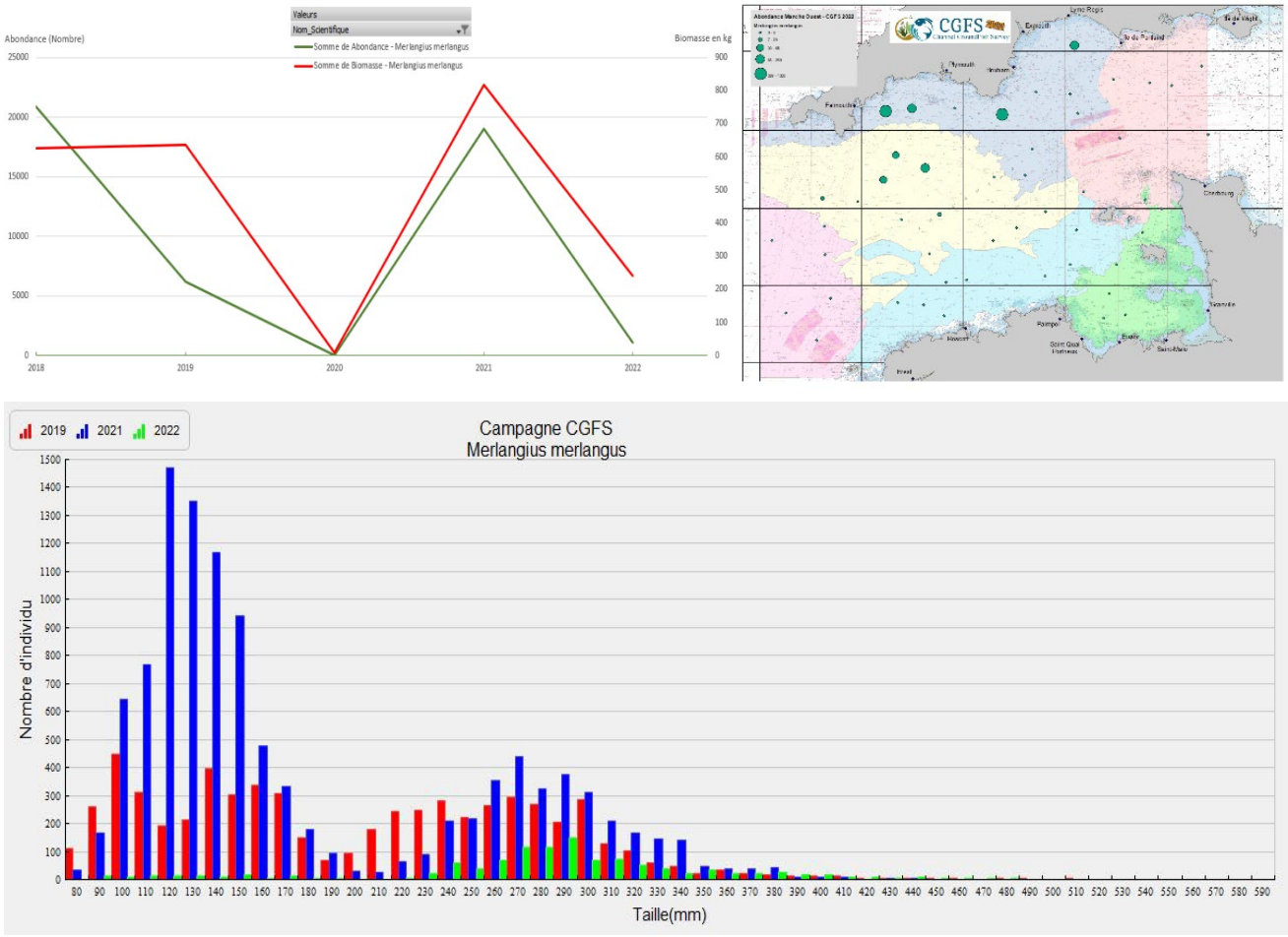


Figure 17 : Top right : Abundance (number of fish per haul) and biomass (kg) of seabass collected during the CGFS (N/O Thalassa) from 2018 to 2022. Size distribution (bottom) and geolgraphical distribution (top left) of whiting in 2019, 2021 and 2022.

John Dory (*Zeus faber*)

The John Dory species is mainly distributed over the north of Brittany to the east of the Anglo-Norman islands, and to a lesser extent in the central zone to the east of the Cherbourg DST. The occurrence of the species remains constant with its presence in 74% of the trawling stations carried out in the Western Channel. However, the abundance and gross biomass have decreased by 30% and 26%, respectively, compared with 2021, with 170 individuals per 183 kg being recorded. The size distribution of the species is quite similar to previous years, with 4 modes observed. The first mode concerns individuals whose size varies between 23 cm and 29 cm, the second between 35 cm and 42 cm, the third for individuals measured between 43 cm and 47 cm, and finally, large individuals between 48 and 53 cm (Fig.18).

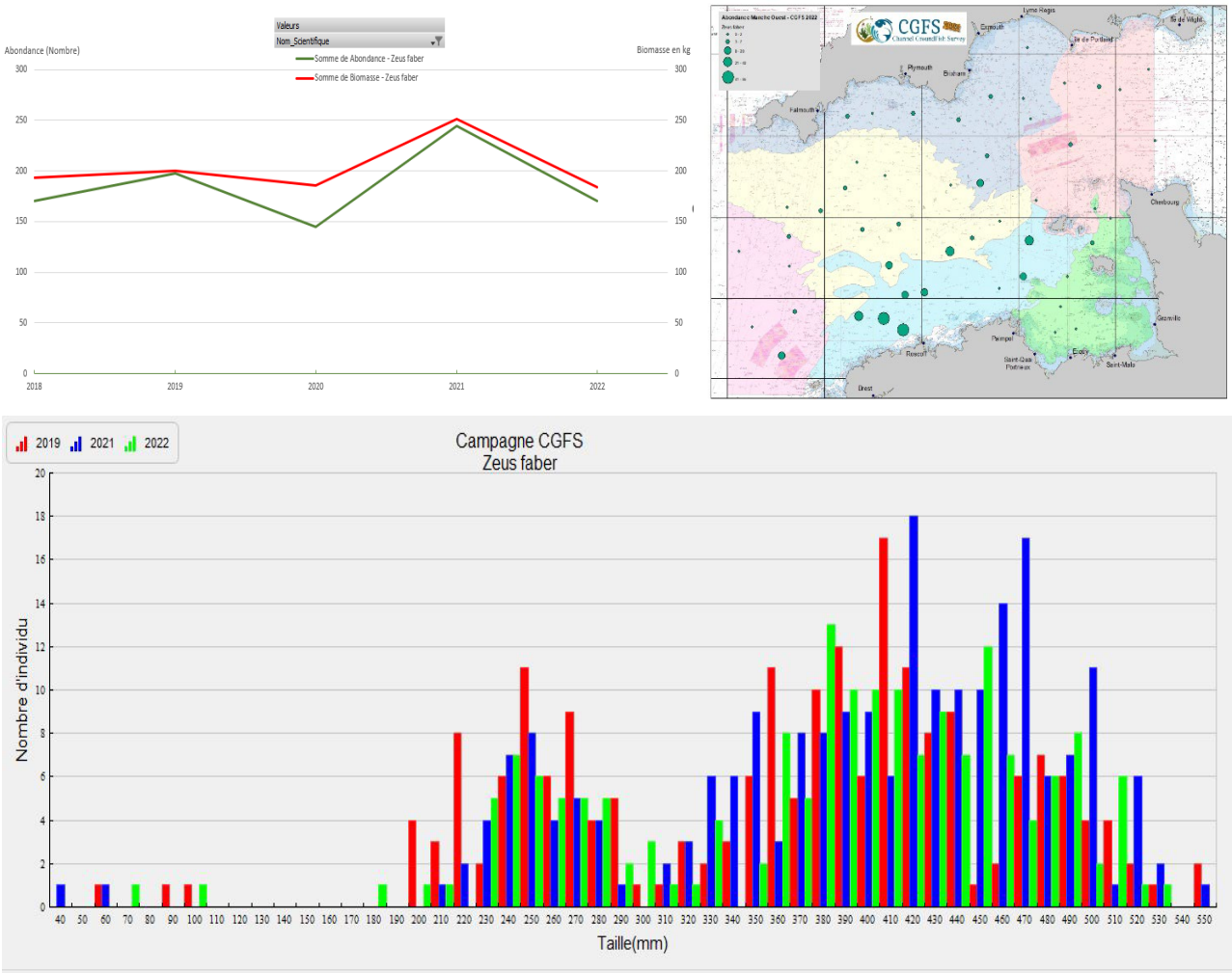
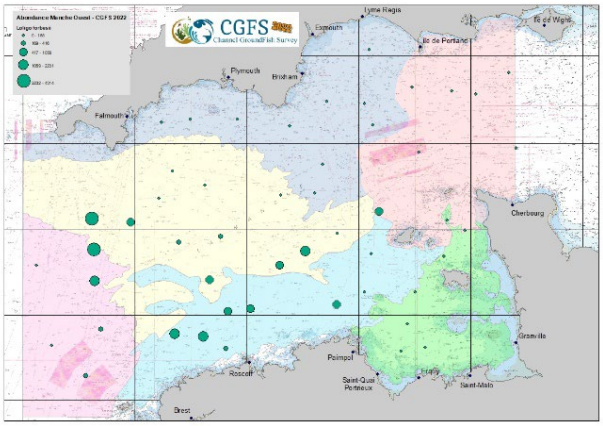
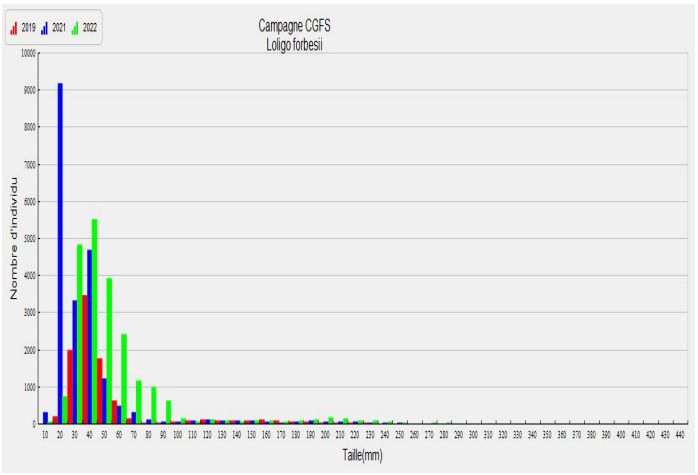


Figure 18 : Top right : Abundance (number of fish per haul) and biomass (kg) of seabass collected during the CGFS (N/O Thalassa) from 2018 to 2022. Size distribution (bottom) and geolgraphical distribution (top left) of John Dory in 2019, 2021 and 2022.

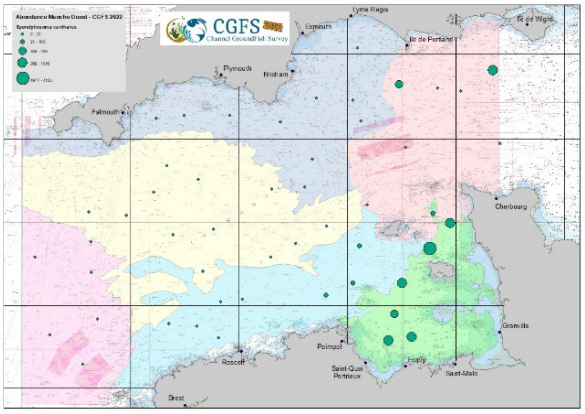
Other important species in the area (size distribution and geographical distribution of abundance)

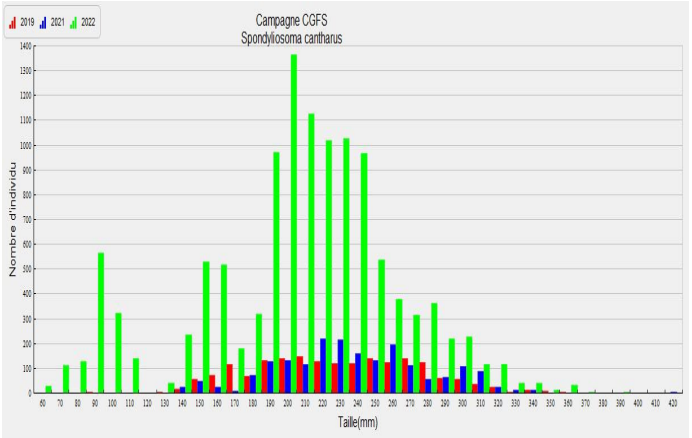
Veined (*Loligo forbesii*)



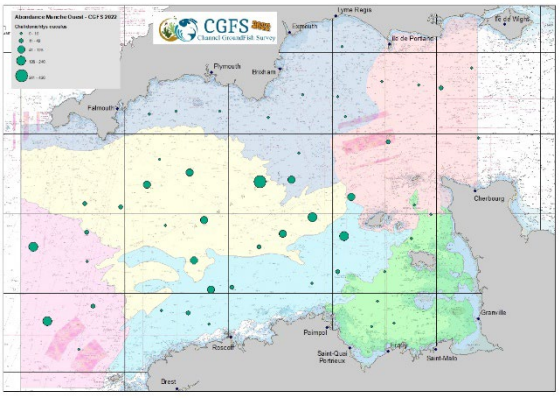


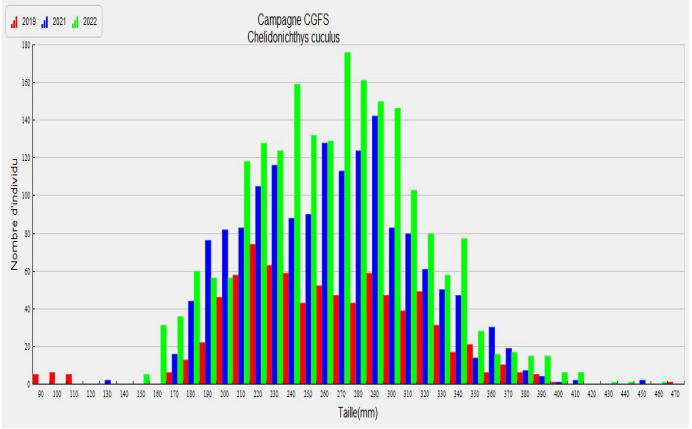
Black seabream(*Spondyliosoma cantharus*)



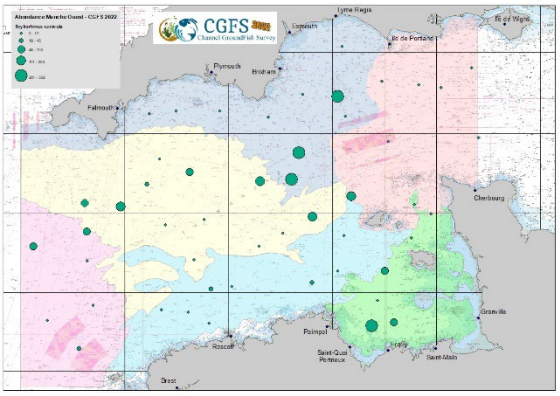


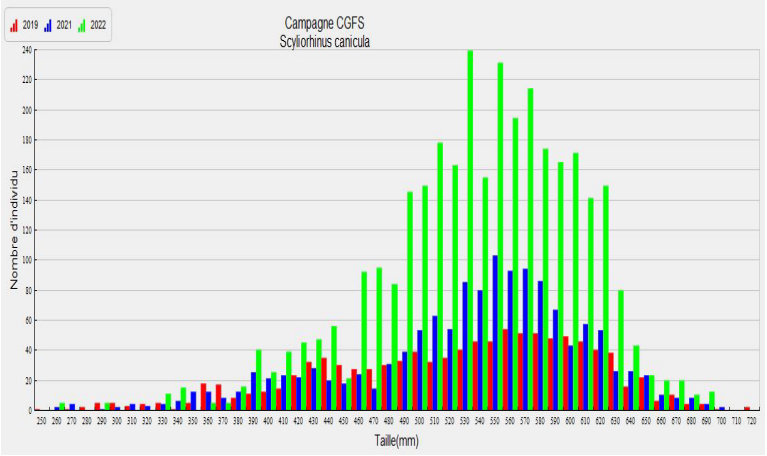
Red gurnard (*Chelidonichthys cuculus*)



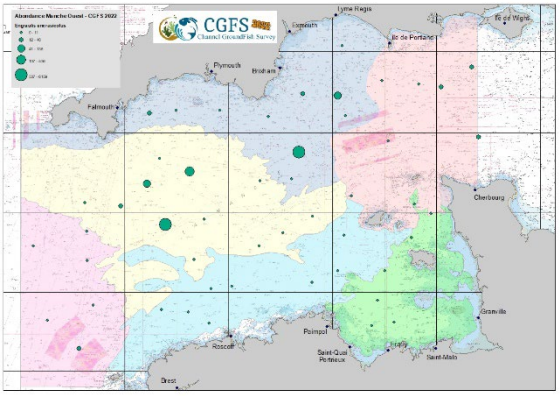


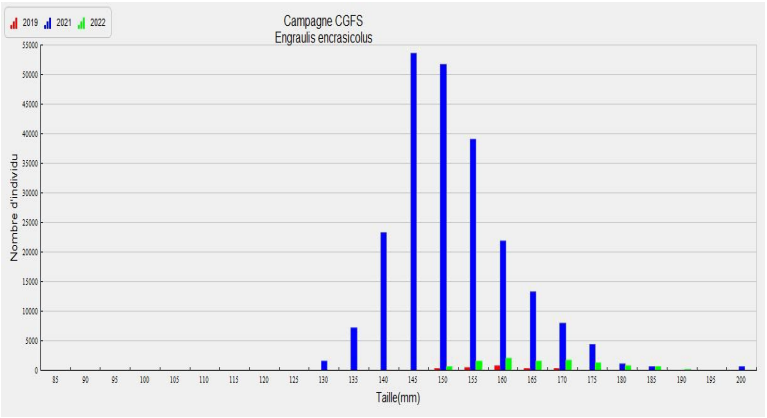
Small spotted catshark (*Scyliorhinus canicula*)



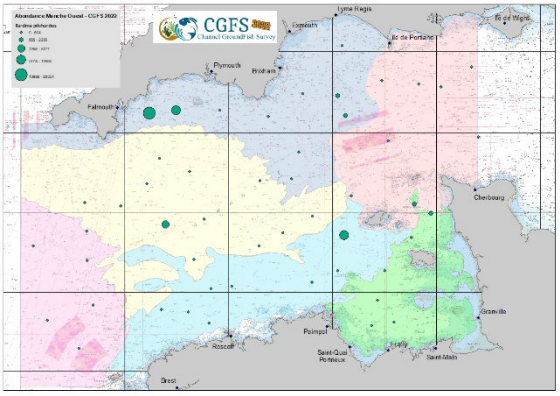


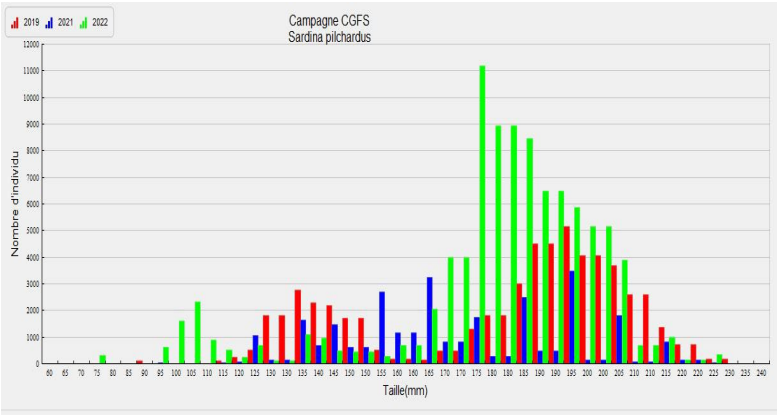
Anchovy (*Engraulis encrasicolus*)





Sardine (*Sardina pilchardus*)





ANNEXE 1 : traw stations characteristics

Eastern Channel

Code station	Num trait	Strate	Engin	Date	Latitude début	Longitude début	Latitude fin	Longitude fin	Duree	Distance	Sonde	Valide	Abond. NBRE/km²	Biom Kg/km²
A1400	1	28E8-7d	GOV 36/47	01/10/2022 08:39:00	49.819200	-1.101000	49.826600	-1.125900	31	1974	55.0	Y	83180	4750
A1401	2	29E8	GOV 36/47	01/10/2022 11:57:00	50.042100	-1.262700	50.034100	-1.296300	30	2555	70.0	Y	218789	5759
A1402	3	29E8	GOV 36/47	01/10/2022 14:10:00	50.100300	-1.107300	50.100200	-1.156900	30	3528	56.0	Y	246279	3714
A1403	4	29E9	GOV 36/47	02/10/2022 06:08:00	50.286300	-0.970200	50.285100	-0.933400	30	2613	70.0	Y	2372982	5533
A1404	5	29E8	GOV 36/47	02/10/2022 08:04:00	50.418200	-1.165800	50.433700	-1.125600	30	3325	35.0	Y	292673	2099
A1405	6	30E9	GOV 36/47	02/10/2022 10:17:00	50.524900	-0.893400	50.526900	-0.931500	30	2700	27.0	Y	211550	2400
A1406	7	30E9	GOV 36/47	02/10/2022 12:06:00	50.527200	-0.699900	50.515700	-0.734900	30	2781	27.0	Y	83249	1519
A1407	8	29E9	GOV 36/47	02/10/2022 13:51:00	50.441600	-0.602100	50.430200	-0.642300	30	3112	66.0	Y	5242195	7187
A1408	9	30E9	GOV 36/47	03/10/2022 06:00:00	50.565900	-0.471700	50.575900	-0.442400	23	2346	66.0	Y	4317723	72311
A1409	10	30E9	GOV 36/47	03/10/2022 08:09:00	50.549700	-0.165100	50.560800	-0.123800	31	3168	61.0	Y	824899	19989
A1410	11	30F0	GOV 36/47	03/10/2022 10:13:00	50.547600	0.060200	50.536200	0.015600	30	3395	60.0	Y	129831	3782
A1411	12	30F0	GOV 36/47	03/10/2022 12:25:00	50.545500	0.374200	50.537300	0.343400	24	2355	48.0	Y	76663	1718
A1412	13	29F0	GOV 36/47	03/10/2022 15:17:00	50.356300	0.634900	50.348300	0.591300	30	3212	39.0	Y	567372	3496
A1413	14	29F0	GOV 36/47	04/10/2022 05:57:00	50.292200	0.482100	50.299600	0.529400	30	3456	57.0	Y	628555	7232
A1414	15	29F0	GOV 36/47	04/10/2022 08:55:00	50.357100	0.014000	50.358300	0.044500	20	2171	54.0	Y	1561425	24187
A1415	16	29E9	GOV 36/47	04/10/2022 10:57:00	50.334000	-0.209500	50.345500	-0.164700	30	3421	48.0	Y	508917	9314
A1416	17	29E9	GOV 36/47	04/10/2022 12:49:00	50.244900	-0.051400	50.238300	-0.089400	28	2798	51.0	Y	928835	10032
A1417	18	29F0	GOV 36/47	04/10/2022 15:26:00	50.018600	0.170900	50.013700	0.130700	31	2921	39.0	Y	816855	5390
A1418	19	28F0	GOV 36/47	05/10/2022 05:58:00	49.874200	0.409100	49.868200	0.364700	30	3247	31.0	Y	269425	4143
A1419	20	28E9	GOV 36/47	05/10/2022 08:41:00	49.905000	-0.110500	49.909900	-0.066400	30	3202	42.0	Y	578200	4336
A1420	21	28E9	GOV 36/47	05/10/2022 10:52:00	49.834400	-0.303100	49.838700	-0.259000	30	3196	41.0	Y	556139	1587
A1421	22	28E9	GOV 36/47	05/10/2022 13:06:00	49.784900	-0.439400	49.784600	-0.484400	30	3232	40.0	Y	363637	4673
A1422	23	28E9	GOV 36/47	05/10/2022 15:17:00	49.660200	-0.648100	49.659000	-0.687400	31	2872	39.0	Y	1259471	1543
A1423	24	28F0	GOV 36/47	06/10/2022 06:00:00	49.642200	0.083400	49.619400	0.055200	30	3239	29.0	Y	204674	4784
A1424	25	28E9	GOV 36/47	06/10/2022 07:49:00	49.653000	-0.186200	49.653500	-0.228000	27	3001	36.0	Y	817694	3621
A1425	26	28E9	GOV 36/47	06/10/2022 09:44:00	49.556900	-0.376000	49.556900	-0.332500	30	3138	26.0	Y	898697	6389
A1426	27	27E9	GOV 36/47	06/10/2022 12:04:00	49.440100	-0.213200	49.453000	-0.174000	30	3170	30.0	Y	5020760	9351
A1427	28	27E9	GOV 36/47	06/10/2022 13:50:00	49.360700	-0.117000	49.358800	-0.166200	30	3564	13.0	Y	2321811	6810
A1428	29	27E9	GOV 36/47	07/10/2022 06:02:00	49.468800	-0.269600	49.471500	-0.310000	31	2926	37.0	Y	753543	2661
A1429	30	27E9	GOV 36/47	07/10/2022 07:47:00	49.447500	-0.385400	49.447300	-0.418600	23	2397	30.0	Y	1387003	10334
A1430	31	27E9	GOV 36/47	07/10/2022 09:43:00	49.414900	-0.549700	49.418400	-0.582700	21	2415	26.0	Y	1558302	3114
A1431	32	27E9	GOV 36/47	07/10/2022 11:13:00	49.460500	-0.664100	49.456400	-0.626100	30	2782	25.0	Y	1201651	6812
A1432	33	27E9	GOV 36/47	07/10/2022 13:10:00	49.452300	-0.923000	49.449100	-0.884100	30	2833	22.0	Y	1086824	4229

Code station	Num trait	Strate	Engin	Date	Latitude début	Longitude début	Latitude fin	Longitude fin	Duree	Distance	Sonde	Valide	Abond. NBRE/km²	Biom Kg/km²
A1434	35	27E9	GOV 36/47	08/10/2022 06:11:00	49.422500	-0.943500	49.424200	-0.983200	30	2873	24.0	Y	491095	3515
A1435	36	27E8-7d	GOV 36/47	08/10/2022 07:42:00	49.430500	-1.077300	49.446100	-1.115300	30	3249	21.0	Y	543083	5039
A1436	37	28E8-7d	GOV 36/47	08/10/2022 09:25:00	49.539800	-1.240100	49.516400	-1.227700	26	2796	17.0	Y	3904005	9577
A1437	38	28E8-7d	GOV 36/47	08/10/2022 11:29:00	49.595900	-1.047200	49.572600	-1.055300	30	2653	36.0	Y	6639770	7857
A1438	39	28E9	GOV 36/47	08/10/2022 13:37:00	49.587500	-0.930000	49.586200	-0.896900	27	2393	31.0	Y	843524	10049
A1439	40	29E9	GOV 36/47	09/10/2022 06:04:00	50.028500	-0.907900	50.022900	-0.935800	29	2092	61.0	Y	142827	1926
A1440	41	28E9	GOV 36/47	09/10/2022 07:40:00	49.990900	-0.761300	49.990800	-0.787900	30	1900	62.0	Y	142058	4563
A1441	42	28E9	GOV 36/47	09/10/2022 09:25:00	49.964400	-0.596300	49.960300	-0.634800	31	2785	53.0	Y	634158	4786
A1442	43	29E9	GOV 36/47	09/10/2022 11:23:00	50.076000	-0.615000	50.080800	-0.574900	30	2903	54.0	Y	314439	2199
A1443	44	29E9	GOV 36/47	09/10/2022 13:18:00	50.087600	-0.458700	50.095600	-0.427300	30	2402	48.0	Y	621958	3164
A1444	45	29F0	GOV 36/47	10/10/2022 06:10:00	50.099000	0.367700	50.092600	0.323200	30	3248	35.0	Y	469728	6188
A1445	46	29F0	GOV 36/47	10/10/2022 08:01:00	50.113900	0.606000	50.109500	0.574400	31	2300	35.0	Y	437898	6520
A1446	47	28F0	GOV 36/47	10/10/2022 10:20:00	49.904000	0.576700	49.898200	0.537000	30	2912	32.0	Y	544810	5129
A1447	48	28F0	GOV 36/47	10/10/2022 12:38:00	49.980300	0.797100	49.984100	0.838200	30	2967	30.0	Y	2836405	5995
A1448	49	29F1	GOV 36/47	10/10/2022 14:35:00	50.009700	1.034200	50.014300	1.070300	30	2628	25.0	Y	1092596	4983
A1449	50	29F0	GOV 36/47	11/10/2022 06:06:00	50.146700	0.915000	50.151700	0.948300	33	1330	28.0	Y	3389815	45586
A1450	51	29F1	GOV 36/47	11/10/2022 08:00:00	50.196700	1.174200	50.224500	1.196700	30	1890	23.0	Y	2281379	55359
A1451	52	29F1	GOV 36/47	11/10/2022 10:18:00	50.210100	1.432300	50.202700	1.405500	20	1224	16.0	Y	5135550	125422
A1452	53	29F1	GOV 36/47	11/10/2022 12:06:00	50.110000	1.402700	50.095400	1.383600	20	2154	15.0	Y	643915	14575
A1453	54	28F1	GOV 36/47	11/10/2022 13:43:00	50.000300	1.204600	50.019900	1.236200	30	3135	19.0	Y	5432787	70418
A1454	55	29F1	GOV 36/47	12/10/2022 06:09:00	50.423800	1.349700	50.440400	1.377000	30	2672	25.0	Y	512541	9797
A1455	56	29F1	GOV 36/47	12/10/2022 07:38:00	50.448900	1.427600	50.464100	1.436300	20	1803	24.0	Y	630588	12546
A1456	57	29F1	GOV 36/47	12/10/2022 10:28:00	50.484600	1.537800	50.459900	1.534800	30	2745	17.0	Y	889900	15295
A1457	58	29F1	GOV 36/47	12/10/2022 13:01:00	50.319200	1.222300	50.305500	1.179200	30	3414	36.0	Y	628056	11005
A1458	59	29F0	GOV 36/47	13/10/2022 06:09:00	50.376200	0.747600	50.383300	0.786400	30	2863	36.0	Y	4051919	1519
A1459	60	30F0	GOV 36/47	13/10/2022 08:41:00	50.535200	0.882800	50.544500	0.921800	25	2960	35.0	Y	327627	5614
A1460	61	30F0	GOV 36/47	13/10/2022 11:07:00	50.561900	0.718700	50.562800	0.676900	30	2954	45.0	Y	433367	3745
A1461	62	30F1	GOV 36/47	14/10/2022 06:11:00	50.661300	1.007500	50.670500	1.049400	30	3122	42.0	Y	178919	2001
A1462	63	30F0	GOV 36/47	14/10/2022 08:20:00	50.787700	0.852700	50.803400	0.890600	30	3191	36.0	Y	322887	7582
A1464	64	30F1	GOV 36/47	15/10/2022 06:14:00	50.573600	1.513500	50.601100	1.523300	31	3129	24.0	Y	209398	5196
A1465	65	30F1	GOV 36/47	15/10/2022 08:31:00	50.660800	1.542500	50.684700	1.532200	30	2750	21.0	Y	130263	9577
A1466	66	30F1	GOV 36/47	15/10/2022 10:18:00	50.579900	1.434400	50.605900	1.457100	30	3297	28.0	Y	443267	4839
A1467	67	30F1	GOV 36/47	16/10/2022 06:02:00	50.934600	1.650000	50.915200	1.614900	30	3266	24.0	Y	391225	14686
A1468	68	30F1	GOV 36/47	16/10/2022 09:04:00	50.836400	1.328700	50.859700	1.343600	30	2795	27.0	Y	2440055	29525
A1469	69	30F1	GOV 36/47	16/10/2022 10:53:00	50.768500	1.558700	50.788700	1.564800	21	2285	18.0	Y	112984	4532

Weastern Channel

Code station	Num trait	Strate	Engin	Date	Latitude début	Longitude début	Latitude fin	Longitude fin	Duree	Distance	Sonde	Valide	Abond. NBRE/km²	Biom Kg/km²
A1313	1	OFF	GOV 36/49	16/09/2022 12:40:00	48.642200	-5.441700	48.608900	-5.447300	30	3734	110.0	Y	59602	1584
A1314	2	OFF	GOV 36/49	16/09/2022 16:16:00	48.821600	-5.745600	48.819800	-5.784200	31	2825	115.0	Y	44228	2131
A1317	3	OFF	GOV 36/49	17/09/2022 06:11:00	48.916500	-5.302800	48.902700	-5.329800	30	2503	110.0	Y	27824	1035
A1318	4	OFF	GOV 36/49	17/09/2022 09:06:00	49.201400	-5.360700	49.179800	-5.384200	31	2945	107.0	Y	2216006	3815
A1319	5	OFF	GOV 36/49	17/09/2022 11:55:00	49.384300	-5.364800	49.392200	-5.328200	30	2795	104.0	Y	284273	3531
A1320	6	OFF	GOV 36/49	17/09/2022 15:24:00	49.291300	-5.877700	49.297600	-5.839500	30	2858	110.0	Y	20837	1037
A1323	7	WEC	GOV 36/49	18/09/2022 06:03:00	49.564100	-5.384700	49.557500	-5.426100	30	3071	96.0	Y	242245	1372
A1324	8	WEC	GOV 36/49	18/09/2022 09:37:00	49.541100	-5.039700	49.534000	-5.077300	31	2822	96.0	Y	272595	2446
A1325	9	WEC	GOV 36/49	18/09/2022 12:19:00	49.683000	-4.785100	49.682900	-4.743100	31	3023	87.0	Y	182767	2252
A1326	10	WEC	GOV 36/49	18/09/2022 14:50:00	49.757100	-4.373000	49.765200	-4.333400	30	2982	80.0	Y	166207	4151
A1329	11	WEC	GOV 36/49	19/09/2022 06:07:00	49.839800	-4.665400	49.843700	-4.624900	30	2935	81.0	Y	86234	1436
A1330	12	SOE	GOV 36/49	19/09/2022 08:39:00	50.118500	-4.763300	50.129800	-4.725100	30	2992	68.0	Y	1833574	27708
A1331	13	SOE	GOV 36/49	19/09/2022 11:09:00	50.137400	-4.504200	50.135700	-4.473300	22	2202	69.0	Y	485500	6139
A1332	14	SOE	GOV 36/49	19/09/2022 13:21:00	50.138500	-4.085200	50.143900	-4.128300	30	3124	65.0	Y	58204	1322
A1337	15	SOE	GOV 36/49	20/09/2022 06:04:00	50.098400	-3.615900	50.112200	-3.581700	30	2879	67.0	Y	223677	2699
A1338	16	SOE	GOV 36/49	20/09/2022 08:32:00	49.879800	-3.321600	49.886100	-3.281600	30	2944	70.0	Y	671305	7395
A1339	17	SOE	GOV 36/49	20/09/2022 10:38:00	49.712900	-3.393200	49.693100	-3.425800	30	3207	70.0	Y	3264110	8427
A1340	18	WEC	GOV 36/49	20/09/2022 12:53:00	49.701100	-3.694700	49.697200	-3.736000	30	3003	77.0	Y	1063661	2764
A1344	19	WEC	GOV 36/49	21/09/2022 05:56:00	49.460700	-4.232300	49.448900	-4.272500	31	3186	90.0	Y	1210254	9220
A1345	20	WEC	GOV 36/49	21/09/2022 08:06:00	49.425400	-4.607900	49.435900	-4.570400	30	2943	93.0	Y	622035	3528
A1346	21	NOB	GOV 36/49	21/09/2022 10:51:00	49.275000	-4.794600	49.289700	-4.756300	30	3214		N		
A1347	22	WEC	GOV 36/49	21/09/2022 15:03:00	49.206000	-4.334500	49.192300	-4.369500	31	2962	94.0	Y	419210	2417
A1350	23	WEC	GOV 36/49	22/09/2022 06:04:00	48.890000	-4.643900	48.900600	-4.618100	25	2225	101.0	Y	46175	1364
A1351	24	NOB	GOV 36/49	22/09/2022 07:48:00	48.874700	-4.387100	48.891600	-4.360800	30	2691	95.0	Y	90973	2196
A1352	25	NOB	GOV 36/49	22/09/2022 10:01:00	49.021800	-4.168200	49.034100	-4.131900	30	2973	92.0	Y	2517548	8652
A1353	26	NOB	GOV 36/49	22/09/2022 13:54:00	48.803200	-4.186600	48.789300	-4.217100	31	2718	87.0	Y	30103	1189
A1357	27	NOB	GOV 36/49	23/09/2022 06:05:00	49.037000	-3.965700	49.049800	-3.928900	30	3030	89.0	Y	70681	2344
A1358	28	WEC	GOV 36/49	23/09/2022 09:42:00	49.290800	-3.707000	49.305300	-3.676100	31	2757	81.0	Y	80023	1520
A1359	29	WEC	GOV 36/49	23/09/2022 11:55:00	49.375100	-3.475300	49.393000	-3.445500	31	2937	78.0	Y	129248	1521
A1360	30	WEC	GOV 36/49	23/09/2022 14:18:00	49.477100	-3.192000	49.465700	-3.227200	30	2836	75.0	Y	420371	4024
A1364	31	CEC	GOV 36/49	24/09/2022 06:04:00	49.607100	-2.817400	49.596000	-2.847100	31	2468	73.0	Y	157005	2195
A1365	32	NOB	GOV 36/49	24/09/2022 08:18:00	49.359300	-2.886700	49.346000	-2.856000	31	2667	68.0	Y	666808	4619
A1366	33	NOB	GOV 36/49	24/09/2022 10:42:00	49.136100	-2.949300	49.154700	-2.934100	30	2339	64.0	Y	11304	821
A1367	34	NOB	GOV 36/49	24/09/2022 12:58:00	49.061100	-3.195000	49.072300	-3.153500	30	3266	69.0	Y	110085	2399
A1371	35	NBG	GOV 36/49	25/09/2022 06:00:00	48.789400	-2.621000	48.803000	-2.660200	30	3242	41.0	Y	267794	4321

Code station	Num trait	Strate	Engin	Date	Latitude début	Longitude début	Latitude fin	Longitude fin	Duree	Distance	Sonde	Valide	Abond. NBRE/km²	Biom Kg/km²
A1372	36	NBG	GOV 36/49	25/09/2022 08:13:00	48.810300	-2.405400	48.791300	-2.405200	22	2111	42.0	Y	300772	3160
A1373	37	NBG	GOV 36/49	25/09/2022 10:47:00	48.970300	-2.543400	48.982700	-2.511800	29	2688		N		
A1374	38	NBG	GOV 36/49	25/09/2022 13:46:00	48.947400	-2.563400	48.924300	-2.521400	30	3996	42.0	Y	63583	1271
A1379	39	NBG	GOV 36/49	26/09/2022 06:01:00	49.135800	-2.496900	49.143000	-2.533000	31	2757	56.0	Y	947297	6588
A1380	40	NBG	GOV 36/49	26/09/2022 08:33:00	49.344700	-2.239500	49.339200	-2.278000	30	2850	53.0	Y	62531	13123
A1381	41	CEC	GOV 36/49	26/09/2022 11:19:00	49.497800	-2.050000	49.520600	-2.037500	30	2687	31.0	Y	214820	3199
A1382	42	NBG	GOV 36/49	26/09/2022 13:25:00	49.553800	-2.208400	49.566300	-2.203900	30	1434	38.0	Y	602990	6902
A1386	43	CEC	GOV 36/49	27/09/2022 05:59:00	49.947300	-2.463000	49.941900	-2.497200	31	2521	66.0	Y	46253	680
A1387	44	SOE	GOV 36/49	27/09/2022 09:15:00	50.103900	-2.874100	50.098600	-2.909500	30	2594	66.0	Y	197233	1714
A1388	45	SOE	GOV 36/49	27/09/2022 11:15:00	50.226900	-2.949300	50.251300	-2.932500	30	2967	60.0	Y	198431	2217
A1389	46	SOE	GOV 36/49	27/09/2022 13:43:00	50.239700	-3.283700	50.251100	-3.255400	30	2383	59.0	Y	635347	2034
A1393	47	SOE	GOV 36/49	28/09/2022 06:00:00	50.537000	-2.905600	50.524300	-2.942300	31	2944	41.0	Y	1156004	2748
A1394	48	CEC	GOV 36/49	28/09/2022 08:43:00	50.320500	-2.523400	50.321200	-2.553300	30	2122	59.0	Y	39391	1723
A1395	49	CEC	GOV 36/49	28/09/2022 11:49:00	50.299300	-2.169000	50.305900	-2.123000	30	3346	55.0	Y	145604	3567
A1396	50	CEC	GOV 36/49	28/09/2022 13:46:00	50.282700	-1.955000	50.292000	-1.935300	30	1737	51.0	Y	164327	2032
A1398	51	CEC	GOV 36/49	29/09/2022 06:00:00	50.403900	-1.659800	50.409600	-1.617300	30	3071	37.0	Y	51103	1357
A1399	52	CEC	GOV 36/49	29/09/2022 09:25:00	49.973300	-1.594900	49.973300	-1.611900	30	1218	76.0	Y	13858	1571

ANNEXE 2 : Dominance of the top 20 fish species

Eastern Channel

Nom scientifique	Code_Rubin	Dominance en nombre
Trachurus trachurus	TRACTRA	55.34%
Sardina pilchardus	SARDPIL	15.13%
Scomber scombrus	SCOMSCO	8.14%
Aequipecten opercularis	AEQUOPE	5.24%
Loligo vulgaris	LOLIVUL	4.60%
Alloteuthis	ALLO	1.86%
Spondyliosoma cantharus	SPONCAN	1.75%
Sepia officinalis	SEPIOFF	1.50%
Scyliorhinus canicula	SCYOCAN	0.79%
Trisopterus luscus	TRISLUS	0.68%
Sprattus sprattus	SPRASPR	0.64%
Trisopterus minutus	TRISMIN	0.64%
Necora puber	NECOPUB	0.61%
Mullus surmuletus	MULLSUR	0.48%
Buccinum undatum	BUCCUND	0.40%
Limanda limanda	LIMDLIM	0.26%
Maja brachydactyla	MAJABRA	0.24%
Raja clavata	RAJACLA	0.19%
Hippocampus hippocampus	HIPPHIP	0.18%
Chelidonichthys cuculus	CHELCUC	0.15%

Nom scientifique	Code_Rubin	Dominance en poids
Trachurus trachurus	TRACTRA	31.58%
Scomber scombrus	SCOMSCO	19.56%
Sardina pilchardus	SARDPIL	16.66%
Scyliorhinus canicula	SCYOCAN	5.42%
Raja clavata	RAJACLA	4.98%
Loligo vulgaris	LOLIVUL	3.74%
Mustelus asterias	MUSTAST	2.52%
Maja brachydactyla	MAJABRA	2.03%
Dicentrarchus labrax	DICELAB	1.73%
Sepia officinalis	SEPIOFF	1.62%
Spondyliosoma cantharus	SPONCAN	1.18%
Liza aurata	LIZAAUR	1.10%
Aequipecten opercularis	AEQUOPE	1.07%
Rhizostoma octopus	RHISOCT	0.96%
Raja undulata	RAJAUND	0.61%
Scyliorhinus stellaris	SCYOSTE	0.53%
Necora puber	NECOPUB	0.48%
Dasyatis tortonesei	DASYTOR	0.43%
Mullus surmuletus	MULLSUR	0.33%
Conger conger	CONGCON	0.32%

Western Channel

Nom scientifique	Code_Rubin	Dominance en nombre
Trachurus trachurus	TRACTRA	39.61%
Trisopterus minutus	TRISMIN	21.22%
Salpidae	FMSALPD	11.22%
Scomber scombrus	SCOMSCO	9.17%
Sardina pilchardus	SARDPIL	5.81%
Capros aper	CAPOAPE	5.36%
Loligo forbesii	LOLIFOR	1.83%
Spondyliosoma cantharus	SPONCAN	1.00%
Sprattus sprattus	SPRASPR	0.97%
Engraulis encrasicolus	ENGRENC	0.88%
Alloteuthis	ALLO	0.81%
Loligo vulgaris	LOLIVUL	0.62%
Merlangius merlangus	MERNMER	0.28%
Scyliorhinus canicula	SCYOCAN	0.27%
Aequipecten opercularis	AEQUOPE	0.20%
Chelidonichthys cuculus	CHELCUC	0.18%
Trisopterus luscus	TRISLUS	0.13%
Illex coindetii	ILLECOI	0.06%
Micromesistius poutassou	MICMPOU	0.05%
Aequorea	AEQO	0.04%

Nom scientifique	Code_Rubin	Dominance en poids
Trachurus trachurus	TRACTRA	24.36%
Scomber scombrus	SCOMSCO	22.89%
Sardina pilchardus	SARDPIL	7.86%
Trisopterus minutus	TRISMIN	6.44%
Scyliorhinus canicula	SCYOCAN	4.77%
Spondyliosoma cantharus	SPONCAN	4.60%
Capros aper	CAPOAPE	4.17%
Merlangius merlangus	MERNMER	2.60%
Loligo forbesii	LOLIFOR	2.36%
Zeus faber	ZEUSFAB	1.98%
Engraulis encrasicolus	ENGRENC	1.88%
Dicentrarchus labrax	DICELAB	1.59%
Loligo vulgaris	LOLIVUL	1.37%
Conger conger	CONGCON	1.30%
Chelidonichthys cuculus	CHELCUC	1.23%
Trisopterus luscus	TRISLUS	1.22%
Raja brachyura	RAJABRA	1.21%
Galeorhinus galeus	GALOGAL	0.81%
Mustelus asterias	MUSTAST	0.66%
Lophius piscatorius	LOPHPIS	0.59%

ANNEXE 3 : Percentage occurrences (>10%)

Manche Est	
Nom scientifique	Occurence
Trachurus trachurus	100.00%
Loligo vulgaris	100.00%
Sepia officinalis	98.53%
Buccinum undatum	83.82%
Scyliorhinus canicula	82.35%
Scomber scombrus	82.35%
Mullus surmuletus	82.35%
Maja brachydactyla	77.94%
Alloteuthis	75.00%
Aequipecten opercularis	75.00%
Raja clavata	73.53%
Chelidonichthys cuculus	73.53%
Spondyliosoma cantharus	72.06%
Zeus faber	63.24%
Mustelus asterias	60.29%
Callionymus lyra	58.82%
Trisopterus minutus	57.35%
Sardina pilchardus	52.94%
Pecten maximus	48.53%
Hippocampus hippocampus	48.53%
Conger conger	47.06%
Pleuronectes platessa	44.12%
Chelidonichthys lucerna	44.12%
Solea solea	42.65%
Dicentrarchus labrax	42.65%
Scyliorhinus stellaris	41.18%
Trigloporus lastoviza	38.24%
Blennius ocellaris	35.29%
Necora puber	30.88%
Raja undulata	30.88%
Merlangius merlangus	29.41%
Loligo forbesii	27.94%
Rhizostoma octopus	26.47%
Limanda limanda	23.53%
Trisopterus luscus	17.65%
Platichthys flesus	16.18%
Dasyatis tortonesei	16.18%
Cancer pagurus	14.71%
Echiichthys vipera	14.71%
Eutrigla gurnardus	13.24%
Ostrea edulis	13.24%
Galeorhinus galeus	11.76%
Scophthalmus maximus	11.76%
Arnoglossus laterna	11.76%
Gobius niger	11.76%
Sepiola	10.29%

Manche Ouest	
Nom scientifique	Occurence
Trachurus trachurus	100.00%
Trisopterus minutus	90.00%
Scyliorhinus canicula	88.00%
Chelidonichthys cuculus	86.00%
Scomber scombrus	84.00%
Loligo forbesii	82.00%
Alloteuthis	80.00%
Zeus faber	74.00%
Sardina pilchardus	72.00%
Loligo vulgaris	52.00%
Engraulis encrasicolus	44.00%
Todaropsis eblanae	44.00%
Spondyliosoma cantharus	42.00%
Trisopterus luscus	42.00%
Conger conger	42.00%
Merlangius merlangus	38.00%
Illex coindetii	38.00%
Microstomus kitt	38.00%
Aequorea	38.00%
Capros aper	34.00%
Aequipecten opercularis	32.00%
Sprattus sprattus	30.00%
Micromesistius poutassou	28.00%
Merluccius merluccius	28.00%
Callionymus lyra	24.00%
Dicentrarchus labrax	22.00%
Ctenolabrus rupestris	22.00%
Scyliorhinus stellaris	22.00%
Pecten maximus	20.00%
Lophius piscatorius	18.00%
Eutrigla gurnardus	18.00%
Chrysaora hysoscella	16.00%
Maja brachydactyla	16.00%
Melanogrammus aeglefinus	16.00%
Raja undulata	16.00%
Raja brachyura	16.00%
Galeorhinus galeus	14.00%
Mustelus asterias	14.00%
Eledone cirrhosa	14.00%
Hyperoplus lanceolatus	14.00%
Hyperoplus immaculatus	14.00%
Sepia officinalis	12.00%
Dasyatis tortonesei	12.00%
Arnoglossus imperialis	12.00%
Rhizostoma octopus	12.00%
Echiichthys vipera	12.00%
Lepidorhombus whiffiagonis	10.00%
Palinurus elephas	10.00%
Salpidae	10.00%
Mullus surmuletus	10.00%
Pollachius pollachius	10.00%
Chelidonichthys lucerna	10.00%

ANNEXE 4: Percentage occurrences of benthos (>10%)

Manche Est	
Nom scientifique	Occurence
Psammechinus miliaris	82.35%
Asterias rubens	75.00%
Inachus dorsettensis	73.53%
Ascidia	72.06%
Pagurus prideaux	54.41%
Adamsia palliata	50.00%
Alcyonidium diaphanum	47.06%
Macropodia	42.65%
Alcyonium digitatum	41.18%
Hydrallmania falcata	35.29%
Anseropoda placenta	32.35%
Flustra foliacea	30.88%
Nemertesia antennina	27.94%
Porifera	26.47%
Crossaster papposus	26.47%
Pyuridae	25.00%
Crepidula fornicata	23.53%
Abietinaria abietina	22.06%
Hydrozoa	22.06%
Styela clava	20.59%
Liocarcinus vernalis	20.59%
Ophiura ophiura	20.59%
Henricia	19.12%
Ophiothrix fragilis	17.65%
Pagurus bernhardus	17.65%
Aphrodita aculeata	17.65%
Actiniaria	17.65%
Liocarcinus holsatus	14.71%
Mimachlamys varia	14.71%
Macropodia tenuirostris	14.71%
Hyas coarctatus	13.24%
Dromia personata	13.24%
Liocarcinus depurator	13.24%
Glycymeris glycymeris	11.76%
Mytilus edulis	11.76%
Sepiolidae	10.29%

Manche Ouest	
Nom scientifique	Occurence
Echinus esculentus	40.00%
Inachus leptochirus	22.00%
Ascidia	22.00%
Abietinaria abietina	18.00%
Marthasterias glacialis	18.00%
Hydrallmania falcata	16.00%
Flustra foliacea	12.00%
Ophiothrix fragilis	10.00%
Nemertesia antennina	10.00%
Asterias rubens	10.00%

ANNEXE 5 : Summary table works :

Hydrological samples

Gear	Nomber		Application
	Western Channel	Eastern Channel	
Manta	16	21	Microplastics DCSMM
WP2	18	9	Food chain, zooplankton abundance
Niskin on surface	21 (+ 36 RECCRU)	34	Total chlorophyll, TSS, nutrient salts, phytoplanktonic flora, food web (isotopy)
SBE	79	68	Temperature, salinity, pH, Fluorescence, Par (irradiance), Oxygen, Turbidity, depth
MIK	48		Phylosome sampling (greater slipper lobster and crayfish larvae)

Trawling and sampling stations to support research programmes

Gear	Nomber		Application
	Western Channel	Eastern Channel	
Trawl station	52 + 9 craper test	68 realised, 6 cancelled (5 authorisations GB ; 1 Fécamp wind farm)	
Otoliths	886	1209	Production of age abundance indices
Measurement	19079	25910	Production of size abundance indices
APECS	32	143	117 tagging of *Mustelus asterias*, 12 *Galeorhinus galeus* and 46 *Raja clavata*
ANSES Sampling		Sampling of different species	Research and study of parasites
IUEM	1000 poor cod 100 Pout		Student training
University of Caen	40 males + 20 females		Fresh tissue collection for molecular and cell biology
RTP	17 species concerned		Improved Height/Weight Relationships
FISHOWF	33 (Scyliorhinus canicula) 7 Scyliorhinus stellaris 11 Raja undulata	13 Scyliorhinus canicula 5 Raja undulata 15 Mustelus asterias 10 Raja clavata	Installation of an acoustic tag (internal for sharks; external for rays). Monitoring the movements of individuals within the wind farms (Saint Brieuc and Courseulles)

Bathymetric acquisitions:

Gear	Nomber		Application
	Western Channel	Eastern Channel	
Sounder ME70 et 20-40	13	14	Development of physical models description of the background

MEGASCOPE Monitoring :

Type of observation	Total obs.	Total ind.
Human activity		
> Fishing buoy	475	559
> Boat	98	122
> Waste	244	281
> Other activity	133	156
Marine mammal	83	495
Marine bird	1 912	10 549
Land bird	123	395
Other megafauna species (tuna, elasmobranchs...)	70	4 705
Dead individual (bird or mammal)	50	51

ANNEXE 6 : MEGASCOPE Monitoring

Monitoring the distribution of marine megafauna in the Channel

MEGASCOPE

CGFS Campaign

Campaign review 2022

Ghislain Dorémus

Observer :
Bernard Martin
Eléonore Méheust
Hervé Lormée
Simon Ernst

OBSERVATOIRE PELAGIS - UAR 3462
Université de La Rochelle - CNRS
Pôle Analytique – 5 allées de l'Océan
pelagis@univ-lr.fr
www.observatoire-pelagis.cnrs.fr

January 2023

Effort and observation conditions

The campaign took place from 16 September to 18 October and was divided into two sampling legs. The transit from Boulogne to Brest on 18 October completed the campaign's data set.
The work during which the observation effort during prospecting and the surveys during the manoeuvres were carried out was monitored over 280 hours for 31 days at sea.

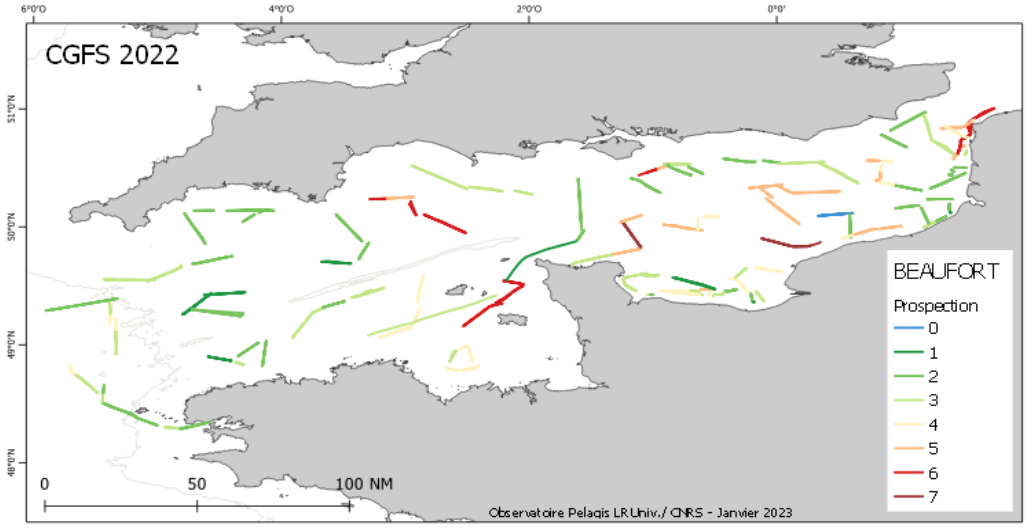


Figure 1 : Area covered in observation effort and conditions

The survey effort according to the standardised protocol totalled 129 hours of observation spent on the foredeck, i.e. an average of 6 hours per day. The "follower" surveys during the trawling operations represented around fifty hours of observation. The conditions encountered throughout the campaign appeared to be correct for detection a little over half the time. They thus allowed 66% of the effort to be made with a sea state of less than or equal to 3 Beaufort.

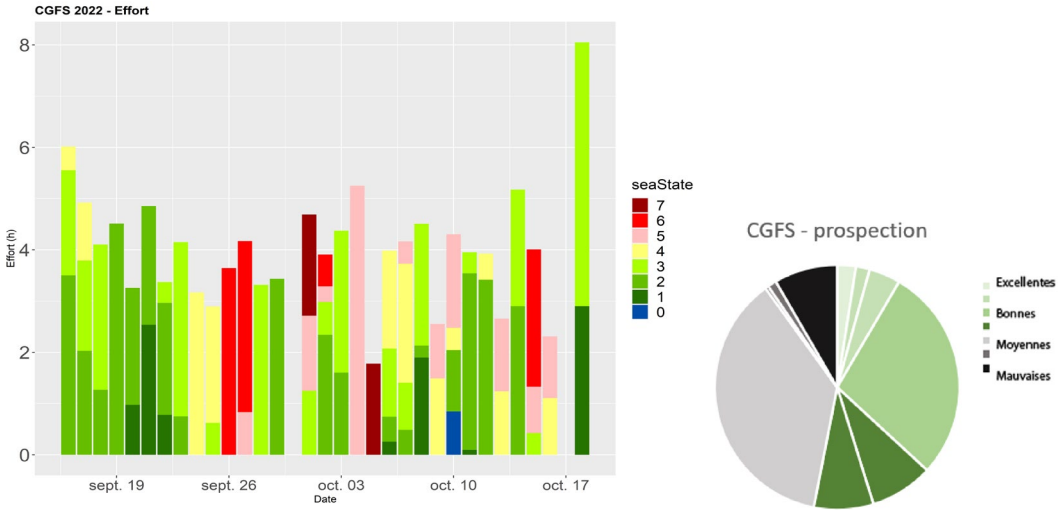


Figure 2 : Observation effort time with sea states encountered (in Beaufort) and conditions estimated by observers

Data collected during CGFS 2022

The total number of observations collected was 2,713 for all taxa combined and 2,659 for effort, i.e. strictly during the survey periods under standardised conditions. Outside the standardised protocol, some 50 observations were added (Table 1). Observations of seabirds were the most abundant, distributed over the entire sampled area, although the numbers were higher at the coast (Figure 4). Gannets and large larids dominate these observations, although many individuals were seen dead. Marine mammals, with nearly 80 sightings, were seen more in the western Channel but also on the eastern side with some delphinids and porpoises (figure 3). The other megafauna species observed were mainly tuna located in the western Channel and jellyfish. The human activities observed consist mainly of cargo ships, fishing boats and gear as well as macro-waste.

Tableau 1 : Number of observations and individuals recorded during the campaign

	Observations in effort		Non-effort		Total obs.	Total ind.
Category	Obs.	Ind.	obs.	ind.		
Humans activity	467	551	8	8	475	559
> Fishing buoy	98	122	0	0	98	122
> Ship	240	277	4	4	244	281
> Waste	129	152	4	4	133	156
> Others activity	1	2	0	0	1	2
Marine mammals	79	459	4	38	83	495
Seabirds	1 879	10 419	33	130	1 912	10 549
Land birds	119	369	4	26	123	395
Others megafauna species (tuna, elasmobranchs…)	65	4 688	5	17	70	4 705
Dead individu (bird or mammal)	50	51	0	0	50	51
Overall total	**2 659**	**16 535**	**54**	**219**	**2 713**	**16 754**

More than 300 monitoring surveys were carried out, representing 617 observations and 11 000 individuals, but with potentially the same revisits from one operation to another (Table 2). It is mainly during fish discard operations and during trawl turns that the concentrations of birds are high. Few spinning operations were monitored due to a reduction in the protocol.

Tableau 2 : Number of survey points and tracker observations according to activity

	Number of survey points	Number of observations	Nomber of individus
Discards	130	312	7 217
Shooting	5	6	251
Hauling	119	224	2 100
In transit	50	75	1 308

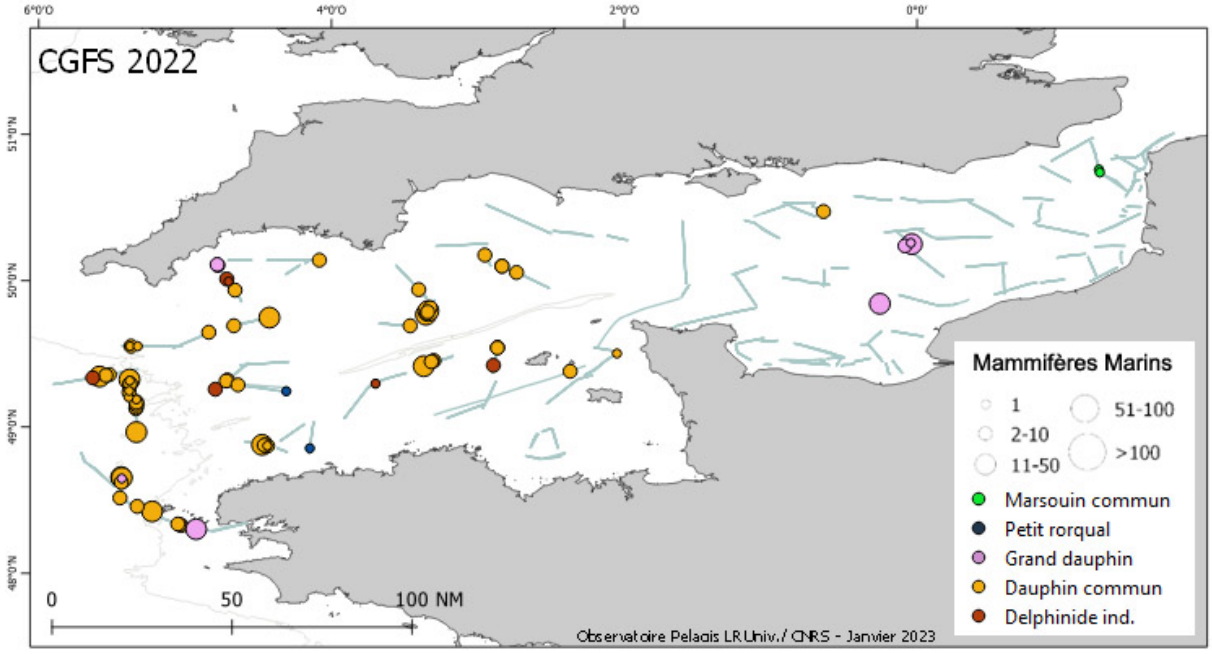


Figure 3 : Distribution of all marine mammal sightings (effort and non-effort)

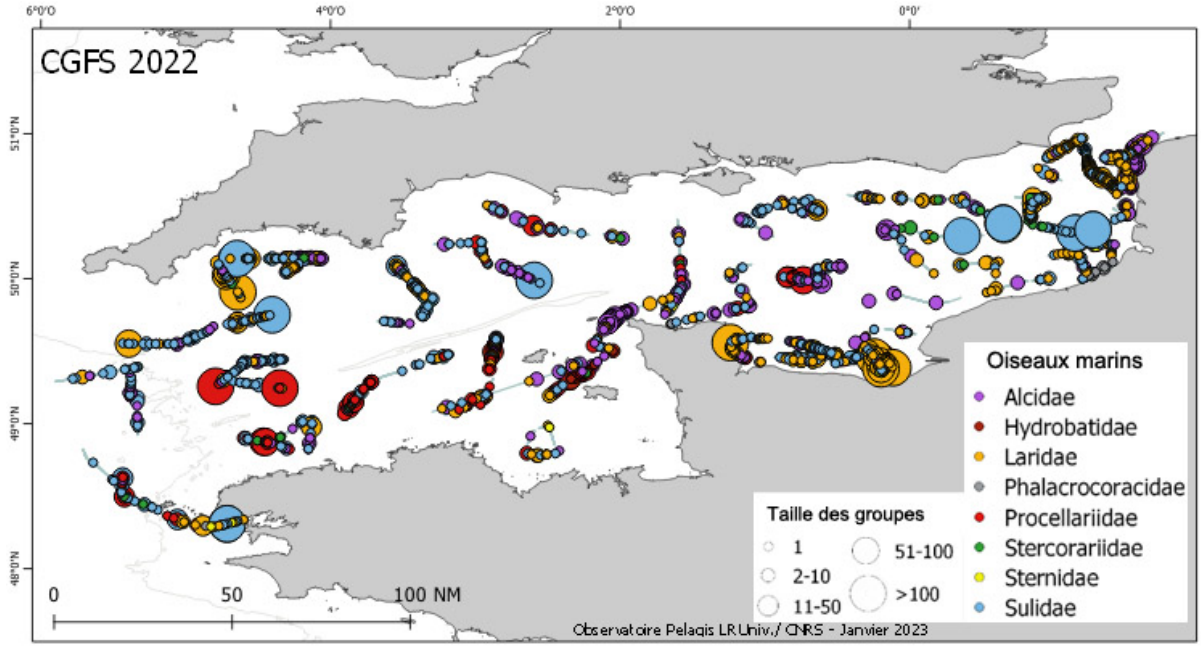
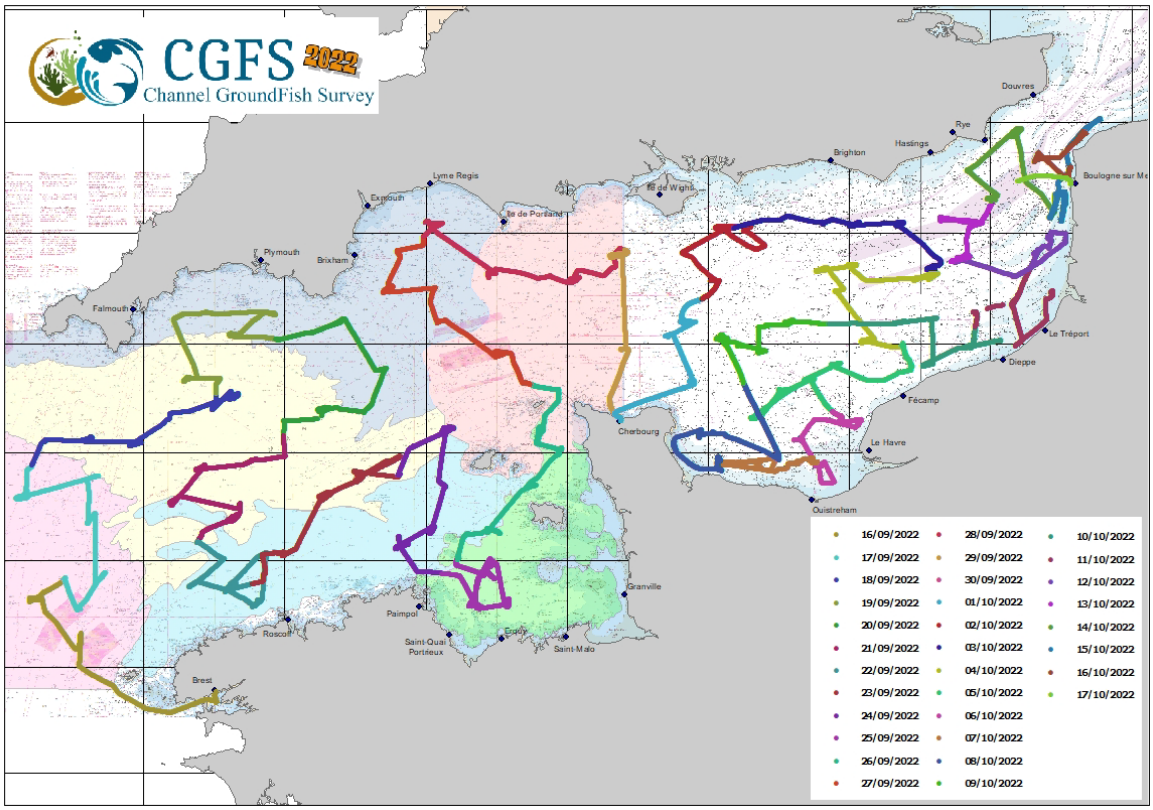


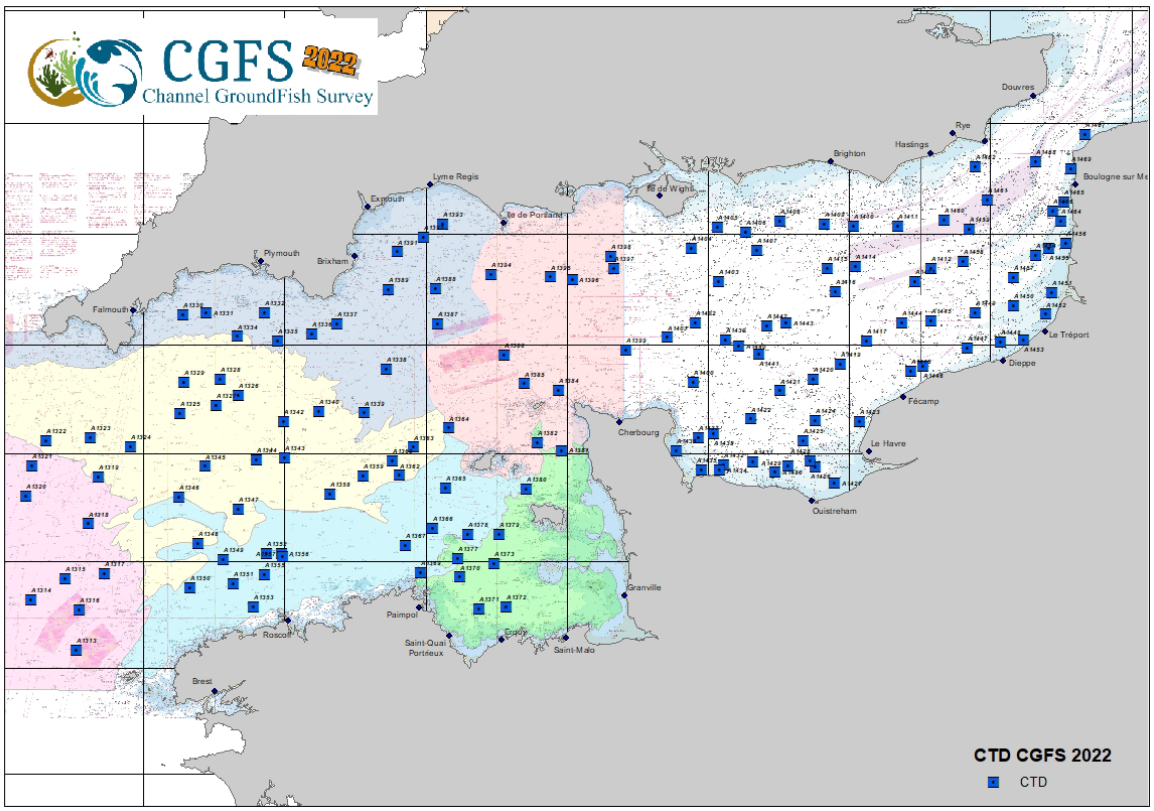
Figure 4 : Distribution of seabird observations by observation effort

ANNEXE 7 : Maps of the samplings carried out

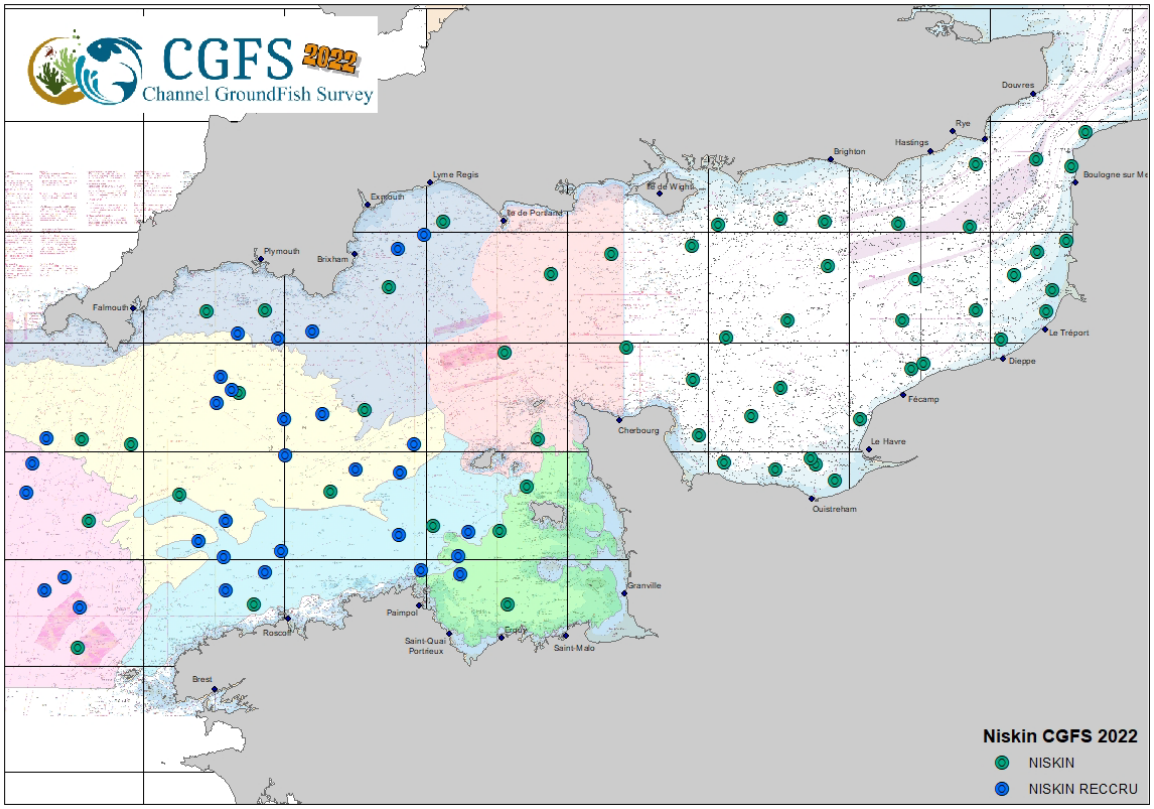
Course of the CGFS 2022 campaign



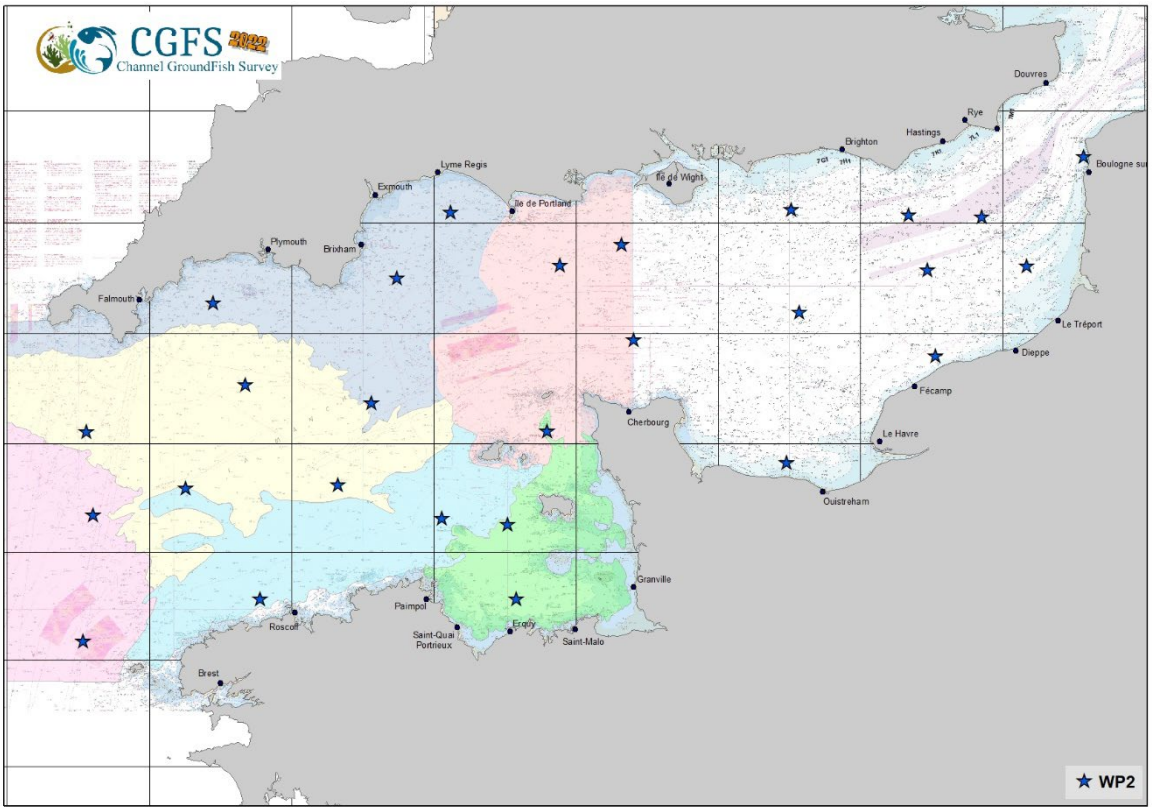
Distribution of CTD profiles



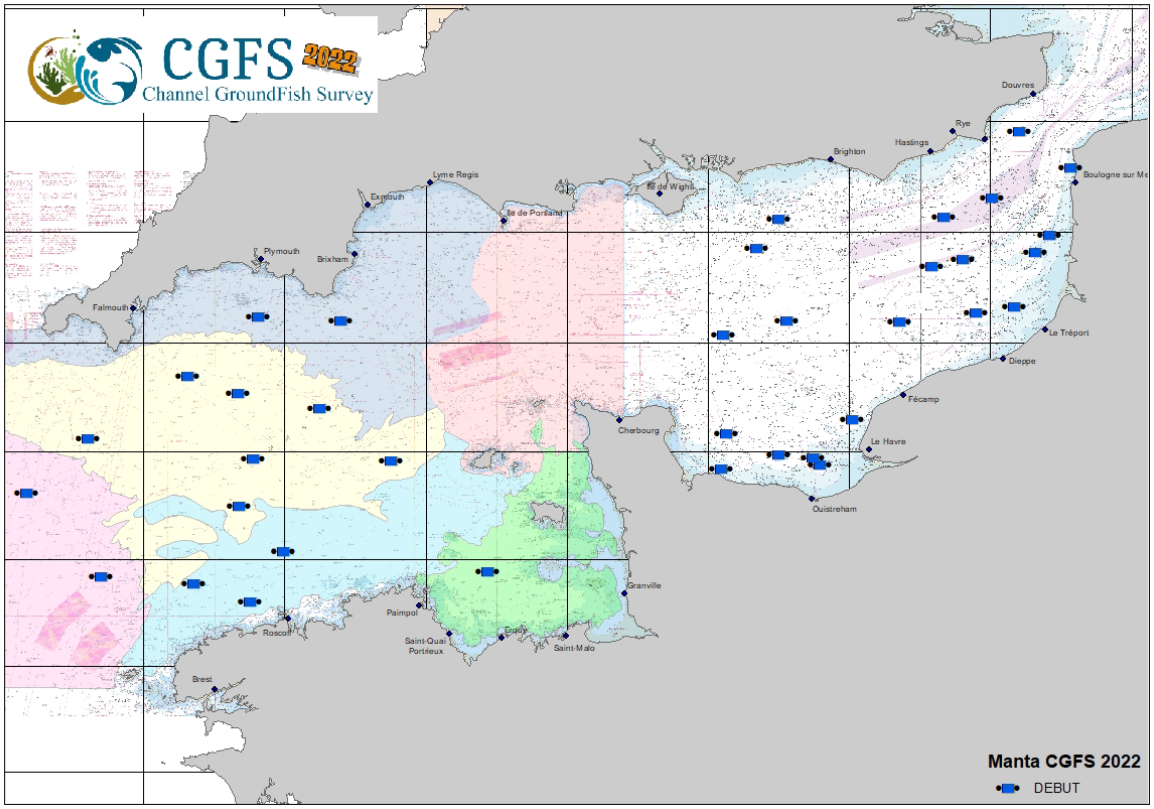
Sampling of NISKIN bottles on the surface



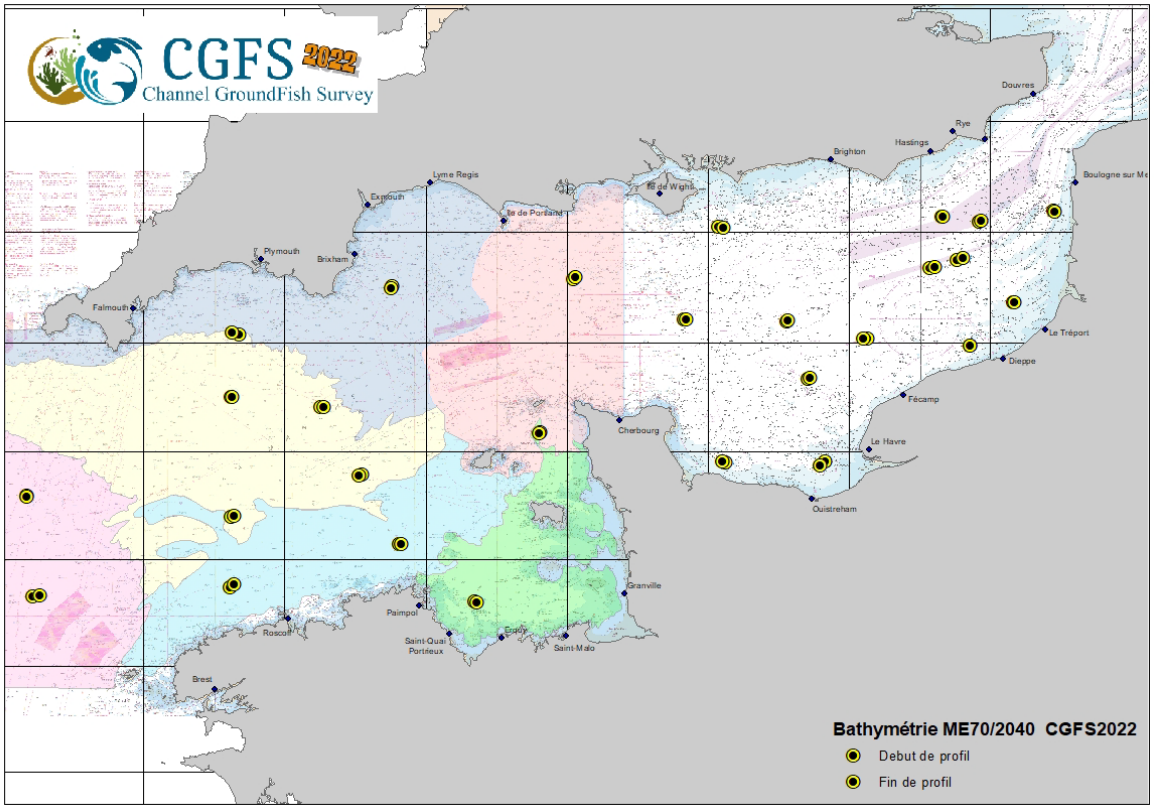
Net sampling WP2



MANTA net sampling for microplastics



Multibeam bathymetric acquisitions



ANNEXE 8 : France – East English Channel Quarter 4 FRCGFS

France – English Channel Quarter 3 & 4 FR-CGFS – FR-WCGFS

Nation:	**France**	Vessel:	THALASSA II
Survey:	CGFS2022	Dates:	THALASSA II: 15/09/2022 to 17/10/2022

Cruise	As from 2018 France sampled both the Eastern (7d) and Western (7e) English Channel. Currently, only data from the Eastern French English Channel Q4 survey is submitted to DATRAS but starting 2023 data from the West will be also available. Trawling was carried out during the day. CTD was deployed at each trawl station to collect temperature and salinity profiles. Age data were collected for 20 species.
Gear details:	The gear used for the Eastern English Channel is the standard GOV 36/47 with ground gear modified for CGFS (bobbins Ø 250 mm) and a GOV 36/49 adapted to the Western Channel with a 400 mm diameter washer with Marport sensors to record doors, wings and vertical openning parameters.
Notes from survey (e.g. problems, additional work etc.):	The 2022 CGFS campaign proceeded under almost normal conditions as we received the necessary authorizations to work in English waters at the beginning of the campaign, with the exception of five stations located in the 6Mn of British waters in the eastern channel. However, we were still able to cover most of the channel and carry out all the planned work for the CGFS campaign. The Thalassa left Brest on October 16th, and the Western Channel was covered with 52 GOV36/49 trawl stations until September 29th. The Eastern Channel was covered from Cherbourg from October 1st to 16th, during which we validated 68 GOV36/47 trawl stations. In addition to the five stations on the English coast, we had to cancel one station on the Fécamp wind farm site as we were denied access *Additional works* : - The CUFES device (Continuous Underwater Fish Egg Sampler) was used during all the survey (day and night) and samples were scanned on board. - Plancton samples were collected for analysis on the planktonic foodweb structure (27 stations with a plankton net (20µm), WP2 and Fluoroprobe) - Microplastic was collected with a Manta net - Observers for mammals and birds information was collected throut out the survey.
Number of fish species recorded and notes on any rare species or unusual catches:	60 different fish's species were recorded (sharks and rays included). Cephalopods and shellfish were also measured and benthic fauna identified within each haul.

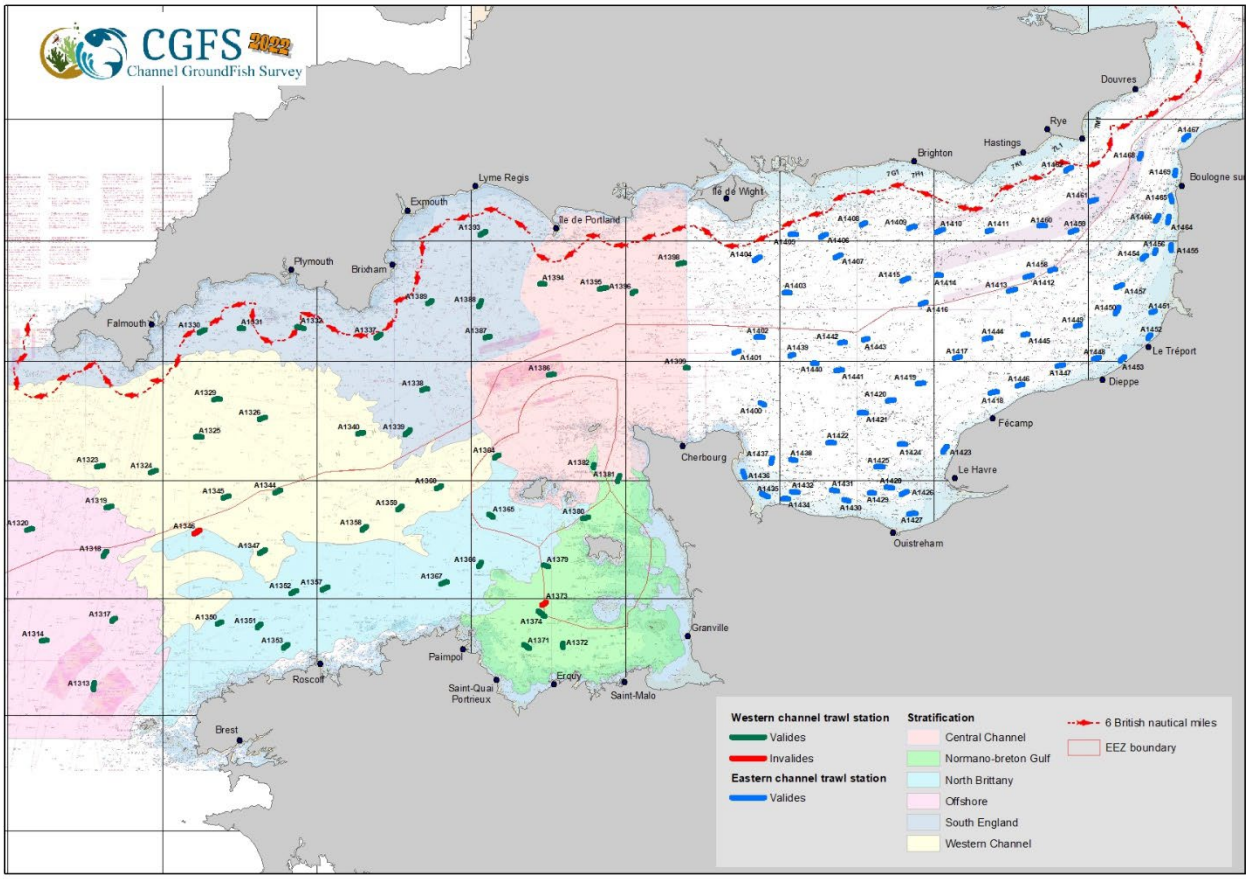
Stations fished

ICES Divisions	Strata	Gear	Tows planned	Valid	Invalid	% stations fished	comments
VIId	**ICES squares**	**GOV 36/47**	**74**	**68**	**0**	**92%**	5 stations cancelled as we did not have permission to work within 6 nautical miles of English waters 1 station cancelled because it was in the Fécamp wind farm area
VIIe	**Western channel strata (cf picture)**	**GOV 36/49**	**48**	**52**	**2**	**106%**	
	TOTAL (GOV)		122	119	2	97%	

Number of biological samples (weight, maturity and age material (otoliths):

Species	Age	Species	Age
Merlangus merlangius	**466** 157(7D) – 309 (7E)	*Gadus morhua*	**9** 6 (7D) – 3 (7E)
Mullus surmuletus	**149** 144 (7D) – 5 (7E)	*Dicentrarchus labrax*	**188** 203 (7D) – 98 (7E)
Pleuronnectes platessa	**237** 233 (7D) – 4 (7E)	*Chelidonichthys cuculus*	**301** 96 (7D) – 113 (7E)
Trisopterus luscus	**152** 69 (7D) – 83 (7E)	*Solea Solea*	**153** 152 (7D) – 1 (7E)
Melanogrammus aeglefinus	**58** (7E)	*Scophthalmus maximus*	**10** 10 (7D) – 0 (7E)
Pollachius pollachius	**14** 0 (7D) - 14 (7E)	*Scophthalmus rhombus*	**3** 3 (7D)- 0 (7E)
Lophius piscatorius	**14** 1 (7D) – 14 (7E)	*Lophius budegassa*	**2** 0 (7D) – 2 (7E)
Lepidorhombus whiffiagonis	**7** 0 (7D) – 7 (7E)	*Microstomus kitt*	**74** 7 (7D) – 67 (7E)
Scomber scombrus	**250** 131 (7D) – 119 (7E)	*Molva molva*	**0**
Phycis blenoides	**0**	*Glyptocephalus cynoglossus*	**0**

Thalassa: GOV hauls FRCGFS-Q4



The CGFS team would like to thank the crew of the Thalassa for their professionalism, as well as all the participants in this campaign.

On-board science team:

AMANDINE SABADEL	UNIVERSITÉ DE NOUVELLE ZÉLANDE
ANTOINE DUSSUEL	IFREMER-HMMN-LRHBL
AURÉLIE LIBEAU	LOG- WIMEREUX
BERNARD MARTIN	PELAGIS- UNIVERSITÉ DE LA ROCHELLE
CAMILLE VERWAERDE	APECS
CHRISTELLE PAILLON	MNHN - DINARD
CHRISTIAN BONNET	IFREMER-IRSI-ISI
DIDIER LE ROY	IFREMER-HALGO-LBH
ELÉONORE MEHEUST	PELAGIS- UNIVERSITÉ DE LA ROCHELLE
EMMA ROBIN	MNHN - DINARD
FANCH GARREN	HALGO-LBH
FLORINE VERHAEGHE	LOG- WIMEREUX
GEOFFREY BLED DEFRUIT	IFREMER-HMMN-LRHBL
HERVÉ LORMÉE	PELAGIS- UNIVERSITÉ DE LA ROCHELLE
HERVÉ BARONE	IFREMER-HALGO-LBH
IVAN SCHLAICH	IFREMER-HMMN-LRHPB
JEAN-HERVÉ BOURDEIX	IFREMER-MARBEC-LHM
JEAN-PHILIPPE VACHEROT	IFREMER-HALGO-LTBH
JOSSELIN CABOCHE	IFREMER-HMMN-LRHBL
LOLA TOOMEY	IFREMER-HMMN-LRHBL
LUCIE SHUCK	STATION BIOLOGIQUE DE ROSCOFF
MARIANNE SAINT-JEAN	APECS
MAUREEN DUFLOT	ANSES - BOULOGNE SUR MER
MORGAN LE MOIGNE	IFREMER-ODE-VIGIES
MORGANE GUILLAM	STATION BIOLOGIQUE DE ROSCOFF
NICOLAS CAROFF	IFREMER-HALGO-LBH
PIERRE CRESSON	IFREMER-HMMN-LRHBL
PIERRE LABOURGADE	FRANCE ENERGIE MARINE
RÉMY CORDIER	IFREMER-HMMN-LRHBL
SIMON ERNST	PELAGIS - UNIVERSITÉ DE LA ROCHELLE
SOLÈNE TELLIEZ	IFREMER-HMMN-LRHBL
SOPHIE LE MESTRE	IFREMER-HALGO-LBH
STÉPHANE LOISEL	STATION BIOLOGIQUE DE ROSCOFF
VALÉRIE LEFEBVRE	IFREMER-HMMN-LRHBL
VICTOR MARTIN-BAILLET	IFREMER-HMMN-LRHPB
VINCENT CORNILLE	IFREMER-HMMN-LRHBL
YANN COUPEAU	IFREMER-RBE-HALGO-LTBH
ZÉLINE HUBERT	LOG- WIMEREUX

Ifremer

Système
d'Informations
Halieutiques

CGFS

Channel GroundFish Survey