CGFS 2017 - Survey Report

Morgane Travers-Trolet
& Franck Coppin

IFREMER Centre Manche-Mer du Nord
150 quai Gambetta
BP 699
62321 Boulogne sur Mer

1. Rationale of the survey

The English Channel is a sector strongly influenced by fisheries, mostly for France and England but also more widely for Northern European countries. The ecological and economic impacts of the exploitation of fisheries resources must be estimated in order for the fishing activity to stay sustainable while accounting for resources limitation and its effect on the environment. To answer this need, E.U. member states have to carry out sea surveys in order to estimate the abundance and distribution of fish stocks, independently of commercial fisheries data.

To achieve this objective, the CGFS (Channel GroundFish Survey) is part of the European program monitoring fish resources, which gather data relative to the exploited stocks (abundance, spatial distribution, maturity, age/size structure, recruitment index). Each year in autumn, about 74 stations are sampled with a standard high vertical opening bottom trawl (GOV 36/47), and the haul is processed to produce the required data. The time series initiated in 1988 is used every year by European stock assessment working groups to derive the exploitation state of the main commercial fish species.

Realized on the R/V Thalassa since 2015, the CGFS offers now the possibility to sample the entire ecosystem in order to better understand it, answering both the MSFD requirements and the need for an ecosystem approach to fisheries at the European scale. Thus, using punctual sampling and en-route recording devices, the CGFS survey allows measurement and analysis of the physic-chemical properties of the water (hydrological probe), the phytoplankton (niskin bottle) and zooplankton communities (plankton nets), the fish eggs abundance (CUFES egg pump) and the species composition of demersal community (GOV trawls). En-route visual observations were also conducted to record encounters of marine birds and mammals. Additionally, during the night some acoustic records were performed in some local places.

2. Survey trajectory and sampling stations

The R/V Thalassa left Boulogne-sur-Mer on the 7th of October 2017 to sample the eastern English Channel (between 2°W and 2°E).The sampling ended on the 21st of October, and the vessel reached Brest on the 22th of October 2017.

The following number of stations were sampled (Figure 1):
- 71 trawls in the eastern English Channel with GOV 36x47 including 66 validated
- 82 hydrology stations (deploying hydrological probe, niskin bottle and for 71 stations plankton WP2 net)
- 15 stations sampled in the eastern English Channel with the MANTA net, in order to collect microplastics
- 160 samples of sub-surface water, in order to get fish eggs, along the vessel trajectory in the eastern English Channel
- 13 acoustic records of fine-scale bathymetry, during the night.

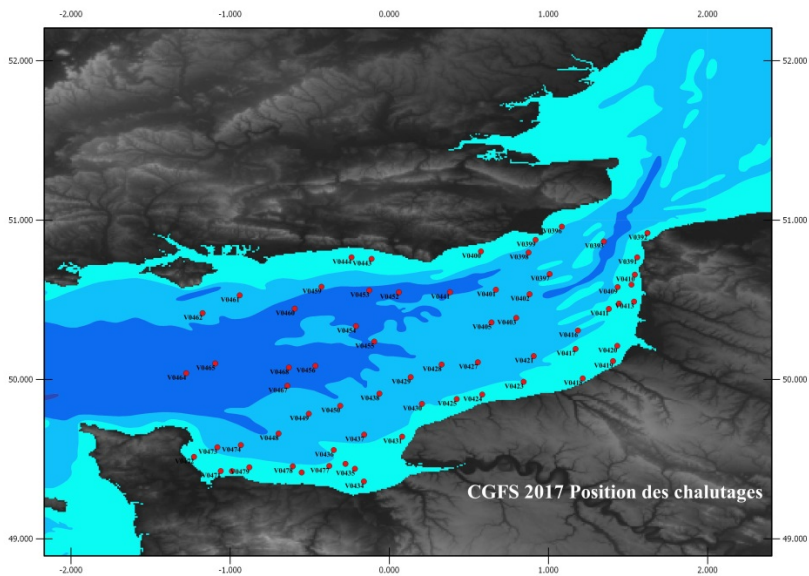During daylight, two observers were also continuously recording seabirds and marine mammals.

Figure 1*: Bottom trawl sampling stations of the CGFS 2017 survey*

3. Preliminary results

3.1 Fish community

The fish community of the eastern Channel has been sampled with a 36x47 GOV trawl equipped with a groundgear adapted to the area. The trawl geometry was recorded during each haul, and was about 4.5 meters of vertical opening and 16m of horizontal opening. The preliminary results concerning the spatial species composition of the catch are shown in figure 2. Similar to previous years, they are characterized by a high dominance of horse mackerel (*Trachurus trachurus*), particularly in the central area, while the coastal areas was dominated by mackerel (*Scomber scombrus*) and whiting (*Merlangus merlangius*) to a lesser extent. Coastal areas show a higher species richness than offshore (from 61 species per haul down to 23 species per haul). When integrated over the area, the dominance shows almost a similar pattern (figure 3) with horse mackerel being the most dominant species in abundance and mackerel which is the most dominant in biomass. It is worth noting the presence of seabass (*Dicentrarchus labrax*) among the most important species in biomass, which was not typical of the previous years. Both the number of fish and mean individual weight per haul have significantly increased compared to 2016. Over the eastern English Channel, 88 species of fish and cephalopods, 111 taxa of benthic invertebrates (including commercial ones) and jellyfish have been identified.
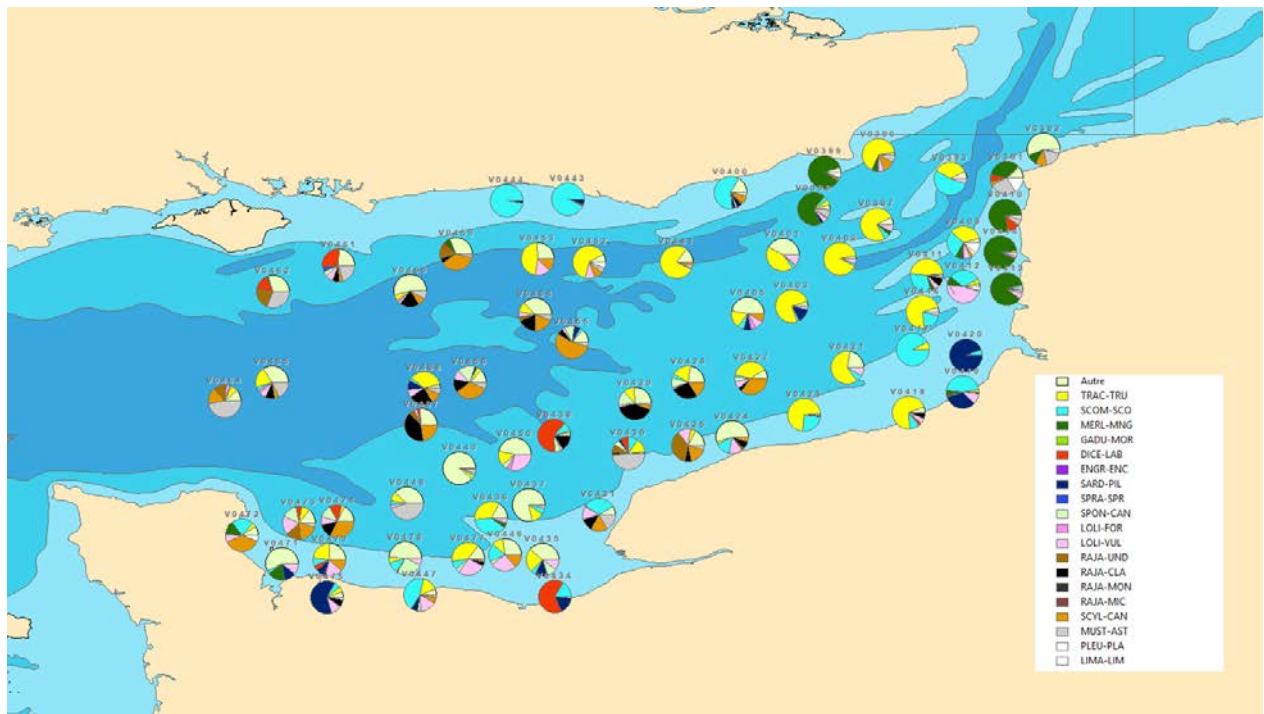

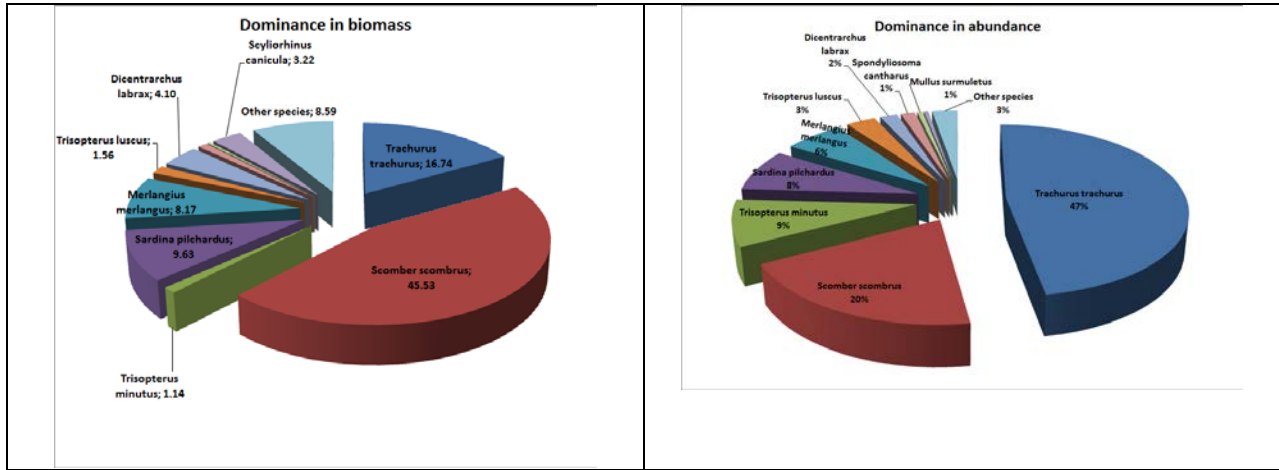*Figure 2: Species composition of the catch in the Eastern English Channel*

Figure 3: Species dominance over the entire eastern English Channel, in term of biomass (on the left) and abundance (on the right)

At each trawl station, fish were sorted and identified, before being measured to the nearest inferior centimeter. As an example, size distribution of plaice and red mullet averaged on the entire area are presented in figure 4.
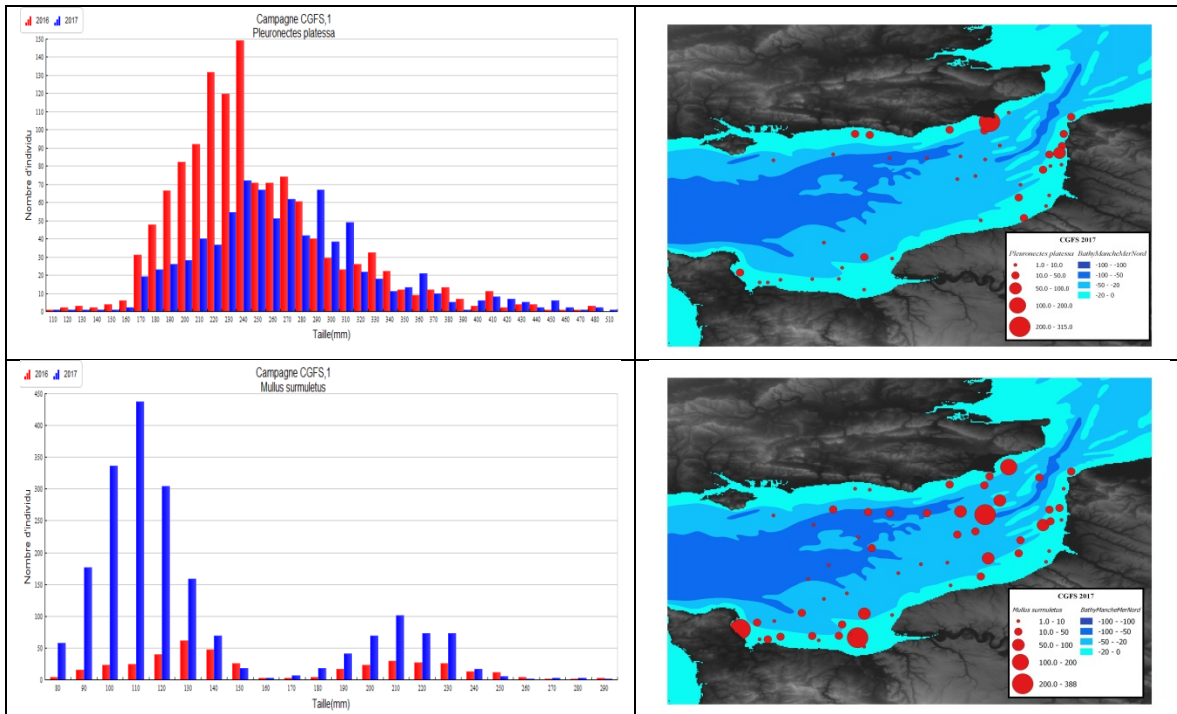

Figure 4: Size distribution and spatial distribution (abundance by km²) of the 2 species assessed by WGNSSK[1] in the VIId ICES area: plaice (top) and red mullet (bottom) for which the mean size is also indicated (smaller than 15cm included in blue, i.e. a priori 0-age group; and larger than 16cm in red, i.e. older than 1-year old included).

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[1] *ICES Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak*

During the survey, some biological samples were realized on some of the fish caught by the GOW trawl, and consist mostly of otolith sampling. (table 1).

Table 1: Number of fish used for otolith, scale or illicium sampling, per species

Species	Number
Whiting	287
Cod	8
Pouting	81
Monkfish	3 (illicium)
Red gurnard	129
Red mullet	139
Seabass	237 (scales)
Plaice	343
Sole	91
Brill	4
Turbot	7

3.2   Plankton community

The pelagic environment has been sampled at each trawling station using CTD probe, Niskin bottle and plankton net. The water and organisms collected will be analyzed at the laboratory. However, gelatinous organisms, and more specifically the ctenophore *Mnemiopsis leidyi*, have been identified and counted alive onboard, as they are partially destroyed when fixed with formaldehyde. In 2017, and conversely to previous years, only a very few number of individuals of this invasive species were found. Subsurface sampling has also been carried out along the vessel track using the CUFES device (Continuous Underway Fish Egg Sampler). Thus, fish eggs and other zooplankton organisms have been collected, processed and identified onboard using a semi-automatic imaging system, that allows to produce distribution maps of the main zooplankton groups in the Eastern English Channel (Figure 5). Zooplankton community is mostly composed of copepoda in the central area (*Calanus* spp and small Calanoidae), and of malacostrata (mainly decapoda) in coastal waters. Fish eggs are located mostly along the French coast, with higher abundance near estuaries (Figure 5). They were composed mainly from sardine eggs. It is worth noting that some fish larvae were caught with the CUFES, with relative high number in the Dover Straight.
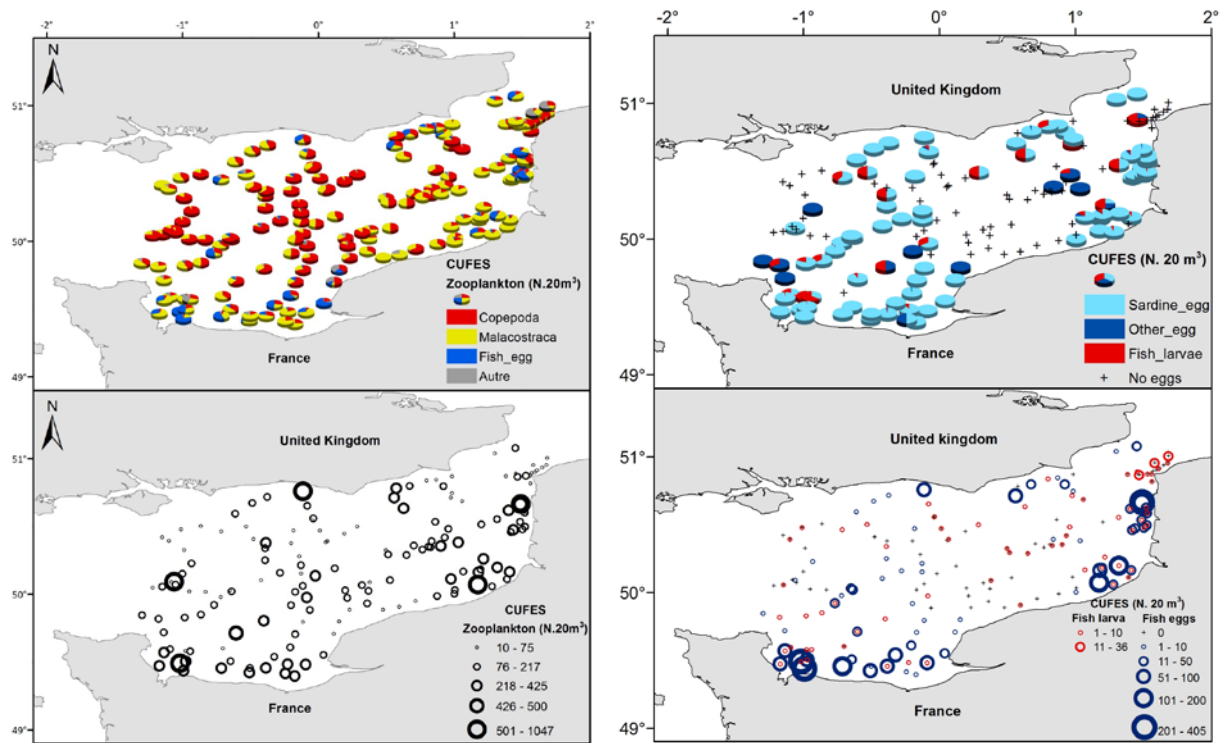
Figure 5: Taxonomic composition and density of subsurface zooplankton (on the left) and particularly on fish eggs (on the right), collected with the CUFES device and processed onboard using the ZooCam device and associated software.

4. Data collected

Different kinds of data were collected; some of them analyzed onboard, others via samples to be analyzed later in the laboratory. According to the type of data, different scientists are in charge of data storage and analysis gathering:
- Abiotic environment: E. Antajan (IFREMER– Elvire.Antajan@ifremer.fr)
- Phytoplankton: E. Antajan (IFREMER– Elvire.Antajan@ifremer.fr)
- Zooplankton and gelatinous organisms: E. Antajan (IFREMER– Elvire.Antajan@ifremer.fr)
- Fish: M. Travers-Trolet and F. Coppin (IFREMER – Morgane.Travers@ifremer.fr, Franck.Coppin@ifremer.fr)
- Top predators: G. Dorémus (Univ. La Rochelle – gdoremus@univ-lr.fr)
- Microplastics: M. Le Moigne (IFREMER – Morgan.Le.Moigne@ifremer.fr)

For further details on data collected or analysis to come, please contact the corresponding scientist in charge and/or Morgane Travers-Trolet (Morgane.Travers@ifremer.fr) for any queries regarding this survey.