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Summary report CGFS 2023

N/O Thalassa

RBE-HALGO-LBH / RBE-HMMN-LRHPB / RBE-HMMN-LRHBL
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Summary Table

Introduction

The English Channel is a region with a strong fishing influence, primarily for the coastal countries but also more broadly for the countries of Northern Europe. The ecological and economic impact of exploiting fishery resources must be measured to ensure that fishing remains a sustainable activity, taking into account the limits of the resource and its impact on the environment. To address this need, European Union member states must conduct scientific sea campaigns to assess the abundance and distribution of stocks, independent of data from commercial fisheries. In this context, the Channel Ground Fish Survey (CGFS) is part of the European program for monitoring fishery resources, providing a set of data related to exploited stocks (maturity, size/age structure, recruitment indices).

The time series initiated in 1988 (on the N/O Gwen-Drez) is used every year by European stock assessment groups, deducing the health status of major commercial species. Initially focused on the Eastern Channel, the CGFS has since 2018 covered the entire Channel to provide independent data from fisheries in the Western area as well. Now conducted on the N/O Thalassa, the CGFS campaign allows for a broader sampling and a better understanding of the entire ecosystem, meeting the demands for monitoring marine ecosystems and implementing an ecosystem-based approach to fisheries at the community level.

Thus, physical and chemical characteristics of the water, phytoplankton and zooplankton communities, fish egg abundance, and the specific composition of nektonic communities are measured and analyzed throughout the campaign. Occasional studies, valued in dedicated projects, allow, for example, a more detailed analysis of the trophic network structure and its spatial variability, influences and parasitic loads in certain fish species, or identification of spawning areas for sardines.

Due to the heterogeneity of the Channel, it was necessary to define a new sampling plan and use a different trawl in the Western Channel. Thus, the mission can be divided into two campaigns:

The first part in the Western Channel (FR-WCGFS) with 48 trawling stations carried out with the GOV 36/49 trawl equipped with a 400 mm diameter diabolos buffer in the middle of the square and a fork rigging. The sampling plan is carried out by a stratified random draw of 48 stations out of the 79 trawls available.

The second part in the Eastern Channel (FR-CGFS) with 74 stations retained out of the 115 historical CGFS campaign stations, ensuring the consistency of the historical series. These stations are carried out with the GOV 36/47 trawl from the IBTS campaigns, with a modified buffer (250 mm diameter diabolos in the middle) to work on the entire Eastern Channel. The sampling plan is fixed."

Progress of the survey

The CGFS 2023 campaign took place on the R/V Thalassa from September 16th to the 29th for the Western part and from October 1st to 16th for the Eastern part. The work permits in English waters were issued well in advance of the campaign's start, allowing us to cover the entire study area without specific restrictions (Fig 1, Appendix 1). During the CGFS 2023, 52 trawling stations were conducted in the Western Channel and 74 in the Eastern Channel, with an invalid tow for each zone due to equipment damage (Fig 1).

At each trawling station, the catch is sorted, weighed by species, and a representative sample is measured. Biological samples are also taken from the catches for later analysis ashore. Throughout the campaign, we experienced only 3 days of bad weather, which led to the cancellation of some plankton and microplastic net samplings. Otherwise, favorable weather conditions allowed us to carry out all work under good conditions.

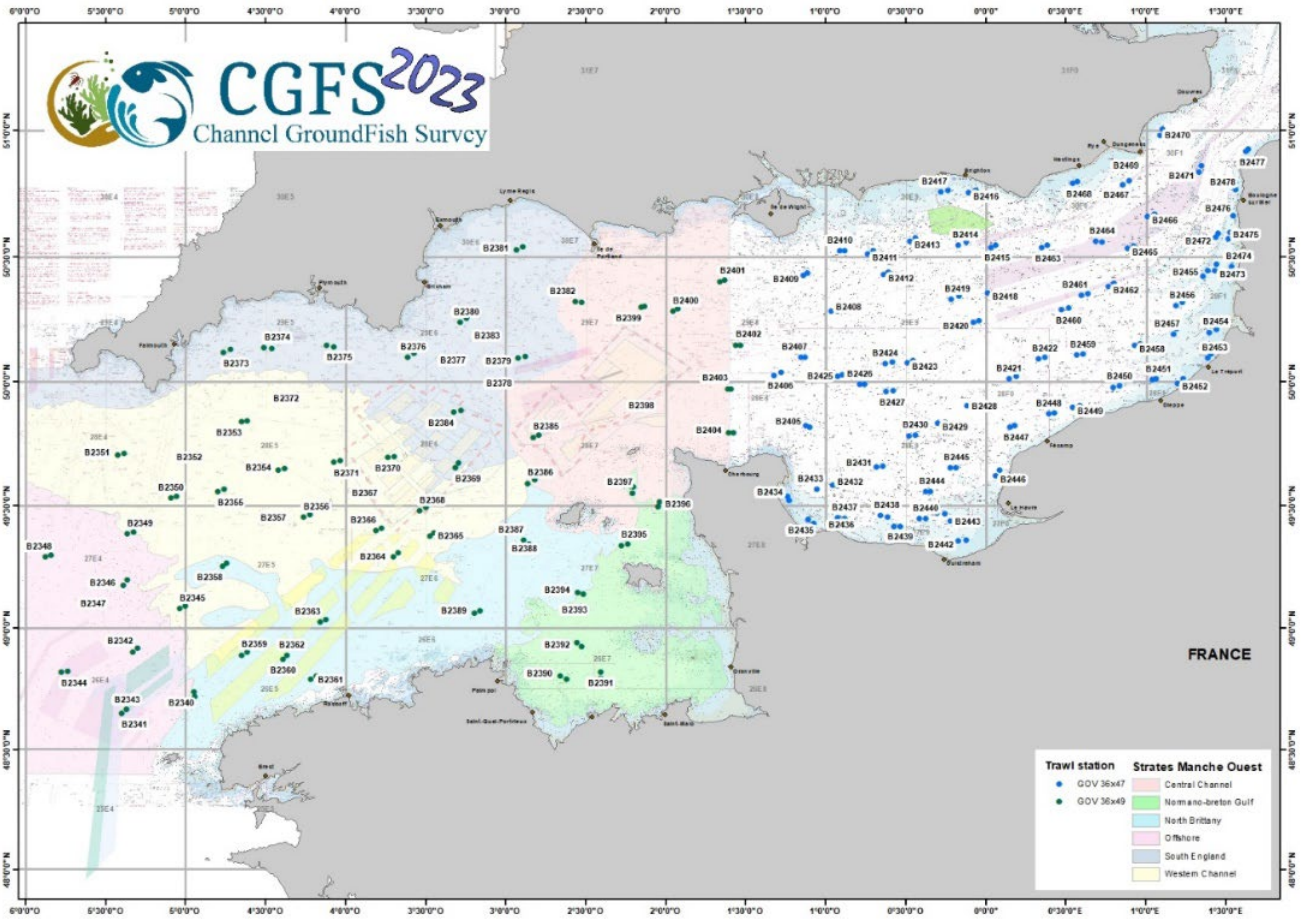


Figure 1: Distribution of Trawling Stations

Supplementary work

Partnership with the Laboratoire d'Océanologie et de Géosciences de Wimereux (62)

The objective of this participation in the CGFS 2023 campaign, is to study the fine variability of the spatial distribution of phytoplankton communities. Continuous pumped surface waters, profiles, and collections of surface waters will be analyzed using characterization and automated analysis devices, counting and size class estimation, pigment classes, biomass of phytoplankton cells/colonies, as well as photosynthetic parameters and estimates of primary production. These efforts are part of the ongoing automated phytoplankton observatories of the European research consortium JERICO-NEXT (2015-2019) in the form of the European project JERICO-S3 (2020-2024. To carry out these tasks, an automated Flow Cytometer of the CytoSense type and a variable Fluorimeter of the Fast Repetition Rate fluorometer type (FRRf-Fast Act-2) were installed on the water intake bypass supplying the FerryBox, collected at subsurface. The measurements were coupled with those from the Thalassa FerryBox, including information on temperature, salinity, estimations of pigment groups' biomass, and raw LED data acquired by the multispectral benchtop fluorometer, the Algae Online Analyser (AOA), and other available parameters. Surface water was sampled during CTD profiles for chlorophyll pigment filtration, automated acquisition, and image analysis.

APECS (Association pour l'étude et la conservation des sélaciens)

A member of this association embarks every year to collect biological and biometric information on certain elasmobranch species and performs markings to enhance knowledge about the movements of three species: the *Mustelus asterias* and *Mustelus sp* (starry smooth-hounds), the *Galeorhinus galeus* (tope shark), and the *Raja clavata* (thornback ray). In 2023, the APECS team has marked 364 *Mustelus asterias*, 23 *Mustelus sp* (starry smooth-hounds), 22 *Galeorhinus galeus* (tope sharks), and 295 *Raja clavata* (thornback rays). APECS also retrieves capsules from rays and sharks found in the captures to estimate spawning areas throughout the entire zone.

Sampling of phyllosomes'larvae (Station biologique de Roscoff)

RECCRU aims to provide information on the recruitment of various commercially significant crustacean species: The European lobster (*Homarus gammarus*), the edible crab (*Cancer pagurus*), the spider crab (*Maja brachydactylus*), and the European spiny lobster (*Palinurus elephas*). This project aims to raise awareness among fleets targeting these species by developing indices on the recruitment level of these resources, enabling proactive management of the fisheries for these crustaceans. The project primarily focuses on studying the larval phases and juvenile stages of these crustaceans. In the long run, it aims to accurately assess recruitments to gain insights into future fisheries for these species. The objective is to collect larvae of slipper lobsters (scyllarides) and spiny lobsters (palinurides). Sampling was conducted by trawling the MIK net for 25 minutes. In total, 38 stations were surveyed at night in 2023 in the Western English Channel zone (Fig 2).

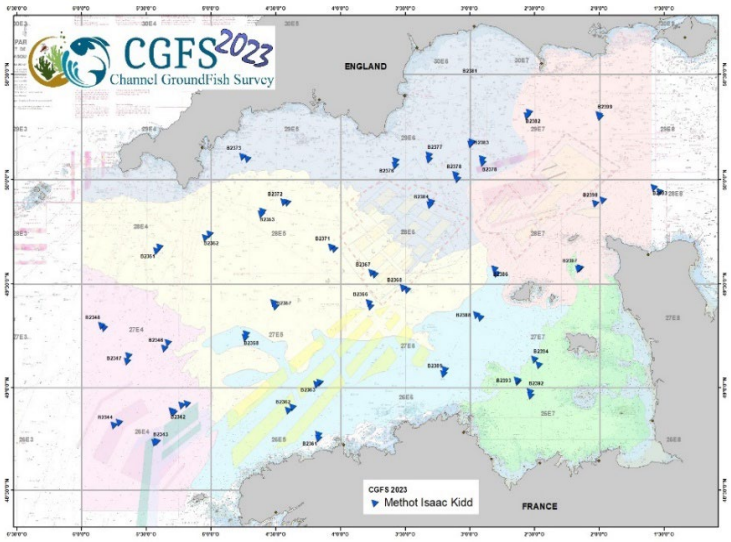


Figure 2:: distribution of MIK nets in the Western English Channel

Project HIOP (IFREMER / ANSES)

These activities are part of the HIOP research program, a thesis jointly supervised by ANSES/LSAl and Ifremer/HMMN, with the aim of acquiring knowledge and skills related to the risk associated with parasites found in seafood products. One of the objectives is to gather data on the distribution (geographical, host spectrum, parasitic diversity) of Anisakidae nematodes present in the organs of commercially important fish, as well as in their prey (copepods and euphausiids). Additionally, similar to CGFS 2022 and IBTS 2023, samplings will be conducted within the framework of the PaPerFish research program (Parasites in seafood products: study of their distribution, zoonotic potential, and consumer perception). The goal is to acquire knowledge and skills related to the risk associated with parasites in seafood products. One of the objectives is to collect data on the distribution (geographical, host spectrum, parasitic diversity) of trematodes causing black spots on the skin and muscles of commercially important fish. Sampling in the sorting room involved collecting between 1 and 15 individuals of 6 cephalopod species (*Loligo forbesii*, *Loligo vulgaris, Sepia, Ilex, Todaropsis, Alloteuthis*) at all stations. The total number of samples represents 2979 individuals across 127 stations. During MIK net samplings, opportunistic samples of euphausiids were collected at 7 stations in the western English Channel, parallel to the collection of mantis shrimp larvae. During WP2 net deployments, a total zooplankton sample was collected at all stations, totaling 28, during the entire campaign.

DNA sampling and tagging of elasmobranchs - Wageningen Marine Research

Wageningen Marine Research is implementing a project titled "Bridging knowledge gaps for skates and rays." This project aims to enhance understanding of the size and structure of the ray population in the North Sea and the eastern English Channel. As part of this initiative, a representative from the institute embarked on the Eastern part of the English Channel to conduct sampling and tagging on various elasmobranch species (see Annex 5). Thirty-two out of the 40 tags were successfully deployed on several ray species. These tags will remain on the fish until July 2023, at which point the detachment mechanism will be activated, allowing for tag retrieval and data downloading. The deployment of tags during the CGFS campaign has expanded the institute's sampling area while increasing the overall number of tags deployed throughout the project's duration. DNA samples from the tagged individuals will contribute to our understanding of migration patterns, where the "migration" of DNA can be observed using genetic data and combining it with information collected from the tags. The DNA of shark species will be used to study the genetic structure of populations for which data are limited, helping to identify the genetic health of these populations.

MEGASCOPE (PELAGIS)

The MEGASCOPE monitoring is carried out annually on certain vessels of the French Oceanographic Fleet in partnership with IFREMER. It involves the implementation of a common protocol called Megascope, applicable to various campaigns, and allows for obtaining data on the distribution and relative abundance of marine megafauna. (Observation summary in Appendix 6).

Parasites Group IMR (BERGEN)- Sampling of juvenile mackerels

The objective of this study is to investigate the geographical distribution and epidemiology of *Kudoa thyrsites* and Ichthyophonus spp. in the Northeast Atlantic Ocean. Specifically, the focus is on studying small mackerels (first infection) from different geographical locations and the occurrence of the parasite *Kudoa thyrsites* in the benthic community (annelids). *Kudoa thyrsites* is a myxozoan parasite that causes a soft-flesh condition in Atlantic mackerel. Its prevalence in mackerel has increased in commercial landings in Norway over the past two or three years. *Ichthyophonus spp*. are cosmopolitan parasites that cause proliferative and systemic diseases in several commercially important species. We have recently observed a high prevalence of Ichthyophonus infections in Atlantic mackerel, but the mode of infection and its detrimental effects on the host's health are still unknown. As part of this international group, we have provided 25 specimens collected from each zone of the campaign.

Analyses of metallic contaminants and trophic markers on sea bass (PELAGIS)

The objective of this work is the analysis of metallic contaminants, trophic markers, and contamination/nursery source tracers (isotopy of certain elements) on two tissues (muscle, liver) of adult sea bass inhabiting the open sea in the English Channel. These analyses are planned within the framework of a project selected for the EC2CO call from CNRS for the period 2023-2024, in which Ifremer/CCEM, UAR 3462 Pelagis, UMR 7372 CEBC, and UMR 7073 LOV are partners: "ISOPESC: Multi-ISOtopic Approach of Trace Metallic Elements for Tracing Sources, Monitoring Bioaccumulation, and Studying Transfers to Marine Ecosystem Predators.

Bathymetric acquisitions (IFREMER / NSE)

Acoustic data in the English Channel is of great interest for methodological developments in seafloor characterization for two reasons: (1) Ground data (Pagure CGFS video) and grabs during campaigns by the Marine Geosciences unit are abundant in the area, allowing for the refinement of physical models describing the seafloor based on the angular reflectivity curve of the bottom. (2) At these shallow depths, it is possible to use the two multibeam echosounders Thalassa ME70 and EM2040 at two different frequencies, as was done in 2018, to better describe sediment structure. Therefore, we have continued the acoustic coverage of trawling zones, aiming to study the direct correlation between trawled species and acoustic response (results appear promising in the Bay of Biscay and the Celtic Sea). Additionally, we aim to establish a connection between acoustic response and sediment description through video and/or sampling.

Genetic Marker Research for *Scyliorhinus stellaris* (IFREMER / L. Baulier)

These samples of flesh from the greater spotted dogfish are intended for the research of genetic markers that could later be applied to explore genetic isolation (and therefore connectivity) between dogfish from different areas. This is thus a preliminary phase necessary for a future project concerning the population genetics of this species. In this regard, 15 samples were taken in the Western English Channel and 19 in the Eastern English Channel. Samples for IUEM (European University Institute of the Sea) involve freezing whole fish (Trisopterus minutus) for dietary analysis purposes. They are made available for practical dissection work for 80 third-year undergraduate students at UBO (Biological Functions and Life Cycles in Marine Organisms).

Overall analysis

The preliminary report presented here displays raw data collected during the CGFS campaign. The data has not been standardized by tawled area, limiting a more detailed comparison of observations.

Eastern English Channel (FR-CGFS)

Fish

The average abundance per trait is 6754 individuals, and the average biomass is 353 kg. Pelagic species such as horse mackerel (*Trachurus trachurus*), sardine (*Sardina pilchardus*), sprat (*Sprattus sprattus*), and mackerel (*Scomber scombrus*) are strongly dominant in abundance (Fig 3a) and represent approximately 86% of the total number of captured individuals. Horse mackerel alone accounts for 65% of the abundance of fish and cephalopods and also dominates in biomass with 45% of the total biomass (Fig 3b). In terms of relative abundance, demersal species follow, including black seabream (*Spondyliosoma cantharus*; 2.63%), common squid (*Loligo vulgaris*; 1.48%), bib (*Trisopterus luscus*; 1.35%), red mullet (*Mullus surmuletus*; 1.20%), and lesser spotted dogfish (*Scyliorhinus canicula*; 1.03%). Regarding relative biomass, it is dominated by horse mackerel and mackerel (11%). Next are species characterized by substantial sizes such as lesser spotted dogfish (8.5%), thornback ray (6.22%). The first representative demersal species are black seabream (2.74%), common squid (1.96%), cuttlefish (*Sepia officinalis*; 1.75%), and sea bass (*Dicentrarchus labrax*; 1.67%).

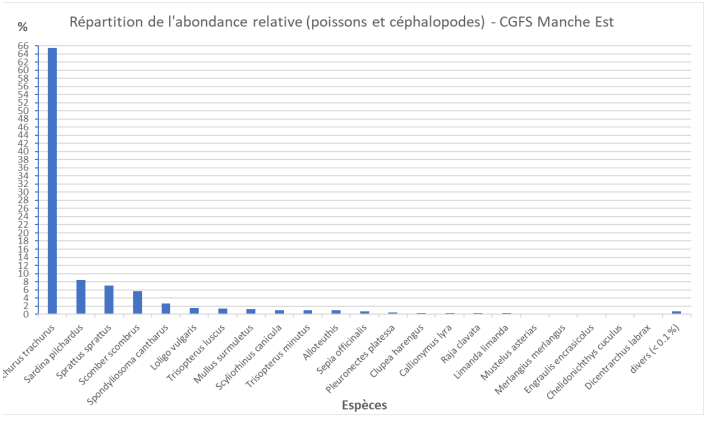


Figure 3a: Abondances relatives des principales espèces

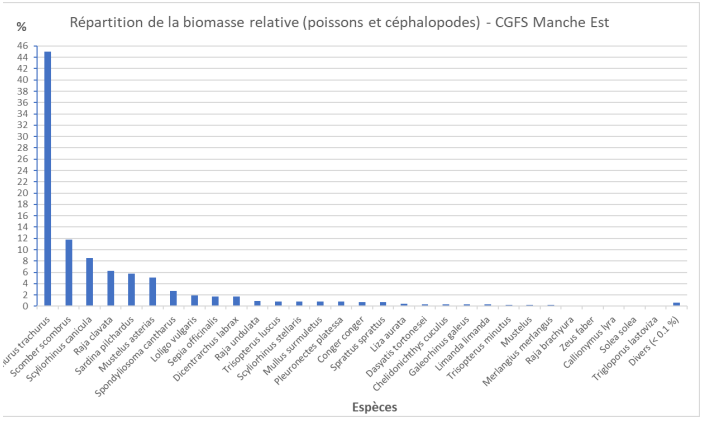


Figure 3b: Répartition de la dominance en biomasse

In general, the geographical distribution of abundances is well correlated with that of biomasses (Fig 4a and 4b). The most significant areas are mainly along the coasts from Boulogne-sur-Mer to Dieppe, in the Bay of Seine, and offshore to the east of the Traffic Separation Scheme (TSS) to the Bay of Brighton. There are also several points offshore from the Bay of Seine, on the boundaries of English waters, showing a high abundance of horse mackerel, thornback ray, and lesser spotted dogfish. In the Bay of Veys, the Bay of Seine, and off the coast from Dieppe to the Bay of Authie, there is an observed discrepancy between abundance and biomass due to the capture of small-sized individuals.

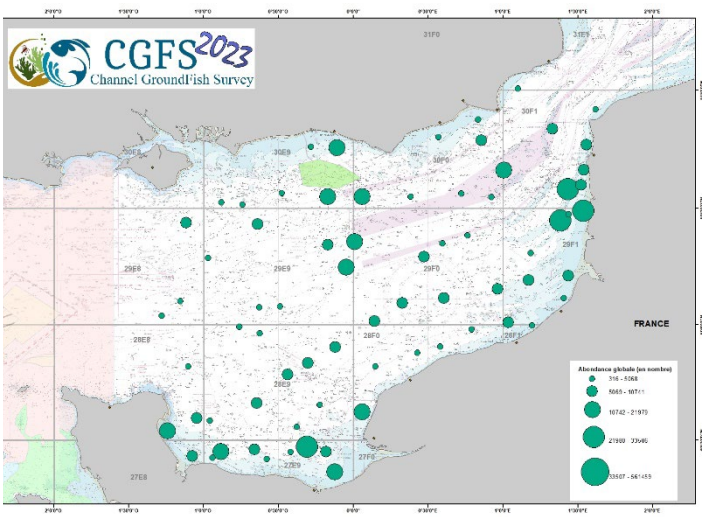


Figure 4a: Abondance globale de poisson (en nombre d'individus)

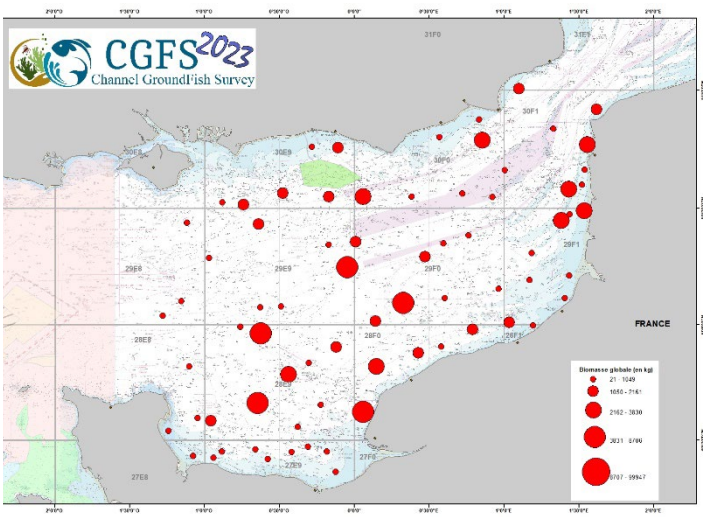


Figure 4b: Biomasse globale de poisson (en kilos)

A total of 86 species were identified during the CGFS 2023 in the Eastern English Channel. Specific richness is highest primarily along the coastline (Fig 4). In terms of occurrence, horse mackerel is present at all trawling stations, while cuttlefish and common squid are present in 98% and 96% of trawling stations, respectively. Among other widely distributed species, Alloteuthis, mackerel, red mullet, and lesser spotted dogfish are also found (Annex 4).

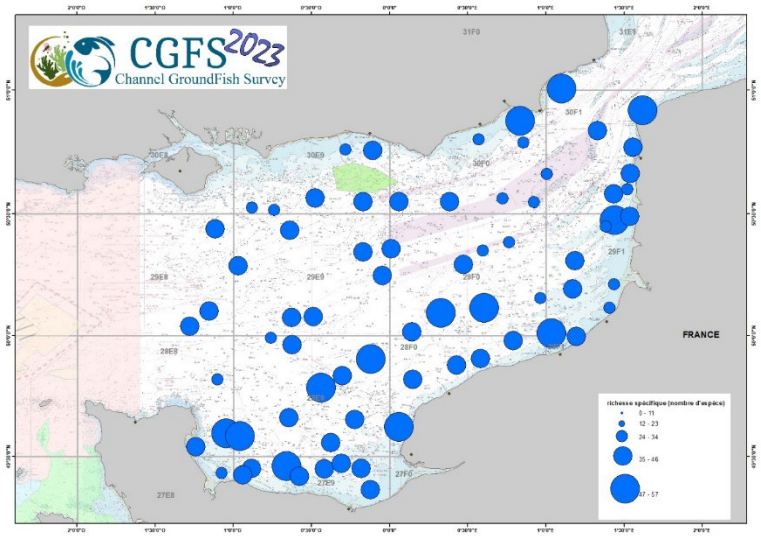


Figure 4: Distribution de la richesse spécifique en nombre d'espèce par trait.

Benthos

A total of 91 species were identified during the CGFS 2023 in the Eastern English Channel. The highest abundances and biomasses of benthos were observed in the Bay of Seine, along the Normandy coast, and along the Opal Coast (Fig 5a and 5b). Brittle stars (*Ophiothrix fragilis*), starfish (*Asterias rubens*), slipper limpets (*Crepidula fornicata*), mussels (*Mytilus edulis*), and green sea urchins (*Psammechinus miliaris*) alone represent 80% of the total biomass of benthic invertebrates captured in the Eastern English Channel, with 44%, 17%, 8%, 7%, and 4.5%, respectively. In 2023, the most widely distributed species in the sampled zone are the starfish (*Asterias rubens*), green sea urchin (*Psammechinus miliaris*), a hydroid species (*Hydrallmania falcata*), and a spider crab species (*Inachus dorsettensis*) with occurrence rates of 75%, 71%, 63%, and 61%, respectively (Annex 4).

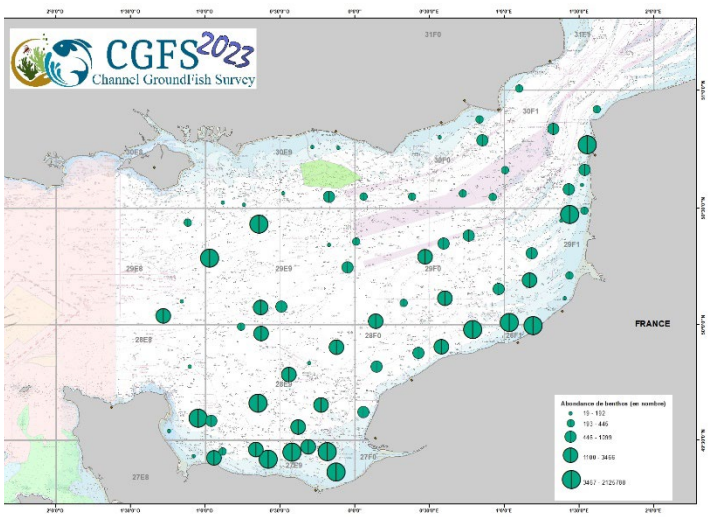


Figure 5a : Abondance globale de benthos (en nombre d'individus)

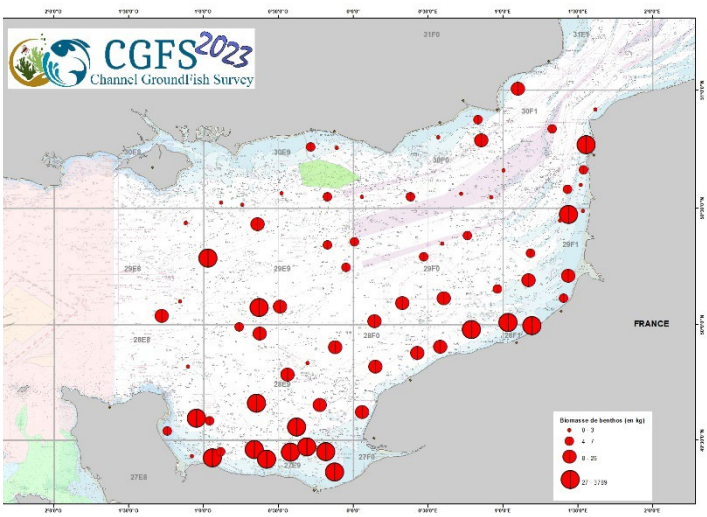


Figure 5b : Biomasse globale de benthos (en kg)

Western English Channel (FR-WCGFS)

Fish

In 2023, the average abundance of commercial fish, cephalopods, and benthos per tow is 12,804 individuals, and the average biomass represents 295 kg. This high average abundance is primarily represented by the capture of pelagic fish. Horse mackerel, sardine, sprat, and mackerel account for 86% of the abundance and 68% of the biomass, with a significant dominance of small horse mackerel (65% and 32%, respectively) (Fig 6a and 6b). The first demersal species is the grey triggerfish (*Spondyliosoma cantharus*), representing 2% of relative abundance and 5% of biomass. Other larger species, such as sea bass (*Dicentrachus labrax*) and lesser spotted dogfish (*Scyliorhinus canicula*), appear significantly in the distribution of biomass, accounting for 5% and 3%, respectively.

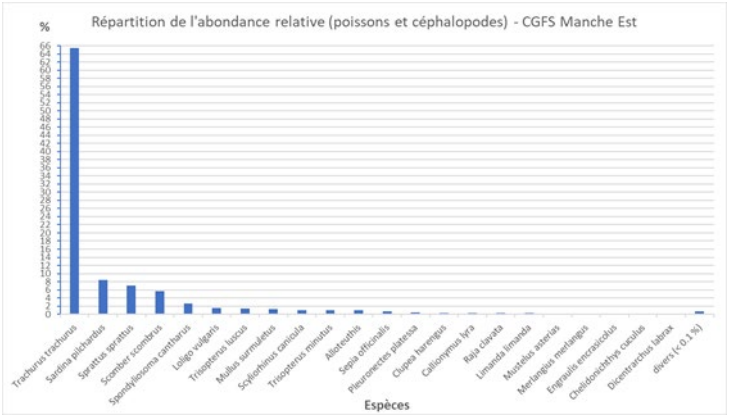


Figure 6a: Abondances relatives des principales espèces

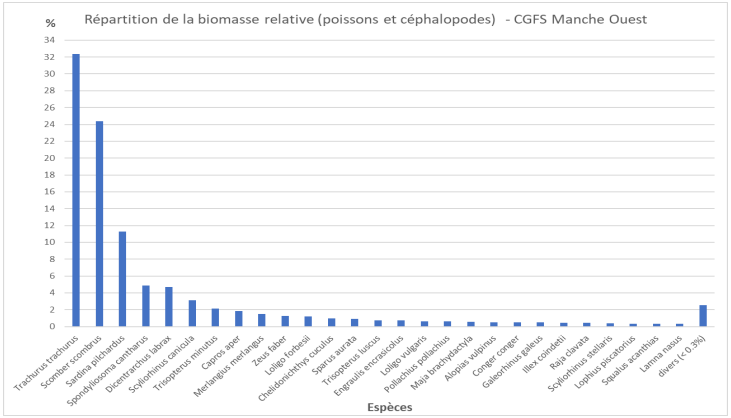


Figure 6b: Répartition de la dominance en biomasse

Eighty-eight species of fish, cephalopods, crustaceans, and gelatinous organisms were identified during the CGFS 2023 campaign in the western English Channel. The most diverse captures are concentrated in the northwest part of Finistère and around Plymouth Bay (Fig 8).

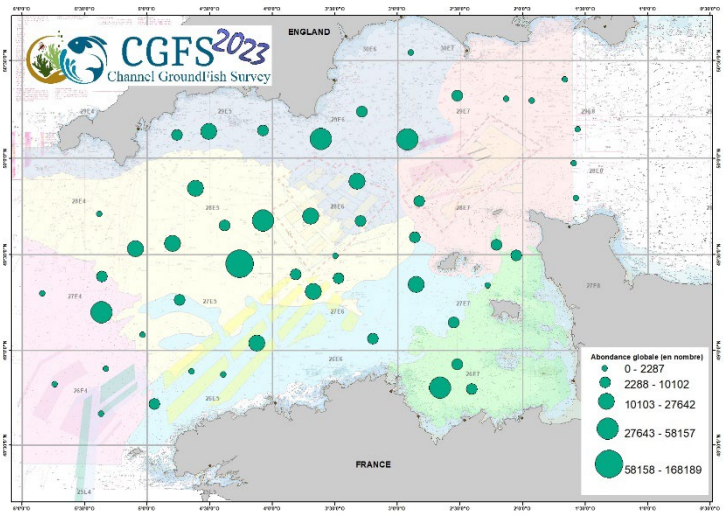


Figure 7a: Abondance globale de poisson (en nombre d'individus)

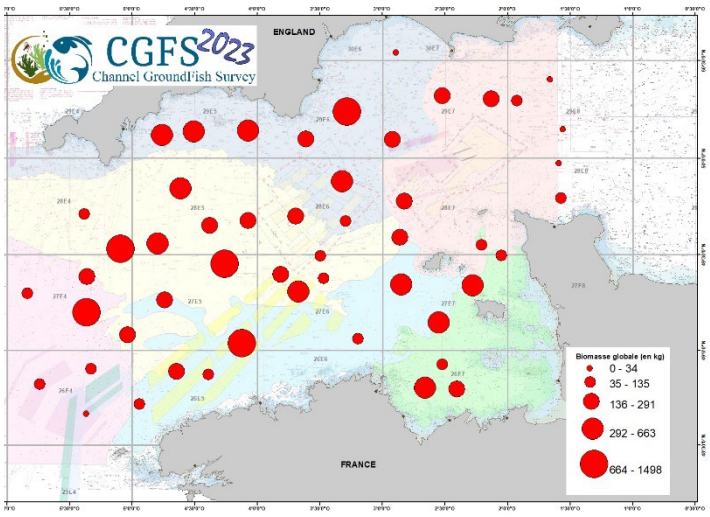


Figure 7b: Biomasse globale de poisson (en kilos)

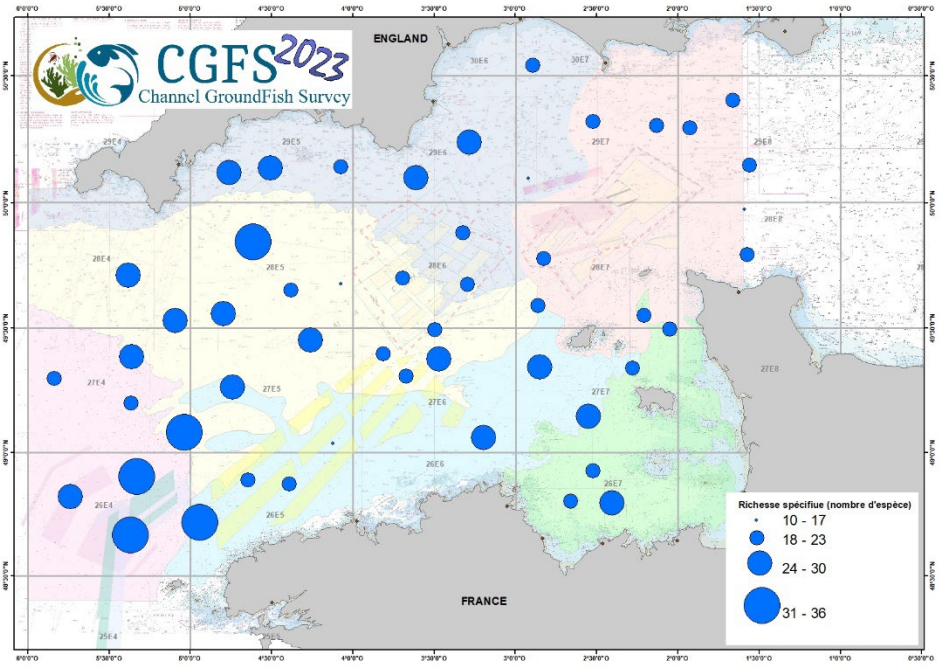


Figure 8: Distribution de la richesse spécifique en nombre d'espèce par trait.

Benthos

Fifty-eight species were observed in the western English Channel. The highest abundances and biomasses of benthic organisms are observed in the north of Finistère up to the limit of English waters and in the Bay of Saint Brieuc (Fig. 9a and 9b). The sea urchin (*Echinus esculentus*) is the most widely distributed species, along with the spiny starfish (*Marthasterias glacialis*), as they are present in 45% and 23% of the trawling stations conducted (see Annex 4). The sea urchin is also dominant in abundance and relative biomass, representing 18% and 59% of the total benthic capture, respectively. The second most abundant benthic species is the hydroid Abietinaria abietina (16%), while in terms of biomass, we find an ascidian, *Diazona violacea* (18%), close to the spiny starfish (14%). It is worth noting that, given the gear used in the western English Channel during the campaign, these results are indicative and do not provide a precise view of the benthic communities in the area.

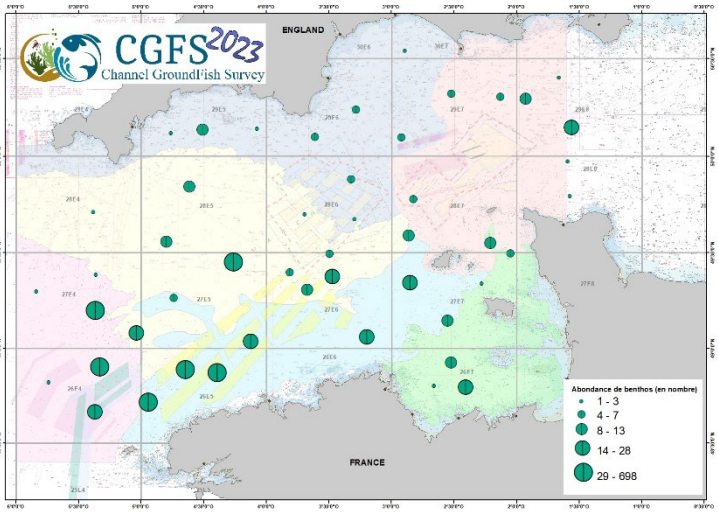


Figure 9a : Abondance globale de benthos (en nombre d'individus)

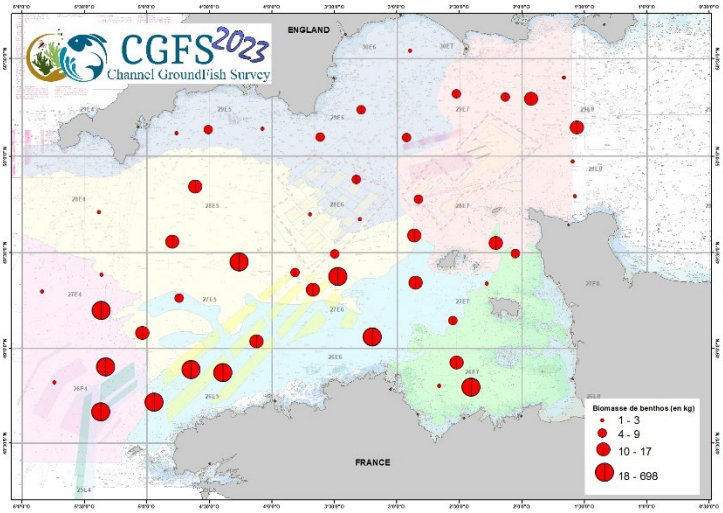


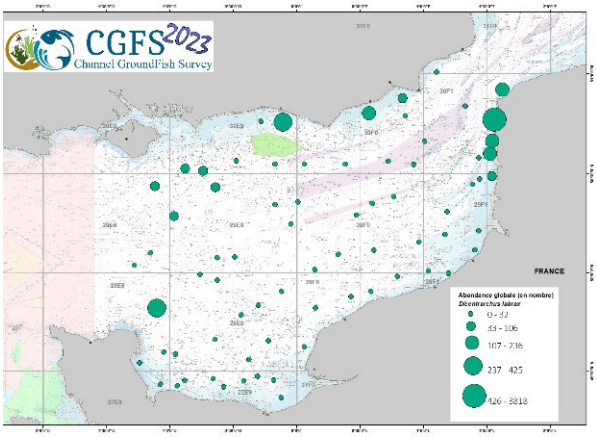
Figure 9b : Biomasse globale de benthos (en kg)

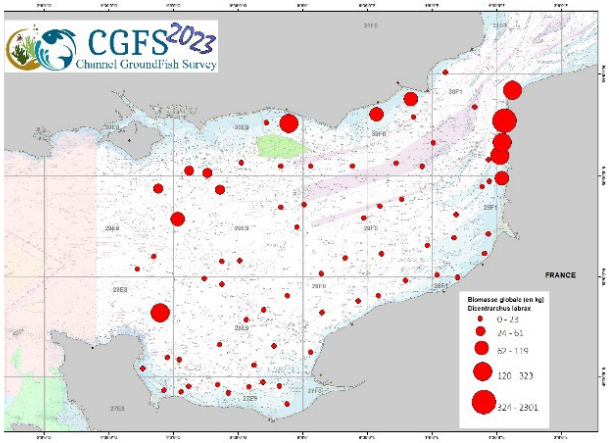
Analysis by species

Eastern English Channel (FR-CGFS)

Sea bass (*Dicentrachus labrax*)

During CGFS 2023, this species is found throughout the Eastern English Channel, but it is primarily captured from Cape Gris-Nez to the south of the Bay of Canche, along the English coast from Rye to Brighton, northeast of the Cotentin Peninsula, and to a lesser extent off the Isle of Wight (Fig. 10). The size spectrum ranges from 23 to 68 cm. Most individuals have a size between 33 and 48 cm, which is around the maturity size of bass in the English Channel (42 cm). Another, less pronounced mode emerges around 53 cm. Larger individuals are mainly distributed in rocky areas that are more difficult to access with the gear used for CGFS, resulting in low catchability. This can explain why their size distribution is mostly restricted to juveniles.





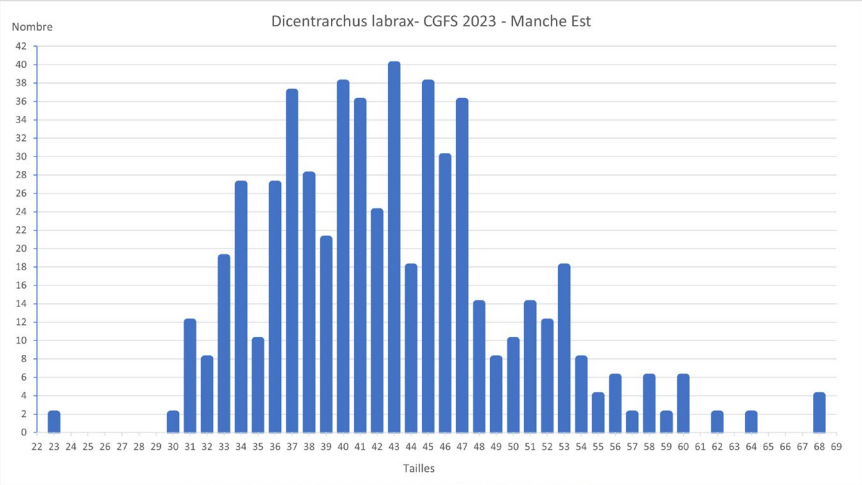


Figure 10: Distribution de l'abondance (en vert), de la biomasse (en rouge) et la répartition en tailles (en bas) des bars capturés lors de la CGFS 2023.

Whiting (*Merlangius merlangus*)

This year, the geographical distribution of whiting is mainly along the coast of Dungeness, off the Isle of Wight, in the eastern part of the Bay of Seine, and to a lesser extent in the sector of the Opal Coast. The size spectrum ranges from 9 to 35 cm, revealing three modes, one more pronounced at 18 cm and two others at 11 and 27 cm. Since the maturity size of whiting in the English Channel is 27 cm, the majority of captured individuals are juveniles (Fig 11).

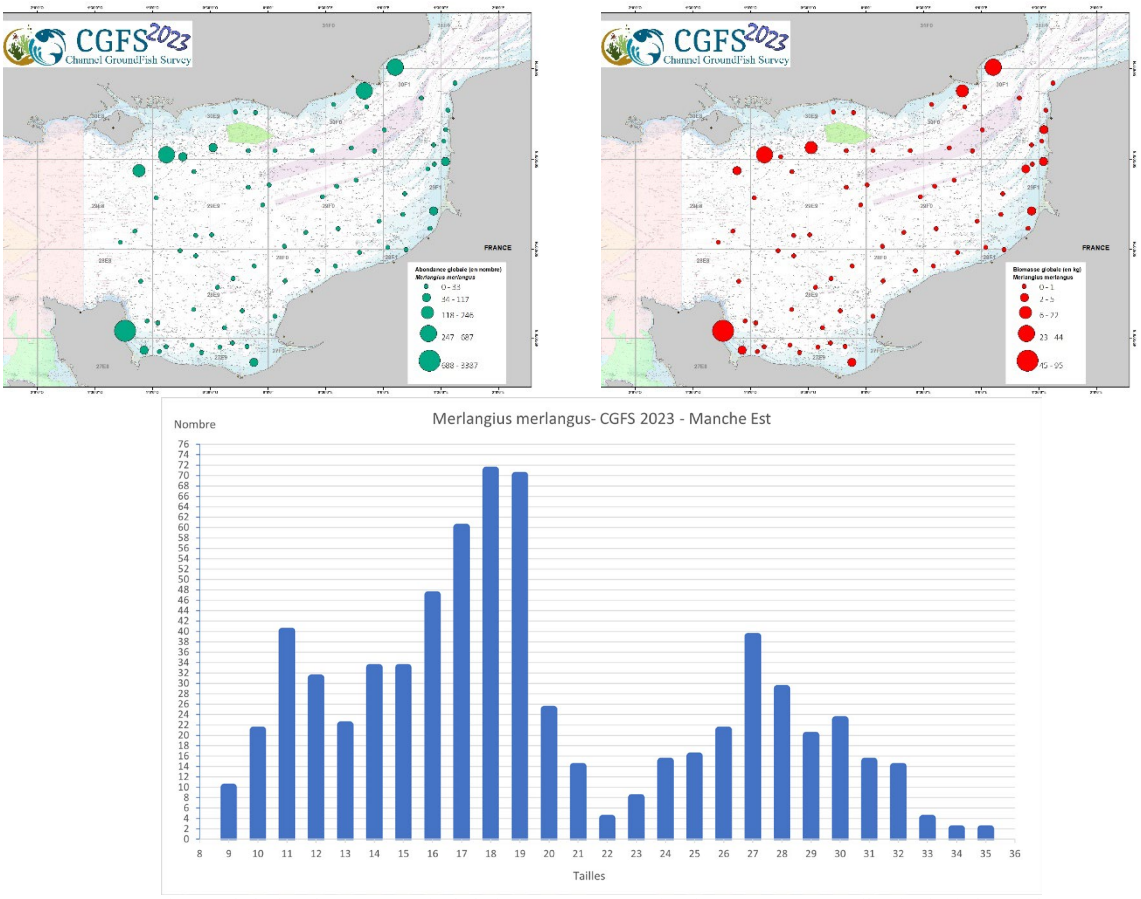


Figure 11: Distribution de l'abondance (en vert), de la biomasse (en rouge) et la répartition en tailles (en bas) des merlans capturés lors de la CGFS 2023.

Plaice (*Pleuronectes platessa*)

The geographical distribution of the plaice is very coastal. It is mainly captured along the English coast from Rye Bay to Brighton and in the Bay of Seine, with a smaller proportion along the Dieppe coast (Fig 12). The size spectrum ranges from 12 to 46 cm, with the majority of individuals having a size between 18 and 28 cm, and to a lesser extent between 30 and 35 cm.

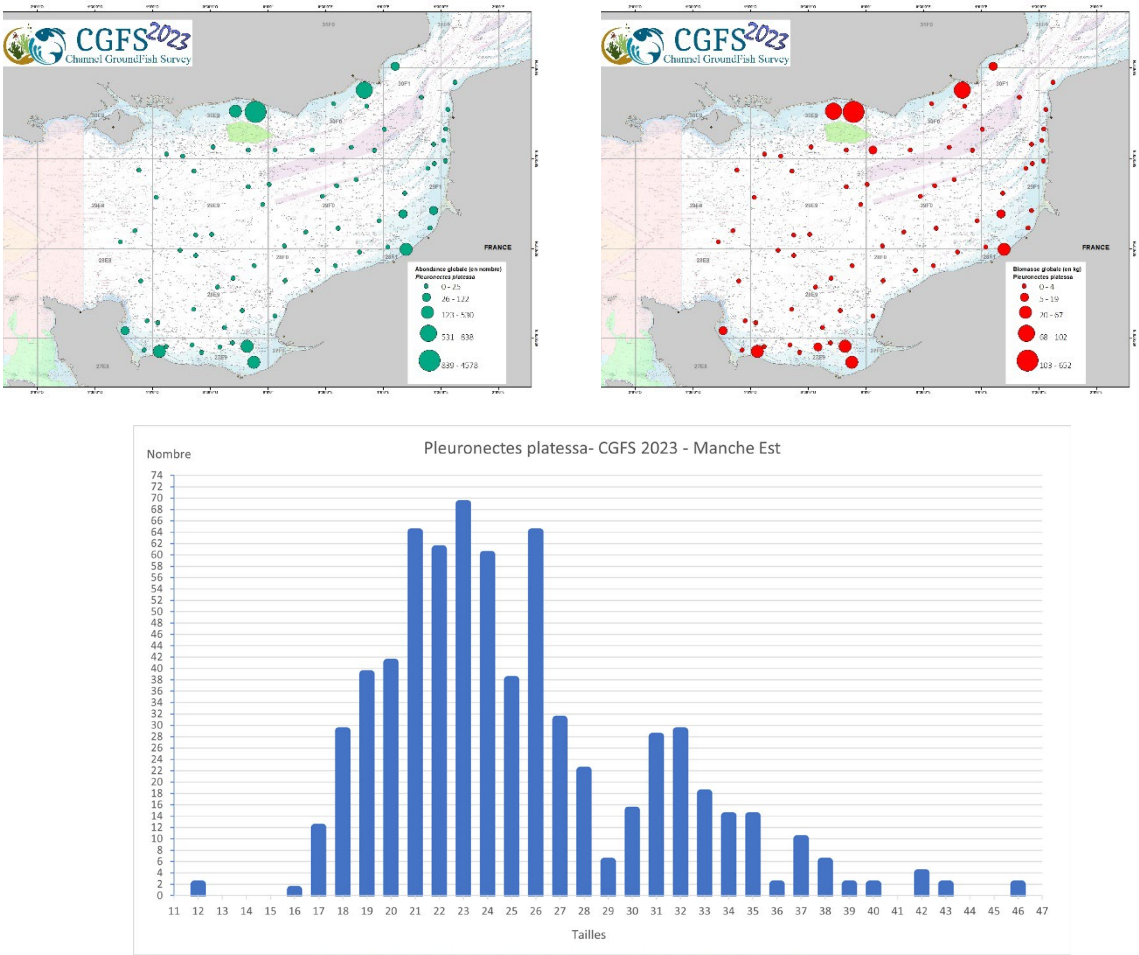


Figure 12: Distribution de l'abondance (en vert), de la biomasse (en rouge) et la répartition en tailles (en bas) des plies capturées lors de la CGFS 2023.

Rock red mullet (*Mullus surmuletus*)

The rock red mullet is widely distributed in the Eastern English Channel in October with an occurrence of 82.19%. However, it is more present in the Bay of Seine and in the central part of the Eastern Channel, and to a lesser extent along the coast between the Bay of Canche and Dieppe (Fig 13). The size spectrum ranges from 9 to 31 cm, with two distinct modes, one more significant around 12 cm and another around 21 cm.

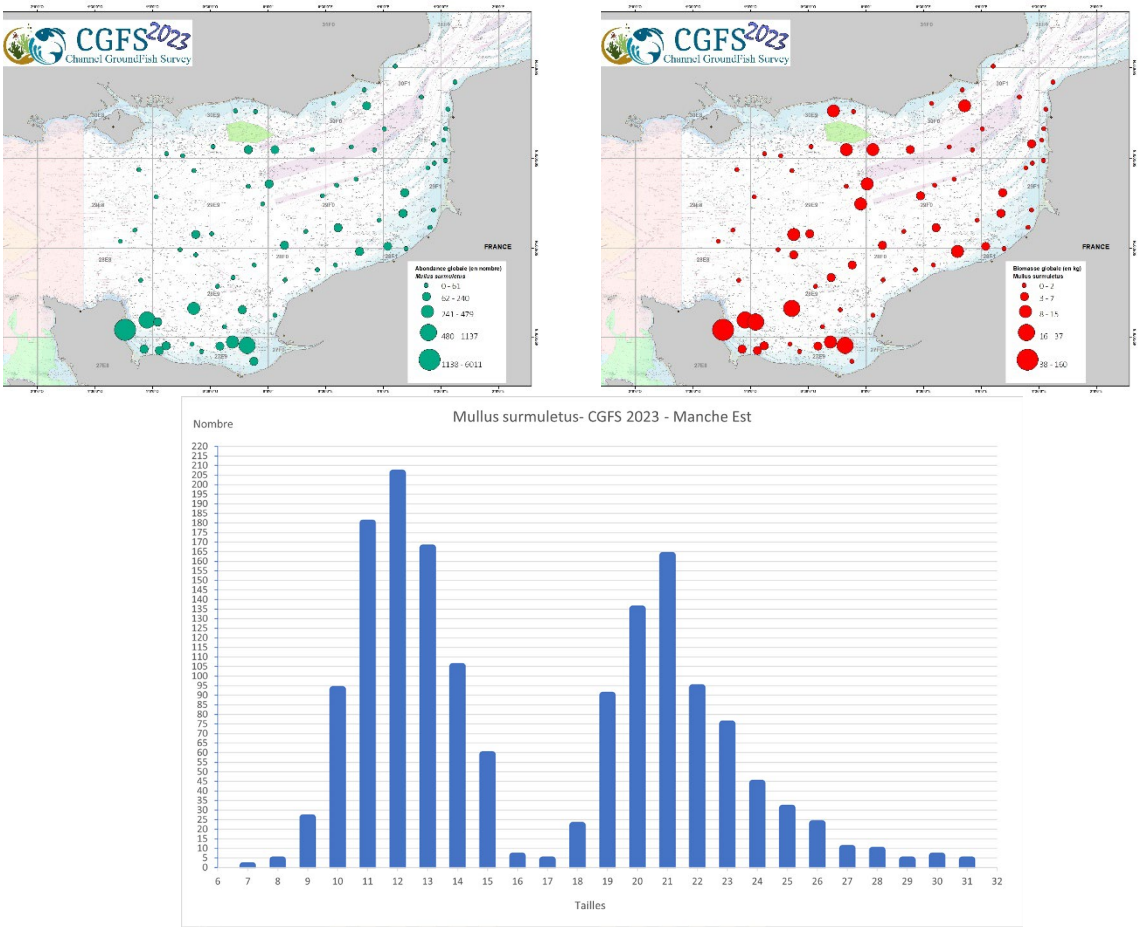
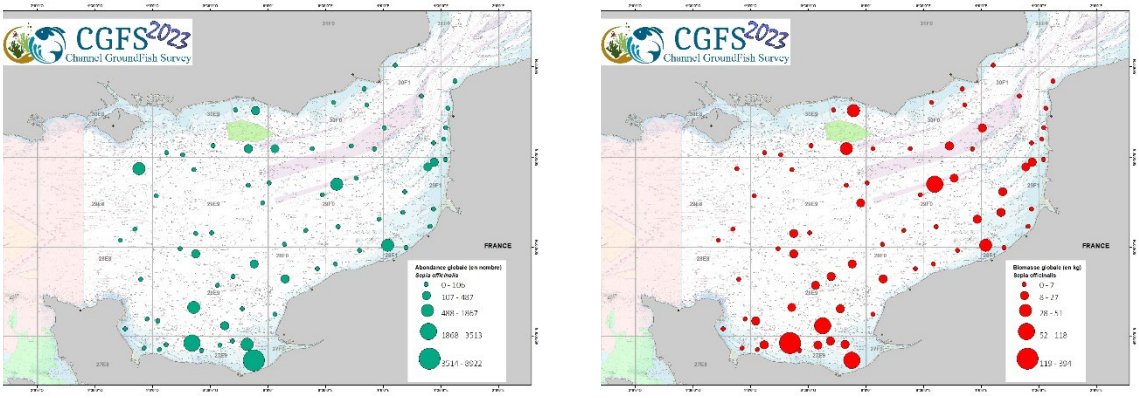


Figure 13: Distribution de l'abondance (en vert), de la biomasse (en rouge) et la répartition en tailles (en bas) des Rouget-barbet capturés lors de la CGFS 2023.

Cuttlefish (*Sepia officinalis*)

The cuttlefish (*Sepia officinalis*) is very abundant in the Eastern English Channel in October, with an occurrence of 98.63% this year. It is mostly found in the Bay of Seine, and to a lesser extent off the coast between the Bay of Authie and Dieppe and off the coast of Brighton. The size spectrum ranges from 1 to 23 cm, with two modes observed—one for a majority of individuals around 6 cm and another around 14 cm (Fig 14).



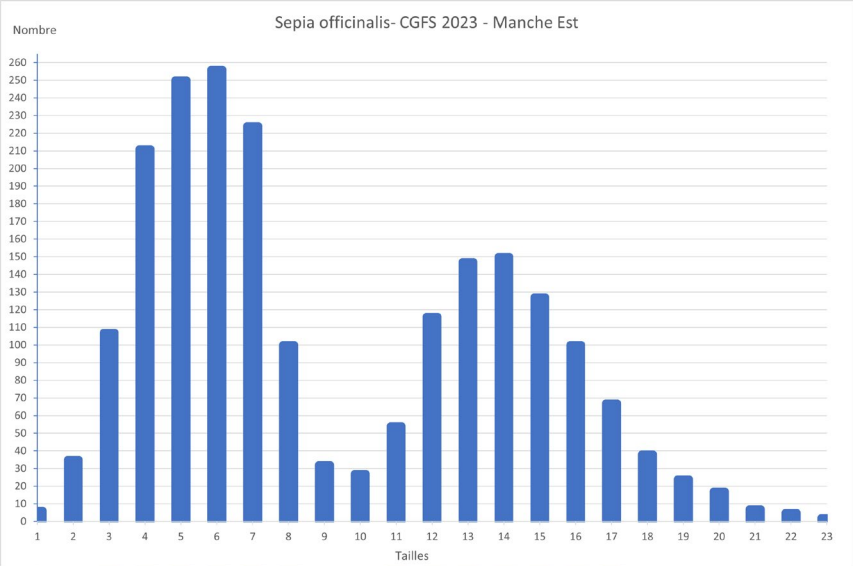
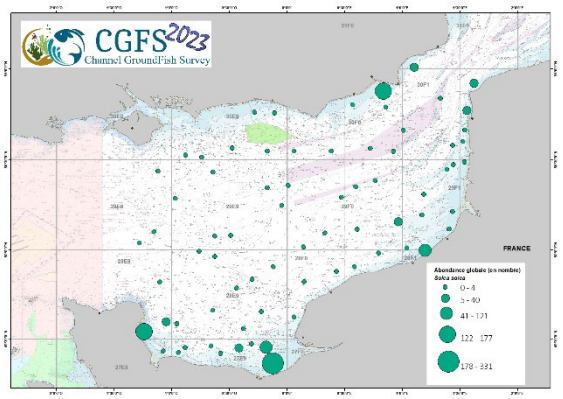
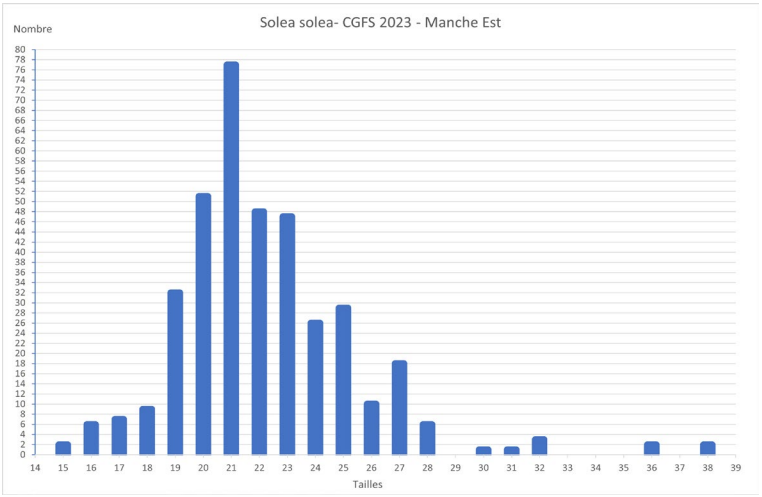


Figure 14: Distribution de l'abondance (en vert), de la biomasse (en rouge) et la répartition en tailles (en bas) des seiches capturées lors de la CGFS 2023.

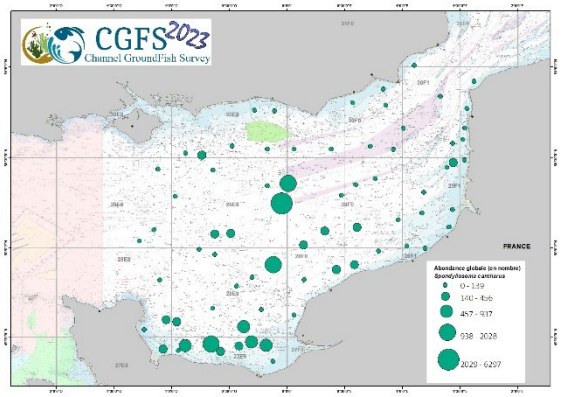
Other important species in the area (size distribution and geographic distribution of abundance)

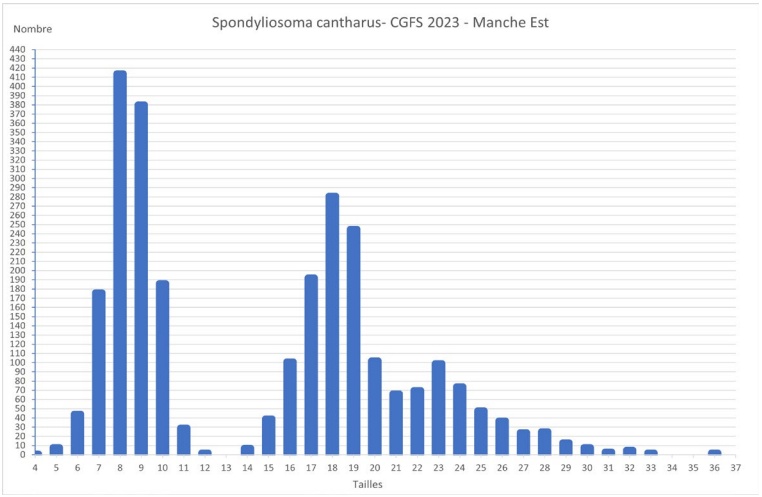
The common sole (*Solea solea*)



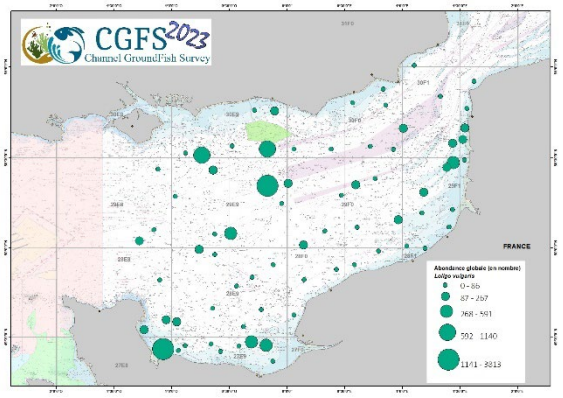


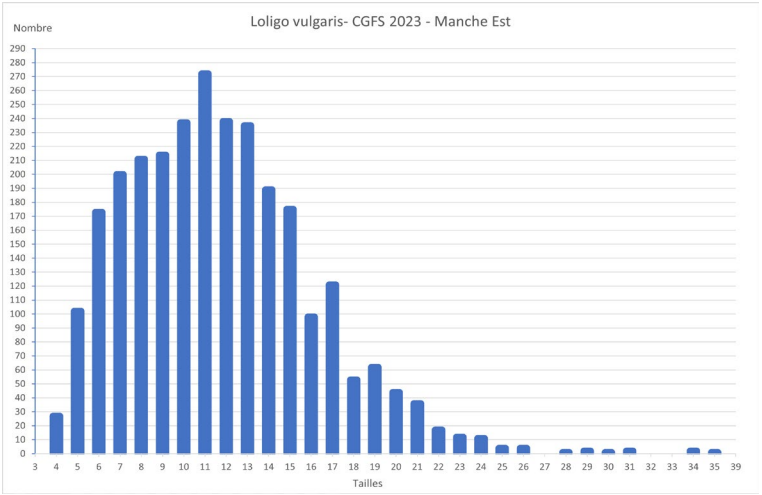
The black seabream (*Spondyliosoma cantharus*)



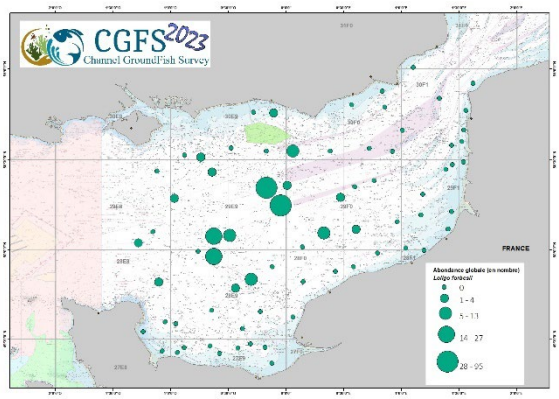


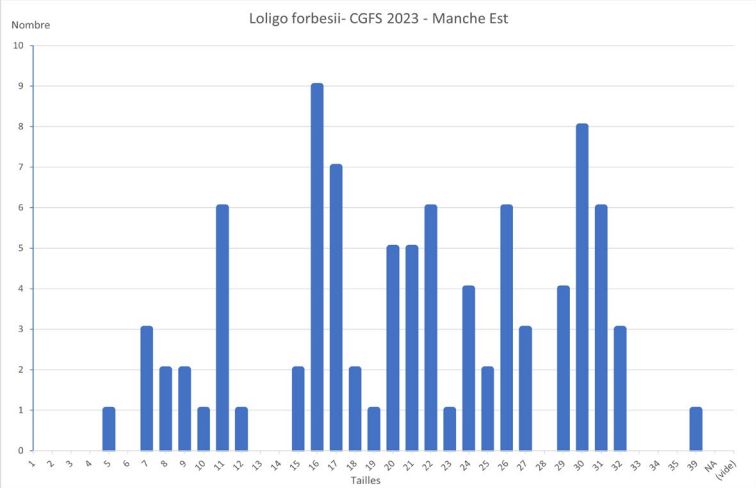
The common squid (*Loligo vulgaris*)



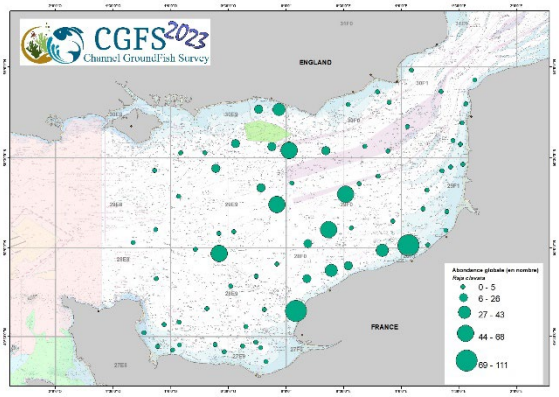


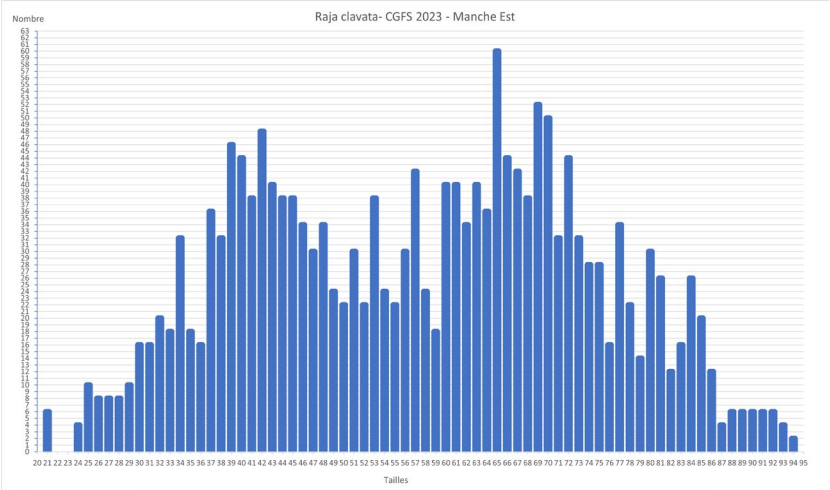
The veined squid (*Loligo forbesii*)



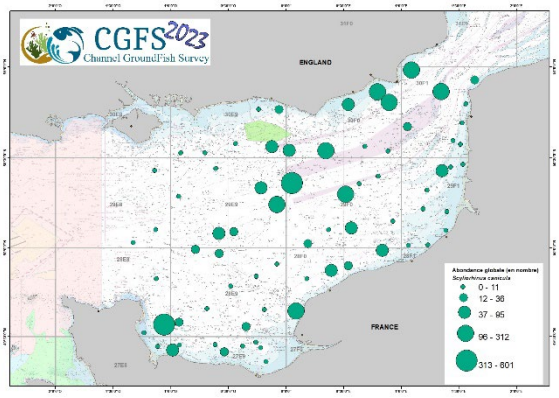


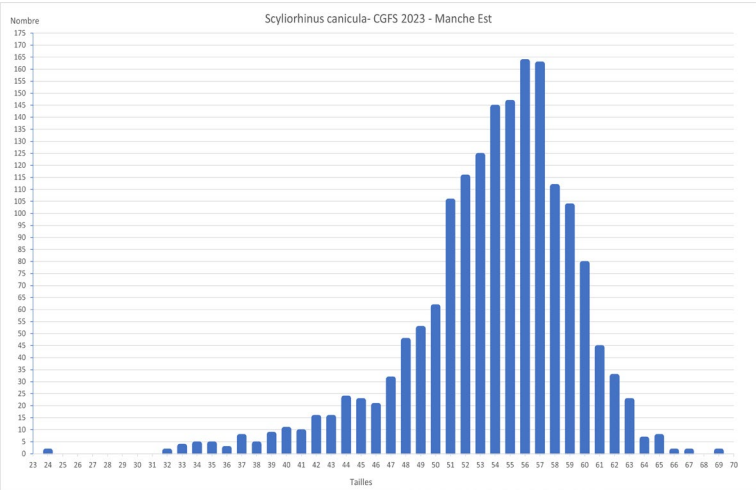
The thornback ray (*Raja clavata*)





The small-spotted catshark (Scyliorhinus canicula)





Western English Channel (FR-WCGFS)

The haddock (*Melanogrammus aeglefinus*)

This species is distributed this year across 4 trawling stations in the western part of the zone. Its occurrence is lower than in previous years. The species represents less than 1% of the overall abundance and biomass this year. The size distribution shows a mode spread between 35 and 40 cm (Fig 15).

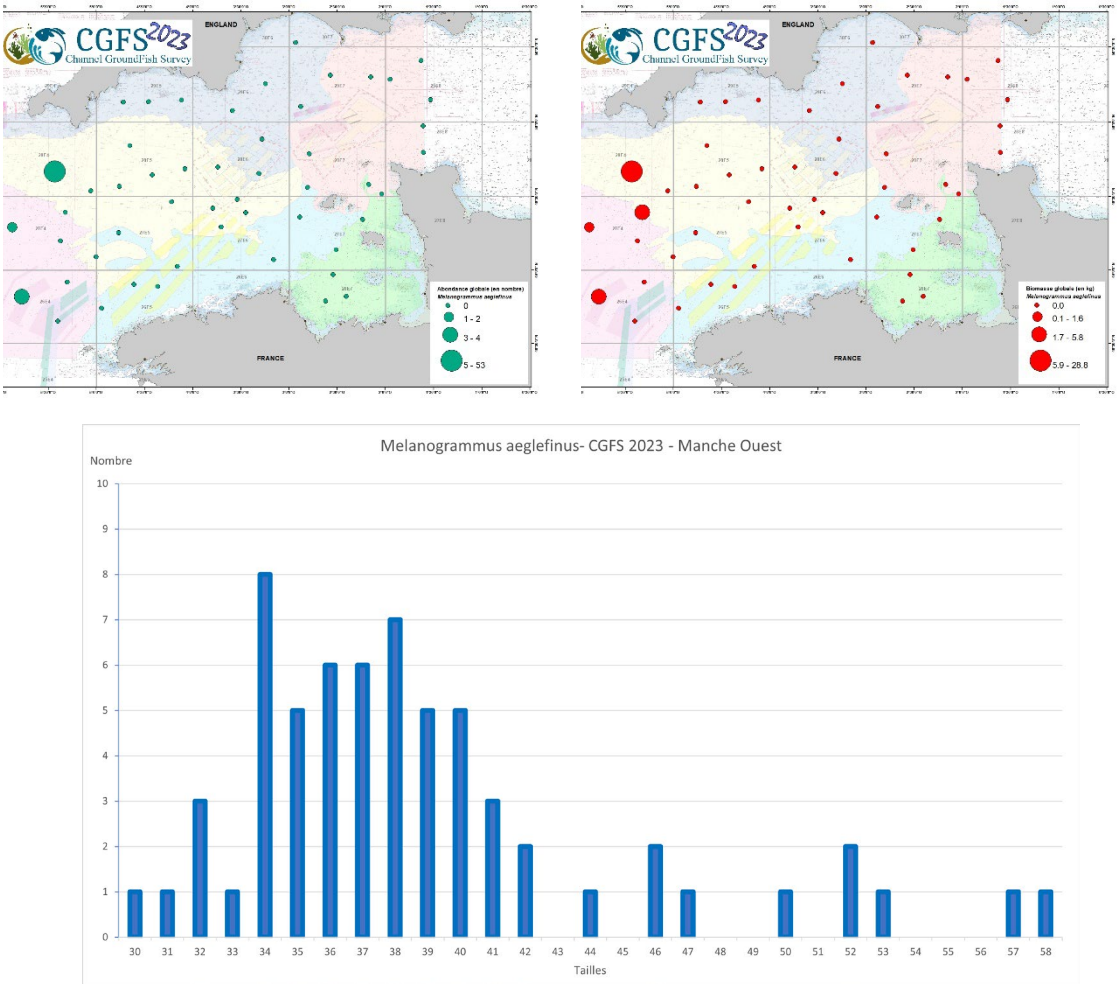


Figure 15: Distribution de l'abondance (en vert), de la biomasse (en rouge) et la répartition en tailles (en bas) des seiches capturées lors de la CGFS 2023.

Whiting (*Merlangius merlangus*)

Whiting is generally distributed, as observed this year, along the English coasts, in the area of Plymouth Bay and Lyme Bay, representing an occurrence of 31% of all trawls conducted. Its relative abundance is less than 1%, while the relative biomass is 1.49%, indicating a relatively higher proportion of larger individuals. The size distribution of the species shows four modes. The first two pertain to small-sized individuals between 9 and 13 cm, then between 14 and 18 cm. We then observe two size ranges for medium-sized whiting between 25 and 28 cm and between 29 and 36 cm (Fig 16).

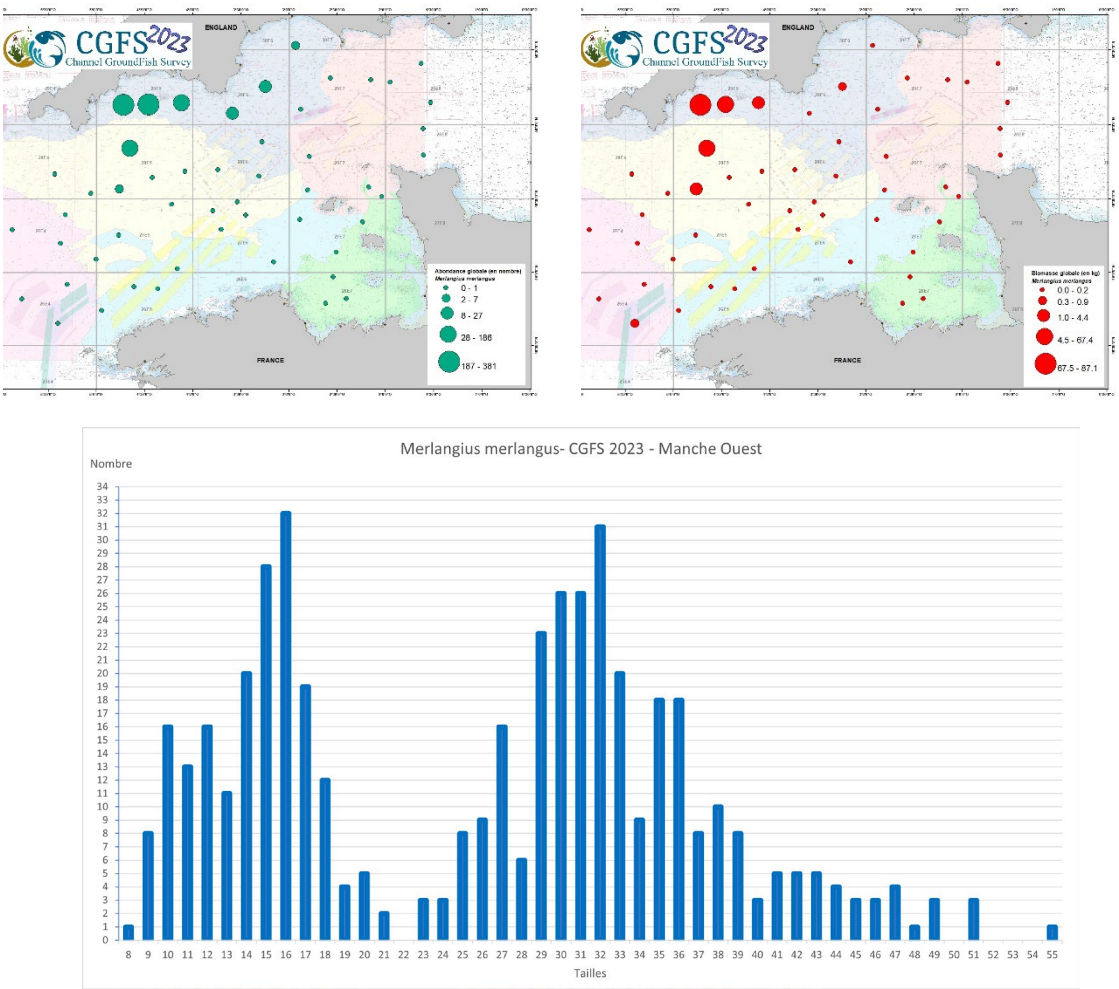
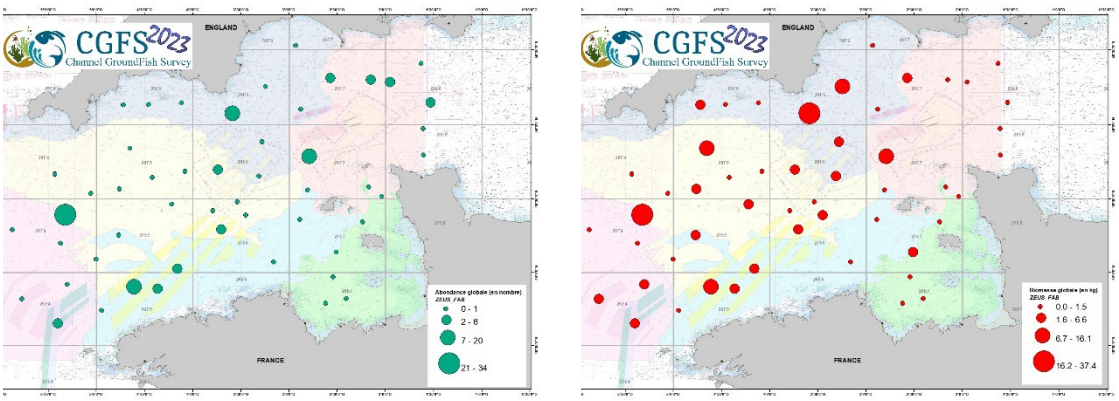


Figure 16 : Distribution de l'abondance (en vert), de la biomasse (en rouge) et la repartition en tailles (en bas).des merlans capturés lors de la CGFS 2023.

John Dory (Zeus faber)

In 2023, John Dory is distributed quite widely in the western English Channel, with some stations showing higher abundance, such as in northern Finistère, further offshore to the west, and also in the central zone northwest of the Channel Islands. The species is present in 82% of the trawls, and despite a relatively low abundance (<1%), there is an observed relative biomass of 1.28%. This difference between biomass and abundance is confirmed by the size distribution, indicating a predominance of large individuals. The species is distributed during the CGFS 2023 campaign in three modes: the first involving very small individuals between 3 and 9 cm, the second being quite dispersed between 23 and 32 cm, and the last, more significant mode between 33 and 50 cm (Fig 17).



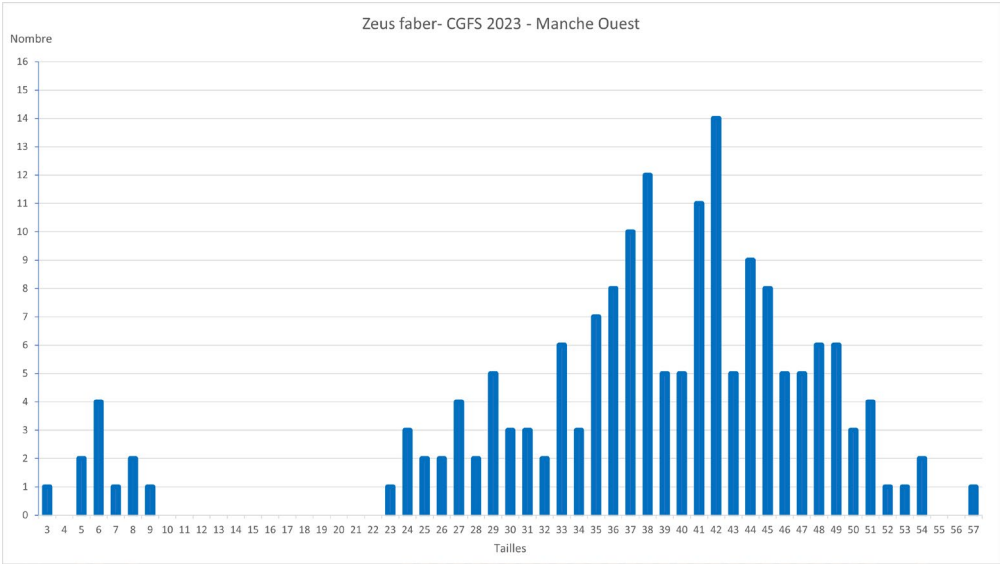
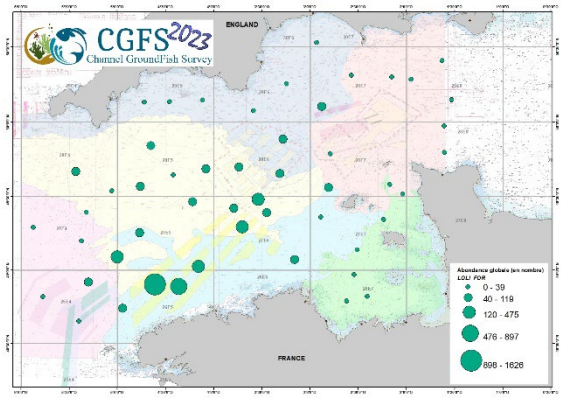
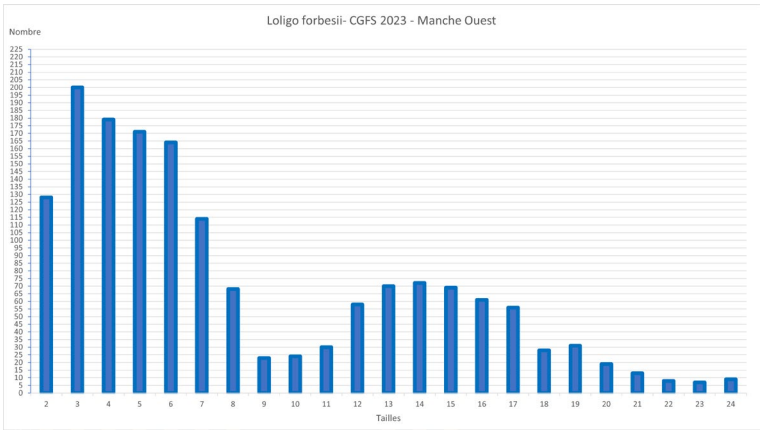


Figure 17: Distribution de l'abondance (en vert), de la biomasse (en rouge) et la repartition en tailles (en bas) des saint pierre capturés lors de la CGFS 2023.

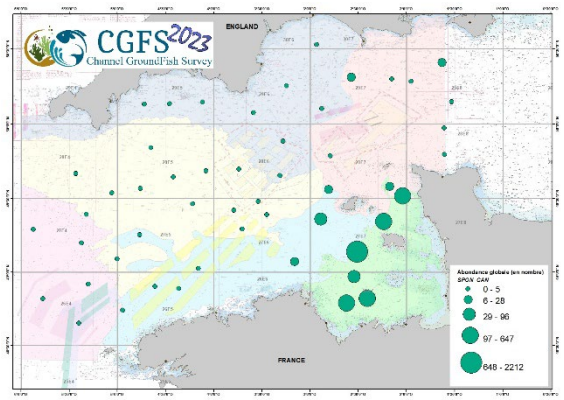
Other important species in the area (size distribution and geographic distribution of abundance)

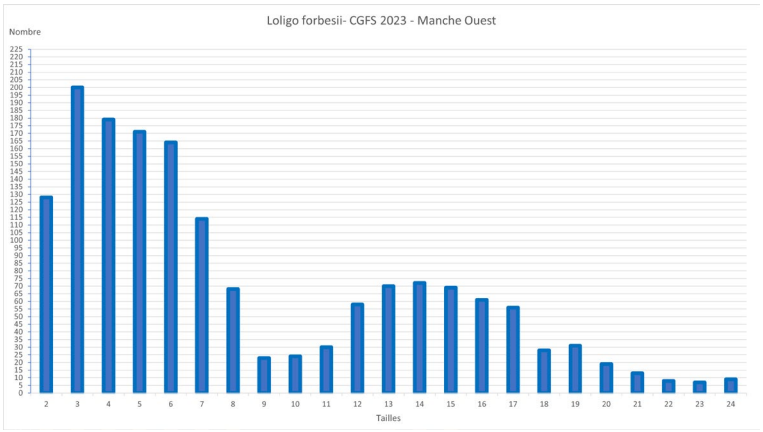
Loligo forbesii



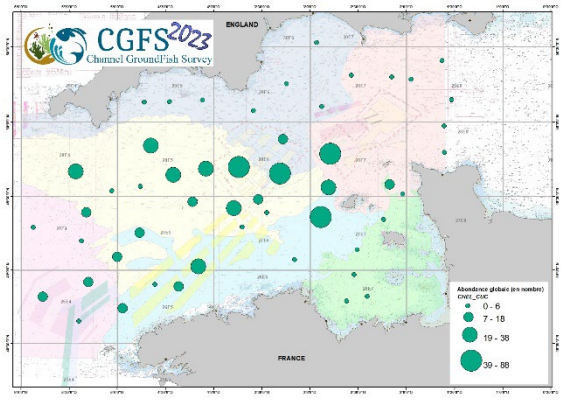


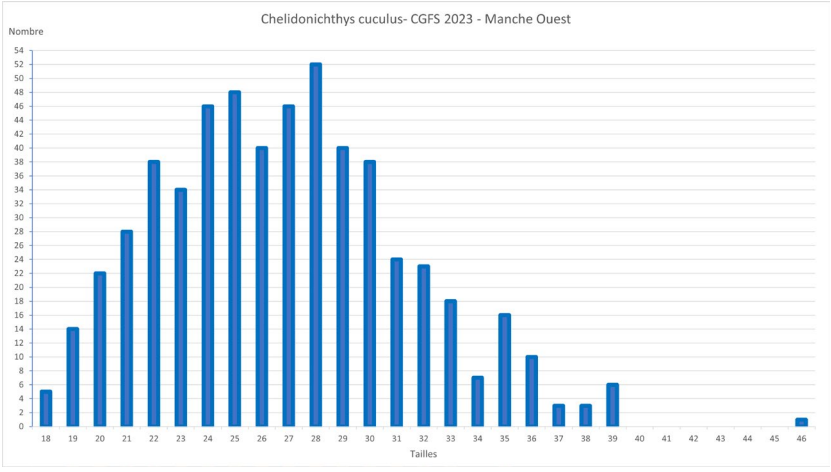
Spondyliosoma cantharus



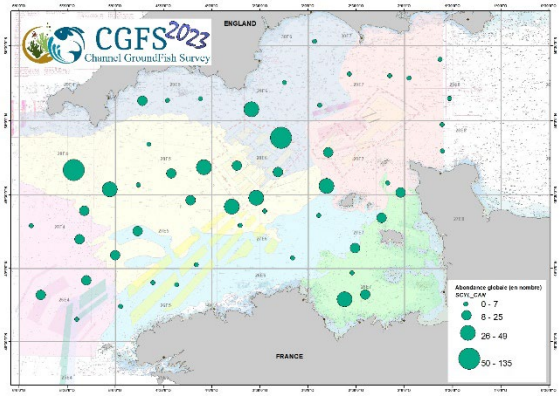


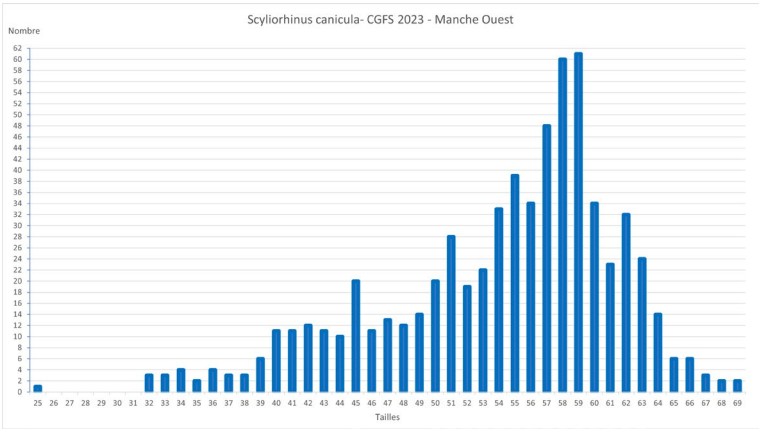
Chelidonichthys cuculus



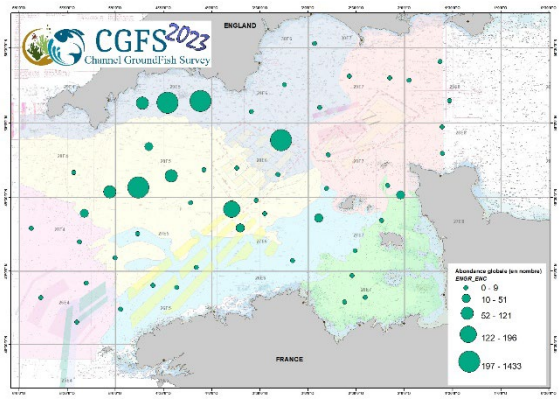


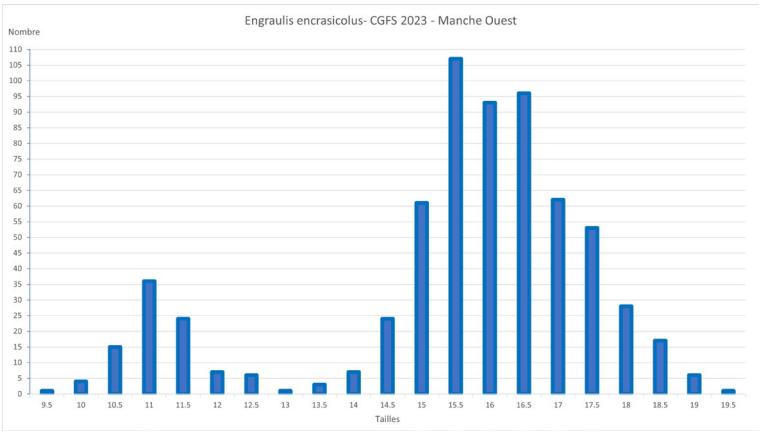
Scyliorhinus canicula



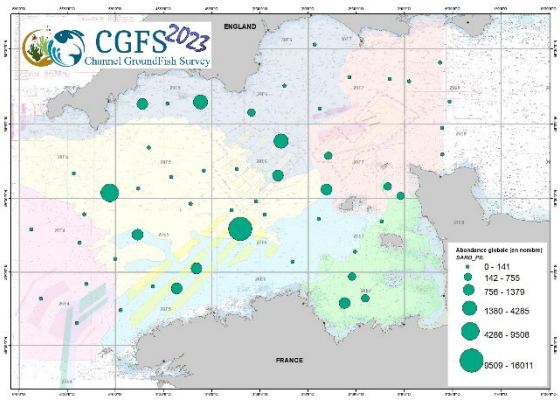


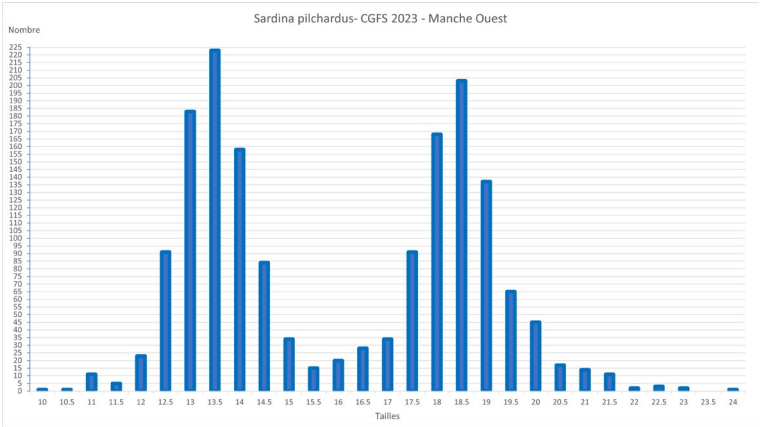
Engraulis encrasicolus





Sardina pilchardus





ANNEXE 1 : Traits information

Manche Est

Code station	Numéro trait	Strate	Engin	Date	Latitude début	Longitude début	Latitude fin	Longitude fin	Durée	Distance	Sonde	Valide	Abondance totale	Biomasse totale
B2405	1	28E8-7d	GOV 36/47	01/10/2023 09:03:00	49.819400	-1.103000	49.825900	-1.124000	31	1683	58.0	Y	732	192.402
B2406	2	29E8	GOV 36/47	01/10/2023 12:07:00	50.038200	-1.279500	50.027600	-1.324600	31	3424	68.0	Y	4414	133.199
B2407	3	29E8	GOV 36/47	01/10/2023 14:27:00	50.100200	-1.154400	50.100200	-1.131300	31	1648	54.0	Y	261	47.483
B2408	4	29E9	GOV 36/47	02/10/2023 06:08:00	50.286200	-0.969400	50.285200	-0.929400	30	2848	69.0	Y	90816	346.678
B2409	5	29E8	GOV 36/47	02/10/2023 08:37:00	50.436700	-1.118100	50.428200	-1.139000	30	1756	34.0	Y	1206	49.868
B2410	6	30E9	GOV 36/47	02/10/2023 10:45:00	50.524700	-0.881000	50.525800	-0.914400	31	2360	28.0	Y	769	61.814
B2411	7	30E9	GOV 36/47	02/10/2023 12:34:00	50.513900	-0.739500	50.526000	-0.704000	31	2843	29.0	Y	1050	213.155
B2412	8	29E9	GOV 36/47	02/10/2023 14:33:00	50.430800	-0.640200	50.439200	-0.610500	31	2306	63.0	Y	11598	199.933
B2413	9	30E9	GOV 36/47	03/10/2023 06:08:00	50.564200	-0.476900	50.576900	-0.439300	30	3004	64.0	Y	796	161.108
B2414	10	30E9	GOV 36/47	03/10/2023 08:00:00	50.547400	-0.170900	50.560900	-0.123300	31	3682	60.0	Y	9736	811.812
B2415	11	30F0	GOV 36/47	03/10/2023 09:53:00	50.547700	0.060300	50.539200	0.028600	31	2428	61.0	Y	11873	1067.604
B2416	12	30E9	GOV 36/47	03/10/2023 12:49:00	50.756600	-0.107300	50.764600	-0.061800	30	3321	21.0	Y	5635	300.522
B2417	13	30E9	GOV 36/47	03/10/2023 15:02:00	50.760000	-0.281000	50.765600	-0.237600	30	3107	19.0	Y	2995	262.893
B2418	14	29F0	GOV 36/47	04/10/2023 06:10:00	50.357100	0.010900	50.358600	0.050000	31	2778	53.0	Y	10775	1129.734
B2419	15	29E9	GOV 36/47	04/10/2023 07:55:00	50.343800	-0.170500	50.332200	-0.216400	31	3501	50.0	Y	3268	237.972
B2420	16	29E9	GOV 36/47	04/10/2023 11:24:00	50.246600	-0.045300	50.240400	-0.077300	29	2374	52.0	Y	3934	501.042
B2421	17	29F0	GOV 36/47	04/10/2023 13:50:00	50.015100	0.142300	50.021900	0.189400	30	3448	41.0	Y	10198	397.198
B2422	18	29F0	GOV 36/47	04/10/2023 15:34:00	50.093000	0.327300	50.099100	0.369000	30	3048	39.0	Y	4274	424.356
B2423	19	29E9	GOV 36/47	05/10/2023 06:17:00	50.078700	-0.489500	50.088500	-0.454100	30	2746	46.0	Y	1914	201.06
B2424	20	29E9	GOV 36/47	05/10/2023 07:57:00	50.074900	-0.627400	50.079900	-0.583200	31	3197	51.0	Y	5216	224.915
B2425	21	29E9	GOV 36/47	05/10/2023 10:28:00	50.030700	-0.896300	50.023800	-0.928600	30	2425	63	N		
B2426	22	28E9	GOV 36/47	05/10/2023 13:01:00	49.990800	-0.761100	49.990800	-0.787000	21	1847	62.0	Y	579	131.918
B2427	23	28E9	GOV 36/47	05/10/2023 14:26:00	49.961400	-0.625700	49.966600	-0.581200	31	3233	51.0	Y	2525	298.304
B2428	24	28E9	GOV 36/47	06/10/2023 06:14:00	49.903700	-0.119600	49.908500	-0.078200	30	3004	42.0	Y	5246	320.772
B2429	25	28E9	GOV 36/47	06/10/2023 08:12:00	49.834500	-0.301600	49.838900	-0.257900	30	3171	40.0	Y	5247	232.064
B2430	26	28E9	GOV 36/47	06/10/2023 10:08:00	49.785200	-0.439600	49.784700	-0.479400	31	2853	41.0	Y	8272	361.295
B2431	27	28E9	GOV 36/47	06/10/2023 12:27:00	49.660200	-0.645400	49.658600	-0.684700	31	2862	39.0	Y	59670	567.705
B2432	28	28E9	GOV 36/47	06/10/2023 14:51:00	49.583100	-0.957100	49.581800	-0.926500	20	2206	35.0	Y	2002	290.293
B2433	29	28E8-7d	GOV 36/47	07/10/2023 06:20:00	49.595200	-1.047100	49.568000	-1.057400	30	3113	35.0	Y	314456	793.335
B2434	30	28E8-7d	GOV 36/47	07/10/2023 08:11:00	49.540000	-1.240200	49.521400	-1.232000	20	2178	14.0	Y	7507	458.485
B2435	31	27E8-7d	GOV 36/47	07/10/2023 10:17:00	49.429700	-1.074900	49.445000	-1.113400	30	3260	18.0	Y	3249	122.157
B2436	32	27E9	GOV 36/47	07/10/2023 12:22:00	49.422400	-0.941200	49.424200	-0.983200	31	3045	23.0	Y	3605	300.012
B2437	33	27E9	GOV 36/47	07/10/2023 14:01:00	49.449000	-0.882400	49.452300	-0.925600	30	3147	25.0	Y	12403	745.546
B2438	34	27E9	GOV 36/47	08/10/2023 06:12:00	49.459700	-0.658900	49.455600	-0.614600	31	3228	26.0	Y	7952	446.604
B2439	35	27E9	GOV 36/47	08/10/2023 07:59:00	49.416800	-0.576200	49.414600	-0.534200	31	3048	23.0	Y	53359	226.184
B2440	36	27E9	GOV 36/47	08/10/2023 10:08:00	49.447500	-0.418400	49.447700	-0.376100	30	3052	28.0	Y	112091	190.507
B2441	37	27E9	GOV 36/47	08/10/2023 12:18:00	49.471200	-0.307300	49.468200	-0.260100	31	3426	35.0	Y	36273	430.45
B2442	38	27E9	GOV 36/47	08/10/2023 14:07:00	49.360400	-0.124300	49.358600	-0.172300	32	3472	16.0	Y	32164	716.824
B2443	39	27E9	GOV 36/47	09/10/2023 06:18:00	49.450600	-0.181600	49.436900	-0.220800	31	3219	30.0	Y	1223943	1486.425
B2444	40	28E9	GOV 36/47	09/10/2023 08:48:00	49.556900	-0.375300	49.557000	-0.345700	21	2137	26.0	Y	3822	118.352

Code station	Numéro trait	Strate	Engin	Date	Latitude début	Longitude début	Latitude fin	Longitude fin	Durée	Distance	Sonde	Valide	Abondance totale	Biomasse totale
B2445	41	28E9	GOV 36/47	09/10/2023 10:18:00	49.653400	-0.223700	49.653100	-0.187400	25	2609	36.0	Y	6462	114.701
B2446	42	28F0	GOV 36/47	09/10/2023 12:14:00	49.622200	0.058600	49.644500	0.086400	30	3185	25.0	Y	3939	390.501
B2447	43	28F0	GOV 36/47	09/10/2023 15:05:00	49.820000	0.147100	49.825700	0.180000	21	2439	31.0	Y	1013	170.859
B2448	44	28F0	GOV 36/47	10/10/2023 06:18:00	49.877800	0.428300	49.871700	0.393000	31	2617	30.0	Y	2002	281.421
B2449	45	28F0	GOV 36/47	10/10/2023 07:55:00	49.905200	0.583300	49.899000	0.541700	30	3057	29.0	Y	2479	198.698
B2450	46	28F0	GOV 36/47	10/10/2023 10:11:00	49.980200	0.792600	49.983700	0.834900	30	3044	29.0	Y	73807	271.792
B2451	47	29F1	GOV 36/47	10/10/2023 11:59:00	50.009400	1.036700	50.013000	1.063300	18	1936	25.0	Y	36179	651.742
B2452	48	28F1	GOV 36/47	10/10/2023 14:29:00	49.996200	1.195600	50.015200	1.229700	30	3222	14.0	Y	16976	222.838
B2453	49	29F1	GOV 36/47	11/10/2023 06:12:00	50.114500	1.406100	50.096600	1.386200	25	2458	12.0	Y	3035	332.684
B2454	50	29F1	GOV 36/47	11/10/2023 07:41:00	50.211700	1.437100	50.200400	1.395800	31	3193	16.0	Y	6263	629.845
B2455	51	29F1	GOV 36/47	11/10/2023 10:15:00	50.446100	1.384600	50.426100	1.353900	30	3113	32.0	Y	8173	499.941
B2456	52	29F1	GOV 36/47	11/10/2023 12:29:00	50.307500	1.185200	50.319900	1.224700	30	3121	31.0	Y	3086	339.542
B2457	53	29F1	GOV 36/47	11/10/2023 14:37:00	50.192200	1.171000	50.215100	1.190100	30	2888	23.0	Y	8899	407.631
B2458	54	29F0	GOV 36/47	12/10/2023 06:21:00	50.154300	0.964400	50.148100	0.926800	30	2767	30.0	Y	7219	248.783
B2459	55	29F0	GOV 36/47	12/10/2023 08:39:00	50.114000	0.606500	50.108600	0.566200	31	2933	38.0	Y	8707	640.672
B2460	56	29F0	GOV 36/47	12/10/2023 10:59:00	50.291300	0.473300	50.297400	0.515500	31	3067	57.0	Y	8731	759.704
B2461	57	29F0	GOV 36/47	12/10/2023 13:36:00	50.349500	0.596000	50.356200	0.634800	30	2849	38.0	Y	1019	30.935
B2462	58	29F0	GOV 36/47	12/10/2023 15:21:00	50.383300	0.764100	50.396900	0.798300	30	2857	36.0	Y	2704	58.208
B2463	59	30F0	GOV 36/47	13/10/2023 06:24:00	50.547800	0.383000	50.538500	0.346400	30	2778	46.0	Y	2458	212.37
B2464	60	30F0	GOV 36/47	13/10/2023 08:41:00	50.561600	0.723700	50.562800	0.684900	31	2744	45.0	Y	2483	86.059
B2465	61	30F0	GOV 36/47	13/10/2023 10:44:00	50.545800	0.924400	50.535600	0.885400	30	3003	38.0	Y	555	21.037
B2466	62	30F1	GOV 36/47	13/10/2023 13:10:00	50.661500	1.007800	50.671300	1.052800	31	3347	45.0	Y	21932	845.857
B2467	63	30F0	GOV 36/47	13/10/2023 15:14:00	50.788400	0.855900	50.804300	0.893200	30	3166	35.0	Y	6668	678.64
B2468	64	30F0	GOV 36/47	14/10/2023 06:28:00	50.801000	0.569900	50.792700	0.540700	21	2246	14.0	Y	1261	89.263
B2469	65	30F0	GOV 36/47	14/10/2023 08:30:00	50.876400	0.834200	50.861100	0.793100	31	3348	16.0	Y	3333	354.146
B2470	66	30F1	GOV 36/47	14/10/2023 11:45:00	51.006800	1.102000	50.981500	1.088400	30	2970	30.0	Y	1377	196.716
B2471	67	30F1	GOV 36/47	14/10/2023 14:28:00	50.837700	1.329600	50.863600	1.345700	30	3101	29.0	Y	6094	366.126
B2472	68	30F1	GOV 36/47	15/10/2023 06:25:00	50.579500	1.434300	50.594400	1.447400	25	1899	26.0	Y	28921	2550.593
B2473	69	29F1	GOV 36/47	15/10/2023 08:51:00	50.472600	1.441200	50.448100	1.427100	30	2906	29.0	Y	24720	310.425
B2474	70	29F1	GOV 36/47	15/10/2023 10:48:00	50.487800	1.538500	50.463400	1.535000	31	2729	18.0	Y	28048	830.719
B2475	71	30F1	GOV 36/47	15/10/2023 12:37:00	50.599500	1.522700	50.573800	1.513600	31	2921	27.0	Y	6386	147.463
B2476	72	30F1	GOV 36/47	15/10/2023 14:28:00	50.663700	1.541400	50.692400	1.528800	30	3311	24.0	Y	8488	158.124
B2477	73	30F1	GOV 36/47	16/10/2023 06:17:00	50.918300	1.620700	50.927800	1.637800	30	1604	23.0	Y	3608	940.781
B2478	74	30F1	GOV 36/47	16/10/2023 08:06:00	50.769100	1.558900	50.795700	1.558900	31	2974	17.0	Y	118405	640.469

Manche Ouest

Code station	Numéro trait	Strate	Engin	Date	Latitude début	Longitude début	Latitude fin	Longitude fin	Durée	Distance	Sonde	Valide	Abondance totale	Biomasse totale
B2340	1	NOB (CGFS)	GOV 36/49	16/09/2023 10:50:00	48.717400	-4.942400	48.739100	-4.944900	30	2420	104.0	Y	4934	94.967
B2341	2	OFF (CGFS)	GOV 36/49	16/09/2023 13:49:00	48.664200	-5.367600	48.650400	-5.398700	30	2751	-9.0	Y	483	36.539
B2342	4	OFF (CGFS)	GOV 36/49	17/09/2023 09:01:00	48.902800	-5.329200	48.918400	-5.298700	30	2817	110.0	Y	279	57.082
B2344	3	OFF (CGFS)	GOV 36/49	17/09/2023 06:16:00	48.822100	-5.735700	48.820100	-5.774000	30	2810	118.0	Y	455	50.902
B2345	5	WEC (CGFS)	GOV 36/49	17/09/2023 11:30:00	49.080400	-5.037400	49.090600	-5.002000	31	2818	101.0	Y	1839	148.733
B2346	6	OFF (CGFS)	GOV 36/49	17/09/2023 14:16:00	49.199000	-5.364300	49.176600	-5.387200	30	2990	105.0	Y	58193	1374.322
B2348	7	OFF (CGFS)	GOV 36/49	18/09/2023 06:18:00	49.297900	-5.837700	49.291600	-5.872600	30	2629	113.0	Y	392	60.544
B2349	8	OFF (CGFS)	GOV 36/49	18/09/2023 09:14:00	49.385300	-5.360600	49.393500	-5.323000	31	2872	105.0	Y	4283	274.629
B2350	9	WEC (CGFS)	GOV 36/49	18/09/2023 12:10:00	49.531000	-5.092200	49.538000	-5.055900	30	2729	94.0	Y	27651	1028.499
B2351	10	WEC (CGFS)	GOV 36/49	18/09/2023 15:44:00	49.712000	-5.380300	49.707500	-5.422100	30	3044	90.0	Y	532	104.71
B2353	11	WEC (CGFS)	GOV 36/49	19/09/2023 06:11:00	49.845000	-4.611800	49.841100	-4.650200	30	2786	82.0	Y	16096	348.805
B2354	12	WEC (CGFS)	GOV 36/49	19/09/2023 08:37:00	49.651600	-4.380400	49.646200	-4.418900	30	2827	86.0	Y	5314	233.274
B2355	13	WEC (CGFS)	GOV 36/49	19/09/2023 12:27:00	49.558800	-4.796700	49.566700	-4.759400	30	2829	90.0	Y	18887	375.87
B2356	14	WEC (CGFS)	GOV 36/49	19/09/2023 15:37:00	49.453100	-4.260800	49.465000	-4.219600	31	3254	-9.0	Y	168242	1500.834
B2358	15	NOB (CGFS)	GOV 36/49	20/09/2023 06:33:00	49.265000	-4.741400	49.254600	-4.769100	31	2320	101.0	Y	2849	169.337
B2359	16	WEC (CGFS)	GOV 36/49	20/09/2023 10:04:00	48.889400	-4.646200	48.902000	-4.611100	31	2927	101.0	Y	2285	148.064
B2360	17	NOB (CGFS)	GOV 36/49	20/09/2023 12:23:00	48.872800	-4.391000	48.889500	-4.363700	30	2726	95.0	Y	2336	104.88
B2361	18	NOB (CGFS)	GOV 36/49	20/09/2023 14:54:00	48.788800	-4.218700	48.804700	-4.183800	30	3107	84	N		
B2363	19	NOB (CGFS)	GOV 36/49	21/09/2023 06:17:00	49.036400	-4.124300	49.025300	-4.157400	31	2708	95.0	Y	12405	907.81
B2364	20	WEC (CGFS)	GOV 36/49	21/09/2023 09:20:00	49.308000	-3.671000	49.292800	-3.703000	30	2869	84.0	Y	18857	398.209
B2365	21	WEC (CGFS)	GOV 36/49	21/09/2023 11:45:00	49.377000	-3.472400	49.391100	-3.449200	22	2303	80.0	Y	3735	72.143
B2366	22	WEC (CGFS)	GOV 36/49	21/09/2023 14:22:00	49.398300	-3.812200	49.408700	-3.775600	30	2888	116.0	Y	3721	144.146
B2368	23	WEC (CGFS)	GOV 36/49	22/09/2023 06:11:00	49.493000	-3.496600	49.479900	-3.538200	30	3339	115.0	Y	1386	64.455
B2369	24	SOE (CGFS)	GOV 36/49	22/09/2023 08:44:00	49.674800	-3.295500	49.654800	-3.312200	26	2525	73.0	Y	7951	124.252
B2370	25	WEC (CGFS)	GOV 36/49	22/09/2023 11:58:00	49.700900	-3.693900	49.696900	-3.737600	31	3168	76.0	Y	15946	162.902
B2371	26	WEC (CGFS)	GOV 36/49	22/09/2023 14:38:00	49.678300	-4.074200	49.682200	-4.032800	31	3010	79.0	Y	35601	275.581
B2373	27	SOE (CGFS)	GOV 36/49	23/09/2023 06:17:00	50.119000	-4.761400	50.131800	-4.718300	30	3378	68.0	Y	8905	664.169
B2374	28	SOE (CGFS)	GOV 36/49	23/09/2023 08:25:00	50.137500	-4.506800	50.134700	-4.459300	30	3390	70.0	Y	22506	434.312
B2375	29	SOE (CGFS)	GOV 36/49	23/09/2023 11:35:00	50.141800	-4.072200	50.146700	-4.115800	30	3154	65.0	Y	10108	524.302
B2376	30	SOE (CGFS)	GOV 36/49	23/09/2023 15:15:00	50.099300	-3.613400	50.115200	-3.574100	30	3310	67.0	Y	43234	288.889
B2379	31	SOE (CGFS)	GOV 36/49	24/09/2023 06:09:00	50.096400	-2.921100	50.103200	-2.879500	30	3059	65.0	Y	33911	291.648
B2380	32	SOE (CGFS)	GOV 36/49	24/09/2023 08:42:00	50.239900	-3.283700	50.255200	-3.246600	30	3142	61.0	Y	7065	949.775
B2381	33	SOE (CGFS)	GOV 36/49	24/09/2023 12:08:00	50.540800	-2.893000	50.527500	-2.932700	30	3172	41.0	Y	827	23.6
B2382	34	CEC (CGFS)	GOV 36/49	24/09/2023 15:39:00	50.320500	-2.523600	50.321800	-2.565200	31	2954	57.0	Y	5210	221.431
B2384	35	SOE (CGFS)	GOV 36/49	25/09/2023 06:16:00	49.879700	-3.322900	49.886200	-3.280100	31	3146	70.0	Y	15635	399.226
B2385	36	CEC (CGFS)	GOV 36/49	25/09/2023 08:58:00	49.777100	-2.826600	49.787000	-2.791000	31	2778	69.0	Y	2960	168.122
B2386	37	CEC (CGFS)	GOV 36/49	25/09/2023 11:47:00	49.590600	-2.860500	49.605800	-2.820000	30	3368	72.0	Y	5389	146.871
B2387	38	NOB (CGFS)	GOV 36/49	25/09/2023 14:50:00	49.344200	-2.851600	49.360200	-2.889300	31	3251	69.0	Y	14299	524.375
B2389	39	NOB (CGFS)	GOV 36/49	26/09/2023 06:19:00	49.060700	-3.196800	49.070900	-3.160600	31	2864	70.0	Y	3341	90.381
B2390	40	NBG (CGFS)	GOV 36/49	26/09/2023 09:52:00	48.802500	-2.658800	48.789300	-2.620500	30	3163	36.0	Y	39565	470.954
B2391	41	NBG (CGFS)	GOV 36/49	26/09/2023 12:38:00	48.794900	-2.405000	48.820700	-2.405700	31	2864	40.0	Y	5612	163.411
B2392	42	NBG (CGFS)	GOV 36/49	26/09/2023 14:23:00	48.925000	-2.523000	48.941200	-2.552200	31	2777	46.0	Y	3024	76.729
B2394	43	NBG (CGFS)	GOV 36/49	27/09/2023 06:14:00	49.146100	-2.550100	49.138800	-2.512500	31	2848	56.0	Y	5896	502.322

Code station	Numéro trait	Strate	Engin	Date	Latitude début	Longitude début	Latitude fin	Longitude fin	Durée	Distance	Sonde	Valide	Abondance totale	Biomasse totale
B2395	44	NBG (CGFS)	GOV 36/49	27/09/2023 08:27:00	49.339000	-2.278300	49.344800	-2.238500	31	2951	51.0	Y	1415	355.735
B2396	45	CEC (CGFS)	GOV 36/49	27/09/2023 11:00:00	49.495800	-2.050500	49.515900	-2.039300	31	2374	29.0	Y	3258	145.664
B2397	46	NBG (CGFS)	GOV 36/49	27/09/2023 13:03:00	49.552100	-2.208100	49.576200	-2.201200	30	2719	42.0	Y	3374	82.662
B2399	47	CEC (CGFS)	GOV 36/49	28/09/2023 06:32:00	50.304000	-2.132500	50.301200	-2.153100	30	1506	56.0	Y	169	152.535
B2400	48	CEC (CGFS)	GOV 36/49	28/09/2023 08:22:00	50.295500	-1.926300	50.284200	-1.951900	31	2217	56.0	Y	142	89.037
B2401	49	CEC (CGFS)	GOV 36/49	28/09/2023 10:49:00	50.403400	-1.663700	50.407800	-1.630600	30	2392	38.0	Y	1314	22.211
B2402	50	CEC (CGFS)	GOV 36/49	28/09/2023 14:07:00	50.149000	-1.560700	50.148900	-1.533800	30	1917	65.0	Y	77	29.404
B2403	51	CEC (CGFS)	GOV 36/49	29/09/2023 06:18:00	49.973400	-1.590600	49.973200	-1.610400	31	1423	76.0	Y	93	16.012
B2404	52	CEC (CGFS)	GOV 36/49	29/09/2023 08:43:00	49.794700	-1.575200	49.797200	-1.606600	30	2270	62.0	Y	2026	47.491

ANNEXE 2 : Dominance of the top 20 fish species

Eastern English Channel

Nom scientifique	Dominance en nombre (%)
Trachurus trachurus	65.47
Sardina pilchardus	8.42
Sprattus sprattus	7.09
Scomber scombrus	5.62
Spondyliosoma cantharus	2.63
Loligo vulgaris	1.48
Trisopterus luscus	1.35
Mullus surmuletus	1.20
Scyliorhinus canicula	1.03
Trisopterus minutus	0.96
Alloteuthis	0.92
Sepia officinalis	0.67
Pleuronectes platessa	0.41
Clupea harengus	0.33
Callionymus lyra	0.29
Raja clavata	0.26
Limanda limanda	0.25
Mustelus asterias	0.23
Merlangius merlangus	0.19
Engraulis encrasicolus	0.15

Nom scientifique	Dominance en poids (%)
Trachurus trachurus	45.01
Scomber scombrus	11.78
Scyliorhinus canicula	8.57
Raja clavata	6.22
Sardina pilchardus	5.75
Mustelus asterias	5.06
Spondyliosoma cantharus	2.74
Loligo vulgaris	1.96
Sepia officinalis	1.75
Dicentrarchus labrax	1.67
Raja undulata	0.89
Trisopterus luscus	0.83
Scyliorhinus stellaris	0.82
Mullus surmuletus	0.80
Pleuronectes platessa	0.79
Conger conger	0.72
Sprattus sprattus	0.69
Liza aurata	0.47
Dasyatis tortonesei	0.39
Chelidonichthys cuculus	0.39

Manche Ouest

Nom scientifique	Dominance en nombre (%)
Trachurus trachurus	64.26
Scomber scombrus	21.35
Sardina pilchardus	6.88
Trisopterus minutus	2.26
Capros aper	0.81
Engraulis encrasicolus	0.78
Loligo forbesii	0.78
Spondyliosoma cantharus	0.64
Illex coindetii	0.39
Loligo vulgaris	0.27
Alloteuthis	0.26
Sprattus sprattus	0.22
Merlangius merlangus	0.17
Loliginidae	0.14
Gymnammodytes semisquamatus	0.14
Scyliorhinus canicula	0.13
Dicentrarchus labrax	0.11
Chelidonichthys cuculus	0.10
Trisopterus luscus	0.07
Zeus faber	0.03

Nom scientifique	Dominance en poids (%)
Trachurus trachurus	32.37
Scomber scombrus	24.38
Sardina pilchardus	11.25
Spondyliosoma cantharus	4.85
Dicentrarchus labrax	4.68
Scyliorhinus canicula	3.10
Trisopterus minutus	2.11
Capros aper	1.86
Merlangius merlangus	1.49
Zeus faber	1.28
Loligo forbesii	1.20
Chelidonichthys cuculus	0.95
Sparus aurata	0.91
Trisopterus luscus	0.72
Engraulis encrasicolus	0.71
Loligo vulgaris	0.62
Pollachius pollachius	0.61
Maja brachydactyla	0.55
Alopias vulpinus	0.53
Conger conger	0.52

ANNEXE 3 : Occurrences (>10%)

Manche Est	
Nom scientifique	**Occurence**
Trachurus trachurus	100.00%
Sepia officinalis	98.63%
Loligo vulgaris	95.89%
Alloteuthis	87.67%
Scomber scombrus	84.93%
Mullus surmuletus	82.19%
Scyliorhinus canicula	80.82%
Sardina pilchardus	75.34%
Spondyliosoma cantharus	75.34%
Maja brachydactyla	73.97%
Raja clavata	73.97%
Mustelus asterias	72.60%
Aequipecten opercularis	71.23%
Buccinum undatum	64.38%
Chelidonichthys cuculus	60.27%
Pecten maximus	54.79%
Zeus faber	54.79%
Pleuronectes platessa	45.21%
Conger conger	45.21%
Raja undulata	42.47%
Dicentrarchus labrax	41.10%
Hippocampus hippocampus	41.10%
Engraulis encrasicolus	41.10%
Merlangius merlangus	39.73%
Callionymus lyra	35.62%
Trisopterus minutus	35.62%
Chelidonichthys lucerna	34.25%
Solea solea	31.51%
Scyliorhinus stellaris	31.51%
Trigloporus lastoviza	30.14%
Sepiola	28.77%
Trisopterus luscus	28.77%
Limanda limanda	27.40%
Necora puber	26.03%
Loligo forbesii	24.66%
Rhizostoma pulmo	21.92%
Sprattus sprattus	21.92%
Blennius ocellaris	19.18%
Ostrea edulis	17.81%
Aequorea	17.81%
Hyperoplus lanceolatus	16.44%
Cancer pagurus	15.07%
Galeorhinus galeus	15.07%
Raja montagui	13.70%
Chrysaora hysoscella	12.33%
Platichthys flesus	12.33%
Echiichthys vipera	12.33%
Trachinus draco	10.96%
Clupea harengus	10.96%
Gymnammodytes semisquamatus	10.96%
Mustelus	10.96%

Manche Ouest	
Nom scientifique	**Occurence**
Trachurus trachurus	*100.00%*
Trisopterus minutus	*90.20%*
Chelidonichthys cuculus	*86.27%*
Scomber scombrus	*84.31%*
Scyliorhinus canicula	*82.35%*
Zeus faber	*82.35%*
Alloteuthis	*74.51%*
Loligo forbesii	*72.55%*
Sardina pilchardus	*72.55%*
Aequorea	*64.71%*
Illex coindetii	*58.82%*
Engraulis encrasicolus	*56.86%*
Loligo vulgaris	*49.02%*
Trisopterus luscus	*45.10%*
Capros aper	*43.14%*
Conger conger	*39.22%*
Spondyliosoma cantharus	*37.25%*
Microstomus kitt	*37.25%*
Todaropsis eblanae	*35.29%*
Micromesistius poutassou	*33.33%*
Sepia officinalis	*31.37%*
Merlangius merlangus	*31.37%*
Lophius piscatorius	*29.41%*
Aequipecten opercularis	*27.45%*
Hyperoplus immaculatus	*25.49%*
Scyliorhinus stellaris	*21.57%*
Merluccius merluccius	*21.57%*
Maja brachydactyla	*19.61%*
Ctenolabrus rupestris	*19.61%*
Dicentrarchus labrax	*19.61%*
Sprattus sprattus	*19.61%*
Palinurus elephas	*17.65%*
Raja undulata	*13.73%*
Mullus surmuletus	*13.73%*
Mustelus asterias	*13.73%*
Raja clavata	*13.73%*
Chelidonichthys lucerna	*13.73%*
Callionymus lyra	*11.76%*

ANNEXE 4 : Occurrences of benthos (>10%)

Manche Est	
Nom scientifique	Occurence
Asterias rubens	75.34%
Psammechinus miliaris	71.23%
Hydrallmania falcata	63.01%
Inachus dorsettensis	61.64%
Macropodia rostrata	58.90%
Alcyonidium diaphanum	54.79%
Pagurus prideaux	52.05%
Alcyonium digitatum	49.32%
Pyuridae	49.32%
Abietinaria abietina	45.21%
Adamsia palliata	45.21%
Anseropoda placenta	43.84%
Ascidia mentula	43.84%
Ophiothrix fragilis	38.36%
Macropodia tenuirostris	34.25%
Crepidula fornicata	34.25%
Nemertesia antennina	30.14%
Liocarcinus vernalis	28.77%
Halecium halecinum	23.29%
Ascidiella scabra	23.29%
Pisidia longicornis	21.92%
Pilumnus hirtellus	21.92%
Crossaster papposus	21.92%
Ascidiella aspersa	20.55%
Porifera	20.55%
Urticina eques	20.55%
Flustra foliacea	20.55%
Mimachlamys varia	20.55%
Dromia personata	20.55%
Ophiura ophiura	19.18%
Liocarcinus depurator	19.18%
Pisa armata	19.18%
Styela clava	16.44%
Pagurus bernhardus	13.70%
Sertularia cupressina	13.70%
Alcyonidium gelatinosum	12.33%
Doris pseudoargus	12.33%
Pagurus cuanensis	12.33%
Tethya aurantium	12.33%
Laetmonice hystrix	12.33%
Stelligera stuposa	12.33%
Suberites	10.96%
Metridium dianthus	10.96%
Hyas coarctatus	10.96%

Manche Ouest	
Nom scientifique	Occurence
Echinus esculentus	45.10%
Marthasterias glacialis	27.45%
Flustra foliacea	23.53%
Pentapora fascialis	21.57%
Inachus dorsettensis	21.57%
Abietinaria abietina	19.61%
Pagurus prideaux	15.69%
Ascidia	15.69%
Hydrallmania falcata	15.69%
Nemertesia antennina	11.76%

ANNEXE 5 : Summary table of work

Hydrology and plankton

Appareil	Manche Ouest	Manche Est	Utilisation
Manta	8	22	Microplastiques DCSMM
WP2	20	9	Réseau trophique, Abondance zooplanctonique
Niskin à la surface	24	37	Chlorophylle totale, MES, sels nutritifs, flore phytoplanctonique, Réseau trophique (isotopie)
SBE	65	74	Température, salinité, pH, Fluorescence, Par (irradiance), Oxygène, Turbidité, profondeur
MIK	38		Prélèvement de Phyllosomes (larves de cigale et langouste)

Additional work on trawls

		Western English Channel	Eastern English Channel	Use
	Station chalutage	52	74	
	Otolithes	874	1311	Provision of age-specific abundance indices
	Mensuration	23344	42501	Provision of size-specific abundance indices
APECS	*Galeorhinus galeus*	7	15	Marking of elasmobranchs
	Mustelus	5	18	
	Mustelus asterias	13	351	
	Raja clavata	26	269	
	Total	**51**	**653**	
Prélèvement IFREMER / ANSES		2979 individus sur 127 stations		Collection of 6 species of cephalopods (*Loligo forbesii, Loligo vulgaris, Sepia, Ilex, Todaropsis, Alloteuthis*) at all stations. Research and parasitic study.
Prélèvement Wageningen Marine Research			DNA samples - 30 de *Mustelus asterias* - 15 de *Galeorhinus galeus* - 7 *Raja montagui* - 14 *Raja brachyura* - 10 *Raja clavata* 32 raies marquées avec DSTags - 7 *Raja montagui* - 14 *Raja brachyura* - 10 *Raja clavata* - 1 *Dasyatis pastinaca*	Study of elasmobranch population in the North Sea and Eastern English Channel.
IFREMER / Lorient		15	19	Search for genetic markers for Scyliorhinus stellaris.
PARASITES GROUP IMR		25	25	Parasitic study on juvenile mackerels as part of the international IBTS group.
PELAGIS		10 bars		Analysis of metallic contaminants, trophic tracers, and tracers of contamination/nursery sources (isotopes of certain elements) on two tissues (muscle, liver) of adult sea bass from offshore areas frequenting the English Channel. EC2CO project of the CNRS.
IUEM		Prélèvement de 1000 *Trisopterus minutus*		

Bathymetrie

Sondeur multifaisceaux ME70 / 2040	Manche Ouest	Manche Est	Utilisation
IFREMER / NSE-ASTI	11	14	Développement des modèles physiques de description du fond

ANNEXE 6 : suivi MEGASCOPE

Suivi de la distribution de la mégafaune marine en Manche

MEGASCOPE

Compte-rendu de campagne

CGFS 2023

Rédaction :
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Novembre 2023

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Remerciements :

Nous tenons à remercier vivement l'IFREMER et plus spécialement les responsables de mission de la campagne CGFS : Didier LE ROY, Victor MARTIN BAILLET et Carolina GIRALDO pour nous permettre de participer à ces missions à bord du *N/O Thalassa,* et pouvoir ainsi assurer le suivi de la mégafaune marine. Merci également aux équipes scientifiques présentes sur le navire pour leur soutien au cours de la campagne.

Pour le bon déroulement des opérations à bord du *N/O Thalassa*, nous remercions également le commandant de bord ainsi que tout son équipage Génavir.

CONTEXTE

Les campagnes Ifremer CGFS (« *Channel Ground Fish Survey »)* sont liées au projet européen de contractualisation de la collecte des données halieutiques de base. Elles ont pour objectif de faire une estimation des indices d'abondance des principales espèces piscicoles commerciales en Manche et Mer du Nord. Plus précisément, elles s'attachent à évaluer la partie inaccessible à la pêche professionnelle, à savoir le recrutement qui constitue le potentiel des jeunes individus entrant dans la population. La mise en place d'une démarche écosystémique incluant la mégafaune marine fut opérée avec le passage de cette campagne sur un navire plus conséquent, le *N/O Thalassa*. Le protocole Mégascope fut appliqué sur la campagne CAMANOC qui est l'homologue de CGFS en Manche Ouest. Depuis, il est mis en place annuellement avec un échantillonnage dans un premier temps centré sur la partie orientale et maintenant plus homogène sur toute la Manche.

Les observations relatives à la mégafaune marine sont collectées sur CGFS depuis 2014 via le suivi MEGASCOPE coordonnée par l'Observatoire Pelagis. Les données, bancarisées dans un premier temps, sont disponibles pour caractériser la distribution et l'abondance des espèces en Manche. Cette campagne vient agrémenter la série historique en place dans le but d'effectuer un suivi à long terme de la mégafaune marine et de détecter d'éventuelles tendances. Elle est ainsi au cœur de la stratégie de surveillance des mammifères et oiseaux marins mise en place au niveau communautaire (Directive Cadre et Stratégie pour le Milieu Marin) et répond aux enjeux relatifs à la diversité biologique.

Citation du document : Vansteenberghe C., Dorémus G., 2023. MEGASCOPE : Suivi de la distribution de la mégafaune marine en Manche. Compte rendu de campagne - CGFS 2023

Crédits photographiques page de garde : C. Dars, J. Avenel et M. Duvilla

EFFORT ET CONDITIONS D'OBSERVATION

La campagne s'est déroulée **du 15 septembre au 19 octobre** en 2 legs d'échantillonnage, distribués dans toute la Manche. Entre le 16 et le 29 septembre, le premier leg a couvert les radiales de la partie Ouest entre Brest et Cherbourg. Après une escale d'une journée, le second leg a couvert la partie Est du 1er au 16 octobre entre Cherbourg et Boulogne-sur-Mer. La journée du 18 octobre correspond au transit retour sur Brest.

Le travail à bord a été réalisé pendant 275 heures sur 31 jours en mer. L'effort d'observation correspond à 120 heures réalisées en suivant le protocole standard et 154 heures hors effort. De plus, les relevés suiveurs ont pu être réalisés 223 fois pendant les relevés de chalut ou au milieu de longs transits. Pour se faire, 4 observateurs se sont relayés pour embarquer sur ces legs.

Les conditions rencontrées lors de la prospection avec observation sont apparues plutôt favorables à la détection, et ont permis d'exercer plus de 77% de l'effort avec un état de la mer inférieur ou égal à 4 Beaufort (figure 1). Le maximum rencontré est de 6-7 Beaufort. Il a été noté les 13 et 18 octobre (ainsi qu'une très courte période le 19 octobre). La mauvaise météo de la journée du 20 septembre (mer à 6-7 beaufort toute la journée) a empêché la réalisation des observations. C'est la seule journée de la campagne pour laquelle l'effort d'observation a complétement été annulé.

En prenant en compte tous les paramètres pouvant affecter la détection, notamment la pluie et la visibilité, les conditions générales ont été considérées par les observateurs excellentes à bonnes 55 % du temps, moyennes 28% du temps et mauvaises 17% du temps (figure 1).

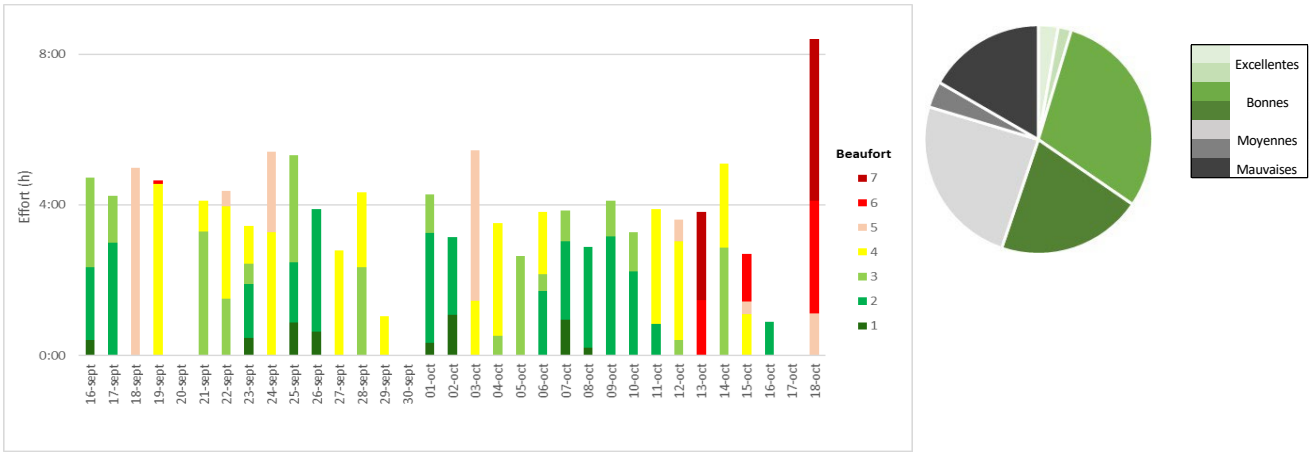


Figure 1 : Temps d'effort d'observation avec états de la mer rencontrés (Beaufort) et conditions estimées par les observateurs

RESULTATS GLOBAUX DES OBSERVATIONS

Le total des observations recueillies s'élève à 4 320, soit 15 749 individus/objets, pendant et en dehors des périodes de prospection (Tableau 1). Les relevés suiveurs représentent quant à eux 580 observations, soit 19 692 individus mais avec potentiellement les mêmes individus d'une opération à l'autre.

Les oiseaux représentent la grande majorité des observations (86 %). Les mammifères marins en constituent 3 %, et les principaux représentants des autres espèces de mégafaune marine, c'est à dire les requins et autres grands poissons (espadons, poisson-lune et thonidés) 1 %.

L'activité humaine représente 10 % des observations totales. Elle se manifeste en premier lieu par les navires avec 6 % des observations totales, suivie des bouées et des macrodéchets représentant environ 1 % des relevés chacun. A noter que la détection des macrodéchets flottants est très dépendante des conditions météorologiques.

Tableau 1 : Nombre d'observations et individus (en/hors effort)

Catégorie	Observations	Individus/objets
Activité humaine	422	503
> Bouée de pêche	109	118
> Bateau	253	324
> Déchet	58	58
> Autre	2	3
Mammifère marin	112	426
Oiseau marin	3 490	13 794
Oiseau terrestre	166	626
Autre espèce de mégafaune	56	64
Total général	**4 246**	**15 413**

OBSERVATIONS DES MAMMIFERES MARINS

Au total, 112 observations de mammifères marins ont été enregistrées sur toute la campagne. Presque toutes (90 %), se rapportent au Dauphin commun et se distribuent essentiellement sur la partie Ouest de la Manche (Figure 2). Une observation située à 1° Est apparait très orientale pour la distribution connue de l'espèce. Les observations de phoque gris et veaux- marins se concentrent uniquement dans la partie Est.

L'unique balénoptère observé lors de cette campagne est un Petit rorqual, vu au nord de l'Iroise (Figure 3). Fait assez rare, un mammifère marin mort a été observé au large du Touquet. D'après les photos prises il s'agirait surement d'un marsouin ou d'un petit delphinidé.

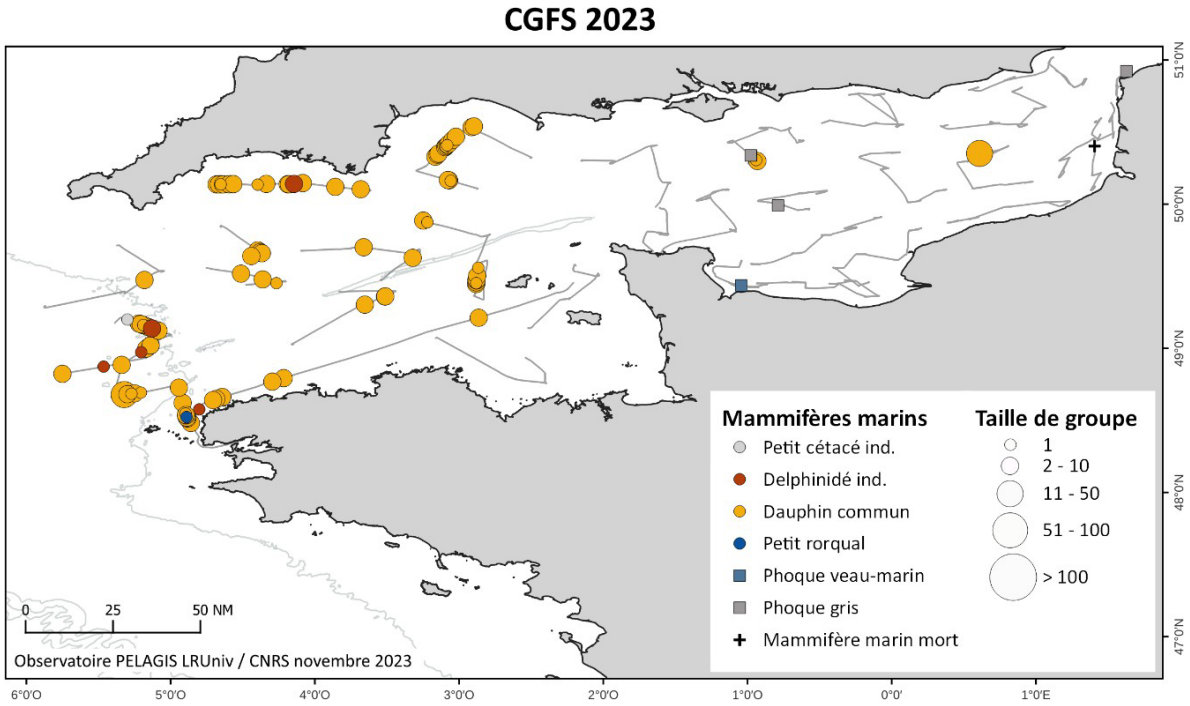


Figure 2 : Distribution des observations de mammifères marins (en/ hors effort)

Figure 3: Petit rorqual - photo C. Vansteenberghe

OBSERVATIONS DES OISEAUX MARINS

Les oiseaux constituent la majorité des observations et sont présents sur toute la zone échantillonnée. Parmi eux, on relève 94 % d'oiseaux marins, 4 % d'oiseaux terrestres (en migration) et 2 % d'oiseaux côtiers (anatidés et cormorans). Sur toute la zone couverte avec effort, les 3 490 observations d'oiseaux marins représentent 13 794 individus et se répartissent en 7 familles. La famille dominante est celle des sulidés avec 40 % des observations d'oiseaux marins, représentés uniquement par le Fou de Bassan (Figure 4).

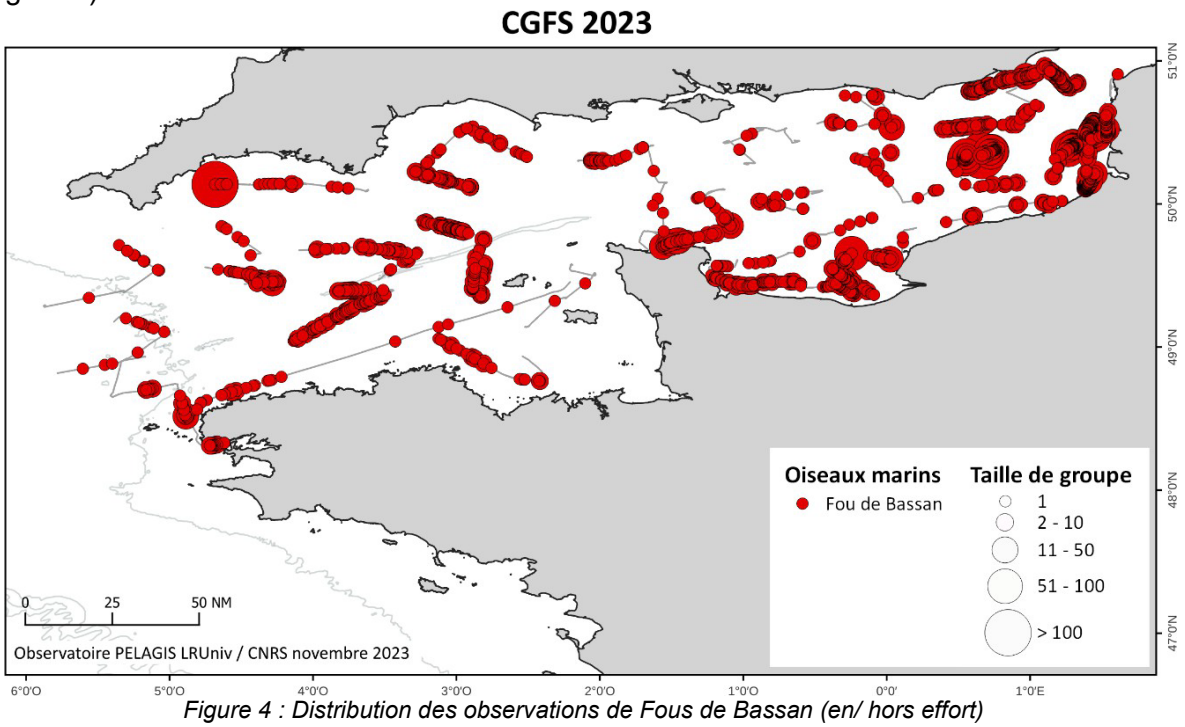


Figure 4 : Distribution des observations de Fous de Bassan (en/ hors effort)

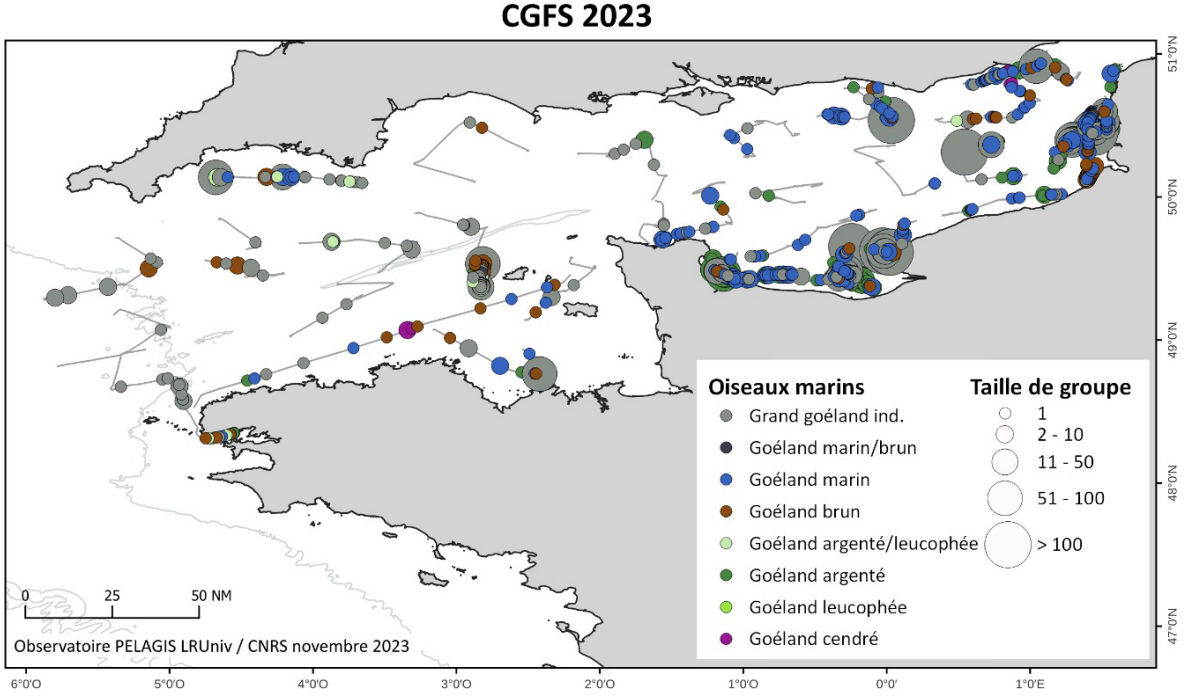


Figure 5 : Distribution des observations de grands laridés (en/ hors effort)

S'ensuivent la famille des laridés (27 %), représentés majoritairement par les goélands marins, argentés et bruns pour les grands laridés et par les mouettes mélanocéphales et tridactyles pour les petits laridés (Figures 5 et 6).

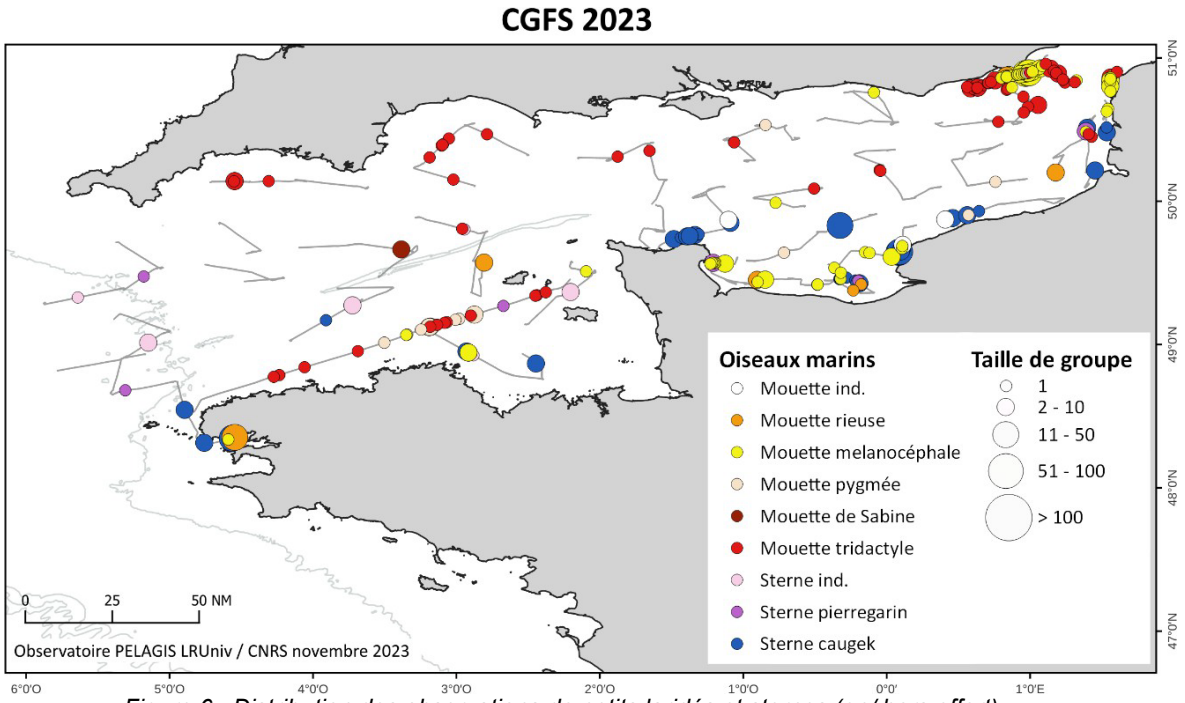


Figure 6 : Distribution des observations de petits laridés et sternes (en/ hors effort)

Les procellariidés arrivent en troisième position dans les observations (18 %) avec une majorité de puffins cendrés, puffins majeurs et puffins des anglais (Figure 7). Ils figurent essentiellement en Manche occidentale bien que des groupes importants de puffins des Baléares étaient stationnés dans le Cotentin Est.

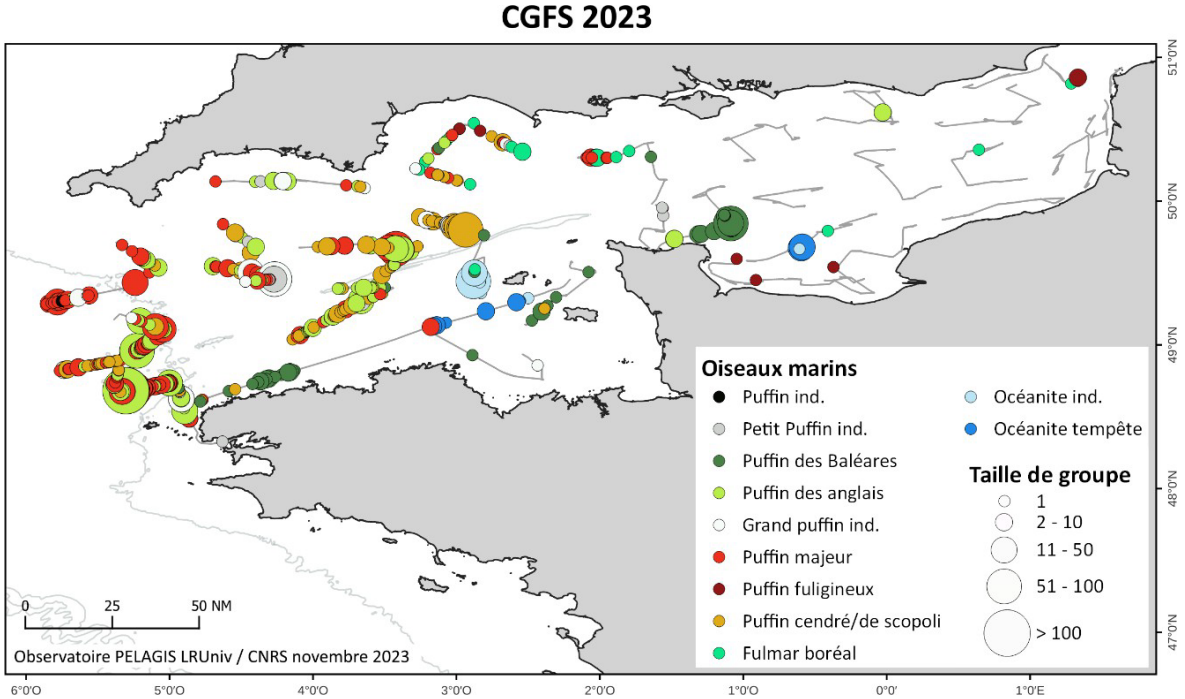


Figure 7 : Distribution des observations des procellariidés et océanites (en/ hors effort)

La famille des alcidés représente 12 % des observations et ne contient que deux espèces dont une majorité de pingouins torda identifiés. (Figure 8).

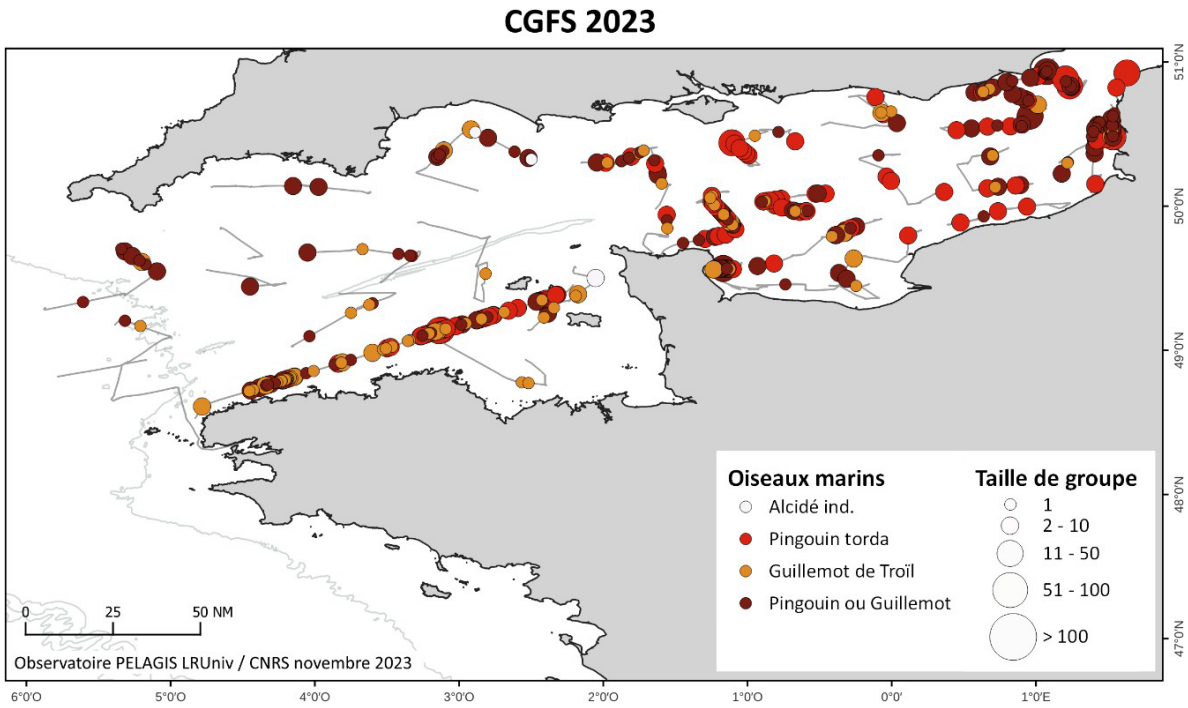


Figure 8 : Distribution des observations des alcidés (en/ hors effort)

Les autres familles dont les sternidés (Figure 6), les hydrobatidés (Figure 7) et les stercorariidés (Figure 9) sont très peu représentées (moins de 2% des observations d'oiseaux marins).

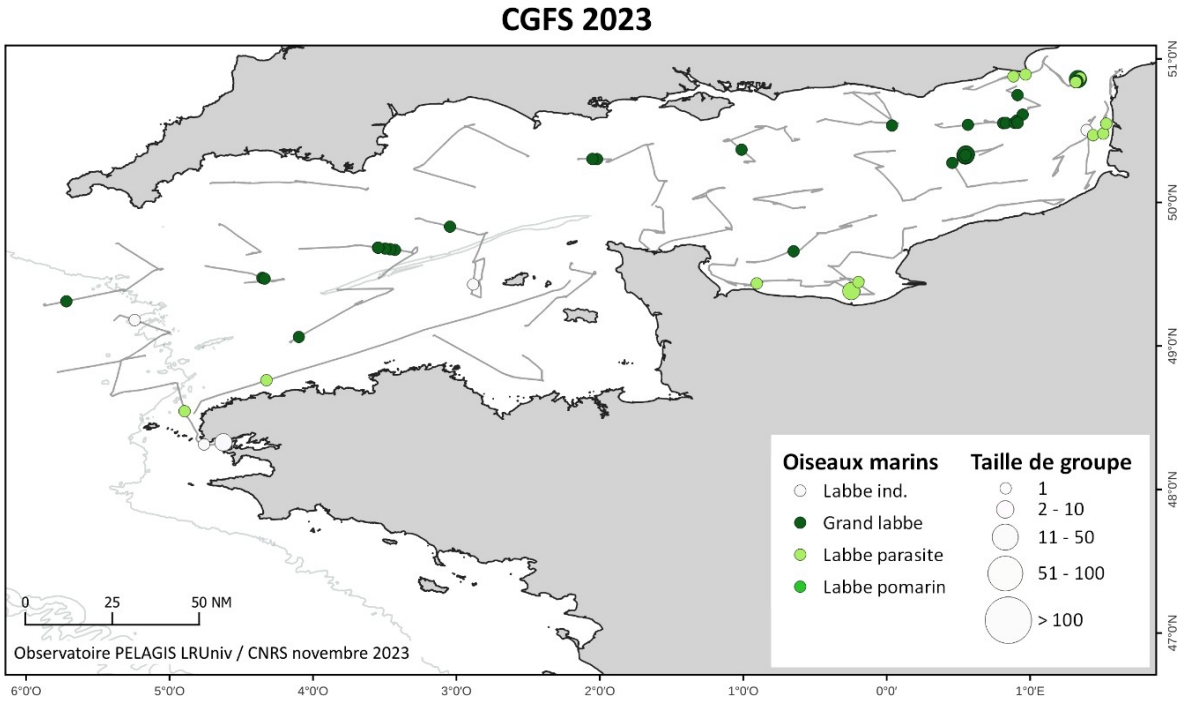


Figure 9 : Distribution des observations de labbes (en/ hors effort)

OBSERVATIONS DES AUTRES ESPECES DE MEGAFAUNE MARINE

Les autres espèces de mégafaune marine sont représentées par les élasmobranches, les poissons pélagiques (thonidés, poissons-lune, etc.), les tortues marines et les méduses. Au total, 46 observations ont été collectées. La majorité concerne les grands poissons (38 %), et les thonidés (35 %) (Figure 10). Les méduses sont le second groupe le plus représenté avec 24 % des observations.

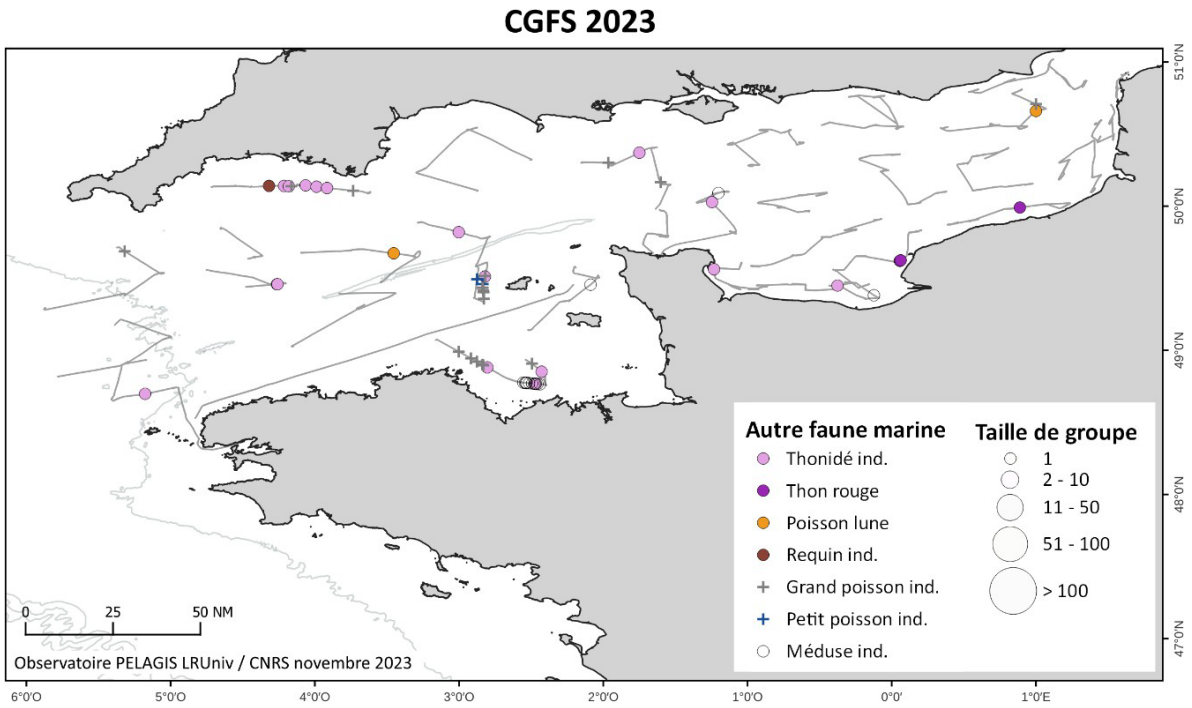


Figure 10 : Distribution des observations d'autres espèces de mégafaune (en/hors effort)

Figure 11 : Banc de petits poissons – photo C. Vansteenberghe

OBSERVATIONS DES INDICES D'ACTIVITES HUMAINES

Liées plus ou moins directement aux activités ayant lieu dans la zone d'étude, 172 observations, soit 184 objets, ont été comptabilisées. La grande majorité des bateaux observés sont des bateaux de commerce, utilisé pour le transport de marchandises, de produits pétroliers ou bien des porte-containers.

En ce qui concerne les activités de pêche, les chalutiers constituent la majorité des bateaux observés. Ils sont particulièrement présents à l'Est, proche des côtes françaises. Les bouées de pêche sont, quant à elles, concentrées de manière générale en côtier (Figure 12). Les macrodéchets flottants, dont la majorité est d'origine plastique, se distribuent sur l'ensemble de la zone échantillonnée (Figure 13).

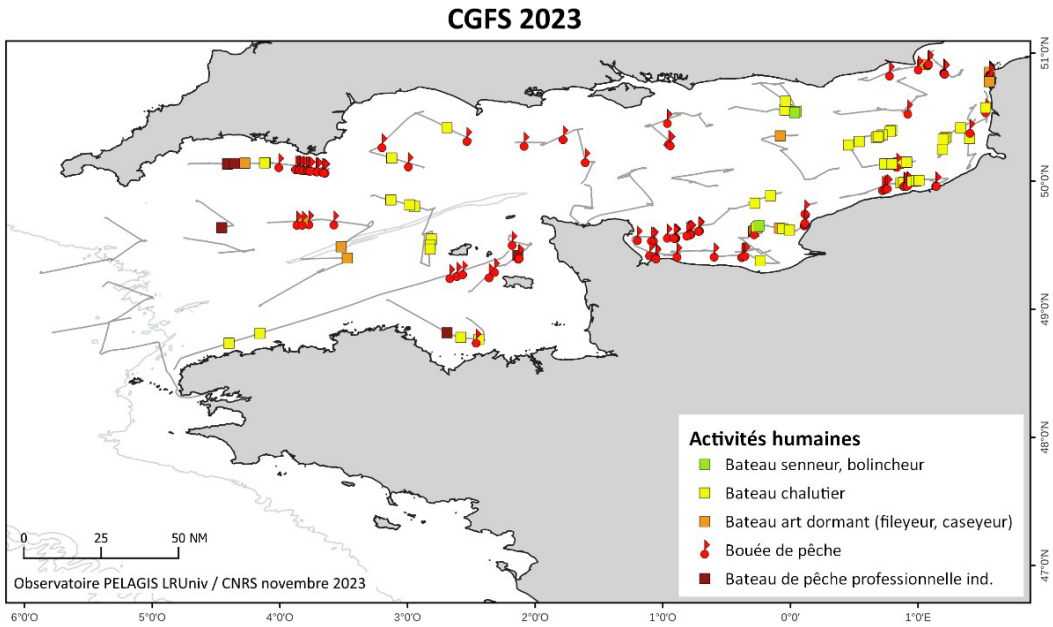


Figure 12 : Distribution des observations d'activités humaines liées à la pêche (en/hors effort)

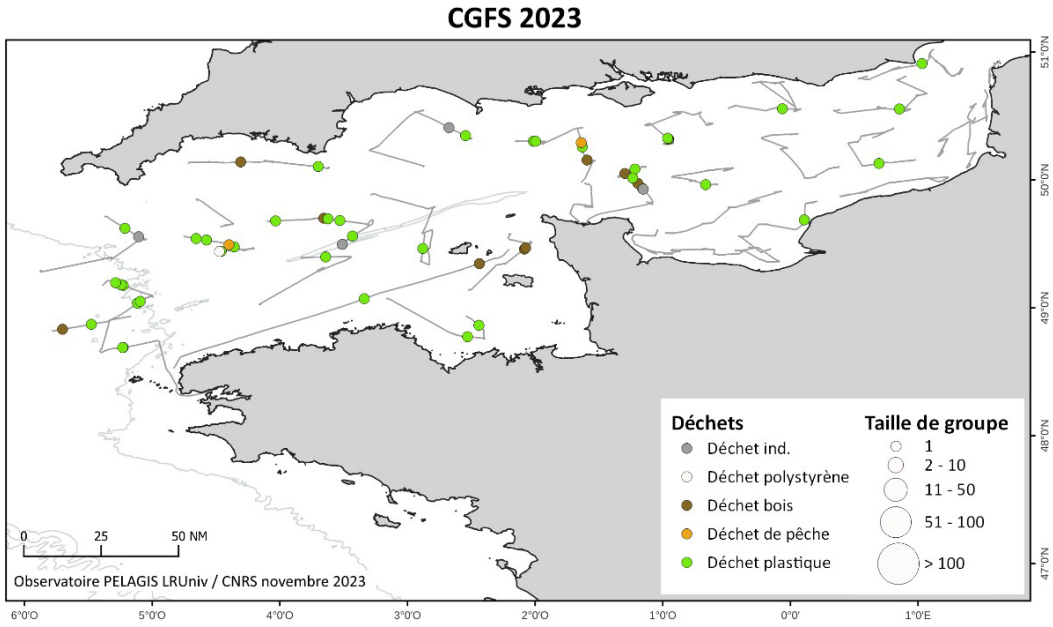


Figure 13 : Distribution des macrodéchets (en/hors effort)

SUIVI ACOUSTIQUE DES CHIROPTERES ET PASSEREAUX

Lors de la campagne, deux capteurs SM4-FS et deux capteurs SM4 (audible) ont été installés à différents points du bateau par le Muséum National d'Histoire Naturelle de Concarneau.

Les capteurs chiroptères ont enregistré pendants 34 nuits au cours de la campagne et les capteurs oiseaux jusqu'à 29 nuits (détail Tableau 2). De plus, un des capteurs oiseaux enregistrait aussi en journée. A noter qu'un dysfonctionnement de cause non identifiée s'est avéré sur le capteur tribord n'ayant enregistré que 2 jours lors du second leg.

Les analyses des sons échantillonnés qui nécessitent beaucoup de traitement pour masquer les bruits parasites seront connus au cours de l'année 2024.

*Tableau 2 : Périodes échantillonnées la campagne de 2023. La période est la date du 1er et dernier enregistrement, mais des nuits peuvent être manquantes entre les legs (maintenance des piles entre les deux legs). Le nombre de nuits correspond aux nombres de nuits complètes avec des enregistrements du coucher au lever du soleil, sauf pour les cases avec un astérisque : * capteur qui enregistrait 24h/24h.*

capteurs		**CGFS**	
		Période	Nb nuits
Chiroptères	Position 1	15/09 – 20/10	22
	Position 2 (bâbord)	X	X
	Position 3	15/09 – 19/10	34
Oiseaux	Bâbord	15/09 – 15/10	29
	Tribord	15/09 – 21/10	15 *

CONCLUSION

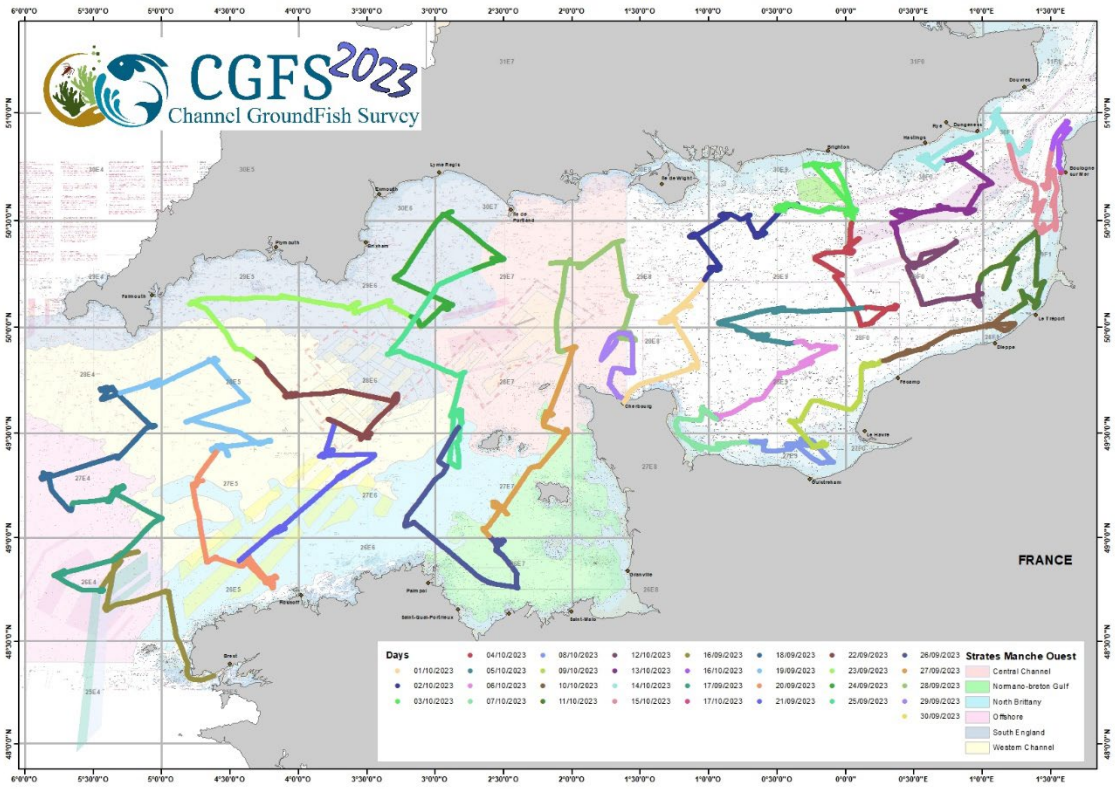
Le programme Mégascope, visant à dénombrer les prédateurs supérieurs sur les campagnes annuelles de l'Ifremer a été mis en place en 2023 pour la neuvième année consécutive.

Les conditions de terrain rencontrées durant cette campagne dans en Manche sont apparues plutôt favorables à la détection. Elles ont permis d'exercer un effort d'observation durant 120 heures avec méthodologie standardisée et d'enregistrer 4 320 observations tous efforts confondus dont 90 % se rapportent à la mégafaune marine.

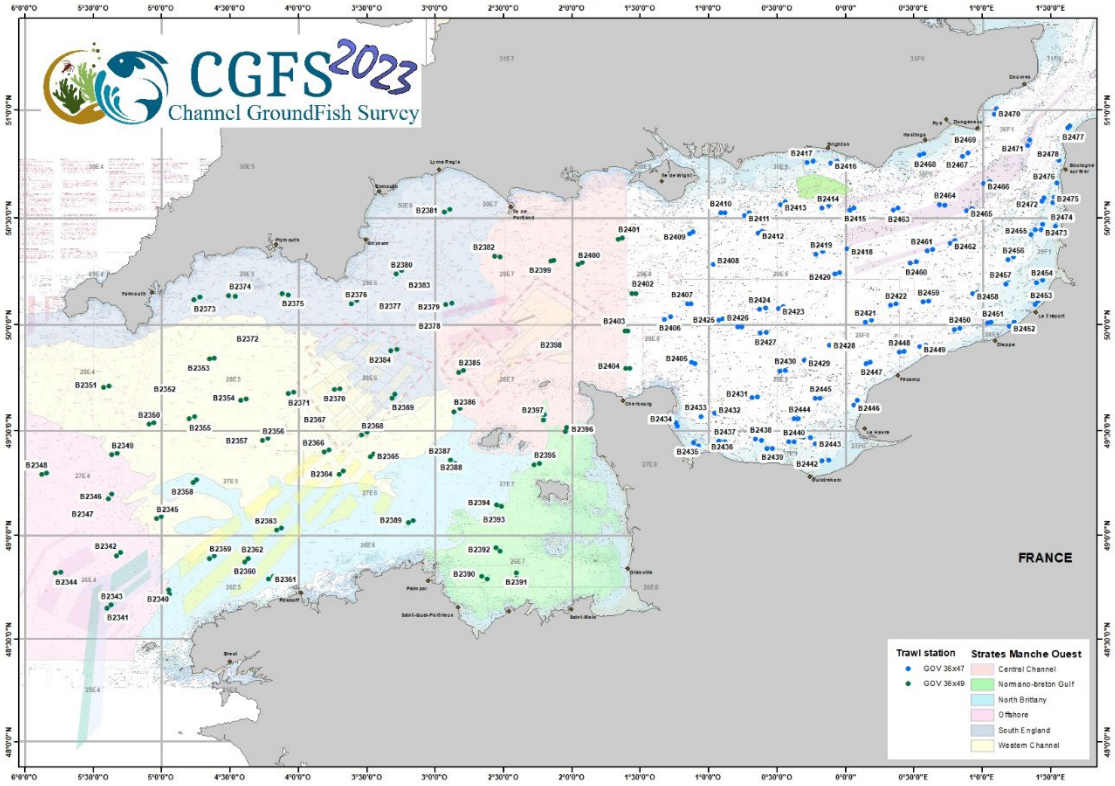
Les principaux taxons observés furent les Fous de Bassan, les laridés (mouettes et goélands) et le Dauphin commun. Les 223 points de relevés suiveurs ont également permis d'acquérir des informations quant à la diversité faunistique présente lors des opérations de pêche.

ANNEXE 7 : cartes des échantillonnages réalisés

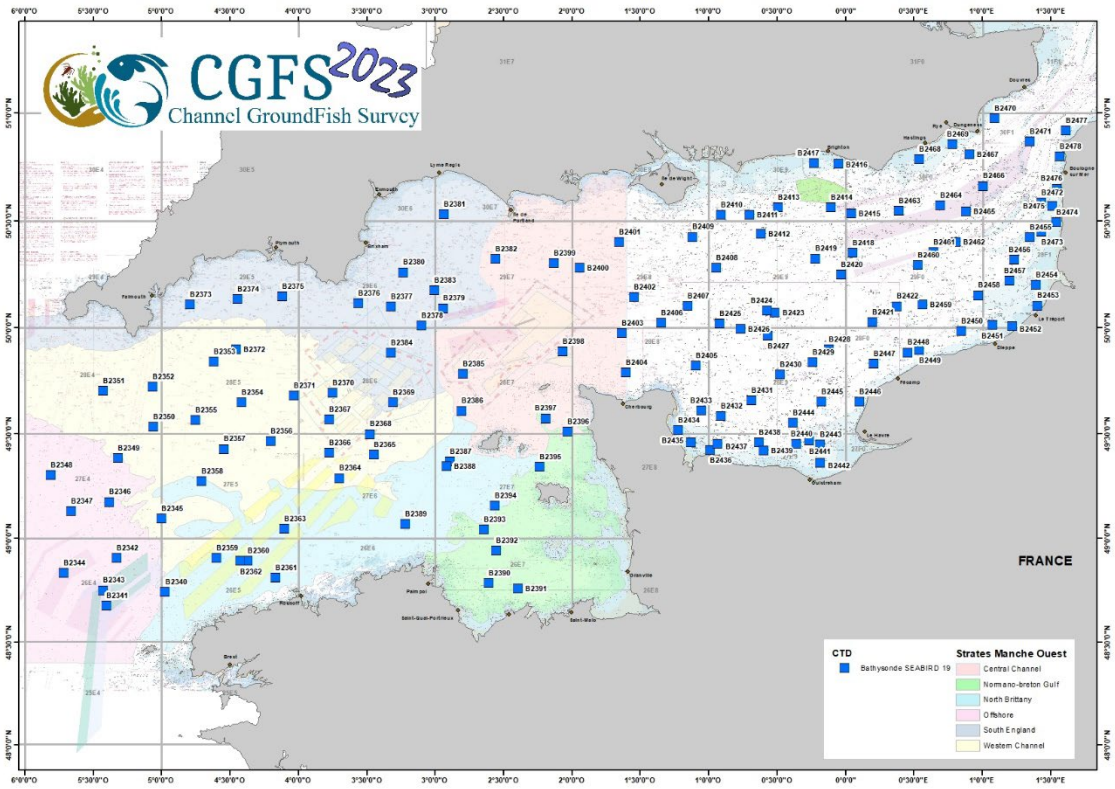
Parcours de la campagne CGFS 2023



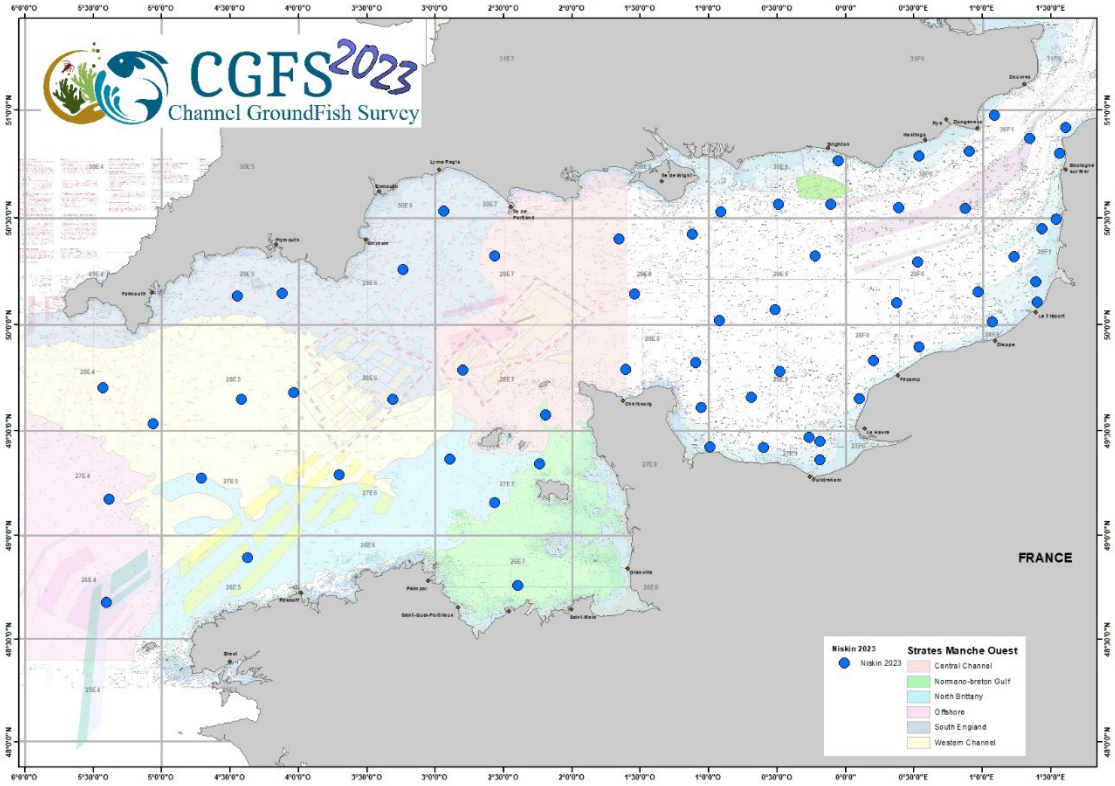
Répartitions des stations de chalutage



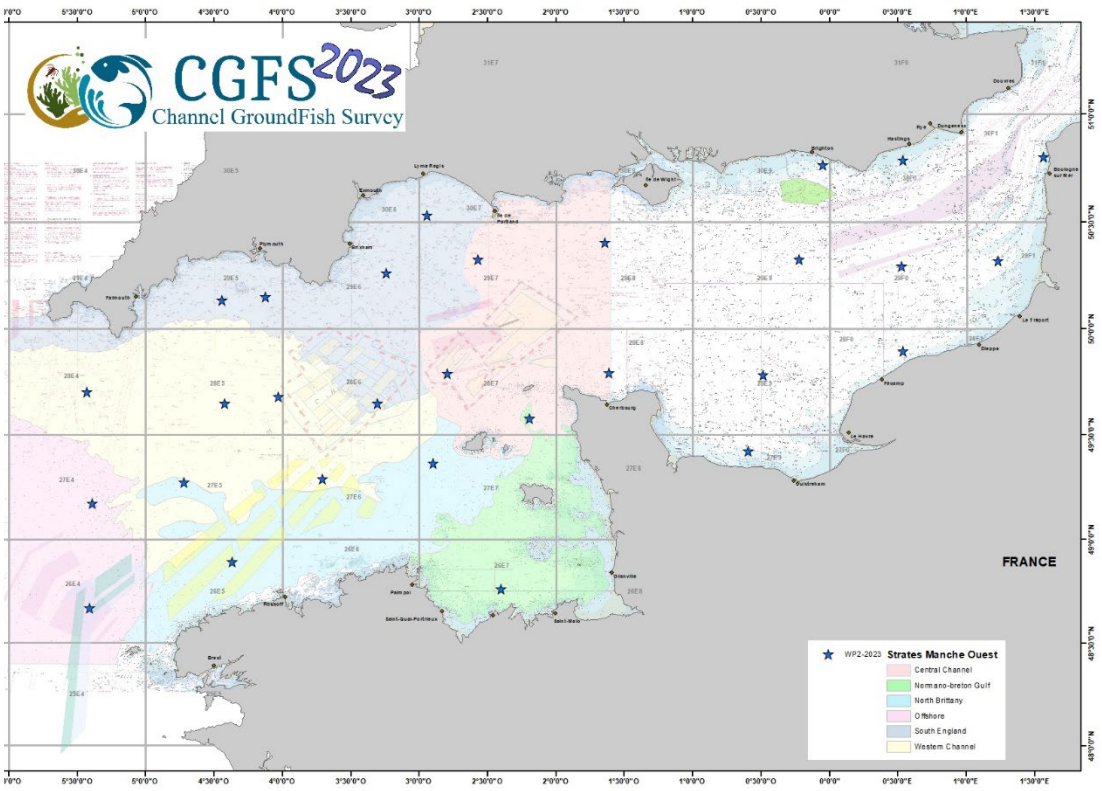
Répartition des profils CTD



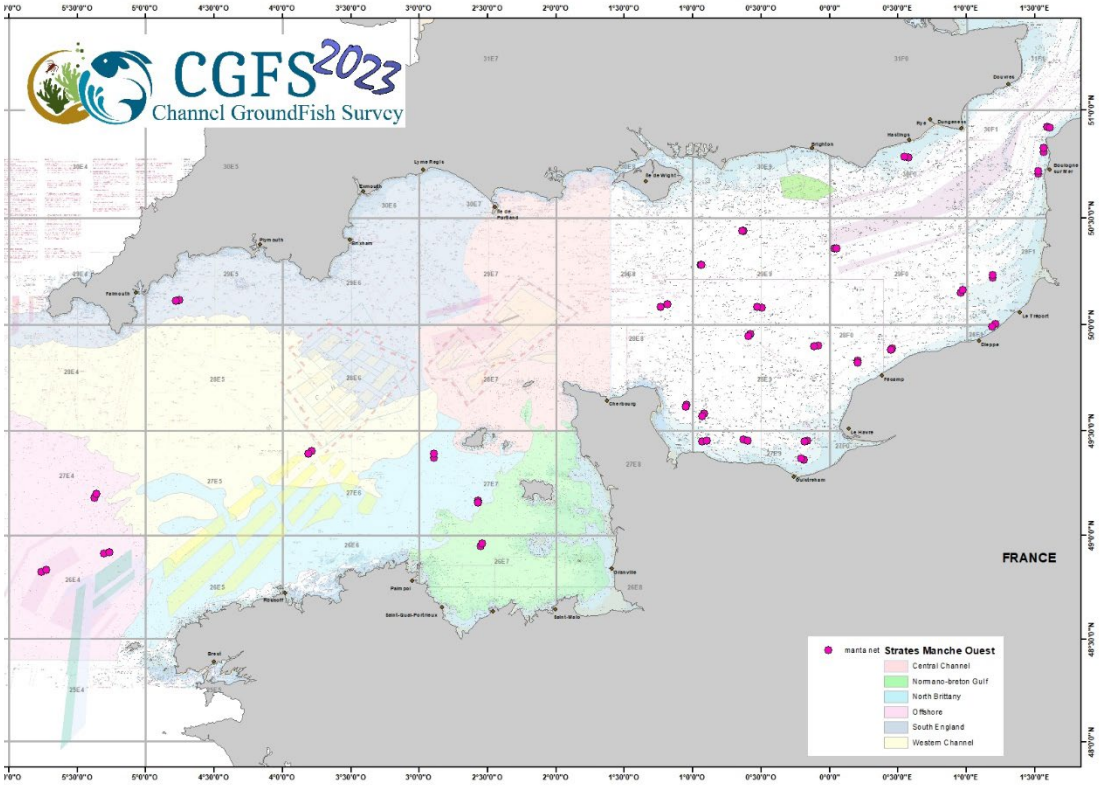
Echantillonnage bouteille NISKIN en surface



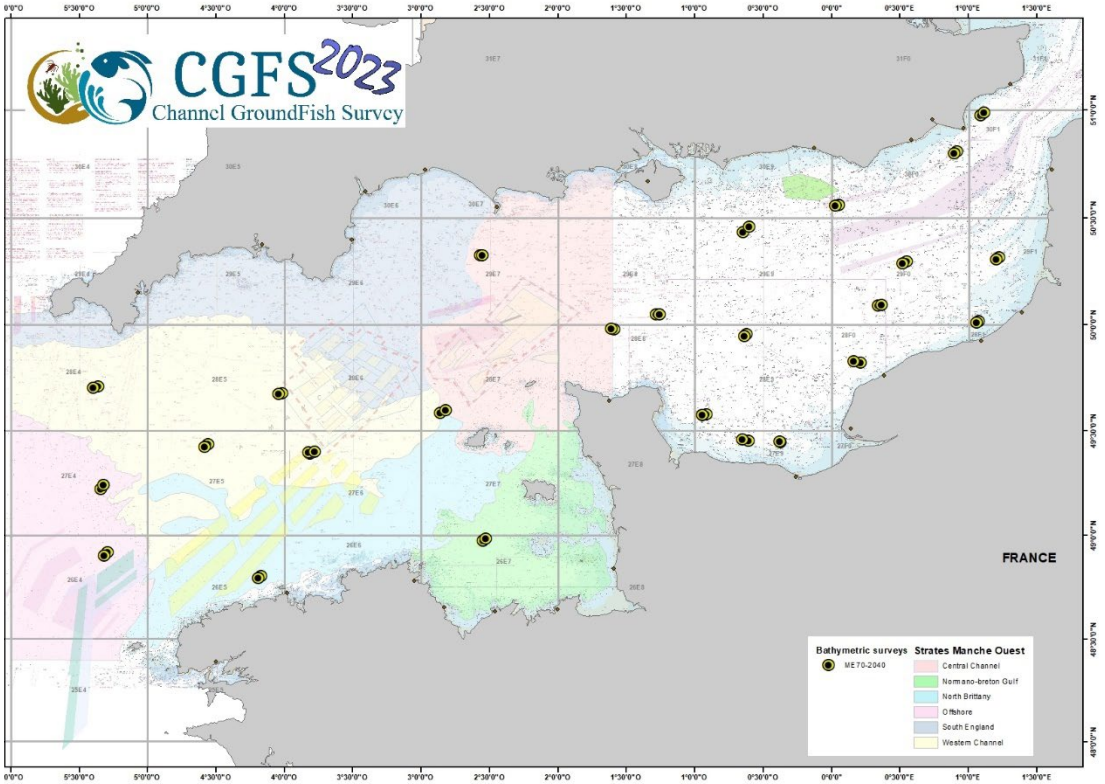
Echantillonnage au filet WP2



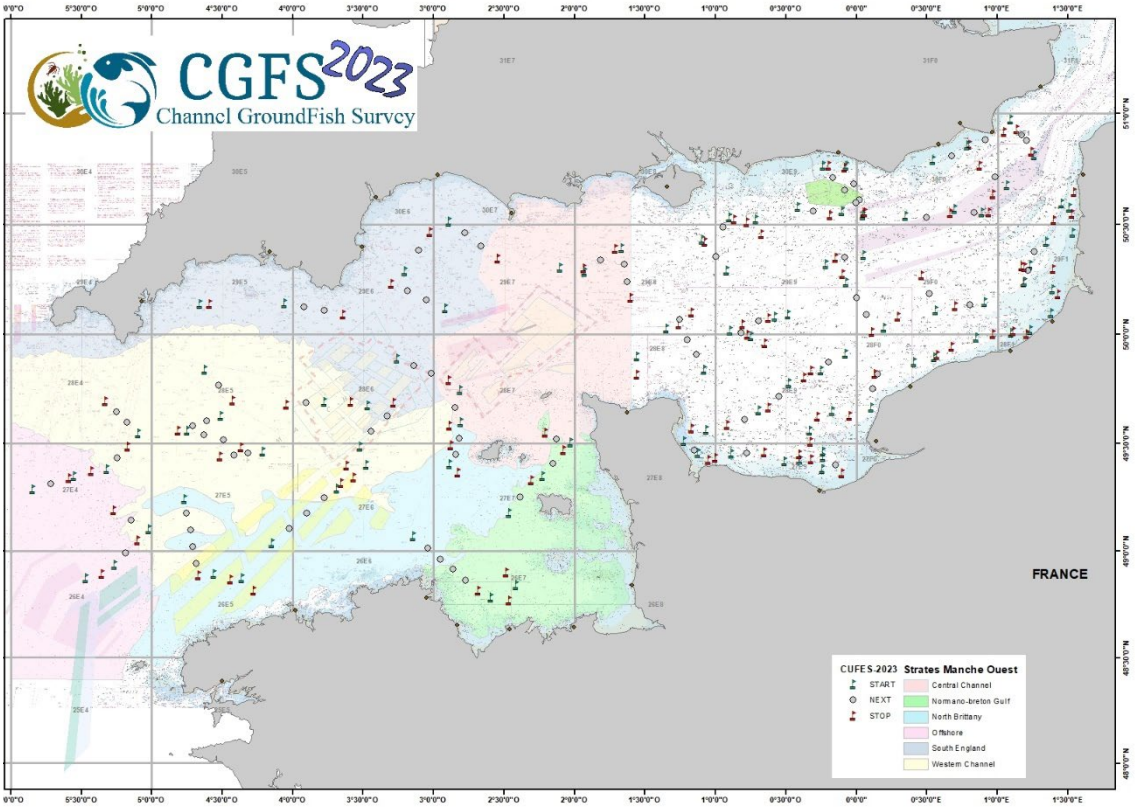
Echantillonnage des microplastiques au filet MANTA



Acquisitions bathymétriques au sondeur multifaisceaux



Echantillonnage des œufs en surface (CUFES)



ANNEXE 8 : France – East English Channel Quarter 4 FR-CGFS

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

Nation:	**France**	Vessel:	THALASSA II
Survey:	CGFS2023	Dates:	THALASSA II: 16/09/2023 to 17/10/2023

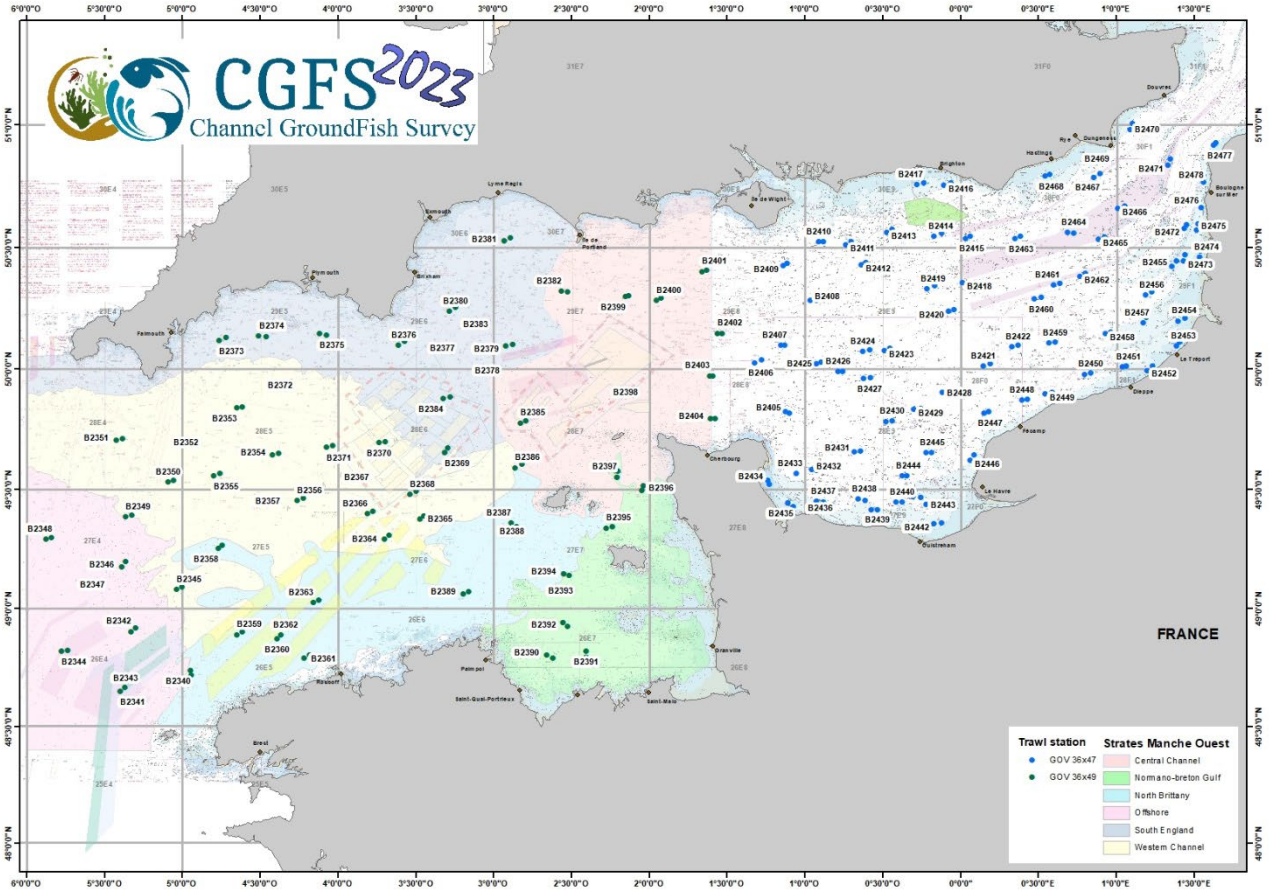
Cruise	As from 2018 France sampled both the Eastern (7d) and Western (7e) English Channel. Data from both surveys, the Western CGFS (FR-WCGFS) in Q3 and the Eastern CGFS in Q4 has been submitted to DATRAS. Trawling was carried out during the day. CTD was deployed at each trawl station to collect temperature 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 CGFS 2023 campaign took place on the N/O Thalassa from 16 to 29 September for the western channel and from 1 to 16 October for the eastern channel. The authorisations to work in English waters were issued well in advance of the start of the survey, which enabled us to cover the entire study area without any particular restrictions. During the CGFS 2023 survey, 52 trawl stations were carried out in the Western Channel, including 1 that was invalid due to damage.

	In the Eastern Channel, we carried out 74 planned trawl stations, only one of which was invalid due to damage. At each trawl, the catch is sorted, weighed by species and a representative sample is measured. Biological samples are also taken from the catches for subsequent analysis on land. Over the whole campaign, we only had 3 days of bad weather, which cancelled some plankton and microplastic net sampling. Otherwise, the clement weather conditions enabled us to carry out all the work in good conditions. *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 with WP2 (29) - Microplastic was collected with a Manta net (30) - hydrological analyses were make with Niskin bottle sample (61) - Observers for mammals and birds information was collected throut out the survey. - bathymetric acquisition for Development of physical models to describe the seabed (25) - ray and shark tagging (726)
Number of fish species recorded and notes on any rare species or unusual catches:	113 different fish's species were recorded (sharks and rays included). Cephalopods and shellfish were also measured and benthic fauna identified within each haul.

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

Species	Age	Species	Age
Merlangus merlangius	**422** 194 (7D) – 228 (7E)	*Gadus morhua*	**0** 0 (7D) – 0 (7E)
Mullus surmuletus	**177** 154 (7D) – 23 (7E)	*Dicentrarchus labrax*	**318** 194 (7D) – 124 (7E)
Pleuronnectes platessa	**235** 232 (7D) – 3 (7E)	*Chelidonichthys cuculus*	**205** 97 (7D) – 108 (7E)
Trisopterus luscus	**201** 120 (7D) – 81 (7E)	*Solea Solea*	**151** 149 (7D) – 2 (7E)
Melanogrammus aeglefinus	**43** (7E)	*Scophthalmus maximus*	**5** 5 (7D) – 0 (7E)
Pollachius pollachius	**40** 0 (7D) - 40 (7E)	*Scophthalmus rhombus*	**2** 2 (7D)- 0 (7E)
Lophius piscatorius	**24** 2 (7D) – 22 (7E)	*Lophius budegassa*	**1** 0 (7D) – 1 (7E)
Lepidorhombus whiffiagonis	**5** 0 (7D) – 5 (7E)	*Microstomus kitt*	**59** 3 (7D) – 56 (7E)
Scomber scombrus	**297** 159 (7D) – 138 (7E)	*Molva molva*	**0**
Phycis blenoides	**0**	*Glyptocephalus cynoglossus*	**0**

Thalassa: GOV hauls FR-CGFS-Q4 & FR-WCGFS-Q3


CGFS2023
Channel GroundFish Survey
FRANCE
Trawl station
GOV 36x47
GOV 36x49
Strates Manche Ouest
Central Channel
Normano-breton Gulf
North Brittany
Offshore
South England
Western Channel

CGFS 2023
Channel GroundFish Survey

L'équipe CGFS remercie l'équipage du Thalassa pour son professionnalisme, ainsi que tous les participant à cette campagne.

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