Monitoring of Seafloor Litter on the Dutch Continental Shelf

International Bottom Trawl Survey 2021, Dutch Beam Trawl Survey 2020

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Wageningen University &
Research report C065/21
BM 21.10

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Wageningen Marine Research
IJmuiden, August 2021

Wageningen Marine Research report C065/21

Keywords: Marine seafloor macro litter, Dutch continental shelf, International bottom trawl survey, Dutch beam trawl survey, OSPAR

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This report can be downloaded for free from https://doi.org/10.18174/553273
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Summary

The Marine Strategy Framework Directive (MSFD) requires EU Member States to develop programmes of measures that aim to achieve or maintain Good Environmental Status (GES) in European seas. In order to be able to evaluate the quality status of marine waters on a regular basis and the effects of the measures taken, monitoring programs for MSFD descriptors and indicators have been established by the Member States. The Dutch monitoring program for Marine Litter (D10) includes the collection of data on the presence, abundance and distribution of macro litter on the seafloor. According to the Dutch program, the data on seafloor litter must be collected during statutory task fish surveys using a standardised GOV (Grand Ouverture Verticale) fishing net as part of the International Bottom Trawl Survey (IBTS), which is carried out yearly in the North Sea.

Anthropogenic pollution of our oceans, including marine litter, threatens wildlife, hinders human activities and reduces the recreational value of our coasts. Marine litter affects all groups of marine wildlife through effects such as entanglement and ingestion. Various initiatives to reduce litter in the (marine) environment have recently been started or are currently under discussion. Despite management measures to decrease the input of litter and to remove litter from the environment, litter remains on the seafloor.

This report presents the seafloor litter composition, abundance and spatial distribution based upon catches of the regular fish surveys, the International Bottom Trawl Survey (IBTS) and the Dutch Beam Trawl Survey (BTS). Only the catches on the Dutch Continental Shelf (DCS) are used. To assess the status of seafloor litter on the DCS, the Dutch data are supplemented with those from international partners surveying the DCS within the IBTS.

The seafloor litter catches on the DCS consisted mainly of plastic items: 88% (BTS) and 95% (IBTS) of the litter items found were made of plastic. Monofilaments, plastic sheets and various types of (plastic) ropes/lines were the most commonly caught litter types. A mean density of 165 (IBTS) and 201 (BTS) litter items per km^2 was calculated on the DCS, with mean values per ICES rectangle exceeding 200 items per km^2. It should be noted that the net used during the IBTS (GOV) and BTS (beam trawl) is not designed to catch litter. For the GOV, the catchability of many benthic species is assumed to be less than 5%, the chance of catching a litter item when it is present in the trawl path is likely to be even smaller than 5%. The fact that these items are caught thus indicates that it is plausible that there are many more litter items in the trawl path and that current values are a large underestimation of the actual litter present. On top of that, due to the selectivity of the fishing gears used in the surveys, only a selection of the types of litter items present retain in the net. This is reflected by the fact that hardly any (small) single-use plastics were caught. However, by including the BTS survey a slightly more representative picture of the litter types present on the seafloor is given since a wider range of litter items was caught, therefore the BTS data will be included in the coming years. Yet, the abundance and density estimations have to be considered as a minimum estimation of the amount of a select part of the litter present on the DCS, rather than the actual status of it.

1 Introduction

The European Marine Strategy Framework Directive (MSFD 2008/56/EC) dictates that EU member States are obligated to establish and implement measures to achieve or maintain good environmental status (GES) in their national marine waters. This GES is defined by 11 descriptors, of which Marine Litter (descriptor 10) is one. In order to be able to achieve GES by 2020 for Marine Litter, it is necessary that "Properties and quantities of marine litter, including their degradation products such as small plastic particles down to micro-plastics do not cause harm to the coastal and marine environment and their volume decreases over time" (MSFD 2008/56/EC).

The oceans are of substantial socio-economic importance, providing employment, food and recreation for much of the world's population (Costanza 1999). Yet anthropogenic pollution abounds in our oceans, with marine litter threating wildlife, hindering human activities and reducing the recreational value of our coasts (Fleet et al. 2009). Sources of marine litter can be sea- or land-based, although it is widely assumed that the latter contributes the overwhelming majority of the litter to the marine environment (Jambeck et al. 2015). Land-based sources and pathways of marine litter include sewage and river outlets, landfills and recreational activities along the coast (Viega et al. 2016). Shipping, fisheries, offshore installations and illegal dumping all constitute some of the sources of sea-based marine litter (Viega et al. 2016).

Plastics represent the majority of marine litter (Galgani et al. 2015). According to Jambeck et al. (2015), between 5 to 13 million metric tonnes of post-consumer plastics entered the oceans solely from land-based sources in 2010. This has impact on all groups of marine wildlife through effects such as entanglement and ingestion (Kühn et al. 2015; 2020). Entanglement may limit movement and inflict injury, thus reducing an animal's ability to avoid predators, acquire food or increase the potential for drowning. Ingestion of marine debris (both intentional and accidental) may cause a suppressed appetite or blockage of the gastrointestinal tract leading to malnutrition or harmful toxicological effects which in some cases may be lethal (Kühn et al. 2015; Rochman 2015; Thompson 2015). Additionally there is increasing evidence that plastic can enter and accumulate in predators (including humans) by indirect (accidental) ingestion via trophic transfer from contaminated prey (Nelms et al. 2018). Litter in the oceans can also have negative (sometimes lethal) effects on marine flora through smothering and crushing, resulting in reduced exposure to sunlight and the development of anoxic conditions on the seafloor (Kühn et al. 2015).

Various initiatives to reduce litter in the environment have recently been started or are currently under discussion. For example, in 2013, the law on dumping of garbage by marine vessels was changed from "all garbage may be dumped except" to "no garbage may be dumped except". Another example is the ban or taxation of single-use plastic carrier bags in shops and supermarkets in many countries. In the Netherlands, taxation was introduced in January 2016, which led to a significant reduction of single-use plastic carrier bags in litter. There has been a significant increase in awareness concerning marine litter in recent years, with particular focus on plastics. In the Netherlands, litter-reduction initiatives include the "Green Deal", a program for Clean Beaches and Fishery for a Clean Sea. The Green Deal on Fishery includes the "Fishing for litter" program by KIMO international, which aims to bring bycatch litter to land for recycling or processing, and includes studies into reducing litter from netting material. The most recent European legislation is a ban on all single-use plastics. Since July 3rd 2021 single use plastics like cutleries, plates, straws, stirrers and cotton bud sticks are banned. In addition, a deposit regulation for small plastic bottles (0.5 L) was put in force by the Dutch government on July 1st 2021, which should greatly reduce this source of litter. The latest initiative is the so called "Plastic Pact"; the Dutch Ministry of Infrastructure and Water Management made a deal with e.g. food companies, supermarkets and festivals to reduce plastic packaging by 20% by 2025 compared to 2017.

The measures described above can help towards achieving GES. In addition, the MSFD requires monitoring of the effects of these measures. This is interpreted as a requirement to monitor the amount of litter in the marine environment and, where possible, monitor potential effects of the measures taken to reduce the amount of litter. The requirements for monitoring are divided in a number of categories: monitoring litter in the water column, washed ashore, in biota and deposited on the seafloor. The beach litter monitoring indicates that a large part of the North Sea litter washes ashore on beaches near the Skagerrak. Monitoring of litter washed ashore results in the indicator on 'Beach litter' (Ospar commission 2010, Schulz et al. 2017, Schulz et al. 2019), and monitoring in biota results in the indicator on 'Plastic particles in fulmar stomachs' (Van Franeker et al. 2017, Van Franeker et al. 2021). Additionally to these two indicators, there is the 'Seabed litter' indicator to describe the litter deposited on the seafloor (Ospar commission 2017). Approximately 70% of marine litter reaches the seafloor where it can accumulate (Pham et al. 2014). Once on the seafloor, marine litter degradation leads to the formation of small microplastics. These microplastics degrade very slowly, since degradation occurs primarily through temperature-dependent solar UV-radiation, and therefore accumulate on the seafloor (Andrady 2015).

This report describes the methods used and data collected in 2021 for the Dutch part of the monitoring of litter deposited on the seafloor as commissioned by Rijkswaterstaat (RWS). The OSPAR commission proposed to collect seafloor litter by using the catches of the International Bottom Trawl Survey (IBTS). This is an internationally coordinated survey covering the Greater North Sea to get recruitment indices of the fish community, focussing on cod, haddock, whiting, Norway pout, mackerel, saithe, herring and sprat. The IBTS provides a good platform for internationally collecting litter data, despite the fact that the sampling gear is not optimal for sampling litter.
Data collection on board follows the CEMP Guidelines of Litter on the Seafloor (EIHA 17/9/1 Annex 12. https://www.ospar.org/work-areas/cross-cutting-issues/cemp) and the most recent Working Group on Marine Litter (WGML) guidelines which are included in the IBTS survey manual (ICES 2020a) and in the Dutch survey manual (van Damme et al. 2020).
All international partners of the IBTS should follow these guidelines for collecting seafloor litter, enabling the combination of the Dutch seafloor litter data from fishing hauls with those from the other partners on the Dutch continental Shelf (DCS). This report provides insight in the seafloor litter composition, abundance and spatial distribution on the DCS.

To put the results of the IBTS in perspective and to get a better insight in the composition and amount of marine litter on the DCS, data of the Dutch Beam Trawl Survey (BTS) are now additionally included in this report for the first time. During the BTS seafloor litter is collected following the same guidelines (protocol) as for the IBTS.

Focussing only on the DCS and including the BTS data as requested by RWS for this report is a deviation from previous Dutch seafloor litter monitoring reports (van Hal, 2019; Volwater & van Hal, 2020), in which all the Dutch data collected during the IBTS (including from regions outside the DCS) were presented. The current focus on the DCS is a result of the way the MSFD is organised. Each European member state is only responsible for their part of the continental shelf and is obliged to report on their own part. Although excluded from this report, Dutch litter data collected by WMR this year but outside of the DCS are reported to the ICES DATRAS database, and are used for the OSPAR North Sea wide seafloor litter assessments.

Aims
Since 2013, IBTS data on seafloor litter have been collected by WMR, provided to RWS and stored in the ICES DATRAS database. Including the data collected in 2021, a total of nine years of data is available. RWS requested WMR to report on the status of seafloor litter on the DCS, including litter data of international IBTS partners on the DCS and the Dutch BTS data.

The core of this report presents the seafloor litter data collected during the (Dutch) International Bottom Trawl Survey in quarter 1 (Q1) of 2021. Addionally, the data collected during the latest Beam Trawl survey in quarter 3 (Q3) of 2020 are reported. The objectives of this report are to:

- Provide insight into the composition and abundance of seafloor litter on the Dutch continental shelf.
- Assess the spatial distribution of seafloor litter on the Dutch continental shelf.

- Compare the findings of the IBTS and the BTS to provide more complete insight of the state of seafloor litter on the Dutch continental shelf.

2 Materials and Methods

2.1 International Bottom Trawl Survey (IBTS)

2.1.1 Dutch IBTS Q1 2021

The International Bottom Trawl Survey Q1 (IBTS Q1) is carried out annually in January and February, and is performed by France, Scotland, Germany, Sweden, Norway, Denmark and the Netherlands (ICES 2020b). The survey design is such that the North Sea is divided into grids (ICES rectangles) of 0.30° latitude and 1° longitude, which are distributed amongst the participating countries. Each rectangle needs to be sampled twice over the course of the IBTS but the allocation of rectangles among countries means that the majority of the rectangles is sampled once by two different countries. For many years the distribution of areas covered by each country remained unchanged. However, in 2017, France had to reduce its effort and was no longer able to cover all its allocated rectangles resulting in a redistribution of rectangles among the participating countries. This change affected the area covered by the Netherlands: it became more compact, no longer reaching as far north to Aberdeen nor as far south as the Channel and the southern English coast. The planned area for 2021 (Figure 2.1) remained unchanged compared to the 2019 survey (van Hal 2019).

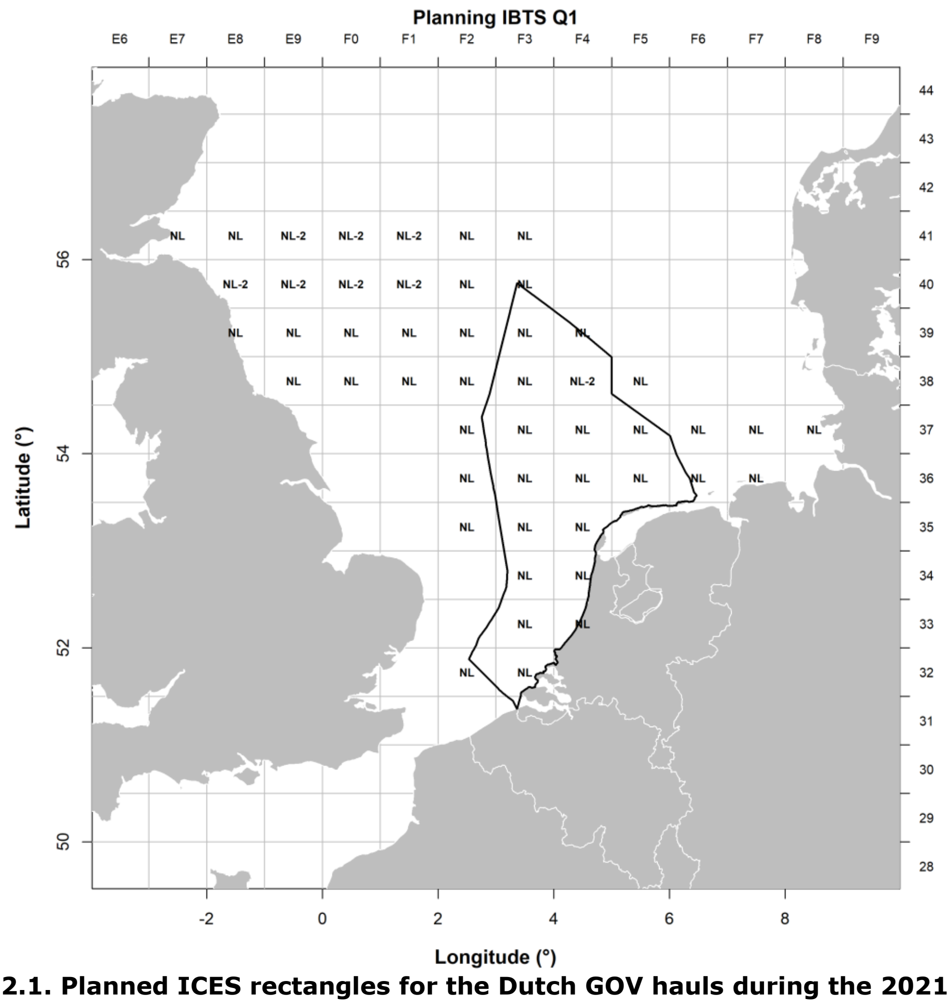

Figure 2.1. Planned ICES rectangles for the Dutch GOV hauls during the 2021 IBTS Q1. Rectangles marked 'NL-' are those that should be covered once by the Netherlands and once by another participating country. Rectangles marked 'NL-2' are those that should be covered twice by the Netherlands. Empty rectangles are those covered by other participating countries. Thick black line shows the outline of the DCS.

The sampling gear used for the IBTS is the "Grand Ouverture Verticale" (GOV), a (semi-pelagic) bottom trawl. The mesh size of the net is 100 mm and 10 mm in the codend. The headline of the net lies about 5 m above the seafloor, which is particularly convenient for sampling pelagic fish species and species that dwell just above the bottom. However, as the ground rope of the GOV only touches the bottom, flatfish, benthic organisms and seafloor litter may well go underneath it, and the proportion that escapes the net can be substantial. For example, the proportion of small flatfish (<25 cm) going underneath the ground rope is assumed to be 50% (Piet et al. 2009). Due to the weak ground contact of the GOV, small flatfish, other small bottom dwelling species and epibenthos are caught by the GOV in a rather random manner (<5% compared to a beam trawl, e.g. each item has less than 5% chance to be retained in the net), and are thus not representative of what is actually on the seafloor (ICES 2003). This is likely to be the case for most types of seafloor litter as well.

The horizontal opening of the net is determined by the pressure on the two doors (otter boards), one on each side of the net. The horizontal opening of the net varies with depth. The width between the doors (door spread) is therefore measured continuously during each haul. The doors are connected to the net by a 10 m back strop and a 50 m sweep. This sweep moves over the seafloor creating a dust cloud, herding fish towards the actual net opening. The actual net opening (wing spread) varies with depth as well. The wing spread is considered most relevant for seafloor litter as it is not expected that seafloor litter is herded towards the net by the dust cloud created by the sweeps. The standard haul duration is 30 minutes, with a fishing speed of approximately 4 knots (7.4 km/h) and trawling is only carried out during daylight hours.

The Netherlands uses the research vessel Tridens II for the IBTS each year. In 2015 and 2016, due to a refit of the Tridens, the English research vessel CEFAS Endeavour was hired. Since the refit of the Tridens, the Dutch GOV-net and otter boards, as well as a new SIMRAD net-geometry system attached to the doors have been used.

Table 2.1. Classification of marine litter items (ICES 2020b). The table presents six categories of litter (A-F) and their respective subcategories, as well as size categories (A-F) used in the categorisation of seafloor litter items caught during the IBTS.

Litter overview			
A: Plastic	**B: Metals**	**Related size category**	
A1. Bottle	**B1.** Cans (food)	**A:** < 5*5 cm = 25 cm^2	
A2. Sheet	**B2.** Cans (beverage)	**B:** < 10*10 cm = 100 cm^2	
A3. Bag	**B3.** Fishing related	**C:** < 20*20 cm = 400 cm^2	
A4. Caps/Lids	**B4.** Drums	**D:** < 50*50 cm = 2500 cm^2	
A5. Monofilament	**B5.** Appliances	**E:** < 100*100 cm = 10000 cm^2 = 1 m^2	
A6. Entangled filaments	**B6.** Car parts	**F:** > 100*100 cm = 10000 cm^2 = 1 m^2	
A7. Synthetic rope	**B7.** Cables		
A8. Fishing net	**B8.** Other		
A9. Cable ties			
A10. Strapping band			
A11. Crates and containers			
A12. Diapers			
A13. Sanitary towel/tampon			
A14. Other			
C: Rubber	**D: Glass/Ceramics**	**E: Natural products**	**F: Miscellaneous**
C1. Boots	**D1.** Jar	**E1.** Wood (processed)	**F1.** Clothing/Rags
C2. Balloons	**D2.** Bottle	**E2.** Rope	**F2.** Shoes
C3. Bobbins (fishing)	**D3.** Piece	**E3.** Paper/Cardboard	**F3.** Other
C4. Tyre	**D4.** Other	**E4.** Pallets	
C5. Glove		**E5.** Other	
C6. Other			

2.1.2 Sampling litter

The IBTS manual states that litter has to be collected each haul. Additional guidelines are available, such as the CEMP Guidelines on Litter on the Seafloor (ICES 2020b).

On the Tridens the complete net is hoisted on board and only a part of the ground rope is left hanging over the side (which thus cannot be checked for the presence of litter). The net is inspected and cleaned as far as possible after each haul. Since the ground rope is hanging over the side, it is only inspected and cleaned once on board in case of maintenance or reparations. Litter items in the net and in the catch are collected. Each litter item is classified **(Table 2.1)**, weighed, the size is estimated **(Table 2.1)**, photographed **(Annex 4)**, and in case of linear objects the length is measured. In case similar items are found in a single haul, these are recorded as a single category, weighed together and the number of individual items is registered. When organisms are attached to litter items, the different kind of species are recorded as well. Moreover, a more detailed description of the litter items is given to facilitate post-survey analysis.

2.1.3 Area surveyed

Seafloor litter is presented as number of items per km^2. To be able to calculate items per km^2, knowledge on the surveyed area (total swept area) is necessary. The swept area of the GOV is variable, and depends on the depth and the amount of fishing line used. For fish calculations, two swept areas are calculated: one based on door spread and the other on wingspread. The door spread is the area between the doors (otter boards) of the gear, which is relevant for fish that are herded into the net. The wingspread is the area between the wings, which is considered to be the actual net opening. We assume that marine litter is not herded into the net by the doors and cables, and thus wingspread is considered the relevant measure for seafloor litter.

The SIMRAD net geometry system records the door spread only, and as such wingspread needs to be calculated based on this data. In some cases, door spread is not recorded properly, and in these cases door spread is estimated based on depth and line length instead. The formulas are based on (1) recorded door spread during the Dutch IBTS on the research vessel Tridens II in previous years and (2) the information gathered during the two years the Dutch IBTS was executed using the English vessel Endeavour using the English wingspread sensors.

The formula for door spread in case door spread is not recorded properly is fitted to data recordings and is as follows:

(1) Door spread = 14.2 * LOG(Depth) + 16.72 * LOG(Warp length) + 18.49

Where Depth is de depth in meters and Warp length the length (m) of fishing line used. Once the door spread is known, wingspread (m) can be derived via the following formula:

(2) Wingspread = Door spread * 0.18870 + 5.87280

To get the number of litter items per km^2, the number of items per haul needs to be divided by the swept area, and is calculated as:

(3) Number of litter items per km^2 = Litter items / (Wingspread (km)* Distance trawled (km))

The above described data processing was done for the most recent (2021) Dutch litter data to get the number of litter items per km^2. Litter data from other IBTS partners from 2013 onwards were processed in the same way, however, the fitted constants in their formulas might slightly differ from the above mentioned values (https://www.ices.dk/data/Documents/DATRAS/NSIBTS_swept_area_km2_algorithms.pdf).

2.1.4 Litter data analysis

The analysis is done in two sections; (1) the Dutch IBTS 2021 Q1 and (2) the status of seafloor litter on the DCS. The litter data of the Dutch IBTS 2021 Q1 is shown as the spatial distribution of litter items per km^2 (**Figure 3.1**). To focus on the Dutch continental shelf (section 2), further analyses were done with DCS data, including the data of the international IBTS partners on the DCS. Litter data of the international IBTS partners performed on the DCS was downloaded from ICES DATRAS (**Annex 1**) database from 2013 onwards. However, not all available data could be used for the litter DCS data analysis due to inconsistencies in counting items. For some years only the presence of seafloor litter and litter items was recorded. While the Netherlands started to count litter items from 2013 onwards (except "singles lines" A5, from 2014 onwards), most countries started to count single litter items a couple of years later. For example, French only started to count A2 "sheets" in 2015 and Germany in 2018 (**Annex 2**). An overview of the seafloor litter data used for this analysis is shown in **Table 2.2**.

Table 2.2. Seafloor litter data on the DCS. The table shows the seafloor litter data (number of hauls) per country per year on the DCS of which count data is available. For the quality control of the available data, see **Annex 2.**

Country	Institute	2013	2014	2015	2016	2017	2018	2019	2020	2021
Denmark*	DTU-AQUA									3
France	IFREMER			19	19	13	17	17	13	14
Germany**	vTI							3		
The Netherlands	WMR	17	13	12	12	19	18	17	17	16

**Denmark only started to count in 2021.*
***Germany only executed three hauls on the DCS in 2019*, as they swapped area with Denmark that year.

To level out strong year-to-year variances the DCS litter, data of the three most recent years (2019 - 2021) are presented as figures showing the composition of the seafloor litter by categories A-F (**Figure 3.2**) and the Top-10 most commonly caught litter types (**Figure 3.3**). To calculate the percentage per litter category or litter type, mean values per km^2 were taken based on all individual hauls executed on the DCS for the period 2019 – 2021. Spatial distribution of number of litter items per km^2 per ICES rectangle was shown by taking the mean value of total litter count per ICES rectangle (**Figure 3.4**). Densities per ICES rectangle were only based on hauls executed on the DCS, even if an ICES rectangle partly overlapped the DCS. To define hauls that were executed on the DCS, the outline of the DCS as shown in **Figure 2.1** was used.

2.2 Beam Trawl Survey (BTS)

In addition to the IBTS data, the Beam Trawl Survey is included to expand the dataset and to get better insight in the amount of marine litter on the DCS. The Beam Trawl Survey (BTS) is carried out annually from July till September. The survey design is similar to that of the IBTS, except that this survey is only performed by the Dutch and that not all ICES rectangles need to be sampled twice (**Figure 2.2**). Instead, in the south-eastern North Sea and in the German Bight a minimum of two and a maximum of four hauls need to be performed per rectangle. The research vessel Tridens II is also used for the BTS each year, where a beam trawl of 8 m with a 40 mm codend mesh size is used. This gear has better bottom contact and is therefore assumed to have higher catches of seafloor litter than the GOV used in the IBTS (Van der Sluis & van Hal, 2017). Litter items are recorded following the same methodology to that of the IBTS; the WGML guidelines (ICES 2018a). Seafloor litter is presented as number of items per km^2, the net width of the beam trawl is fixed and the surveyed area is therefore calculated by making use of the following formula:

(1) Number of litter items per km^2 = Litter items / (Beam trawl width (km)* Distance trawled (km))

Data analysis for the DCS is done in a similar way as described above for the IBTS, except that it's based on only Dutch hauls since it is only performed by the Dutch. In addition, only the data of 2020 was used.

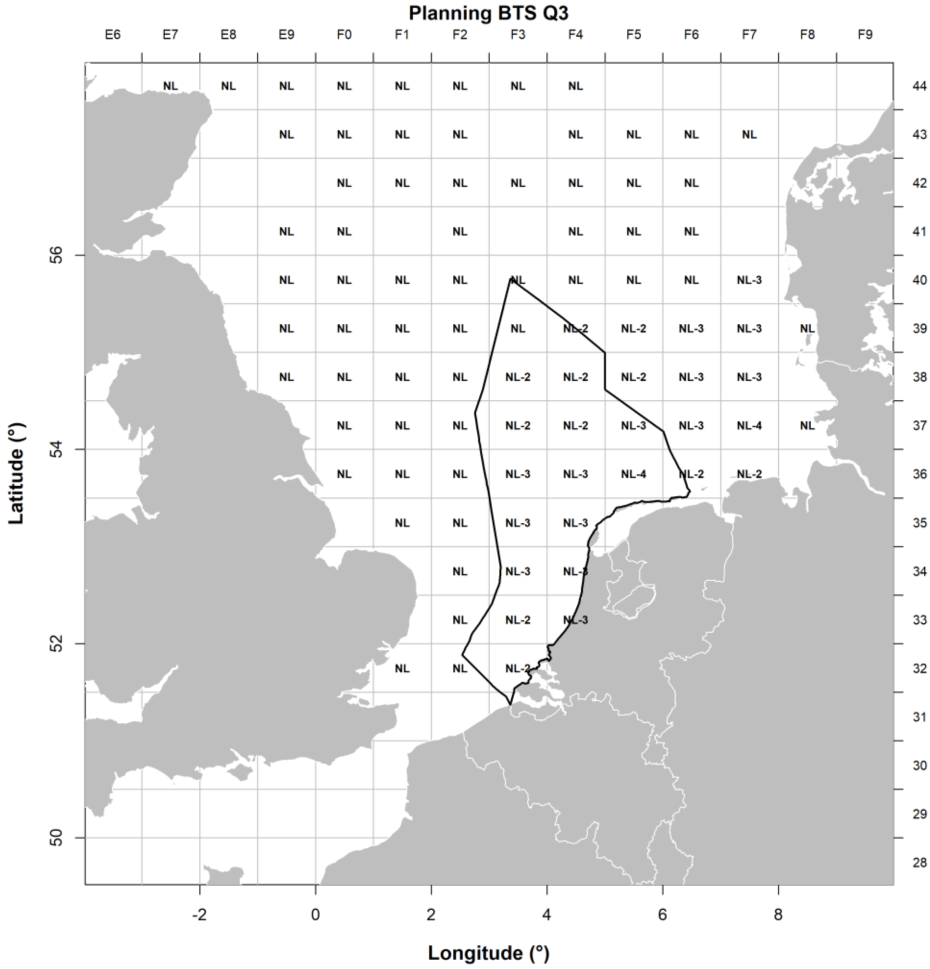

Figure 2.2. Planned ICES rectangles for the Dutch bottom trawl hauls during the 2020 BTS Q3. Rectangles marked 'NL-' are those that should be covered once, rectangles marked 'NL-2' should be covered twice etc. Empty rectangles are those that are not covered at all. Thick black line shows the outline of the DCS.

3 Results

3.1 International Bottom Trawl Survey (IBTS)

3.1.1 Dutch IBTS Q1 2021

The Dutch IBTS 2021 Q1 performed 58 valid hauls, of which 16 were conducted on the Dutch continental shelf. All hauls lasted the standard 30 minutes. As shown in **figure 2.1**, the planned area for 2021 remained unchanged compared to that of previous years. However, not all planned hauls were executed by the Dutch themselves. For instance, the two southernmost hauls in ICES rectangle 32F3 and 32F2 were taken over by the French. In general, however, nearly all of the planned hauls could be sampled by the Dutch. All the available GOV-data are presented in the file: RWS_dataformat_GOV_data_NCP_2013-2021.xls.

The spatial distribution of litter caught during the Dutch IBTS 2021 is presented in **figure 3.1**. The smallest circle represents hauls without litter items in the catch, empty hauls. There was one empty haul (0 items/km2) located in the southern part close to the Dutch coast in the ICES rectangle 33F3 and six in British waters. The haul with the highest amount of items per km^2 was located just outside the DCS, with 407 litter items per square kilometre. The highest amount of litter items recorded on the DCS in the Dutch IBTS Q1 was 161 items per km^2.

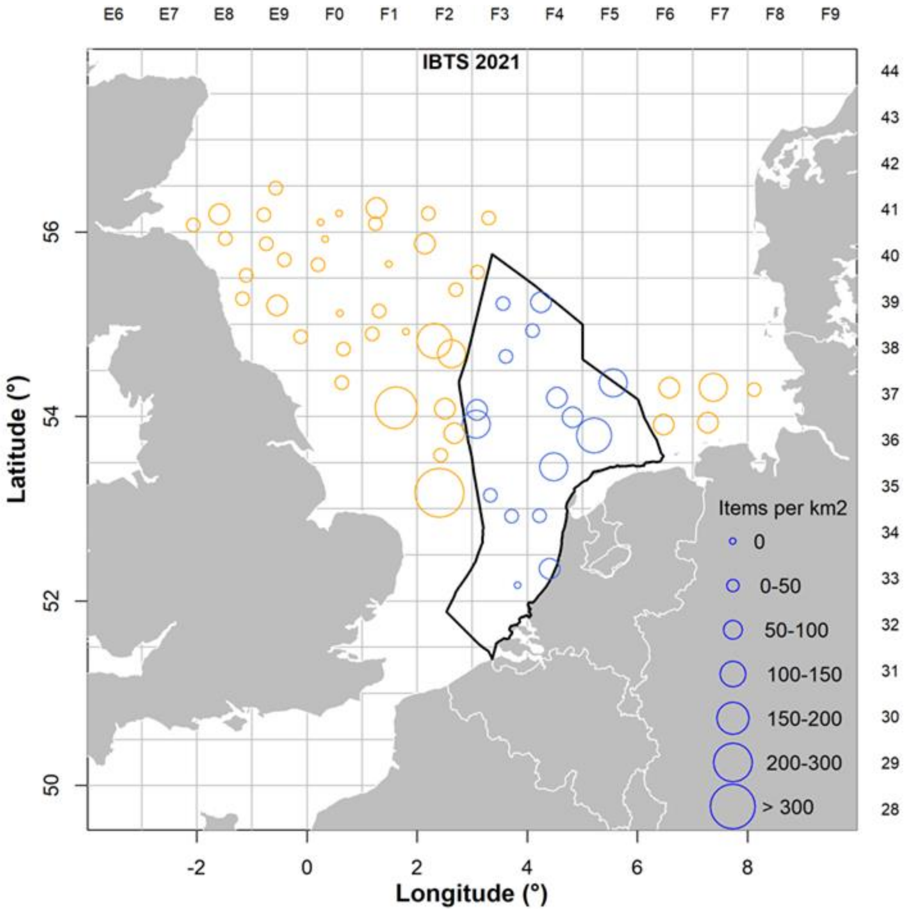

Figure 3.1. Executed Dutch GOV hauls and total items per km^2 during the 2021 IBTS. GOV-hauls executed on the DCS (blue) and GOV-hauls executed by the Netherlands (WMR) outside the DCS (orange). Size of the circles indicates the number of items caught per km^2. Note that not all hauls were performed as planned, e.g. ICES rectangles 32F2 and 32F3 were taken over by the French in 2021.

3.1.2 Seafloor litter on the DCS

The analysis in this section is done with all available and usable seafloor litter data on the Dutch continental shelf for the three most recent years, 2019 – 2021. In total 100 hauls, all together a swept area of 6.2 km^2, were conducted on the Dutch continental shelf for these years. The general composition of seafloor litter and the Top-10 litter types were calculated by mean values. Since the dataset contains a large amount of zero values, mean values will be used because the median might give a biased (zero) outcome.

3.1.2.1 Material composition DCS

Plastic was by far the most dominant category of seafloor litter; 95% of all litter items caught on the DCS over the period 2019 – 2021 were plastic items (**Figure 3.2**). "Natural products" was the second most dominant litter category, responsible for 3% of all litter items caught. Metals, rubber and miscellaneous were representing less than 1% of the litter items, glass was not recorded at all over the period 2019 – 2021 on the DCS.

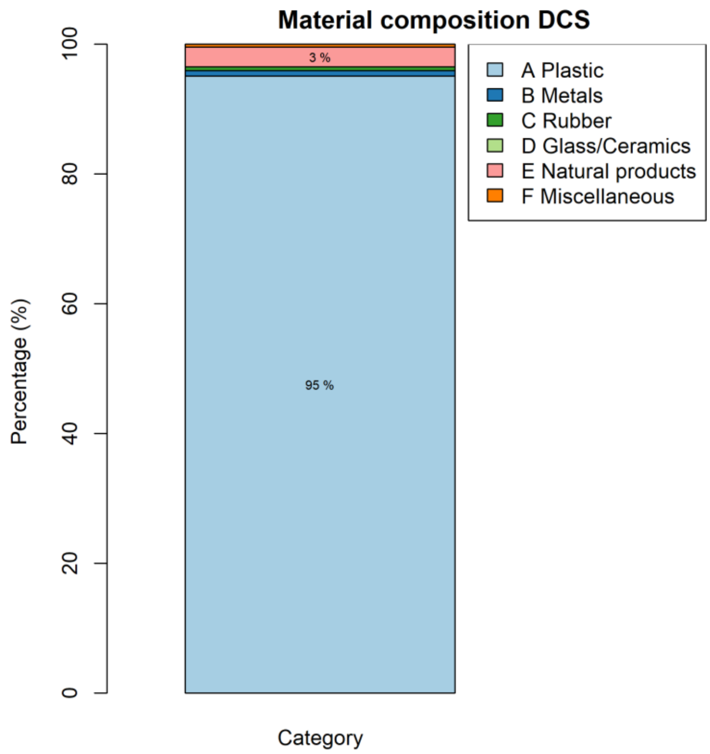

Figure 3.2. Material composition of the seafloor litter in the catches of the IBTS on the DCS. The percentages are based on mean values per km^2 per litter category. The litter categories of which no percentage is shown; Metals (0.9%), Rubber (0.6%), Glass/Ceramics (0.0%) and Miscellaneous (0.4%).

3.1.2.2 Top-10 litter types

Based on the mean values per litter type, a top-10 of most dominant litter types caught on the DCS was created (**Figure 3.3**). The top-10 is dominated by plastic litter types, only two litter types were made of natural material, respectively "wood (processed)" (E1) and "paper/cardboard" (E3). The most dominant litter type was "monofilament" (A5), representing 53% of the litter items caught. Followed by "sheet" (A2) and "synthetic rope" (A7) representative for 19% and 12% of the litter items caught. "Plastic bags" (A3) accounted for 5% of the litter items and the other litter types in the top-10 list were each responsible for 2% or less of the litter items caught on the DCS.

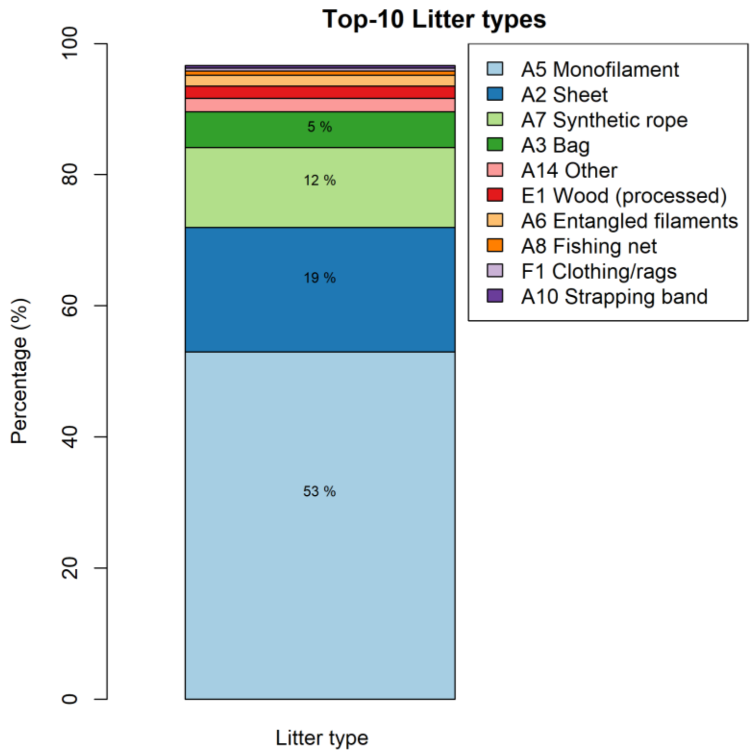

Figure 3.3. Top-10 list of seafloor litter items in the catches of the IBTS on the DCS. The percentages are based on mean values per km² per litter type. The top-10 litter types of which no percentage is shown; Other (2%), Wood (1.9%), Entangled filaments (1.6%), Fishing net (0.6%), Clothing (0.4%) and Strapping band (0.4%).

3.1.2.3 Abundance and distribution of seafloor litter

At least one litter (plastic) item was found in 89% of the hauls on the Dutch continental plate over the last three years (**Table 3.1**). The maximum amount of 4709 items per km² (total count) was recorded by the French, this number was dominated by the enormous amount of "monofilaments" (A5) that were counted. If all these monofilaments were recorded as one "entangled filaments" (A6), which regularly happens as they become entangled on the seafloor or in the catch, the maximum amount of litter items per km² would have been much lower and more in the range of the reported 90th percentile of total count (**Table 3.1**). The ratio of the mean and median values in **Table 3.1** do not indicate that these French extreme value influence the overall mean result strongly.

Table 3.1. Summary table of the abundance of seafloor litter on the DCS for the period 2019-2021. The minimum, median, mean, 90th percentile, maximum and the percentage of hauls with at least one item present are presented for total count of the different litter categories and the Top-10 litter types.

Items per km²	Min	Median	Mean	90th percentile	Max	% of Total Count	% of hauls with item present
Total count	0	79	165	284	4709	-	89
Litter categories							
A - Plastic	0	71	156	261	4709	95	87
B - Metals	0	0	1	0	28	0.9	8
C - Rubber	0	0	1	0	18	0.6	7
D - Glass	0	0	0	0	0	0	0
E - Natural	0	0	5	16	179	3	14
F - Miscellaneous	0	0	1	0	24	0.4	4
Top - 10 Litter types							
A2_Sheet	0	16	31	80	366	19	65
A3_Bag	0	0	9	20	240	5.5	23
A5_Monofilament	0	14	87	157	4281	53	53

A6_Entangled filaments	0	0	3	14	30	1.6	16
A7_Synthetic rope	0	0	20	56	218	12	44
A8_Fishing net	0	0	1	0	28	0.6	4
A10_Strapping band	0	0	1	0	19	0.4	4
A14_Other	0	0	3	16	56	2	17
E1_Wood (processed)	0	0	4	0	179	1.9	9
F1_Clothing/rags	0	0	1	0	24	0.4	4

Despite the WGML guidelines, the best way to count the number of individual monofilaments or sheets correctly and in a consistent way is still under discussion. The guideline states that if items are entangled but recognisable as separate items, they should be counted as separate items. **Annex 4** (Haul 3400003 & 3400060) shows such an entangled item. Where the Dutch counted these examples as one entangled item (filament), some international partners might have separated these items and counted them as multiple litter items (monofilaments). The same discussion occurs for photo 3400017 in **annex 4**. This item is recorded by the Dutch as one "synthetic rope" (A7), while other IBTS partners might have counted it as multiple monofilaments.

The spatial distribution is shown as total litter items per km^2 per ICES rectangle on the Dutch continental plate, with light colours (green) representing low number of items and dark (purple) colours representing high number of litter items. The amount of litter items per ICES rectangle is shown as the mean number of litter items per km^2 of the last three years. The distribution of litter seems more or less random, no clear pattern or litter hotspot can be distinguished (**Figure 3.4**). Likewise, no clear pattern is visible when comparing the total count of litter items on the DCS over time (2013 – 2021), where the recordings fluctuate strongly from year-to-year (**Figure 3.5**).

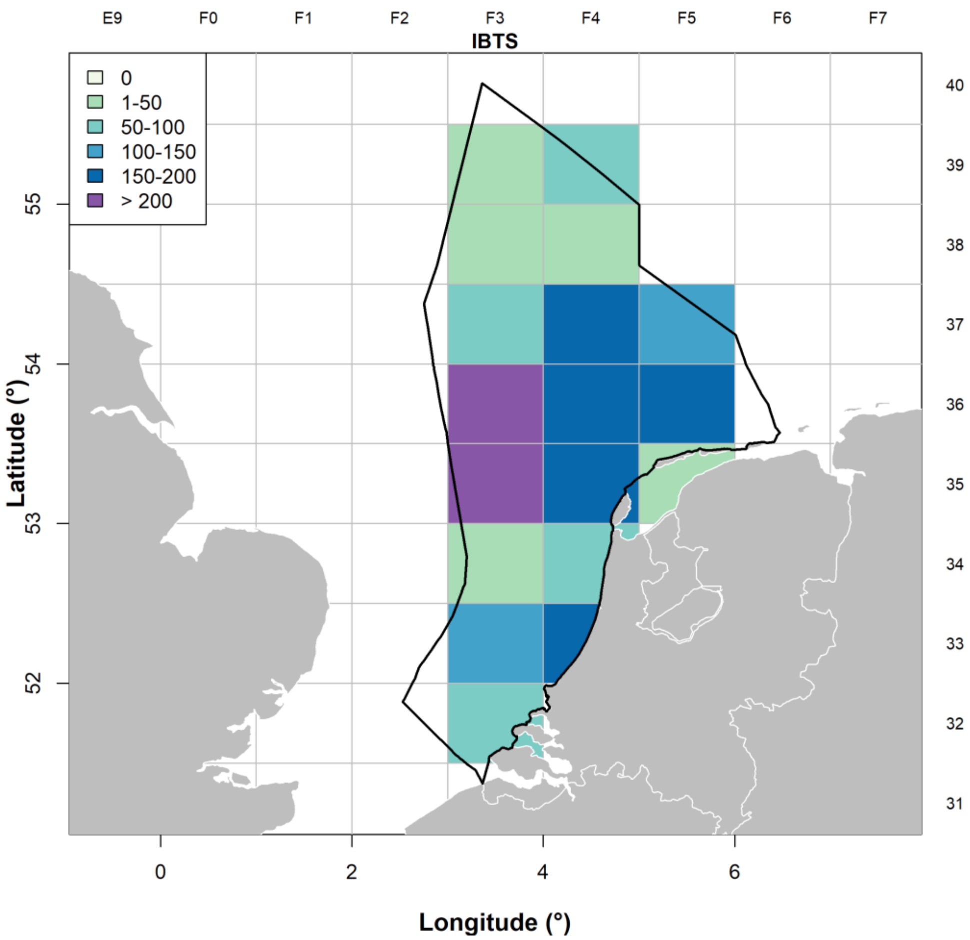

Figure 3.4. Density of litter items per km^2 per ICES rectangle on the DCS. The different colours represent the numbers (total count) of litter items per km^2, this number is calculated as the mean number per ICES rectangle of the last three years (2019 – 2021).

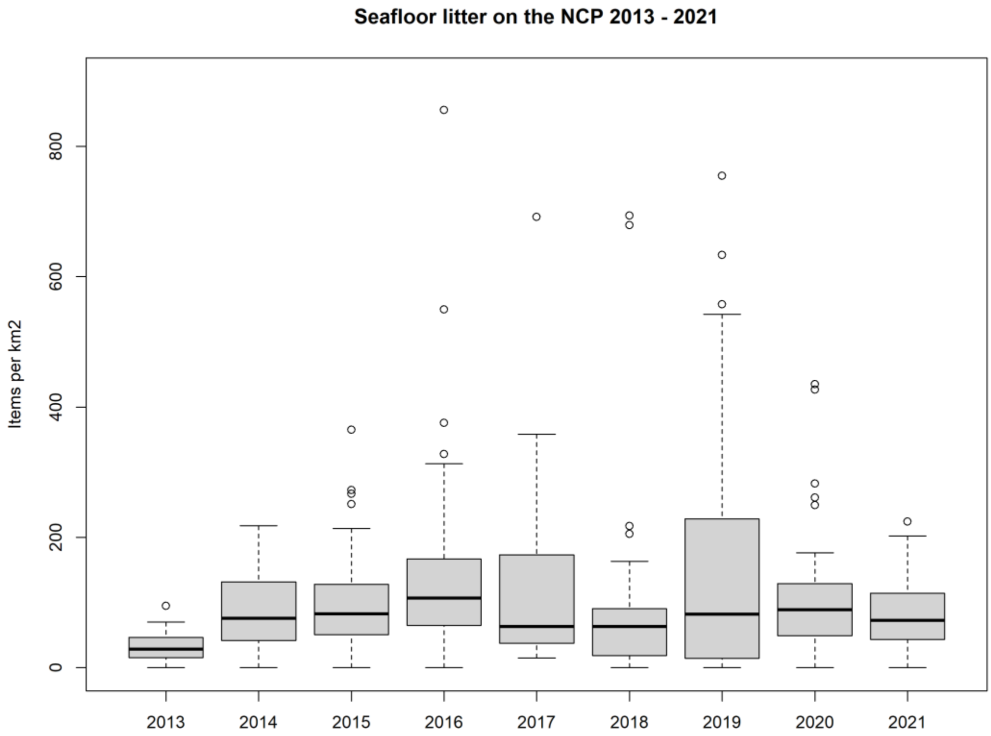

Figure 3.5. Boxplot of the seafloor litter items per km² for all hauls conducted on the DCS each year (2013 – 2021). The data selection as shown in table 2.2 was used, so as a result 2013 and 2014 are only based on Dutch count data, from 2015 French data is included and for 2019 and 2021 also data from respectively Germany and Denmark is included.

3.2 Beam Trawl survey (BTS)

The analyses in this section are done with all the available and usable seafloor litter data on the Dutch continental shelf of the latest BTS (2020). The BTS 2020 Q3 performed 30 valid hauls on the Dutch continental shelf for which litter was recorded, in which not the entire continental plate was covered (**Figure 3.8**). Nearly all hauls lasted the standard 30 minutes. The general composition of seafloor litter, the Top-10 litter types and spatial distribution were all calculated by mean values. Since the dataset contains a large amount of zero values, the median might give a biased outcome.

3.2.1 Material composition DCS

Plastic was the most dominant category of seafloor litter on the DCS in the BTS, 88% of all litter items caught on the DCS in 2020 were plastic items (**Figure 3.6**). "Natural products" was the second most dominant litter category, responsible for 6% of all litter items caught. Metals and rubber represented respectively 3% and 2% of the litter items, glass and miscellaneous were representing 1% or less of the litter items.

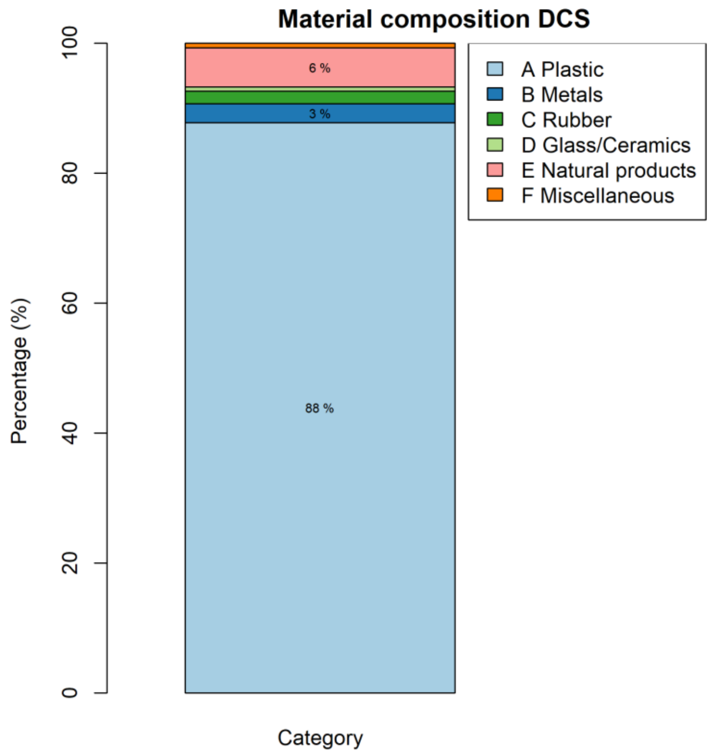

Figure 3.6. Material composition of the seafloor litter in the catches of the BTS on the DCS in 2020. The percentages are based on mean values per km^2 per litter category. The litter categories of which no percentage is shown; Rubber (2%), Glass/Ceramics (0.7%) and Miscellaneous (0.7%).

3.2.2 Top-10 litter types

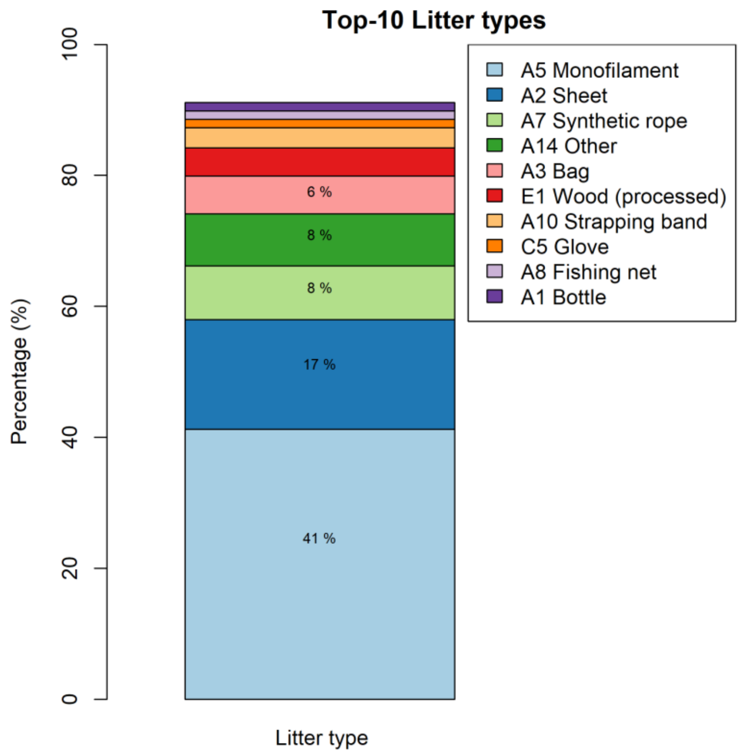

Figure 3.7. Top-10 list of seafloor litter items in the catches of the IBTS on the DCS. The percentages are based on mean values per km^2 per litter type. The top-10 litter types of which no percentage is shown; Wood (4%), Strapping band (3%), Glove (1.3%), Fishing net (1.3%) and Bottle (1.3%).

Based on the mean values per litter type, a Top-10 of most dominant litter types caught in the BTS on the DCS was created (**Figure 3.7**). The top-10 is dominated by plastic litter types, only three litter types were made of natural material or rubber, respectively "wood (processed)" (E1), "rope" (E2) and "glove" (C5). The most dominant litter type was "monofilament" (A5), representing 41% of the litter items caught. Followed by "sheet" (A2), "synthetic rope" (A7) and "others" (A14) representative for 17%, 8% and 8% of the litter items caught. The other litter types in the Top-10 list were each responsible for less than 8% of the litter items caught on the DCS.

3.2.3 Abundance and distribution of seafloor litter

Litter (plastic) was found in 91% of the BTS hauls on the Dutch continental plate in 2020 (**Table 3.2**). The maximum recorded amount was 1013 litter items per km^2 (total count), this number was dominated by "monofilaments" (A5). Since the number of hauls per ICES rectangle in the BTS is not equally **(Figure 2.2)**, the weighted mean for total count, each litter category and the Top-10 litter items was calculated to correct for this.

Table 3.2. Summary table of the abundance of seafloor litter on the DCS. The minimum, median, weighted mean, mean, 90th percentile, maximum, percentage of total count and the percentage of hauls with at least one item present are presented for total count, the different litter categories and the Top-10 litter types.

Items per km^2	Min	Median	Weighted mean	Mean	90th percentile	Max	% of Total Count	% of hauls with item present
Total count	0	169	187	201	347	1013	-	91
Litter categories								
A - Plastic	0	135	163	177	308	1013	88	91
B - Metals	0	0	5	6	31	34	3	19
C - Rubber	0	0	4	4	27	34	2	13
D - Glass	0	0	1	1	0	32	0.7	4
E - Natural	0	0	11	12	31	161	6	26
F - Miscellaneous	0	0	1	1	0	32	0.7	4
Top - 10 Litter types								
A1_Bottle	0	0	3	3	0	32.1	1	9
A2_Sheet	0	28	32	34	92	256	17	55
A3_Bag	0	0	12	12	33	92	6	28
A5_Monofilament	0	34	74	83	196	675	41	68
A7_Synthetic rope	0	0	15	17	57	101	8	38
A8_Fishing net	0	0	2	3	0	34	1	9
A10_Strapping band	0	0	5	6	31	54	3	17
A14_Other	0	0	16	16	34	169	8	30
C5_Glove	0	0	2	3	0	34	1	9
E1_Wood (processed)	0	0	9	9	31	161	4	17

The spatial distribution on the Dutch continental shelf based on the BTS is shown as litter items per km^2 per ICES rectangle, with the same colour legend as in **section 3.1.2.3**. The amount of litter items per ICES rectangle is shown as the mean number of litter items per km^2 in 2020. No clear pattern or litter hotspot can be seen, but the spatial distribution tends to show higher densities of marine litter closest to the coast (**Figure 3.8**). Highest densities were recorded in the 36F4 and 35F4 ICES rectangles with respectively densities of 462 and 351 items per km^2.

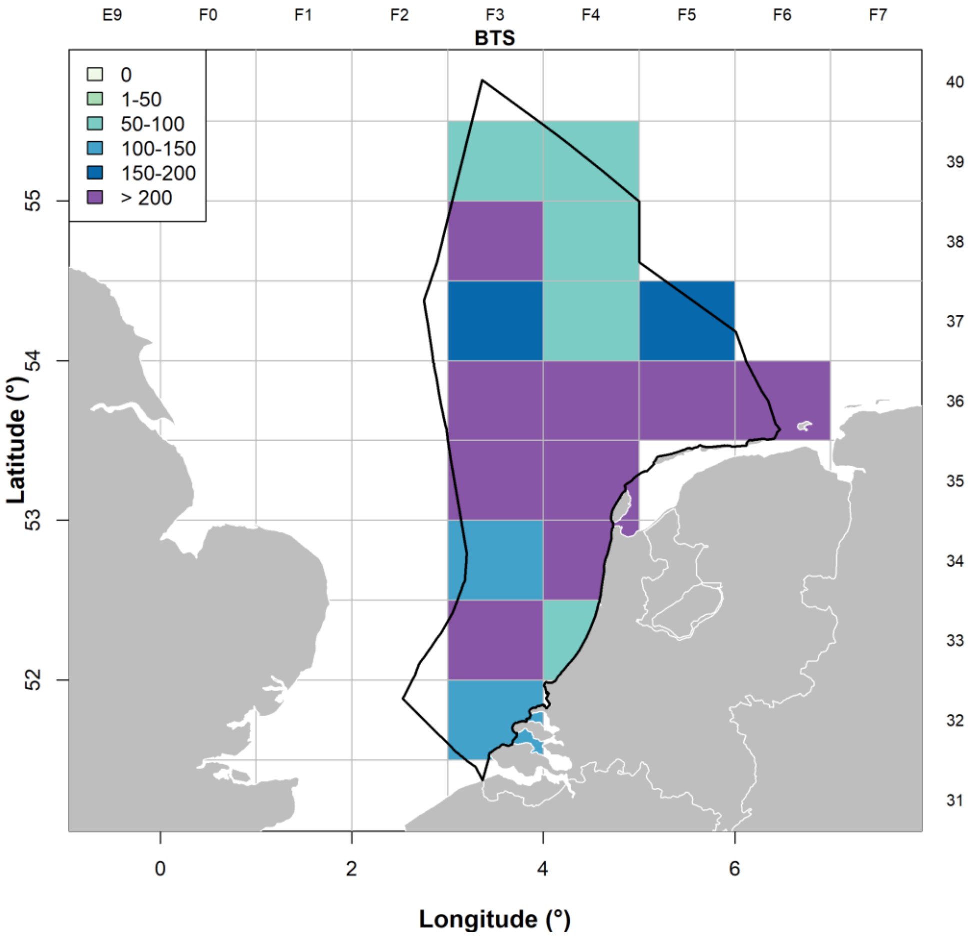

Figure 3.8. Density of litter items per km² per ICES rectangle on the DCS. The different colours represent the numbers (total count) of litter items per km², this number is calculated as the mean value per ICES rectangle for 2020.

3.3 Comparison IBTS and BTS

The composition of the litter caught on the DCS is generally comparable between the two surveys; plastic accounts for 95% of the litter caught in the IBTS, compared to 88% in the BTS. Litter categories such as natural products, rubber and metals (that might be partly buried in the top layer of the seafloor) were caught slightly more in the BTS. The beam trawl used in this survey scrapes the top layer of the seafloor and also catches items that are buried in this top layer. The Top-10 litter types caught in both surveys is also comparable, although the relative abundances of litter types differ. "Monofilament" (A5) and "sheet" (A2) represent more than 70% of the litter items caught in the IBTS, whereas in the BTS these litter types represent less than 60% of the items caught. Items such as "bag" (A3), "wood" (E1) and "others" (A14) were more commonly caught in the BTS. The difference in the amount of litter items caught per km² is noticeable for total count and most litter categories; the mean amount of litter items caught in the BTS was slightly higher than that of the IBTS. In addition, in 91% of the hauls at least on litter item was caught on the DCS during the BTS, whereas for the IBTS this was in 89% of the hauls. The presence-absence of litter items per litter category shows noticeable differences between the BTS and the IBTS **(Tabel 3.1; Tabel 3.2)**, indicating that the BTS has a higher chance of catching a litter item, while a haul of the BTS covers a smaller area of seafloor.

4 Discussion & Conclusion

The composition of seafloor litter on the Dutch continental shelf as presented in this report is in line with those of previous years (Volwater & van Hal, 2020; van Hal, 2019). The seafloor litter catches on the DCS consisted mainly of plastic items; 85% (BTS) and 95% (IBTS) of the litter items found were made of plastic. Monofilaments, plastic sheets and various types of (plastic) ropes/lines were the most commonly caught litter types. Single-use plastics like cups, plates, drink bottles, caps/lids and cigarette butts, which are commonly found on beaches (Boonstra et al. 2016; Scotti et al. 2021), were rarely or not caught by the IBTS and BTS. This could indicate a difference in the spatial distribution of litter items, but for some of these items it is most likely a result of the monitoring method. Cigarette butts, for example, will go through the meshes of the codend and won't end up in the catch, but are findable on the beach. The very low amount of these single-use plastics shows however that management measures banning the use of these cannot be evaluated using the data from the fish surveys.

The observed dominance of plastic items in the survey catches is similar to most studies on seafloor litter (Alvito et al. 2018; Carcia-Alegre et al. 2020; Kammann et al. 2018; Spedicato et al. 2019). Many studies report that most of the litter items found on the seafloor originated from the fishing industry, dominated by fishing lines (e.g. Buhl-Mortensen & Buhl-Mortensen, 2017; Consoli et al. 2018; Gutow et al. 2018; Pham et al. 2013). It is impossible to discriminate monofilament used by the fishing industry from those used in other sectors. However, it is very likely that many if not most of the monofilaments and synthetic ropes caught in the IBTS and BTS originate from the fishing industry, mainly being "fish fluff". Experiments are currently carried out to replace the "fish fluff" with other materials; an experiment with yak leather as an alternative was for instance carried out in the BTS of 2020. The overall composition is comparable between studies, but comparing studies of seafloor litter in terms of presence and densities is not straightforward due to the use of different gears and the differences in sampled substrates (Canals et al. 2021, Madricardo et al. 2020). The 89% (IBTS) and 91% (BTS) of hauls on the DCS with litter are amongst the higher values reported. In other studies the percentage of hauls with litter items is as low as ~8% in the Flemish Pass (Carcia-Alegre et al. 2020) to 90% in the northern Mediterranean (Spedicato et al. 2019). Studies from similar areas as the DCS report 53% in the North Sea and Baltic (Kammann et al. 2018, Zablotski et al. 2019), and 63% in the waters around the UK (Maes et al. 2018). Also large differences in densities are reported, with a mean number of 1.4 items per km^2 in the Flemish Pass (Carcia-Alegre et al. 2020), to 2840 items per km^2 in the northern Gulf of Mexico (Canals et al. 2021) and up to 1835 items per km^2 in the North and Irish Seas (Maes et al. 2018). Using the GOV-net in the German part of the North Sea resulted in 16.8 litter items per km^2 (Kammann et al. 2018), while ~5 litter items per km^2 where reported by the same study in the Baltic Sea using a different gear.

The influence of gear type mentioned above is shown by the differences in the catches of the GOV (IBTS) and the beam trawl (BTS). The ploughing beam trawl has a higher chance of catching seafloor litter items and has a higher median number of items per km^2. There is a noticeable difference in mean values per km^2 (165 IBTS; 201 BTS) between the BTS and IBTS, and this difference was even larger when comparing the 2016 BTS and IBTS data (Volwater & van Hal, 2019). The smaller difference in average values compared to the 2016 data analysis is a result of some large outliers in the French IBTS data, where very large number of monofilaments were recorded. The idea, as requested by RWS, was to level out such outliers and year-to-year variance in the IBTS litter analysis by combining data of the three most recent years, including the international data on the DCS. Instead, large variance in number of items per km^2 arose between the Dutch and the French data due to structural higher recordings by the French for especially plastic sheets (A2), monofilaments (A5) and synthetic ropes (A7). However, the ratio of the mean and median values do not indicate that these French extreme values influence the overall mean litter items per km^2 strongly. Still, the higher seafloor litter recordings of the French mask the differences in the catches between the GOV (IBTS) and the beam trawl (BTS), as was clearly shown with the 2016 data (Volwater & van Hal, 2019).

The decision on how to categorise an item has been an issue since the start of the monitoring (van Hal & de Vries 2013). A guideline has been provided by the ICES WGML (ICES 2018), and fine-tuned by WGML in recent years (ICES, unpubl.), solving a number of the classification issues. An ongoing issue is the way to count items in case of entanglement. The guideline states: "*If an item is made up of two or more objects that have become entangled, and all items are recognisable, all items should be accounted for separately.*" In **Annex 4** (photo of haul 3400003 and haul 3400060), examples of this issue are given. Fully disentangling it might result in a large number of separated monofilaments, potentially attributing a larger catch of litter to these hauls than has currently been reported. Fully disentangling all litter items would cost a lot of effort, is not possible in all cases, and would still lead to arbitrary choices. Usually, monofilaments that are recognisable as separate items are counted as separate items, while heavily entangled items that are not separately recognisable are counted as one. The same discussion occurs for (degrading) synthetic rope "A7" (photo 3400017 in **Annex 4**). The question remains whether to record it as a synthetic rope or as multiple monofilaments, in fact most monofilaments originate from the degradation of synthetic rope.
Monofilaments and synthetic rope form the majority of the counts of litter items (65% IBTS, 49% BTS), with that being the major items determining if a location is seen as hotspot and affecting the summary statistics and possible trend analysis. Next to the described issues in determining the correct number of items and the arbitrary choices in that, there is a methodological error impacting the counts. Cleaning the net of the GOV (and beam trawl) isn't a pleasant job, especially in February sitting on your knees with bad weather on the deck. Monofilament/ropes easily wrap around the fishing net, the ground rope chain and the bobbins. Disentangling each single monofilament from the fishing gear is nearly impossible and is even less likely to be done in bad weather conditions. This results in the accumulation of attached items in the fishing gear. Once accumulated it is only taken out when it becomes a clear entanglement; it can loosen on rough ground and end up in the codend or it can be taken out when parts of the net have to be repaired. Repairing the net has yet another impact; own (netting) materials (ropes, strapping bands) being mixed with the litter and subsequently difficult to discriminate. Based on some French photos of their litter items in 2019, own materials clearly impacted the French counts. The actual counts of litter items are thus heavily influenced by methodological aspects rather than by the amount of litter on the seafloor.

There seems to be some difference in the composition of the litter between the IBTS and BTS, with a larger part of the IBTS items being "monofilament" (A5) and "sheet" (A2). In the BTS these same types also constituted the majority of the items, but form a smaller part of the total number of litter items.
The overall data of the two gears indicates a higher catchability of litter items in the BTS than in the GOV. Despite that, the beam trawl also catches only a part of the litter present in the trawl path. This is one of the issues pointed at by Canals et al. (2021) in using trawls of fish surveys for monitoring seafloor litter. So the data of both gears presents an underestimation of the amount of litter items present on the seafloor, where the underestimation using the IBTS data is larger than when the BTS data is used. Since the IBTS data has a larger spatial extent, it is suggested to use a conversion factor to raise the values of the IBTS to the levels of the BTS, to present less underestimated values on the larger spatial extent. However, there are some issues with that:

- A straightforward conversion factor can't be used to raise the hauls without litter (zero haul). while most likely there was litter in the trawl path. This is indicating that a higher percentage of the BTS hauls contained litter and knowing that a haul of the BTS covers a smaller area of seafloor.
- In the comparison between both surveys, there is a seasonal difference. This might influence the amount of litter accessible. The season also affects the amount of fish caught, which in turn influences the amount of litter that is retained within the codend.
- The two gears cannot fish on the same grounds, habitat types, in all cases. This likely has little impact on the scale of the DCS, as here both gears can more or less fish on the same grounds. On the larger spatial scale (North Sea wide) of both surveys, however, this could hamper the comparison.
- The higher vertical net opening of the IBTS likely results in the retention of more floating litter, while the larger length of the net and the larger mesh size in the first part of the belly of

the net likely result in a lower retainment of heavier items. This indicates that a different conversion factor would be required for different litter types.

That fishing locations differ between the BTS and the IBTS is an issue in the comparison of these two gear types, however the effect of the actual fishing location also influences the comparison of the IBTS catches between years. The actual fishing locations of the IBTS are semi-randomly chosen within a rectangle, and as a result, differ between years. Litter items can easily be transported from a low-density site by e.g. bottom currents to a site where seafloor structures retain the litter items and form a litter hotspot (Canals et al. 2021). This retainment of litter items is observed in the catches of the IBTS, where in cases that much organic debris (benthos, shells, seaweed e.d.) is retained in the IBTS net, it is more likely to have higher amounts of litter. Unfortunately, habitat characteristics are not recorded in the IBTS (e.g. by side-scan sonar or multibeam), nor are the amounts of debris in the catches thus analyses on this level are not possible. It is known that these habitat characteristics can vary at a small local scale, and with that likely the amount of litter on the sea floor. This might be the explanation for the empty hauls close to larger catches on the Dutch continental shelf in earlier years. A method to gain insight in the effect of substrate on the accumulation of marine litter was applied in the Bay of Fundy, eastern Canada. Seafloor litter was detected simultaneously with the habitat characteristics by using a drop camera system. Most litter was detected on sandy substrates, contrasting the hypothesis that more litter accumulates on harder/coarser benthic substrates (Goodman et al. 2020). In recent years, the number of studies using seafloor imagery is increasing and deep learning even has the potential to automatically recognize seafloor litter by type (Canals et al. 2021; Politikos et al. 2021). By using drop- and/or towed cameras, a better estimation of the abundance of litter on the seafloor might be obtained and accumulation areas (hotspots) can be identified. However, the applicability of this method in the North Sea might be limited, since the water clarity of the southern North Sea is assumed to be relatively low.

In addition to a status analysis (average of three years of data), RWS requested a trend analyses of the amount of seafloor data comparable to beach litter trend analysis using the R-package, litteR (Walvoort & van Loon, 2018; LitteR v0.8.2). Simultaneously, OSPAR (lead country United Kingdom) is working on trend analyses of the International litter data with their own methods. However, it was decided not to continue in this direction for the Dutch IBTS data, nor the international data collected on the DCS. The goal of the trend analysis is to get statistical support for a potential trend in the amount of litter on the seafloor, or at least of a consistent part of the litter on the seafloor. It is widely accepted that with the GOV, which is not designed to catch litter, the probability of catching a litter item when it is present in the trawl path is low, and varies with litter type and size. The GOV is designed to avoid retainment of larger object (stones) by hopping over these, otherwise the gear gets ripped and the haul becomes invalid. As a result, the bottom contact of the gear is minimal, and earlier analysis indicated that the catchability of the GOV for many benthic species was less than 5% (ICES, 2003). Therefore, the probability of catching small items on the seafloor is assumed to be low and random. The fact that most items caught are relatively small indicates that it is likely that there are many more items in the trawl path and that current values are a large underestimation of the actual litter present on the seafloor. This was shown clearly when the GOV was used to fish in the area where the container vessel MSC Zoe lost its cargo in 2019. While beam trawls were catching large amounts of items from the cargo, only three items were caught in the two hauls with the GOV (extended in duration) (van Hal, 2019).
This issue is recognized in the second OSPAR intermediate assessment (EIHA 19/07/19-Add.1). Due to the low catchability there is a large chance that the zeros (no litter in a GOV-haul) are actually false zeros (no litter caught, while there were multiple items of litter on the seafloor). There are statistical methods that could deal with these false zero's, however those are not part of the LitteR-program. Even when using these kind of methods, it is questionable if this trend line will be informative and represents the actual trend in litter on the North Sea seafloor. Furthermore, this would not solve the issue of the litter catches not being a reliable proxy for the amount of litter on the seafloor.
In conclusion, in view of these reservations, it was decided not to present a trend analysis of the GOV data on the DCS within this report.

The definition of Good Environmental Status (GES) for marine litter is that "The composition, amount and spatial distribution of litter on the coastline, in the surface layer of the water column, and on the seabed, are at levels that do not cause harm to the coastal and marine environment." (COMMISSION DECISION (EU) 2017/848 of 17 May 2017). It is not yet defined what these levels are and the current approach is to try to reduce of the amount of litter in the environment. It is clear (Maes et al. 2018, Urban-Malinga et al. 2018), also from the results presented here, that despite the management measures to decrease the input of litter and to remove the litter from the environment, there is still litter on the seafloor. The indicators proposed for the MSFD should be able to detect a reduction in litter related to management measures. A situation with a relatively low amount of (or without) litter in the marine environment has not been realized yet and it is unlikely to be realized within a short timeframe (van Loon et al. 2020).

To conclude, a relatively low number of items found per haul, a low probability of catching an item when it is present in the trawl path and the spatial differences in fishing location (habitat, seafloor structures), make it difficult to draw conclusions on the absolute amounts of litter. Since the catchability issue with the GOV net is hard to solve and difficult to incorporate in the analyses, it might be worthwhile to find or develop other methods for detecting the abundance of litter on the seafloor. Incorporating litter data of the BTS indicates that seafloor litter is more abundant than the IBTS data indicate. However, it is assumed that even the BTS beam trawl gives an underestimation of the actual litter present on the seafloor. A dedicated survey, possibly focused on areas where litter is likely to be gathered by dominant currents and habitat features, could assist in providing information of fixed locations (litter hotspots). However, it remains to be proven that these "hotspots" actually exist, and whether these shift through time, which seems to be suggested by the second OSPAR intermediate assessment. A study with a drop-down or towed camera system has the potential to give better estimations of the abundance of litter on the seafloor and can possibly identify hotspots of seafloor litter in the North Sea. Possibilities for this are discussed in (Madricardo et al. 2020). For now, the here reported abundances of litter on the DCS are likely to be a minimum estimation of the amount of litter items presented on the seafloor and thus the Dutch continental shelf.

5 Recommendations

- Reconsider the goals and purpose of the monitoring of litter. The use of the IBTS as monitoring platform only gives indicative results of a small part of the litter composition. For the evaluation of specific management measures the IBTS data is questionable and it is also unsuitable to give a good estimation of the litter present on the seafloor. It's best use, other than to raise awareness, would most likely be as a signal of very large changes in the litter part caught by the IBTS, in this case being a large change in the amount of monofilament and synthetic rope in the marine environment.
- Follow the progress of alternative methods of collecting seafloor litter data and explore the application of alternative methods on the DCS, for example the use of the benthos dredge sampling. The use of additional methods to collect seafloor litter might give a better understanding of the actual amount and distribution of litter items on the Dutch continental shelf.
- Explore the possibilities to study the occurrence of litter "hotspots" with a drop down or towed camera system in the North Sea (DCS). Such systems have the possibility to identify hotspots of seafloor litter in the North Sea. In clear waters these systems have even the potential to give better estimations of the abundance of litter on the seafloor.
- Further investigate the differences in seafloor litter catch efficiency of the GOV and beam trawl gears, and establish a correction factor that takes substrate into account.

6 Quality Assurance

Wageningen Marine Research utilises an ISO 9001:2015 certified quality management system. This certificate is valid until 15 December 2021. The organisation has been certified since 27 February 2001. The certification was issued by DNV GL.

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Justification

Report: C065/21
Project Number: 4316100081

The scientific quality of this report has been peer reviewed by a colleague scientist and a member of the Management Team of Wageningen Marine Research

Approved: Jip Vrooman
Researcher

Signature:

Date: 31st of August 2021

Approved: Jakob Asjes
Manager Integration

Signature:

Date: 31st of August 2021

Annex 1 Litter data in DATRAS

The ICES Database of Trawl Surveys (DATRAS) is the international database in which the results of the North Sea IBTS, but also a large number of other surveys in the North Sea and other ICES regions are stored and made publicly available. The data of the fish surveys is made publicly available as raw data (Exchange format) and in a large variety of data-products depending on the survey (for example indices, Age-Length-keys, CPUE by length or by age, etc.)

Since a couple of years DATRAS also contains the international litter data of the trawl surveys and makes these publicly available. The Dutch data is provided to DATRAS every year after the survey, with a deadline of providing the data prior to WGML.

DATRAS makes the litter data available as raw data and as a data-product, being the latest OSPAR litter assessment output.

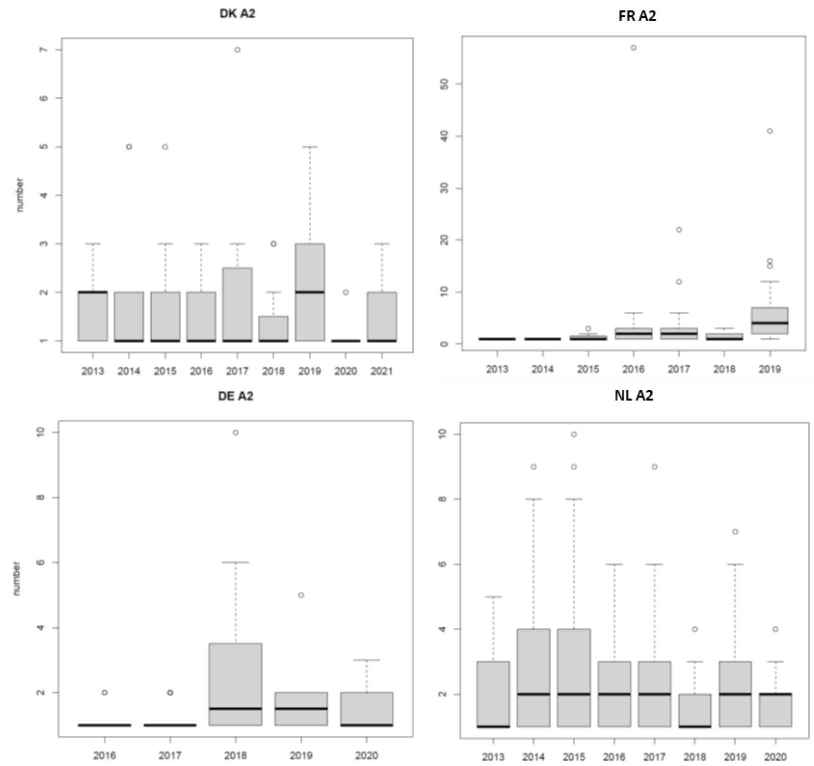
DATRAS can be accessed via: datras.ices.dk
On the right side of the page you can select the download page and the DATRAS documents page. The last contains all the relevant documents with, amongst others, the survey manuals and the Litter format. Via the download page all the data and data products can be downloaded.

- First select the preferred data product, in case of litter the options are:
  - Litter Exchange data (raw data)
  - Litter Assessment output (the OSPAR product).
- Then select the preferred survey, relevant for the North Sea:
  - NS-IBTS
  - BTS (beam trawl survey)
- Select the preferred quarter and year (or all)
- Submit
- Accept the download policies
- A zip-file is downloaded, including a disclaimer, a pdf met metadata and references to the headers, and a csv-file with the data.
- The first column of this file is the RecordType: HH (haul information) and LT (litter data). Based upon year, country and StNo the HH and LT can be combined to get all the haul information added to the litter information.

Issues with these downloads should be communicated directly to the ICES data centre. Advice on improvements to the data products should be communicated to the IBTSWG-chair(s) and the ICES data centre.

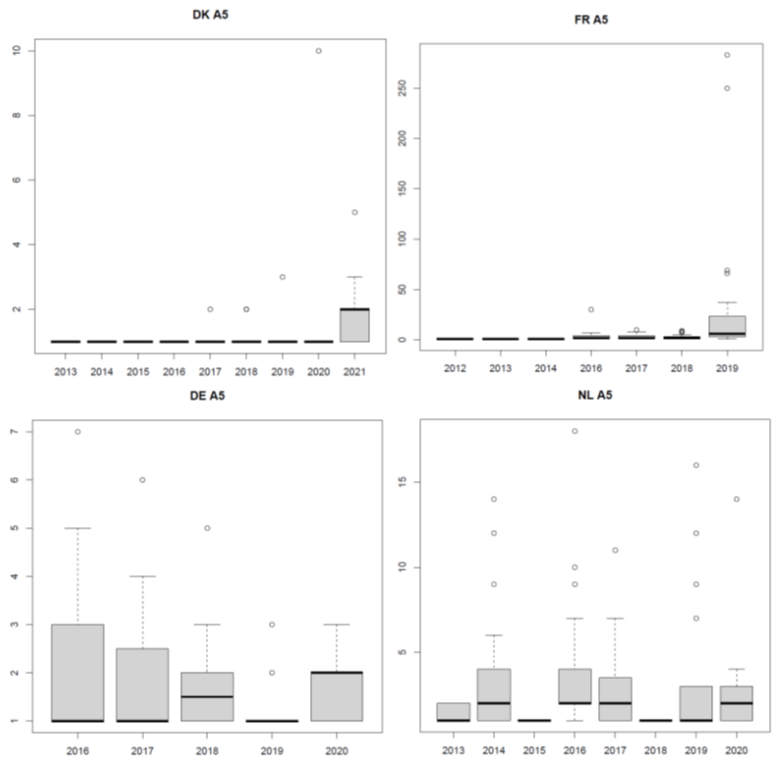
Annex 2 Quality check international IBTS data

Marine litter data from the international IBTS partners was obtained from ICES DATRAS, however not all data could be used for the litter DCS data analysis due to inconsistencies in counting items. For some years only the presence of seafloor litter and/or specific litter items was recorded. The Netherlands started to count litter items from 2013 onwards (except "singles lines" (A5), which are counted (when possible) from 2014 onwards). Other countries that conducted hauls on the DCS started to count single litter items a couple of years later. To check whether litter items were only recorded as present (1) or that single litter items were counted per haul, the recordings of the three main litter types (A2, A5 and A7) were checked by making use of boxplots showing the amount of items per haul recorded. If only presence is recorded, it would mean that for all hauls in which a certain litter type is recorded the value is 1. Based on the Dutch, but also the international data set, it is very unlikely that the amount of items of the main types equals 1 in all hauls.

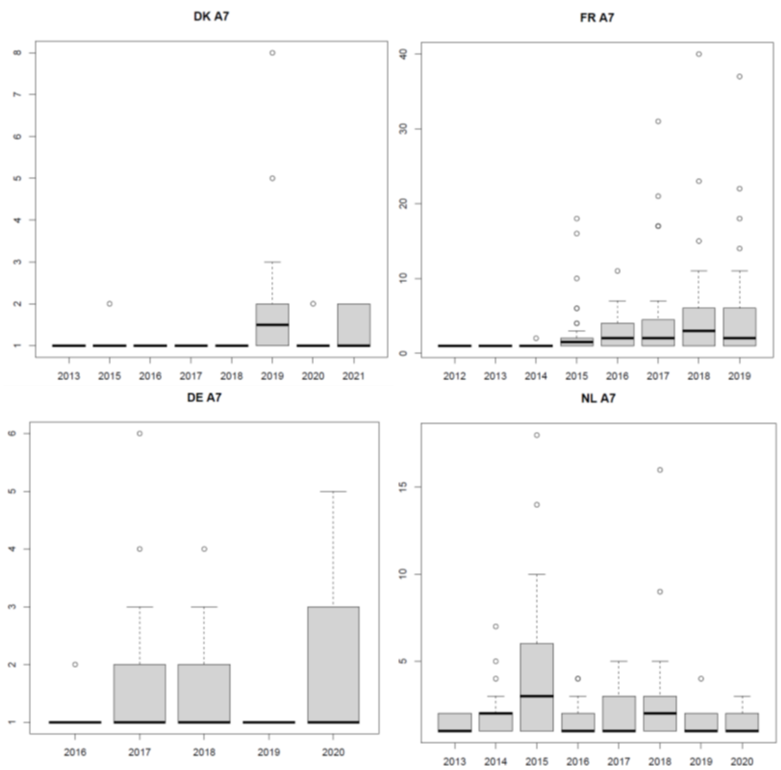


Annex 2a. A2: Plastic sheet. The number of plastic sheets per haul per year per country (boxplots) for hauls in which plastic sheet were recorded. Only IBTS countries which executed hauls on the DCS (top left: Denmark, top right: France, bottom left: Germany & bottom right: the Netherlands) were quality checked.

In **annex 2a** it can be seen that it is very likely that France started to count single plastic sheets only in 2015, Germany in 2018 and Denmark and the Netherlands from 2013 onwards.
Denmark only started to count monofilament in 2021, while Germany and France started to count these litter items in 2016 and the Netherlands from 2014 on (**annex 2b**).
For synthetic rope, Denmark started to count in 2019, Germany and France in 2015 and the Netherlands since 2014 (**annex 2c**).
So for analysis based on counts, only 2021 data from Denmark could be used since they only started to count monofilaments in 2021. German count data was available from 2015 onwards, although Germany only conducted hauls on the DCS in 2019. France count data from 2015 onwards was included while Dutch count data was available from 2013 onwards.



Annex 2b. A5: Monofilament. Number of monofilaments per haul per year per country (boxplots) for hauls in which monofilaments were recorded. Only IBTS countries which executed hauls on the DCS (top left: Denmark, top right: France, bottom left: Germany & bottom right: the Netherlands) were quality checked.



Annex 2c. A7: Synthetic rope. Number of synthetic ropes per haul per year per country (boxplots) for hauls in which synthetic ropes were recorded. Only IBTS countries which executed hauls on the DCS (top left: Denmark, top right: France, bottom left: Germany & bottom right: the Netherlands) were quality checked.

Annex 3 Data tables with seafloor litter monitoring data

The complete IBTS DCS dataset is available in the Excel file: RWS.dataformat.international.xls

Annex 3.a. Complete trawl list of the Dutch IBTS Q1 2021, in which the total number of items per trawl (Total_Count [Items/km²]) and the number of items per category (A, B, C, D & E [Items/km²]) are reported.

RefNo	Ices.rect	Latitude	Longitude	EEZ	Survey_date	Country	Institute	Wing_spread (m)	Bottom_track (m)	Duration (min)	A	B	C	D	E	F	Total_Count
3400001	37F5	54.3627	5.55517	NL	2021-01-26	NL	WMR	18.70	3362	30.1	95.4	0	0	0	47.7	0	143.1
3400002	37F6	54.3133	6.58117	DE	2021-01-26	NL	WMR	18.70	3358	30.1	79.6	0	0	0	0	0	79.6
3400003	37F7	54.316	7.3735	DE	2021-01-26	NL	WMR	20.21	3638	30.1	149.6	0	0	0	0	0	149.6
3400004	37F8	54.2882	8.12033	DE	2021-01-27	NL	WMR	19.11	4043	30	38.7	0	0	0	0	0	38.7
3400005	36F7	53.9337	7.275	DE	2021-01-27	NL	WMR	17.95	4085	30	95.5	0	0	0	0	0	95.5
3400006	36F6	53.912	6.47333	DE	2021-01-27	NL	WMR	18.14	4036	30	41	13.7	0	0	0	0	54.7
3400007	37F4	54.2057	4.53667	NL	2021-01-28	NL	WMR	20.78	3918	30	86	0	0	0	0	0	86
3400008	36F4	53.9915	4.82133	NL	2021-01-28	NL	WMR	19.46	3545	30	72.5	0	0	0	0	0	72.5
3400009	36F5	53.7943	5.21133	NL	2021-01-28	NL	WMR	19.08	3258	30	144.8	0	16.1	0	0	0	160.9
3400010	35F4	53.4528	4.477	NL	2021-01-28	NL	WMR	20.17	3037	30	114.3	0	0	0	0	0	114.3
3400011	33F4	52.3498	4.4035	NL	2021-02-01	NL	WMR	17.76	4605	30	61.1	0	0	0	0	0	61.1
3400012	38F3	54.6488	3.613	NL	2021-02-02	NL	WMR	19.08	3713	30	28.2	0	0	0	0	0	28.2
3400013	38F4	54.929	4.099	NL	2021-02-02	NL	WMR	21.35	3478	30	26.9	0	0	0	0	0	26.9
3400014	39F4	55.2385	4.246	NL	2021-02-02	NL	WMR	20.21	3594	30	82.6	0	0	0	0	0	82.6
3400015	39F3	55.2207	3.55883	NL	2021-02-02	NL	WMR	20.08	3437	30	14.5	0	0	0	0	0	14.5
3400016	34F4	52.9217	4.22533	NL	2021-02-03	NL	WMR	18.52	3765	30.1	42.9	0	0	0	0	0	42.9
3400017	34F3	52.9183	3.722	NL	2021-02-03	NL	WMR	18.52	3278	30.1	49.5	0	0	0	0	0	49.5
3400018	35F3	53.145	3.33283	NL	2021-02-03	NL	WMR	17.95	3758	30.1	44.4	0	0	0	0	0	44.4
3400019	37F2	54.0872	2.50133	UK	2021-02-04	NL	WMR	22.10	3745	30	84.6	0	0	0	0	0	84.6
3400020	37F3	54.0725	3.0875	NL	2021-02-04	NL	WMR	20.03	3903	30	64	0	12.8	0	0	0	76.8
3400021	36F3	53.915	3.069	NL	2021-02-04	NL	WMR	21.91	3504	30.7	104.1	0	0	0	0	0	104.1
3400022	36F2	53.8208	2.6735	UK	2021-02-04	NL	WMR	21.72	3609	30.1	63.8	0	0	0	0	0	63.8
3400023	39F2	55.374	2.70467	UK	2021-02-09	NL	WMR	20.80	3652	30.1	39.5	0	0	0	0	0	39.5
3400024	40F3	55.5617	3.099	UK	2021-02-09	NL	WMR	18.70	3645	30.2	29.4	0	0	0	0	0	29.4
3400025	41F3	56.1498	3.30083	UK	2021-02-09	NL	WMR	19.46	3488	30.1	14.7	0	0	0	0	0	14.7
3400026	41F2	56.1963	2.20517	UK	2021-02-10	NL	WMR	20.21	3398	30.1	43.7	0	0	0	0	0	43.7
3400027	40F2	55.872	2.13733	UK	2021-02-10	NL	WMR	21.72	3463	30	66.5	0	0	0	0	0	66.5
3400028	40F1	55.651	1.48333	UK	2021-02-10	NL	WMR	21.53	3983	30	0	0	0	0	0	0	0
3400029	40F1	0	0	UK	2021-02-10	NL	WMR	22.65	2805	30.1	0	0	0	0	0	0	0
3400030	41F1	56.2612	1.26517	UK	2021-02-11	NL	WMR	21.53	3131	30.3	59.4	0	0	0	0	0	59.4
3400031	41F1	56.0873	1.24867	UK	2021-02-11	NL	WMR	20.40	3642	30.3	13.5	0	0	0	0	0	13.5
3400032	41F0	56.201	0.58617	UK	2021-02-11	NL	WMR	22.67	4070	30	0	0	0	0	0	0	0
3400033	41F0	56.1052	0.24717	UK	2021-02-11	NL	WMR	21.53	4784	30	0	0	0	0	0	0	0
3400034	40F0	55.9238	0.3285	UK	2021-02-11	NL	WMR	21.91	4230	30	0	0	0	0	0	0	0
3400035	40F0	55.6415	0.20467	UK	2021-02-12	NL	WMR	20.40	3988	30.1	0	0	0	0	0	12.3	12.3
3400036	4.00E+10	55.6968	-0.40633	UK	2021-02-12	NL	WMR	20.59	3959	30	12.3	0	0	0	0	0	12.3
3400037	4.00E+10	55.8697	-0.73267	UK	2021-02-12	NL	WMR	21.91	3561	30.1	12.8	0	0	0	0	0	12.8
3400038	4.10E+10	56.186	-0.77667	UK	2021-02-12	NL	WMR	21.53	3534	30.2	39.4	0	0	0	0	0	39.4
3400039	4.10E+10	56.4743	-0.56517	UK	2021-02-13	NL	WMR	20.40	4162	30	11.8	0	0	0	0	0	11.8
3400040	4.10E+08	56.0757	-2.0615	UK	2021-02-15	NL	WMR	20.78	3803	30.5	38	0	0	0	0	0	38
3400041	4.10E+09	56.1918	-1.58867	UK	2021-02-15	NL	WMR	19.84	3323	30.1	91	0	0	0	0	0	91
3400042	4.00E+09	55.9283	-1.482	UK	2021-02-15	NL	WMR	21.72	3819	30.2	12.1	0	0	0	0	0	12.1
3400043	4.00E+09	55.5258	-1.09667	UK	2021-02-15	NL	WMR	23.23	4226	30	30.6	0	0	0	0	0	30.6
3400044	3.90E+09	55.273	-1.16567	UK	2021-02-16	NL	WMR	21.72	3545	30.1	26	0	0	0	0	0	26
3400046	3.90E+10	55.2052	-0.5395	UK	2021-02-16	NL	WMR	21.91	3596	30.2	76.2	0	0	0	0	0	76.2
3400047	3.80E+10	54.8618	-0.107	UK	2021-02-16	NL	WMR	21.16	3795	30.2	12.5	0	0	0	0	0	12.5
3400048	39F1	55.1433	1.31017	UK	2021-02-17	NL	WMR	19.08	3793	30	13.8	0	0	0	0	0	13.8
3400049	39F0	55.1212	0.59967	UK	2021-02-17	NL	WMR	21.53	3369	30.3	0	0	0	0	0	0	0
3400050	38F0	54.7298	0.666	UK	2021-02-17	NL	WMR	21.91	3837	30	23.8	0	0	0	0	11.9	35.7

3400051	37F0	54.3627	0.63567	UK	2021-02-17	NL	WMR	19.46	3537	30.2	14.5	0	0	0	0	0	14.5
3400052	33F3	52.1712	3.8235	NL	2021-02-22	NL	WMR	18.14	3693	30.1	0	0	0	0	0	0	0
3400053	38F2	54.6778	2.62367	UK	2021-02-23	NL	WMR	16.82	3964	30	75	0	0	0	0	30	105
3400054	38F2	54.8182	2.32033	UK	2021-02-23	NL	WMR	16.44	3064	30.2	158.9	0	0	0	0	0	158.9
3400055	38F1	54.9203	1.79817	UK	2021-02-23	NL	WMR	17.57	3581	30.1	0	0	0	0	0	0	0
3400056	38F1	54.8912	1.18417	UK	2021-02-23	NL	WMR	20.59	3945	30.1	12.3	0	0	0	0	0	12.3
3400058	37F1	54.0932	1.61633	UK	2021-02-24	NL	WMR	22.67	3781	30	210	0	0	0	0	0	210
3400059	36F2	53.58	2.429	UK	2021-02-24	NL	WMR	20.03	4086	30	24.4	0	0	0	0	0	24.4
3400060	35F2	53.1712	2.40667	UK	2021-02-24	NL	WMR	19.27	3445	30	406.8	0	0	0	0	0	406.8

Annex 3.b. Complete list of all the DCS data from 2013 to 2021, in which the total number of items per trawl (Total_Count [Items/km^2]) and the number of items per size category (A, B, C, D & E [Items/km^2]) are reported.

RefNo	Ices.rect	Latitude	Longitude	EEZ	year	Country	Institute	A	B	C	D	E	F	Total_Count
DK202134	37F3	54.1733	3.0744	NL	2021	DK	DTU-AQUA	24.18	0.00	0.00	0.00	0.00	0.00	24.18
DK202135	38F3	54.8847	3.6916	NL	2021	DK	DTU-AQUA	11.61	11.61	0.00	0.00	0.00	0.00	23.23
DK202136	39F3	55.2372	3.815	NL	2021	DK	DTU-AQUA	47.28	0.00	0.00	0.00	0.00	23.64	70.92
FR202110	37F4	54.07	4.1371	NL	2021	FR	IFREMER	157.23	0.00	0.00	0.00	15.72	0.00	172.96
FR202111	36F5	53.7475	5.2962	NL	2021	FR	IFREMER	98.04	16.34	0.00	0.00	0.00	0.00	114.38
FR202120	37F5	54.3214	5.3014	NL	2021	FR	IFREMER	224.00	0.00	0.00	0.00	0.00	0.00	224.00
FR202124	38F4	54.9185	4.1159	NL	2021	FR	IFREMER	146.82	0.00	0.00	0.00	0.00	0.00	146.82
FR202127	36F3	53.9072	3.9319	NL	2021	FR	IFREMER	63.80	0.00	0.00	0.00	0.00	0.00	63.80
FR202128	36F4	53.6223	4.5215	NL	2021	FR	IFREMER	31.80	0.00	0.00	0.00	31.80	0.00	63.59
FR202129	35F3	53.2862	3.8243	NL	2021	FR	IFREMER	103.63	0.00	0.00	0.00	17.27	0.00	120.90
FR202130	32F3	51.626	3.1677	NL	2021	FR	IFREMER	99.01	0.00	0.00	0.00	0.00	0.00	99.01
FR20214	32F3	51.8275	3.4376	NL	2021	FR	IFREMER	44.84	22.42	0.00	0.00	44.84	0.00	112.11
FR20215	33F3	52.2512	3.9192	NL	2021	FR	IFREMER	69.81	0.00	0.00	0.00	0.00	0.00	69.81
FR20216	33F4	52.2782	4.1456	NL	2021	FR	IFREMER	35.78	0.00	0.00	0.00	0.00	0.00	35.78
FR20217	35F4	53.1611	4.1522	NL	2021	FR	IFREMER	201.83	0.00	0.00	0.00	0.00	0.00	201.83
FR20218	34F4	52.848	4.1165	NL	2021	FR	IFREMER	76.34	0.00	0.00	0.00	0.00	0.00	76.34
FR20219	34F3	52.673	3.4227	NL	2021	FR	IFREMER	17.76	0.00	0.00	0.00	0.00	0.00	17.76
3400001	37F5	54.36267	5.55517	NL	2021	NL	WMR	95.40	0.00	0.00	0.00	47.70	0.00	143.10
3400007	37F4	54.20567	4.53667	NL	2021	NL	WMR	86.00	0.00	0.00	0.00	0.00	0.00	86.00
3400008	36F4	53.9915	4.82133	NL	2021	NL	WMR	72.50	0.00	0.00	0.00	0.00	0.00	72.50
3400009	36F5	53.79433	5.21133	NL	2021	NL	WMR	144.80	0.00	16.10	0.00	0.00	0.00	160.90
3400010	35F4	53.45283	4.477	NL	2021	NL	WMR	114.30	0.00	0.00	0.00	0.00	0.00	114.30
3400011	33F4	52.34983	4.4035	NL	2021	NL	WMR	61.10	0.00	0.00	0.00	0.00	0.00	61.10
3400012	38F3	54.64883	3.613	NL	2021	NL	WMR	28.20	0.00	0.00	0.00	0.00	0.00	28.20
3400013	38F4	54.929	4.099	NL	2021	NL	WMR	26.90	0.00	0.00	0.00	0.00	0.00	26.90
3400014	39F4	55.2385	4.246	NL	2021	NL	WMR	82.60	0.00	0.00	0.00	0.00	0.00	82.60
3400015	39F3	55.22067	3.55883	NL	2021	NL	WMR	14.50	0.00	0.00	0.00	0.00	0.00	14.50
3400016	34F4	52.92167	4.22533	NL	2021	NL	WMR	42.90	0.00	0.00	0.00	0.00	0.00	42.90
3400017	34F3	52.91833	3.722	NL	2021	NL	WMR	49.50	0.00	0.00	0.00	0.00	0.00	49.50
3400018	35F3	53.145	3.33283	NL	2021	NL	WMR	44.40	0.00	0.00	0.00	0.00	0.00	44.40
3400020	37F3	54.0725	3.0875	NL	2021	NL	WMR	64.00	0.00	12.80	0.00	0.00	0.00	76.80
3400021	36F3	53.915	3.069	NL	2021	NL	WMR	104.10	0.00	0.00	0.00	0.00	0.00	104.10
3400052	33F3	52.17117	3.8235	NL	2021	NL	WMR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FR202013	32F3	51.6213	3.1647	NL	2020	FR	IFREMER	0.00	18.83	0.00	0.00	0.00	0.00	18.83
FR202014	32F3	51.8301	3.4448	NL	2020	FR	IFREMER	0.00	28.33	0.00	0.00	28.33	0.00	56.66
FR202015	33F3	52.2529	3.914	NL	2020	FR	IFREMER	75.47	0.00	0.00	0.00	0.00	18.87	94.34
FR202016	36F5	53.898	5.7292	NL	2020	FR	IFREMER	128.82	0.00	0.00	0.00	0.00	0.00	128.82
FR202019	37F5	54.1497	5.2018	NL	2020	FR	IFREMER	105.82	0.00	0.00	0.00	0.00	0.00	105.82
FR202020	37F4	54.3595	4.7221	NL	2020	FR	IFREMER	411.59	0.00	0.00	0.00	15.24	0.00	426.83
FR202021	36F4	53.8775	4.7169	NL	2020	FR	IFREMER	165.02	0.00	0.00	0.00	0.00	0.00	165.02
FR202022	35F4	53.2442	4.2035	NL	2020	FR	IFREMER	434.78	0.00	0.00	0.00	0.00	0.00	434.78
FR202023	35F3	53.1699	3.7489	NL	2020	FR	IFREMER	176.47	0.00	0.00	0.00	0.00	0.00	176.47
FR202024	34F3	52.7481	3.5055	NL	2020	FR	IFREMER	66.52	0.00	0.00	0.00	0.00	0.00	66.52
FR202025	34F4	52.7072	4.0305	NL	2020	FR	IFREMER	249.52	0.00	0.00	0.00	0.00	0.00	249.52
FR202026	33F4	52.3317	4.4201	NL	2020	FR	IFREMER	83.10	0.00	0.00	0.00	0.00	0.00	83.10
FR202030	36F3	53.5416	3.2309	NL	2020	FR	IFREMER	260.87	0.00	0.00	0.00	0.00	0.00	260.87
NL202013	39F3	55.2225	3.3598	NL	2020	NL	WMR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NL202014	33F3	52.414	3.3871	NL	2020	NL	WMR	18.42	0.00	0.00	0.00	0.00	0.00	18.42
NL202015	34F3	52.702	3.2801	NL	2020	NL	WMR	60.24	0.00	0.00	0.00	12.05	0.00	72.29
NL20202	34F4	52.8136	4.4085	NL	2020	NL	WMR	34.66	0.00	0.00	0.00	0.00	0.00	34.66

NL20203	39F4	55.0908	4.3671	NL	2020	NL	WMR	106.84	0.00	0.00	0.00	0.00	0.00	106.84
NL202039	35F4	53.042	4.2558	NL	2020	NL	WMR	66.23	0.00	0.00	0.00	0.00	0.00	66.23
NL20204	38F4	54.8523	4.5166	NL	2020	NL	WMR	48.94	0.00	0.00	0.00	0.00	0.00	48.94
NL202040	35F3	53.0483	3.8253	NL	2020	NL	WMR	105.49	0.00	0.00	0.00	0.00	0.00	105.49
NL202042	36F3	53.8773	3.1315	NL	2020	NL	WMR	81.97	0.00	0.00	0.00	0.00	0.00	81.97
NL202043	38F3	54.5398	3.4081	NL	2020	NL	WMR	83.75	0.00	16.75	0.00	0.00	0.00	100.50
NL202044	37F3	54.2928	3.4598	NL	2020	NL	WMR	18.25	0.00	0.00	0.00	0.00	0.00	18.25
NL202045	37F3	54.0975	3.8426	NL	2020	NL	WMR	282.74	0.00	0.00	0.00	0.00	0.00	282.74
NL202046	37F4	54.0858	4.2903	NL	2020	NL	WMR	69.35	0.00	13.87	0.00	13.87	0.00	97.09
NL202047	36F4	53.932	4.5165	NL	2020	NL	WMR	121.79	0.00	0.00	0.00	0.00	0.00	121.79
NL202048	33F4	52.0738	4.1105	NL	2020	NL	WMR	68.97	0.00	0.00	0.00	0.00	0.00	68.97
NL20205	38F4	54.6671	4.2718	NL	2020	NL	WMR	29.37	0.00	0.00	0.00	0.00	0.00	29.37
NL20206	38F3	54.7061	3.7726	NL	2020	NL	WMR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DE20191	39F4	55.1232	4.0885	NL	2019	DE	vTI	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DE20192	39F3	55.1107	3.7682	NL	2019	DE	vTI	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DE20193	38F3	54.9097	3.7115	NL	2019	DE	vTI	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FR201910	36F5	53.7415	5.2362	NL	2019	FR	IFREMER	557.32	0.00	0.00	0.00	0.00	0.00	557.32
FR201911	37F5	54.1557	5.4782	NL	2019	FR	IFREMER	71.63	0.00	0.00	0.00	0.00	0.00	71.63
FR201912	37F5	54.252	5.7543	NL	2019	FR	IFREMER	178.93	19.88	0.00	0.00	0.00	0.00	198.81
FR201918	35F4	53.2456	4.1949	NL	2019	FR	IFREMER	111.32	0.00	0.00	0.00	0.00	0.00	111.32
FR201919	35F4	53.0556	4.3202	NL	2019	FR	IFREMER	21.41	0.00	0.00	0.00	0.00	0.00	21.41
FR201920	35F3	53.1979	3.429	NL	2019	FR	IFREMER	736.65	0.00	0.00	0.00	18.42	0.00	755.06
FR201921	35F3	53.2765	3.7709	NL	2019	FR	IFREMER	228.47	0.00	0.00	0.00	0.00	0.00	228.47
FR201922	36F3	53.7832	3.477	NL	2019	FR	IFREMER	#####	0.00	0.00	0.00	0.00	0.00	4708.90
FR201923	37F4	54.298	4.5024	NL	2019	FR	IFREMER	111.11	15.87	0.00	0.00	15.87	0.00	142.86
FR201924	36F4	53.845	4.5289	NL	2019	FR	IFREMER	542.06	0.00	0.00	0.00	0.00	0.00	542.06
FR201925	36F4	53.5833	4.3874	NL	2019	FR	IFREMER	180.36	0.00	0.00	0.00	0.00	0.00	180.36
FR201938	32F3	51.8097	3.6019	NL	2019	FR	IFREMER	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FR201939	33F3	52.2024	3.6662	NL	2019	FR	IFREMER	263.16	0.00	0.00	0.00	35.09	0.00	298.25
FR201940	34F3	52.6786	3.4191	NL	2019	FR	IFREMER	82.37	0.00	0.00	0.00	0.00	0.00	82.37
FR20197	33F3	52.2516	3.9167	NL	2019	FR	IFREMER	353.54	0.00	0.00	0.00	0.00	0.00	353.54
FR20198	33F4	52.3009	4.3946	NL	2019	FR	IFREMER	611.35	0.00	0.00	0.00	0.00	21.83	633.19
FR20199	34F4	52.6299	4.5279	NL	2019	FR	IFREMER	17.64	0.00	0.00	0.00	0.00	0.00	17.64
NL20191	33F4	52.1863	4.302	NL	2019	NL	WMR	119.52	0.00	0.00	0.00	###	0.00	298.80
NL201910	38F4	54.7028	4.7211	NL	2019	NL	WMR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NL201941	34F4	52.5975	4.2823	NL	2019	NL	WMR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NL201942	34F3	52.6836	3.6206	NL	2019	NL	WMR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NL201945	39F3	55.2585	3.722	NL	2019	NL	WMR	54.84	0.00	0.00	0.00	18.28	0.00	73.13
NL201951	38F3	54.658	3.8095	NL	2019	NL	WMR	14.43	0.00	0.00	0.00	0.00	0.00	14.43
NL201952	38F4	54.6141	4.5996	NL	2019	NL	WMR	13.83	0.00	0.00	0.00	0.00	0.00	13.83
NL201953	37F4	54.3061	4.383	NL	2019	NL	WMR	238.10	0.00	0.00	0.00	0.00	0.00	238.10
NL201954	37F3	54.1926	3.7011	NL	2019	NL	WMR	44.58	0.00	0.00	0.00	0.00	0.00	44.58
NL201955	37F3	54.1328	3.3538	NL	2019	NL	WMR	116.28	0.00	0.00	0.00	0.00	0.00	116.28
NL201956	32F3	51.8041	3.5966	NL	2019	NL	WMR	45.56	0.00	0.00	0.00	0.00	0.00	45.56
NL201960	36F3	53.8785	3.9625	NL	2019	NL	WMR	163.45	0.00	14.86	0.00	0.00	0.00	178.31
NL201961	36F3	53.8813	3.9423	NL	2019	NL	WMR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NL201962	36F5	53.7431	5.5163	NL	2019	NL	WMR	71.17	0.00	17.79	0.00	0.00	0.00	88.97
NL201963	36F5	53.5001	5.7603	NL	2019	NL	WMR	39.84	7.97	0.00	0.00	0.00	7.97	55.78
NL201964	35F5	53.4336	5.2956	NL	2019	NL	WMR	22.99	0.00	7.66	0.00	0.00	0.00	30.65
NL20198	37F5	54.3298	5.6333	NL	2019	NL	WMR	82.24	0.00	0.00	0.00	0.00	0.00	82.24
FR20181	33F4	52.2248	4.3	NL	2018	FR	IFREMER	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FR201818	33F3	52.2023	3.6718	NL	2018	FR	IFREMER	200.33	0.00	0.00	0.00	0.00	16.69	217.03
FR201819	33F3	52.389	3.7074	NL	2018	FR	IFREMER	89.29	0.00	0.00	0.00	0.00	0.00	89.29
FR20182	33F4	52.2831	4.3713	NL	2018	FR	IFREMER	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FR201820	34F3	52.6144	3.2771	NL	2018	FR	IFREMER	81.57	0.00	0.00	0.00	0.00	0.00	81.57
FR201821	35F3	53.3692	3.7182	NL	2018	FR	IFREMER	693.95	0.00	0.00	0.00	0.00	0.00	693.95
FR201822	36F3	53.6203	3.7309	NL	2018	FR	IFREMER	678.81	0.00	0.00	0.00	0.00	0.00	678.81
FR20183	32F3	51.7978	3.5152	NL	2018	FR	IFREMER	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FR201834	35F4	53.1557	4.1479	NL	2018	FR	IFREMER	16.67	0.00	0.00	0.00	0.00	0.00	16.67
FR201835	34F4	52.6057	4.5053	NL	2018	FR	IFREMER	92.17	0.00	0.00	0.00	0.00	0.00	92.17
FR201836	36F4	53.7888	4.4828	NL	2018	FR	IFREMER	191.26	0.00	0.00	0.00	0.00	13.66	204.92
FR201837	37F4	54.1769	4.1153	NL	2018	FR	IFREMER	47.10	0.00	0.00	0.00	0.00	0.00	47.10
FR201838	37F3	54.0834	3.8234	NL	2018	FR	IFREMER	163.13	0.00	0.00	0.00	0.00	0.00	163.13
FR20184	32F3	51.8086	3.5727	NL	2018	FR	IFREMER	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FR201843	37F5	54.1739	5.5362	NL	2018	FR	IFREMER	0.00	0.00	0.00	0.00	0.00	17.54	17.54
FR201844	36F5	53.8113	5.5997	NL	2018	FR	IFREMER	66.23	0.00	0.00	0.00	0.00	0.00	66.23

FR20185	33F3	52.2265	3.6613	NL	2018	FR	IFREMER	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NL20181	34F4	52.6878	4.1926	NL	2018	NL	WMR	69.08	0.00	0.00	0.00	0.00	17.27	86.36
NL201810	36F4	53.9206	4.9016	NL	2018	NL	WMR	99.50	0.00	0.00	0.00	12.44	0.00	111.94
NL201811	37F4	54.1291	4.8863	NL	2018	NL	WMR	13.16	0.00	0.00	0.00	0.00	0.00	13.16
NL201812	33F3	52.3293	3.958	NL	2018	NL	WMR	51.15	0.00	0.00	0.00	0.00	0.00	51.15
NL201813	34F3	52.6431	3.968	NL	2018	NL	WMR	123.63	0.00	0.00	0.00	0.00	0.00	123.63
NL201815	38F3	54.8588	3.1926	NL	2018	NL	WMR	34.19	0.00	0.00	0.00	0.00	0.00	34.19
NL201816	39F3	55.1578	3.6855	NL	2018	NL	WMR	45.87	0.00	0.00	0.00	0.00	0.00	45.87
NL20182	35F4	53.0518	4.3133	NL	2018	NL	WMR	76.45	0.00	0.00	0.00	0.00	0.00	76.45
NL201842	38F4	54.7691	4.902	NL	2018	NL	WMR	58.82	0.00	0.00	0.00	0.00	0.00	58.82
NL201843	38F4	54.8806	4.5588	NL	2018	NL	WMR	0.00	0.00	0.00	0.00	0.00	16.34	16.34
NL201844	35F3	53.1025	3.8175	NL	2018	NL	WMR	58.39	0.00	0.00	0.00	0.00	0.00	58.39
NL201851	40F3	55.6505	3.3713	NL	2018	NL	WMR	33.50	0.00	0.00	0.00	0.00	0.00	33.50
NL201852	39F4	55.4085	4.1418	NL	2018	NL	WMR	49.42	0.00	0.00	0.00	16.47	0.00	65.90
NL201853	37F3	54.4441	3.3261	NL	2018	NL	WMR	0.00	0.00	0.00	0.00	19.19	0.00	19.19
NL201854	37F2	54.2446	2.7973	NL	2018	NL	WMR	52.54	0.00	0.00	0.00	17.51	0.00	70.05
NL201856	36F3	53.564	3.1723	NL	2018	NL	WMR	62.89	0.00	0.00	0.00	0.00	0.00	62.89
NL20188	37F5	54.3161	5.2831	NL	2018	NL	WMR	85.59	0.00	0.00	0.00	14.27	0.00	99.86
NL20189	36F5	53.9631	5.294	NL	2018	NL	WMR	75.85	0.00	12.64	0.00	0.00	0.00	88.50
FR201731	34F3	52.6441	3.2752	NL	2017	FR	IFREMER	14.75	0.00	0.00	0.00	0.00	0.00	14.75
FR201732	33F3	52.3751	3.4359	NL	2017	FR	IFREMER	52.45	0.00	0.00	0.00	0.00	17.48	69.93
FR201733	35F4	53.3684	4.0985	NL	2017	FR	IFREMER	149.25	0.00	0.00	0.00	0.00	18.66	167.91
FR201734	36F3	53.62	3.7315	NL	2017	FR	IFREMER	68.26	0.00	0.00	0.00	0.00	0.00	68.26
FR201735	36F4	53.5681	4.3357	NL	2017	FR	IFREMER	53.19	0.00	0.00	0.00	0.00	0.00	53.19
FR201736	37F5	54.1854	5.6796	NL	2017	FR	IFREMER	44.38	0.00	0.00	0.00	0.00	0.00	44.38
FR201737	36F5	53.8149	5.8987	NL	2017	FR	IFREMER	14.71	0.00	0.00	0.00	0.00	0.00	14.71
FR201745	37F4	54.0978	4.1822	NL	2017	FR	IFREMER	15.53	0.00	0.00	0.00	0.00	0.00	15.53
FR201746	37F3	54.2188	3.2807	NL	2017	FR	IFREMER	16.29	0.00	0.00	0.00	0.00	0.00	16.29
FR201750	35F3	53.2344	3.4292	NL	2017	FR	IFREMER	240.96	0.00	0.00	0.00	0.00	15.06	256.02
FR201751	34F4	52.5565	4.2328	NL	2017	FR	IFREMER	17.18	0.00	0.00	0.00	0.00	17.18	34.36
FR201752	33F4	52.1914	4.2622	NL	2017	FR	IFREMER	35.97	0.00	0.00	0.00	0.00	0.00	35.97
FR201753	32F3	51.8216	3.6396	NL	2017	FR	IFREMER	14.93	0.00	0.00	0.00	0.00	0.00	14.93
NL20171	33F4	52.4058	4.5021	NL	2017	NL	WMR	587.00	20.96	0.00	0.00	41.93	41.93	691.82
NL201710	34F4	52.6786	4.3953	NL	2017	NL	WMR	20.88	0.00	0.00	0.00	0.00	0.00	20.88
NL201711	40F3	55.5696	3.7128	NL	2017	NL	WMR	168.63	0.00	0.00	0.00	16.86	0.00	185.50
NL20172	36F3	53.8143	3.5941	NL	2017	NL	WMR	135.34	0.00	15.04	0.00	45.11	30.08	225.56
NL20173	35F3	53.3901	3.6226	NL	2017	NL	WMR	144.63	0.00	0.00	0.00	0.00	20.66	165.29
NL201737	32F3	51.8521	3.7491	NL	2017	NL	WMR	220.39	0.00	0.00	0.00	55.10	0.00	275.48
NL201738	36F4	53.7938	4.4651	NL	2017	NL	WMR	99.83	0.00	0.00	0.00	49.92	0.00	149.75
NL201739	37F4	54.1361	4.6218	NL	2017	NL	WMR	158.48	0.00	0.00	0.00	47.54	0.00	206.02
NL201740	37F5	54.1703	5.3776	NL	2017	NL	WMR	55.10	0.00	0.00	0.00	0.00	0.00	55.10
NL201741	36F5	53.812	5.6113	NL	2017	NL	WMR	61.07	0.00	0.00	0.00	0.00	0.00	61.07
NL201747	39F3	55.0915	3.8523	NL	2017	NL	WMR	25.64	0.00	0.00	0.00	12.82	0.00	38.46
NL201748	39F4	55.0885	4.377	NL	2017	NL	WMR	28.29	0.00	0.00	0.00	0.00	14.14	42.43
NL201749	38F4	54.8056	4.5983	NL	2017	NL	WMR	49.94	0.00	0.00	0.00	0.00	0.00	49.94
NL201750	38F4	54.791	4.9456	NL	2017	NL	WMR	46.73	0.00	0.00	0.00	0.00	0.00	46.73
NL201752	33F3	52.2293	3.6513	NL	2017	NL	WMR	65.68	0.00	0.00	0.00	0.00	0.00	65.68
NL201754	34F3	52.6825	3.3066	NL	2017	NL	WMR	101.16	0.00	0.00	0.00	0.00	0.00	101.16
NL201755	35F4	53.1293	4.1645	NL	2017	NL	WMR	342.02	0.00	0.00	0.00	16.29	0.00	358.31
NL20176	37F3	54.4175	3.094	NL	2017	NL	WMR	178.28	0.00	0.00	0.00	0.00	0.00	178.28
NL20179	38F3	54.6428	3.6208	NL	2017	NL	WMR	123.65	0.00	0.00	0.00	0.00	0.00	123.65
FR201624	37F3	54.2791	3.5034	NL	2016	FR	IFREMER	15.92	0.00	0.00	0.00	0.00	15.92	31.85
FR201625	38F3	54.5792	3.3717	NL	2016	FR	IFREMER	45.87	0.00	0.00	0.00	0.00	0.00	45.87
FR201626	39F3	55.0897	3.7455	NL	2016	FR	IFREMER	80.26	0.00	0.00	0.00	0.00	0.00	80.26
FR201637	36F4	53.6241	4.5224	NL	2016	FR	IFREMER	81.70	0.00	0.00	0.00	0.00	0.00	81.70
FR201638	35F4	53.1585	4.15	NL	2016	FR	IFREMER	71.17	0.00	0.00	0.00	###	0.00	177.94
FR201639	35F3	53.2848	3.8241	NL	2016	FR	IFREMER	52.63	0.00	0.00	0.00	0.00	0.00	52.63
FR201640	33F3	52.4513	3.9243	NL	2016	FR	IFREMER	64.72	0.00	0.00	0.00	0.00	0.00	64.72
FR201641	33F4	52.3337	4.422	NL	2016	FR	IFREMER	103.09	0.00	0.00	0.00	17.18	0.00	120.27
FR201642	34F3	52.7927	3.9342	NL	2016	FR	IFREMER	217.73	0.00	0.00	0.00	0.00	0.00	217.73
FR201643	34F4	52.8454	4.1085	NL	2016	FR	IFREMER	335.97	0.00	0.00	0.00	0.00	39.53	375.49
FR201660	36F3	53.7813	3.4737	NL	2016	FR	IFREMER	48.62	0.00	0.00	0.00	16.21	0.00	64.83
FR201661	38F4	54.761	4.8428	NL	2016	FR	IFREMER	855.86	0.00	0.00	0.00	0.00	0.00	855.86
FR201662	37F4	54.4048	4.8528	NL	2016	FR	IFREMER	45.05	0.00	0.00	0.00	0.00	0.00	45.05
FR201664	37F5	54.1704	5.2483	NL	2016	FR	IFREMER	86.33	0.00	0.00	0.00	0.00	0.00	86.33
FR201665	36F5	53.8982	5.7212	NL	2016	FR	IFREMER	549.93	0.00	0.00	0.00	0.00	0.00	549.93

FR201666	36F6	53.8634	6.1344	NL	2016	FR	IFREMER	107.69	0.00	0.00	0.00	0.00	0.00	107.69
FR201668	37F5	54.2527	5.737	NL	2016	FR	IFREMER	82.78	0.00	0.00	0.00	0.00	0.00	82.78
FR201669	36F4	53.6673	4.8424	NL	2016	FR	IFREMER	77.04	0.00	0.00	0.00	0.00	0.00	77.04
FR201674	32F3	51.8095	3.6022	NL	2016	FR	IFREMER	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NL20161	33F4	52.1764	4.2979	NL	2016	NL	WMR	127.93	0.00	0.00	0.00	0.00	0.00	127.93
NL201610	37F4	54.1883	4.3532	NL	2016	NL	WMR	106.71	0.00	0.00	0.00	0.00	0.00	106.71
NL201611	36F3	53.9864	3.8814	NL	2016	NL	WMR	226.93	0.00	15.13	0.00	0.00	15.13	257.19
NL20162	36F5	53.75	5.4046	NL	2016	NL	WMR	35.52	0.00	0.00	0.00	0.00	0.00	35.52
NL20163	36F6	53.6089	6.1423	NL	2016	NL	WMR	100.20	0.00	0.00	0.00	40.08	0.00	140.28
NL201645	32F3	51.8397	3.498	NL	2016	NL	WMR	33.67	0.00	0.00	0.00	0.00	0.00	33.67
NL201646	33F3	52.2031	3.6379	NL	2016	NL	WMR	66.01	0.00	0.00	0.00	0.00	0.00	66.01
NL201647	34F3	52.6799	3.2686	NL	2016	NL	WMR	155.52	0.00	0.00	0.00	0.00	0.00	155.52
NL201648	35F3	53.4104	3.1276	NL	2016	NL	WMR	112.00	0.00	0.00	0.00	32.00	0.00	144.00
NL201652	35F4	53.038	4.2483	NL	2016	NL	WMR	327.61	0.00	0.00	0.00	0.00	0.00	327.61
NL201653	34F4	52.6666	4.3712	NL	2016	NL	WMR	257.83	0.00	0.00	0.00	55.25	0.00	313.08
NL20169	36F4	53.8922	4.7656	NL	2016	NL	WMR	106.38	0.00	15.20	0.00	0.00	0.00	121.58
FR201532	36F3	53.879	3.8943	NL	2015	FR	IFREMER	255.54	0.00	0.00	0.00	0.00	17.04	272.57
FR201533	37F3	54.0443	3.8268	NL	2015	FR	IFREMER	126.90	0.00	0.00	0.00	0.00	0.00	126.90
FR201534	37F4	54.0727	4.1417	NL	2015	FR	IFREMER	102.74	0.00	0.00	0.00	0.00	17.12	119.86
FR201535	36F4	53.7915	4.4892	NL	2015	FR	IFREMER	67.80	0.00	0.00	0.00	0.00	0.00	67.80
FR201543	37F5	54.2519	5.761	NL	2015	FR	IFREMER	52.36	0.00	0.00	0.00	0.00	0.00	52.36
FR201545	36F6	53.8573	6.2093	NL	2015	FR	IFREMER	71.17	0.00	0.00	0.00	0.00	17.79	88.97
FR201546	36F5	53.8106	5.9533	NL	2015	FR	IFREMER	82.64	0.00	0.00	0.00	0.00	0.00	82.64
FR201547	33F3	52.4506	3.9252	NL	2015	FR	IFREMER	17.57	0.00	0.00	0.00	0.00	0.00	17.57
FR201548	33F4	52.2798	4.1377	NL	2015	FR	IFREMER	123.02	0.00	0.00	0.00	0.00	0.00	123.02
FR201549	33F3	52.2052	3.6418	NL	2015	FR	IFREMER	18.08	0.00	0.00	0.00	0.00	0.00	18.08
FR201550	32F3	51.8302	3.6618	NL	2015	FR	IFREMER	28.61	0.00	0.00	0.00	0.00	0.00	28.61
FR201551	34F3	52.6644	3.4008	NL	2015	FR	IFREMER	14.08	0.00	0.00	0.00	0.00	42.25	56.34
FR201552	34F4	52.8212	4.0727	NL	2015	FR	IFREMER	112.36	0.00	0.00	0.00	84.27	14.04	210.67
FR201553	35F4	53.2195	4.2179	NL	2015	FR	IFREMER	105.63	0.00	0.00	0.00	0.00	0.00	105.63
FR201554	38F4	54.8081	4.507	NL	2015	FR	IFREMER	50.51	0.00	0.00	0.00	0.00	0.00	50.51
FR201555	39F4	55.0381	4.8773	NL	2015	FR	IFREMER	102.04	0.00	0.00	0.00	0.00	0.00	102.04
FR201562	39F3	55.2422	3.4984	NL	2015	FR	IFREMER	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FR201563	38F3	54.7667	3.3343	NL	2015	FR	IFREMER	50.17	0.00	0.00	0.00	0.00	0.00	50.17
FR201586	35F3	53.3567	3.1817	NL	2015	FR	IFREMER	112.54	0.00	0.00	0.00	0.00	16.08	128.62
NL20151	33F4	52.2602	4.3339	NL	2015	NL	WMR	0.00	0.00	0.00	0.00	0.00	18.02	18.02
NL201511	37F5	54.1672	5.5043	NL	2015	NL	WMR	250.00	16.67	0.00	0.00	0.00	0.00	266.67
NL201512	36F5	53.9606	5.2943	NL	2015	NL	WMR	78.00	0.00	0.00	0.00	0.00	0.00	78.00
NL201513	36F4	53.9619	4.8661	NL	2015	NL	WMR	365.08	0.00	0.00	0.00	0.00	0.00	365.08
NL201514	37F4	54.1459	4.3078	NL	2015	NL	WMR	200.62	0.00	0.00	0.00	0.00	0.00	200.62
NL201515	36F3	53.8913	3.8191	NL	2015	NL	WMR	198.47	0.00	0.00	0.00	0.00	15.27	213.74
NL201516	35F3	53.423	3.221	NL	2015	NL	WMR	250.78	0.00	0.00	0.00	0.00	0.00	250.78
NL20152	33F3	52.3902	3.6398	NL	2015	NL	WMR	40.57	0.00	0.00	0.00	0.00	0.00	40.57
NL20153	34F3	52.6663	3.9727	NL	2015	NL	WMR	49.42	0.00	16.47	0.00	0.00	16.47	82.37
NL20154	34F4	52.9606	4.2367	NL	2015	NL	WMR	62.89	0.00	0.00	0.00	0.00	0.00	62.89
NL201546	32F3	51.7995	3.5272	NL	2015	NL	WMR	17.30	0.00	0.00	0.00	0.00	0.00	17.30
NL20155	35F4	53.0731	4.2789	NL	2015	NL	WMR	48.23	0.00	16.08	0.00	0.00	0.00	64.31
NL20141	33F4	52.3456	4.4651	NL	2014	NL	WMR	213.82	0.00	0.00	0.00	0.00	0.00	213.82
NL201414	34F4	52.6686	4.3711	NL	2014	NL	WMR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NL201415	35F4	53.0278	4.304	NL	2014	NL	WMR	111.27	0.00	0.00	0.00	0.00	0.00	111.27
NL201418	40F3	55.7331	3.3845	NL	2014	NL	WMR	12.95	12.95	0.00	0.00	12.95	0.00	38.86
NL20142	32F3	51.9155	3.8148	NL	2014	NL	WMR	105.12	13.14	0.00	0.00	13.14	0.00	131.41
NL201435	33F3	52.3651	3.2643	NL	2014	NL	WMR	176.37	0.00	0.00	0.00	0.00	35.27	211.64
NL201446	37F5	54.1666	5.7221	NL	2014	NL	WMR	13.25	0.00	13.25	0.00	0.00	0.00	26.49
NL201447	36F5	53.9661	5.2986	NL	2014	NL	WMR	60.51	15.13	0.00	0.00	0.00	0.00	75.64
NL201448	36F4	53.9498	4.8105	NL	2014	NL	WMR	41.49	0.00	0.00	0.00	0.00	0.00	41.49
NL201449	37F4	54.1206	4.2721	NL	2014	NL	WMR	67.34	0.00	0.00	0.00	0.00	0.00	67.34
NL201450	36F3	53.959	3.9313	NL	2014	NL	WMR	110.80	0.00	0.00	0.00	0.00	0.00	110.80
NL201455	36F3	53.7421	3.3435	NL	2014	NL	WMR	28.33	0.00	0.00	0.00	14.16	0.00	42.49
NL201457	35F3	53.4118	3.1356	NL	2014	NL	WMR	193.70	12.11	12.11	0.00	0.00	0.00	217.92
NL20131	33F4	52.3385	4.2793	NL	2013	NL	WMR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NL201312	37F5	54.151	5.5793	NL	2013	NL	WMR	24.91	0.00	0.00	0.00	0.00	0.00	24.91
NL201313	36F5	53.9623	5.3035	NL	2013	NL	WMR	94.64	0.00	0.00	0.00	0.00	0.00	94.64
NL201314	37F4	54.1185	4.6713	NL	2013	NL	WMR	38.86	0.00	0.00	0.00	0.00	0.00	38.86
NL201315	34F3	52.5848	3.355	NL	2013	NL	WMR	35.05	0.00	0.00	0.00	0.00	0.00	35.05
NL201316	33F3	52.4306	3.2646	NL	2013	NL	WMR	0.00	0.00	11.20	0.00	0.00	0.00	11.20

NL201335	35F3	53.2241	3.1086	NL	2013	NL	WMR	61.73	0.00	0.00	0.00	0.00	0.00	61.73
NL201348	32F3	51.7431	3.3726	NL	2013	NL	WMR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NL201349	33F4	52.2185	4.3745	NL	2013	NL	WMR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NL201350	34F4	52.5695	4.2581	NL	2013	NL	WMR	15.15	0.00	0.00	0.00	0.00	0.00	15.15
NL201351	35F4	53.0243	4.3063	NL	2013	NL	WMR	28.37	0.00	0.00	0.00	0.00	0.00	28.37
NL201352	36F4	53.9611	4.8586	NL	2013	NL	WMR	26.18	0.00	0.00	0.00	0.00	13.09	39.27
NL201353	37F5	54.2876	5.171	NL	2013	NL	WMR	46.40	0.00	0.00	0.00	0.00	0.00	46.40
NL201355	38F4	54.6196	4.3055	NL	2013	NL	WMR	66.40	0.00	0.00	0.00	0.00	0.00	66.40
NL201359	39F3	55.3781	3.8561	NL	2013	NL	WMR	56.02	0.00	0.00	0.00	0.00	14.01	70.03
NL20136	36F6	53.8706	6.157	NL	2013	NL	WMR	26.63	0.00	0.00	0.00	0.00	0.00	26.63
NL201360	36F3	53.9475	3.1063	NL	2013	NL	WMR	25.54	0.00	0.00	0.00	0.00	0.00	25.54

Annex 3.c. Complete trawl list of the Dutch BTS Q3 2020, in which the total number of items per trawl (Total_Count [Items/km^2]) and the number of items per category (A, B, C, D & E [Items/km^2]) are reported.

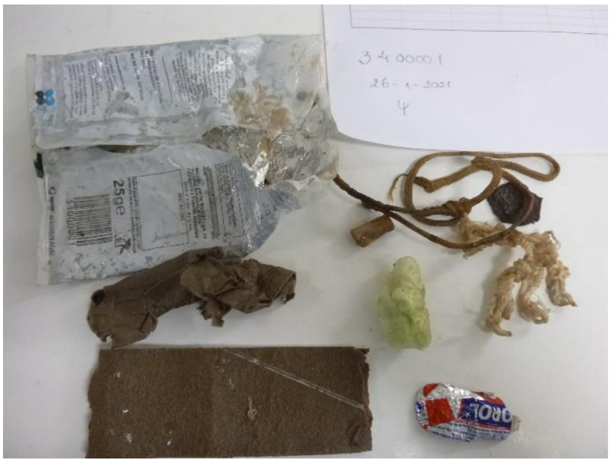
RefNo	Ices.rect	Latitude	Longitude	EEZ	Survey_date	Country	Institute	Wing_spread (m)	Bottom_track (m)	Duration (min)	A	B	C	D	E	F	Total_Count
1400001	35F3	53.2945	3.8455	NL	2020	NL	WMR	8	3913	30	255.6	0	0	0	0	0	255.6
1400002	39F4	55.3945	4.37017	DE	2020	NL	WMR	8	4084	30.1	183.6	0	0	0	0	0	183.6
1400003	40F4	55.70467	4.6945	DK	2020	NL	WMR	8	4009	30.2	156	0	0	0	0	0	156
1400004	40F5	55.8135	5.691	DK	2020	NL	WMR	8	4462	30	56	0	0	0	0	0	56
1400005	40F6	55.89133	6.58133	DK	2020	NL	WMR	8	4385	30.1	142.5	0	0	0	0	0	142.5
1400006	41F6	56.14267	6.57083	DK	2020	NL	WMR	8	3936	30.5	95.3	31.8	0	0	0	0	127.1
1400007	41F5	56.32417	5.60783	DK	2020	NL	WMR	8	4072	30.3	30.7	0	0	0	0	0	30.7
1400008	41F4	56.16817	4.53167	DK	2020	NL	WMR	8	3708	30	168.5	0	0	0	0	0	168.5
1400009	40F3	55.69667	3.5755	GE	2020	NL	WMR	8	3919	30.1	127.6	0	0	0	0	0	127.6
1400010	39F3	55.4095	3.5675	NL	2020	NL	WMR	8	3836	30.2	32.6	0	32.6	0	0	0	65.2
1400011	36F3	53.651	3.36217	NL	2020	NL	WMR	8	4079	30	122.5	0	0	0	30.6	0	153.1
1400012	37F3	54.24467	3.86033	NL	2020	NL	WMR	8	4531	30.2	55.2	27.6	0	0	0	0	82.8
1400013	38F4	54.58967	4.29	NL	2020	NL	WMR	8	3958	30.1	94.8	0	0	0	0	0	94.8
1400014	42F4	56.70833	4.39033	UK	2020	NL	WMR	8	3854	30.1	194.6	0	0	0	0	32.4	227
1400015	42F5	56.9465	5.52083	UK	2020	NL	WMR	8	4563	30.1	191.8	0	0	0	0	0	191.8
1400016	42F6	56.6665	6.48633	DK	2020	NL	WMR	8	4039	29.9	154.7	0	30.9	0	0	0	185.6
1400017	43F6	57.0595	6.426	UK	2020	NL	WMR	8	3602	30.1	104.1	0	34.7	0	0	0	138.8
1400018	43F5	57.17033	5.76133	UK	2020	NL	WMR	8	4181	30.1	179.4	0	0	0	0	0	179.4
1400019	43F4	57.382	4.17933	UK	2020	NL	WMR	8	4267	30.1	234.4	29.3	0	0	0	29.3	293
1400020	44F4	57.62333	4.20283	UK	2020	NL	WMR	8	3795	30	164.6	0	0	0	0	0	164.6
1400021	44F3	57.76283	3.52317	UK	2020	NL	WMR	8	3842	30.2	292.8	0	0	0	0	32.5	325.3
1400022	45F3	58.076	3.185	UK	2020	NL	WMR	8	3929	30.2	31.8	0	0	31.8	31.8	31.8	127.2
1400023	45F2	58.34117	2.74217	UK	2020	NL	WMR	8	3752	30.1	33.3	0	0	0	0	0	33.3
1400024	45F1	58.07483	1.83383	UK	2020	NL	WMR	8	3318	26.2	226.1	0	0	0	0	0	226.1
1400025	44F1	57.802	1.55283	UK	2020	NL	WMR	8	3403	25.7	146.8	36.7	36.7	0	0	0	220.2
1400026	44F2	57.80783	2.57533	UK	2020	NL	WMR	8	4025	30.2	31.1	0	31.1	0	0	0	62.2
1400027	43F2	57.1945	2.69283	UK	2020	NL	WMR	8	4147	30.1	90.3	0	0	0	0	0	90.3
1400028	42F2	56.702	2.78133	UK	2020	NL	WMR	8	4000	30.2	124.9	0	31.2	0	0	0	156.1
1400029	42F3	56.68633	3.46033	UK	2020	NL	WMR	8	3796	30	131.7	0	0	0	32.9	0	164.6
1400030	41F3	56.16567	3.37767	UK	2020	NL	WMR	8	3882	30.1	193.2	0	0	0	0	0	193.2
1400031	41F2	56.11783	2.5295	UK	2020	NL	WMR	8	4074	30.1	153.5	0	0	30.7	0	30.7	214.9
1400032	40F2	55.70533	2.56250	UK	2020	NL	WMR	8	4369	30.2	0	0	0	0	0	0	0
1400033	37F1	54.41367	1.14283	UK	2020	NL	WMR	8	3667	30.1	136.4	0	0	0	68.2	34.1	238.7
1400034	37F0	54.25433	0.37467	UK	2020	NL	WMR	8	4487	30	111.4	27.9	0	0	0	0	139.3
1400035	36F0	53.9525	0.8105	UK	2020	NL	WMR	8	3780	30	99.2	0	0	0	0	33.1	132.3
1400036	36F1	53.7375	1.40233	UK	2020	NL	WMR	8	3457	30	144.8	0	0	0	0	0	144.8

1400037	32F1	51.71367	1.90317	UK	2020	NL	WMR	8	3646	30	274.3	0	0	0	0	34.3	308.6
1400038	32F2	51.70112	2.26448	UK	2020	NL	WMR	8	3700	30	135.2	0	33.8	33.8	168.9	33.8	405.5
1400039	33F2	52.34033	2.72883	UK	2020	NL	WMR	8	3031	30	247.4	123.7	0	0	123.7	0	494.8
1400040	38F3	54.84417	3.16867	NL	2020	NL	WMR	8	3689	30	271.1	0	0	0	0	0	271.1
1400041	38F2	54.71367	2.6425	UK	2020	NL	WMR	8	3233	30	38.7	0	0	0	0	0	38.7
1400042	39F2	55.11883	2.40833	UK	2020	NL	WMR	8	3810	30	0	0	32.8	0	0	0	32.8
1400043	39F1	55.24433	1.66917	UK	2020	NL	WMR	8	3977	30.2	94.3	0	0	0	0	0	94.3
1400044	40F1	55.66483	1.904	UK	2020	NL	WMR	8	3370	30.1	74.2	0	0	0	37.1	0	111.3
1400045	40F0	55.59867	0.23683	UK	2020	NL	WMR	8	3785	30	132.2	0	0	0	0	0	132.2
1400046	41F0	56.14267	0.22733	UK	2020	NL	WMR	8	4422	30.2	113.1	0	28.3	28.3	0	0	169.7
1400047	41F1	56.16083	1.371	UK	2020	NL	WMR	8	3378	30.1	111	0	37	37	0	0	185
1400048	42F1	56.56733	1.2395	UK	2020	NL	WMR	8	3854	30	32.4	0	0	0	0	0	32.4
1400049	42F0	56.61017	0.568	UK	2020	NL	WMR	8	4156	30	120.4	0	30.1	30.1	0	0	180.6
1400050	43F1	57.35917	1.62367	UK	2020	NL	WMR	8	3268	23.5	152.9	0	0	38.2	38.2	38.2	267.5
1400051	43F0	57.33883	0.52933	UK	2020	NL	WMR	8	4012	30	93.6	0	31.2	31.2	0	0	156
1400052	44F0	57.67033	0.65583	UK	2020	NL	WMR	8	3478	30	143.7	0	0	0	0	0	143.7
1400053	44E9	57.69717	-0.16783	UK	2020	NL	WMR	8	3997	30	62.6	0	62.6	0	0	31.3	156.5
1400054	45E9	58.15633	-0.60817	UK	2020	NL	WMR	8	3829	29.7	195.7	0	65.3	32.6	32.6	0	326.2
1400055	45E8	58.23433	-1.343	UK	2020	NL	WMR	8	3697	30.1	135.2	0	101.4	33.8	0	0	270.4
1400056	45E7	58.19817	-2.28483	UK	2020	NL	WMR	8	3940	30.7	31.7	0	0	0	0	0	31.7
1400057	45E6	58.21583	-3.11383	UK	2020	NL	WMR	8	4265	30.1	0	0	0	0	0	0	0
1400058	44E6	57.971	-3.22717	UK	2020	NL	WMR	8	3890	30	0	64.2	32.1	0	0	0	96.3
1400059	44E7	57.9025	-2.787	UK	2020	NL	WMR	8	4524	30	27.6	0	0	0	27.6	0	55.2
1400060	43E8	57.34867	-1.80483	UK	2020	NL	WMR	8	3165	30	3989	237	1047	79	552.9	118.5	6023.1
1400061	43E9	57.11683	-0.34283	UK	2020	NL	WMR	8	3888	30.1	514.6	64.3	0	0	0	160.8	739.7
1400062	42E9	56.66983	-0.26167	UK	2020	NL	WMR	8	4226	30	266.3	0	29.6	0	0	59.2	355.1
1400063	41E9	56.24167	-0.44267	UK	2020	NL	WMR	8	4731	30	105.6	0	52.8	0	26.4	0	184.8
1400064	40E9	55.82167	-0.83133	UK	2020	NL	WMR	8	4361	30.1	172.1	0	0	0	0	0	172.1
1400065	39E9	55.41117	-0.481	UK	2020	NL	WMR	8	4421	30.1	169.6	28.3	0	56.5	0	28.3	282.7
1400066	39F0	55.13517	0.19483	UK	2020	NL	WMR	8	3705	30	236.1	0	0	33.7	0	0	269.8
1400067	38F0	54.83767	0.4655	UK	2020	NL	WMR	8	4700	30	79.8	0	0	0	0	0	79.8
1400068	38E9	54.70417	-0.32967	UK	2020	NL	WMR	8	3789	30	231	0	33	0	33	0	297
1400069	38F1	54.71033	1.33783	UK	2020	NL	WMR	8	4208	30.1	207.9	0	0	0	0	0	207.9
1400070	37F2	54.1505	2.08617	UK	2020	NL	WMR	8	4453	30	112.3	0	0	0	0	0	112.3
1400071	36F2	53.662	2.4225	UK	2020	NL	WMR	8	4213	30.1	148.4	0	29.7	0	0	0	178.1
1400072	35F2	53.243	2.66167	UK	2020	NL	WMR	8	4221	30	236.9	0	0	0	0	0	236.9
1400073	35F1	53.359	1.71433	UK	2020	NL	WMR	8	2953	30	169.3	0	0	0	0	0	169.3
1400101	33F4	52.34867	4.04283	NL	2020	NL	WMR	8	3889	30	64.2	0	0	32.1	0	0	96.3
1400102	34F4	52.57300	4.27983	NL	2020	NL	WMR	8	3704	30	0	0	0	0	0	0	0
1400103	34F3	52.58483	3.76717	NL	2020	NL	WMR	8	4259	30	0	0	0	0	0	0	0
1400104	35F3	53.08933	3.24683	NL	2020	NL	WMR	8	3704	30	135	0	33.7	0	33.7	0	202.4
1400105	35F3	53.28583	3.1345	NL	2020	NL	WMR	8	3889	30	321.4	0	0	0	0	0	321.4
1400106	35F3	53.42917	3.38	NL	2020	NL	WMR	8	3704	30	202.2	0	0	0	33.7	0	235.9
1400107	36F3	53.65217	3.3595	NL	2020	NL	WMR	8	4630	30	108	0	0	0	0	0	108
1400108	36F3	53.8665	3.26883	NL	2020	NL	WMR	8	4630	30	243	0	27	0	0	0	270
1400109	36F3	53.90767	3.64867	NL	2020	NL	WMR	8	3889	30	224.9	32.1	32.1	0	0	0	289.1
1400110	38F3	54.7775	3.33683	NL	2020	NL	WMR	8	4259	30	58.6	0	0	0	0	0	58.6
1400111	38F3	54.60767	3.51333	NL	2020	NL	WMR	8	4074	30	306.8	0	0	0	0	0	306.8
1400112	37F3	54.42667	3.61667	NL	2020	NL	WMR	8	4074	30	184.1	0	0	0	0	0	184.1
1400113	37F3	54.28167	3.87033	NL	2020	NL	WMR	8	4074	30	122.8	0	0	0	61.4	0	184.2

1400114	37F4	54.30183	4.18833	NL	2020	NL	WMR	8	4630	30	135	0	0	0	0	0	135
1400115	37F4	54.09333	4.19867	NL	2020	NL	WMR	8	4630	30	0	0	0	0	0	0	0
1400116	34F3	52.80817	3.29233	NL	2020	NL	WMR	8	4074	30	122.8	0	0	0	30.7	0	153.5
1400117	34F3	52.57	3.30367	NL	2020	NL	WMR	8	4074	30	245.5	0	0	0	30.7	0	276.2
1400118	33F3	52.36733	3.265	NL	2020	NL	WMR	8	3889	30	160.6	0	0	32.1	160.7	32.1	385.5
1400119	33F3	52.12767	3.36883	NL	2020	NL	WMR	8	4074	30	61.4	30.7	0	0	0	0	92.1
1400120	32F3	51.63267	3.24967	NL	2020	NL	WMR	8	4259	30	58.6	0	29.3	0	0	0	87.9
1400121	32F3	51.74583	3.369	NL	2020	NL	WMR	8	3704	30	168.7	0	0	0	0	0	168.7
1400122	33F4	52.20500	4.04700	NL	2020	NL	WMR	8	3013	22.8	0	0	0	0	0	0	0
1400123	33F4	52.404	4.11367	NL	2020	NL	WMR	8	3869	30.3	96.9	0	0	0	0	0	96.9
1400124	34F4	52.70717	4.5475	NL	2020	NL	WMR	8	4186	26	29.9	0	0	0	0	0	29.9
1400125	38F4	54.61767	4.41583	NL	2020	NL	WMR	8	4144	30	120.7	0	0	0	0	0	120.7
1400127	39F4	55.0785	4.448	NL	2020	NL	WMR	8	3821	30.3	65.4	0	0	0	0	0	65.4
1400128	39F4	55.3915	4.75983	GE	2020	NL	WMR	8	3869	30	193.8	0	0	0	32.3	0	226.1
1400129	39F5	55.34467	5.26433	DK	2020	NL	WMR	8	3734	30	33.5	0	33.5	0	33.5	0	100.5
1400130	39F5	55.21583	5.56817	GE	2020	NL	WMR	8	3702	30.2	33.8	0	0	0	33.8	0	67.6
1400131	37F5	54.18183	5.199	NL	2020	NL	WMR	8	4630	30	135	0	0	0	0	0	135
1400132	37F5	54.26683	5.455	NL	2020	NL	WMR	8	4630	30	108	27	0	0	0	0	135
1400133	37F5	54.4315	5.592	GE	2020	NL	WMR	8	4444	30	84.3	0	0	0	0	28.1	112.4
1400134	38F5	54.71	5.60533	GE	2020	NL	WMR	8	4444	30	309.4	28.1	0	0	0	28.1	365.6
1400135	38F5	54.80767	5.8755	GE	2020	NL	WMR	8	3889	30	610.5	32.1	0	0	0	32.1	674.7
1400136	38F6	54.8445	6.282	GE	2020	NL	WMR	8	4074	30	337.6	0	0	0	0	0	337.6
1400137	38F6	54.70883	6.87233	GE	2020	NL	WMR	8	3704	30	303.6	0	33.7	0	101.2	0	438.5
1400138	38F6	54.8965	6.67083	GE	2020	NL	WMR	8	3704	30	1079.9	0	0	0	0	0	1079.9
1400139	39F6	55.089	6.76217	GE	2020	NL	WMR	8	3704	30	809.8	33.7	0	0	236.2	0	1079.7
1400140	39F6	55.357	6.56833	DK	2020	NL	WMR	8	3704	30	303.7	0	0	0	0	0	303.7
1400141	39F6	55.3765	6.85783	DK	2020	NL	WMR	8	2778	20	450	0	0	0	0	0	450
1400142	39F7	55.43617	7.2535	DK	2020	NL	WMR	8	3704	30	101.2	0	67.4	0	0	0	168.6
1400143	39F7	55.2005	7.329	GE	2020	NL	WMR	8	4074	30	184.1	0	0	0	0	0	184.1
1400144	40F7	55.92967	7.09083	GE	2020	NL	WMR	8	3889	30	225	0	0	0	0	0	225
1400145	40F7	55.7165	7.0645	DK	2020	NL	WMR	8	3889	30	546.3	0	0	0	0	0	546.3
1400146	40F7	55.62117	7.23883	DK	2020	NL	WMR	8	4074	30	245.5	0	30.7	0	92	0	368.2
1400147	39F7	55.15083	7.6335	GE	2020	NL	WMR	8	3889	30	160.7	0	0	0	0	0	160.7
1400148	39F8	55.16617	8.08183	DK	2020	NL	WMR	8	1852	15	0	0	0	0	0	0	0
1400149	38F7	54.9195	7.6665	GE	2020	NL	WMR	8	1852	15	67.5	0	0	0	0	0	67.5
1400150	38F7	54.82817	7.1815	GE	2020	NL	WMR	8	3704	30	303.6	0	0	0	0	0	303.6
1400151	38F7	54.5785	7.20233	GE	2020	NL	WMR	8	3704	30	134.9	0	0	0	0	0	134.9
1400152	37F7	54.36917	7.21467	GE	2020	NL	WMR	8	4259	30	176	0	0	0	0	0	176
1400153	37F7	54.09817	7.26933	GE	2020	NL	WMR	8	4630	30	108	0	0	0	27	0	135
1400154	37F7	54.101	7.73783	GE	2020	NL	WMR	8	4074	30	153.4	0	30.7	0	0	0	184.1
1400155	37F7	54.2925	7.60033	GE	2020	NL	WMR	8	4074	30	61.4	0	0	0	0	0	61.4
1400156	37F8	54.17867	8.0095	GE	2020	NL	WMR	8	1852	15	337.5	202.5	67.5	270	67.5	67.5	1012.5

Annex 4 Photos of seafloor litter in the Dutch IBTS Q1 2020 hauls

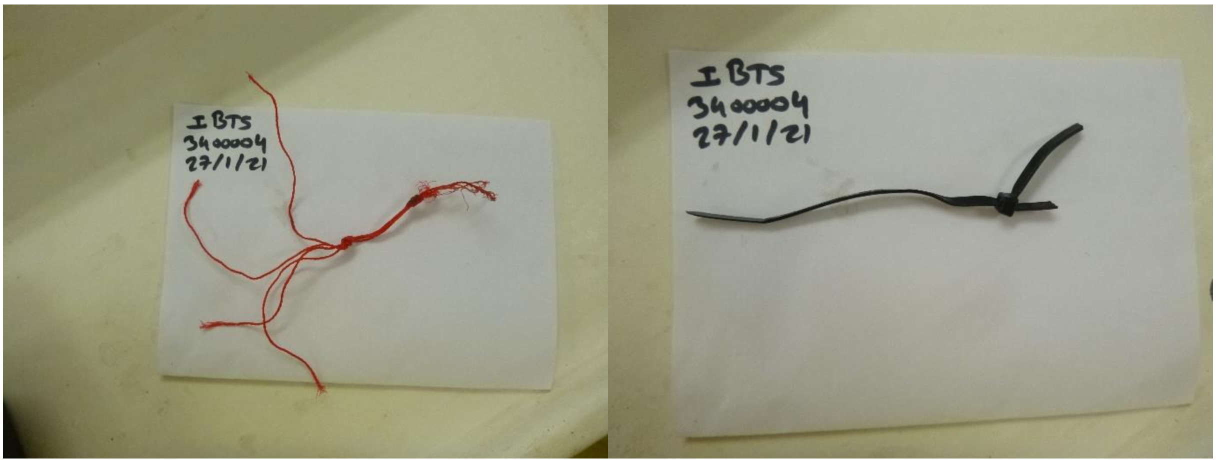
Photos are captioned as follows:
Haul number: Subcategory (number of items)



Haul 3400001: A2 (2), A5 (1), A6 (1), A14 (2), E1, (1) & E3 (2)

Haul 3400002: A5 (1) & A7 (4)

Haul 3400003: Left: A1 (1), A6 (1) & A2 (2). Right: A2 (4) & A7 (3)

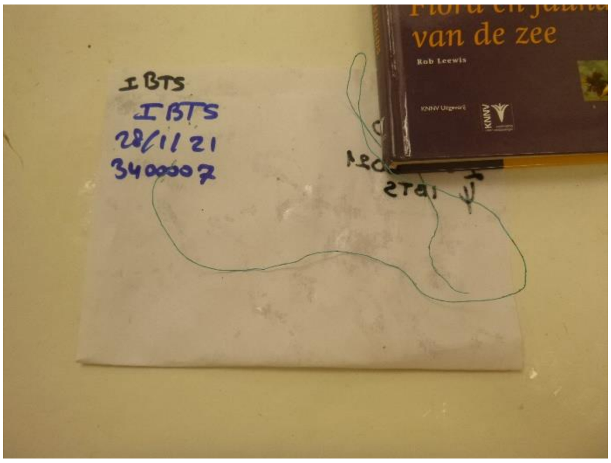


Haul 3400004: A8 (1) & A9 (1)

Haul 3400005: A2 (2), A5 (2), A7 (1), A9 (1) & A14 (2)

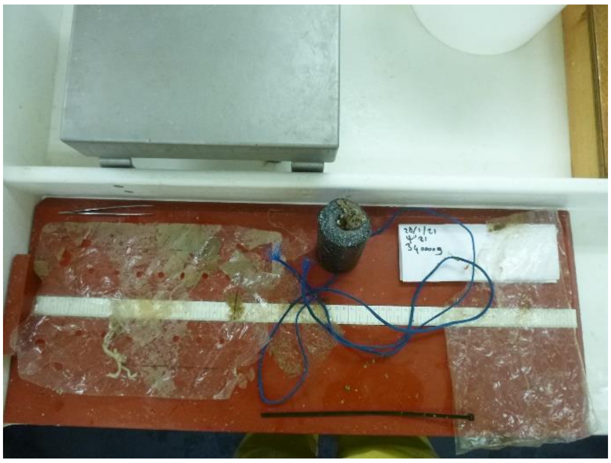
No picture

Haul 3400006: A7 (3) & B3 (1)

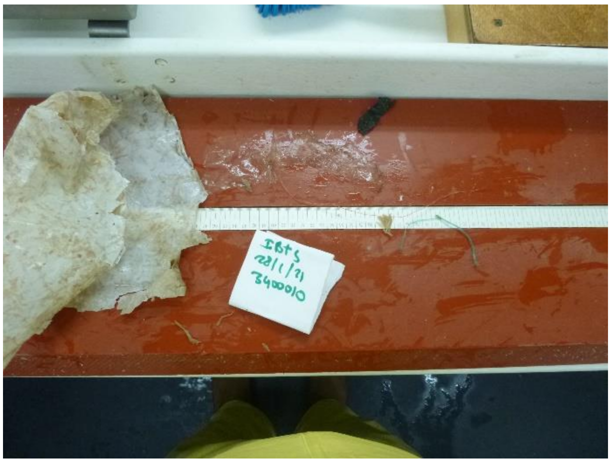


Haul 3400007: A5 (1)

Haul 3400008: A2 (4) & A5 (1)



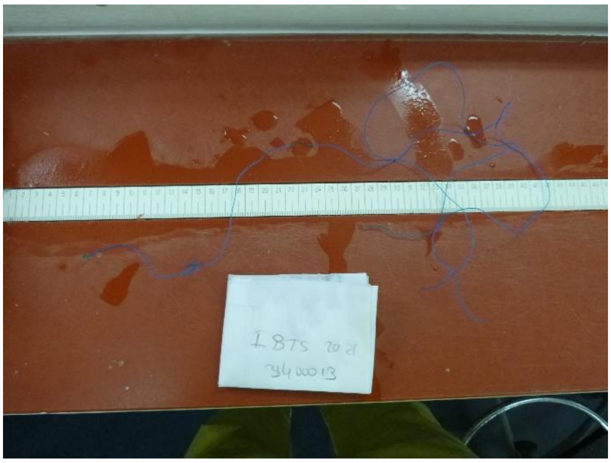
Haul 3400009: A2 (4), A3 (1), A7 (2), A8 (1), A10 (1) & C3 (1)



Haul 3400010: A2 (3), A5 (1) & A7 (1)

Haul 3400011: A5 (2), A6 (1), A7 (1) & A14 (1)

Haul 3400012: A1 (1) & A2 (1)



Haul 3400013: A5 (2)

Haul 3400014: A2 (1), A5 (2), A6 (1) & A8 (2)

Haul 3400015: A2 (1)

Haul 3400016: A2 (1), A5 (1) & A7 (1)

Haul 3400017: A2 (1), A3 (1) & A7 (1)

Haul 3400018: A2 (1) & A5 (2)

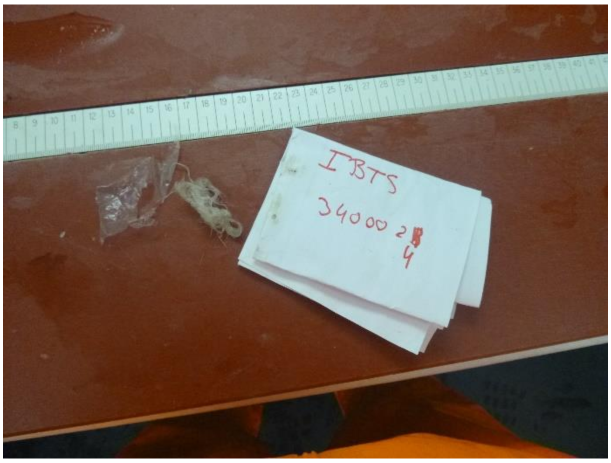
Haul 3400019: A2 (1), A3 (1), A5 (4) & A7 (1)


Haul 3400020: A2 (2), A5 (3) & C6 (1)

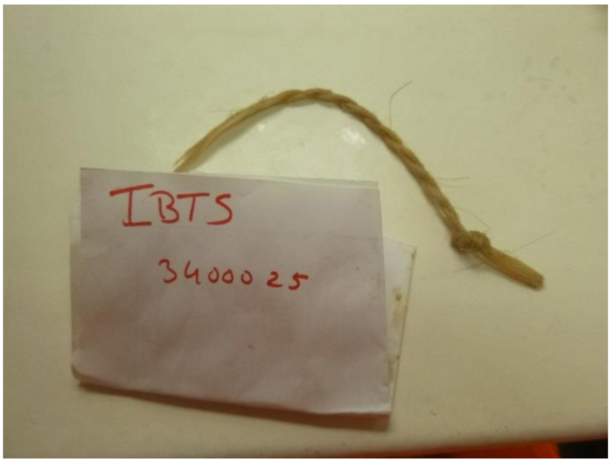
Haul 3400021: A2 (1), A3 (1), A5 (5) & A7 (1)

Haul 3400022: A2 (1) & A5 (4)

Haul 3400023: A2 (3)



Haul 3400024: A2 (1) & A8 (1)



Haul 3400025: A7 (1)

Haul 3400026: A5 (1) & A9 (1)

Haul 3400027: A2 (2), A5 (1) & A7 (1)

Haul 3400028: Empty haul, no litter.

Haul 3400029: Empty haul, no litter.

Haul 3400030: A2 (2) & A5 (2)

Haul 3400031: A2 (1)

Haul 3400032: Empty haul, no litter.

Haul 3400033: Empty haul, no litter.

Haul 3400034: Empty haul, no litter.

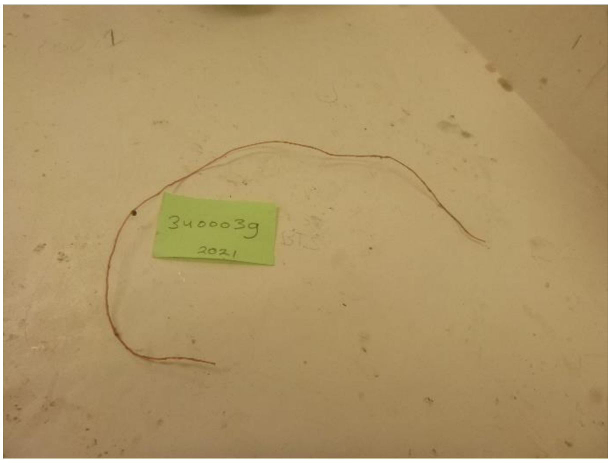
Haul 3400035: F1 (1)

No picture

Haul 3400036: A7 (1)

Haul 3400037: A7 (1)

Haul 3400038: A7 (2)



Haul 3400039: A5 (1)

Haul 3400040: A2 (2) & A6 (1)

Haul 3400041: A1 (1), A2 (2), A6 (1) & A7 (2)

Haul 3400042: A11 (1)


Haul 3400043: A2 (3)

Haul 3400044: A2 (2)

Haul 3400046: A2 (2), A5 (1), A7 (1), A9 (1) & A14 (1)

Haul 3400047: A7 (1)

Haul 3400048: A5 (1)

Haul 3400049: Empty haul, no litter.

Haul 3400050: A2 (2), F1 (1)

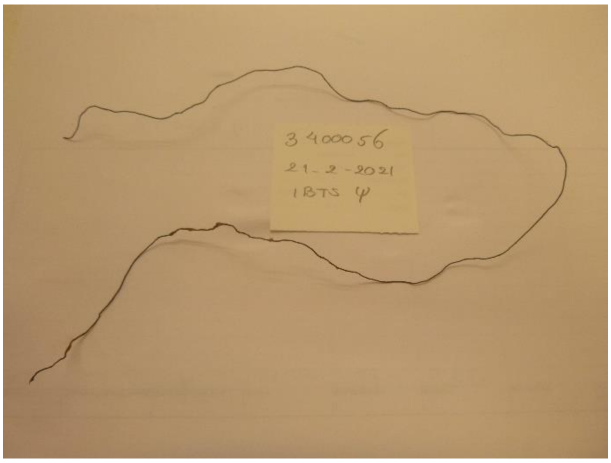

Haul 3400051: A2 (1)

Haul 3400052: Empty haul, no litter.

Haul 3400053: A2 (2), A6 (2), A7 (1), F1 (1)

Haul 3400054: A5 (4), A7 (3), A8 (1)

Haul 3400055: Empty haul, no litter.



Haul 3400056: A5 (1)

Haul 3400058: A2 (3), A5 (9), A6 (1) & A7 (5)

Haul 3400059: A5 (2)

Haul 3400060: Left: A5 (7), A6 (3) & A7 (1). Right: A2 (8) & A5 (1)

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- Haringkade 1, 1976 CP IJmuiden

With knowledge, independent scientific research and advice, **Wageningen Marine Research** substantially contributes to more sustainable and more careful management, use and protection of natural riches in marine, coastal and freshwater areas.

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