

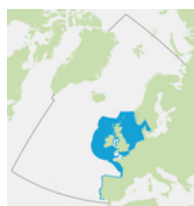
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Composition and Spatial Distribution of Litter on the Seafloor

D10 - Marine Litter

D10.1 - Characteristics of litter in the marine and coastal environment

Litter is widespread on the seafloor across the area assessed, with plastic the predominant material encountered. Higher amounts of litter are found in the Eastern Bay of Biscay, Southern Celtic Seas and English Channel than in the northern Greater North Sea and Celtic Seas.



Area assessed



(https://oap-cloudfront.ospar.org/media/filer_public/82/19/8219c6d3-7270-400a-9466-149903d7e2ba/seabed_litter.pdf)
Printable Summary

Background

Marine litter is a global problem, with increasing quantities of litter documented in recent decades. The abundance of seafloor litter is influenced by anthropogenic inputs, including litter transported by rivers and ocean currents, which can redistribute this material over long distances. Marine litter is therefore a transboundary problem.

Marine animals can ingest or become entangled in litter (e.g. discarded fishing gear, strapping bands) on or near the seafloor. This could result in death or injury, for example through suffocation or starvation. Plastic items are potential vectors for contaminants and can also scour or smother the seafloor. This can impact on fragile benthic habitats, reducing photosynthesis and preventing the movement of animals, gases and nutrients. Marine litter also acts as a vector for invasive species, transporting non-indigenous organisms into new areas where they can out compete or prey upon native organisms.

Litter on the seafloor has been studied in both coastal waters and the deep sea. The presence of large amounts of plastic litter has been reported on the European continental shelf. Benthic trawl surveys are a practical way to monitor seafloor litter (on the continental shelf), because they are already in use for fish stock assessments, cover a wide area of seafloor and collect a sufficient quantity of litter for analysis.



Marine litter bycatch on board of the RV Endeavour ((c) J. Thain)

Background (Extended)

Litter on the seafloor has been studied in both coastal and deep sea waters using techniques that include snorkelling, SCUBA diving, trawl surveys, sonar and the use of manned and unmanned submersibles (Spengler and Costa, 2008; Miyake et al., 2011; Watters et al., 2010; Bergmann and Klages, 2012; Galgani et al., 2013; Schlining et al., 2013). The presence of large amounts of plastic litter has been reported in European continental shelf seas (Galgani et al., 2000; Pham et al., 2014), including in the Baltic Sea, the North Sea, the Celtic Sea, the Bay of Biscay (Galgani et al., 1995a), the Mediterranean Sea (Galgani et al., 1995b, 1996; Galil et al., 1995; Stefatos et al., 1999), the Adriatic Sea (Bingel et al., 1987) and the Black Sea (Loakeimidis et al., 2014). On continental shelves, trawl surveys are a practical way to monitor seafloor litter because they are already used for fish stock assessments, cover a wide area of the seafloor and collect a sufficient quantity of litter for analysis.

Benthic trawls (**Figure a**) are designed to capture marine biota on or near the seafloor over a range of different seabed types. As a result, some trawl designs will plough through the seafloor while others roll over the seafloor. This interaction with the seafloor together with the mesh size will influence the amounts of litter captured during a survey.

As the trawl passes across the seafloor, litter is 'kicked up' into the water. Because plastics are prone to drifting they are more likely to remain suspended long enough to be retained in the cod-end (see **Figure a**). In contrast, metals, glass and ceramics and other heavier materials are more likely to drop out through the mesh before reaching the cod-end. As a result, different litter types have different catchabilities and so are differently represented in the catch (Moriarty et al., 2016). However, because these differences in catchability are relatively constant and should show little change from survey to survey, the survey results can still be compared. Furthermore, plastics (which have the highest catchability) are of greatest concern in terms of harm.

Thus, although the sampled quantities are 'relative' rather than absolute numbers, they can be used to compare regions sampled with similar gear. The number of stations monitored will determine the confidence that can be applied to the assessments and define the time (number of years of survey data) that will be needed to obtain an acceptable confidence in the assessment.

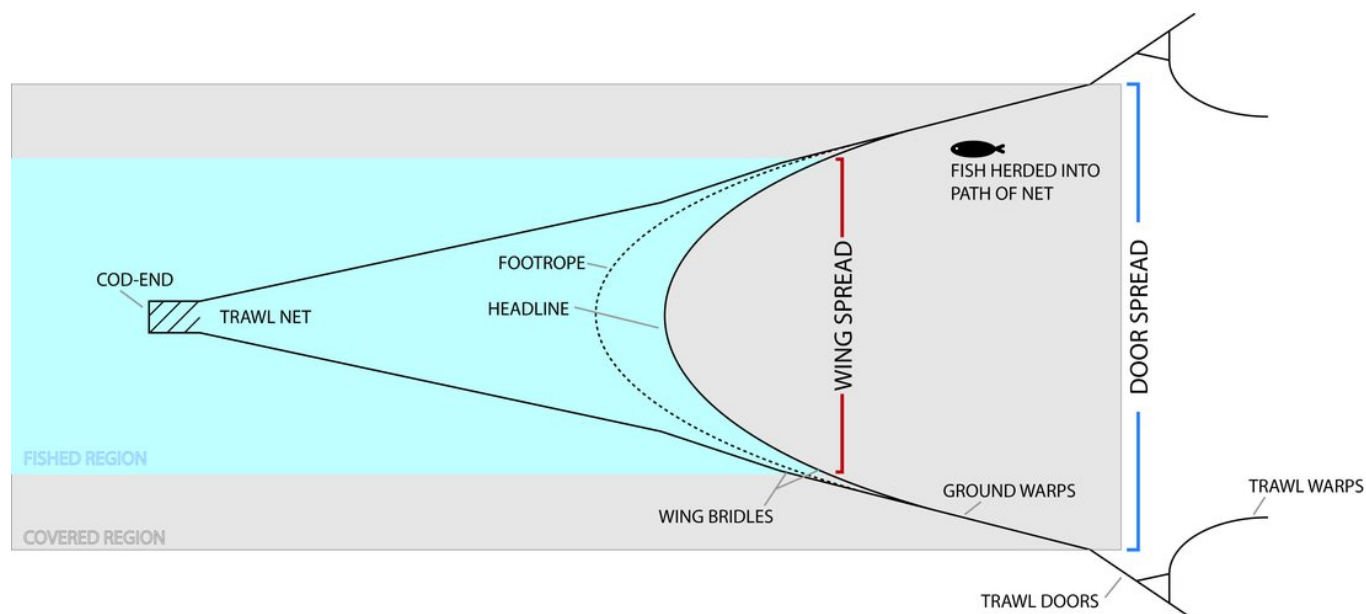


Figure a: The active region of a trawl. Door spread is shown in blue and wing spread is shown in red (Adapted from Carrothers, 1980).

Assessment Method

As part of the implementation of the OSPAR North-East Atlantic Environment Strategy, OSPAR has adopted a common indicator on seafloor litter in response to the European Union (EU) Marine Strategy Framework Directive (MSFD) Criterion 10.1.2: *Trends in the amount of litter in the water column (including floating at the surface) and deposited on the seafloor, including analysis of its composition, spatial distribution and, where possible, source.*

In order to assess the indicator, it was necessary to collect litter data that has been gathered by existing fisheries trawl surveys. OSPAR Contracting Parties agreed to submit litter data to the International Council for the Exploration of the Sea (ICES), which has developed databases to hold these data. Seafloor litter monitoring data, generated through existing fisheries trawl surveys, was requested for 2012 onwards.

The majority of the seafloor litter data originated from surveys organised by the International Bottom Trawl Survey Working Group (IBTSWG), which coordinates fishery-independent multispecies bottom trawl surveys within the ICES area. The main objective of the surveys is the long-term monitoring of demersal fish, to provide ICES and science groups with consistent and standardised data for commercial fish stock assessments. Marine litter data is collected as part of these fish stock surveys and thus follows a sampling strategy as outlined by IBTSWG.

Ideally, the trawl wing spread (i.e. the width of the opening of the net, outlined in red in **Figure a**) would be used for calculating litter counts as it provides a more accurate calculation of litter items per km². However this measurement is not always available so the door spread (i.e. the distance between the trawl doors, outlined in blue in **Figure a**) must be used instead and a conversion factor applied to the data.

Details regarding the data used

Litter data collected during fisheries trawl surveys are submitted directly to the Database of Trawl Surveys (DATRAS). The format, including field descriptions can be found on the ICES website (<http://dome.ices.dk/datsu/selRep.aspx>), dataset name 'Litter data from DATRAS surveys', reference document 'Litter_Format_DATRAS', more information can also be found in the Guidance on Monitoring of Marine Litter in European Seas (<https://ec.europa.eu/jrc/sites/jrcsh/files/lb-na-26113-en-n.pdf>), (Galgani et al, 2013). The data include seafloor litter data from fisheries trawl surveys for the period 2012–2014 undertaken in the OSPAR Maritime Area. The data will be available through the ICES Data Portal on the ICES website <http://ecosystemdata.ices.dk/>.

Because this is the first OSPAR-wide seafloor litter assessment of this type there were some initial data issues. Due to time constraints some pragmatic decisions were taken concerning the management and processing of the data :

- Some rows in the original data file that seemed largely to contain missing values were deleted.
- There were 177 values of -9 in the 'items' field, these were recoded as zero.
- Data from 2011 (54 values) and from 2015 (1023 values) were excluded. Only data for 2012–2014 were used.
- Only Grande Ouvreure Verticale (GOV) trawl values were used for the Greater North Sea, the Celtic Seas and the Eastern Bay of Biscay so that the gear type was comparable across those regions.
- Only BAK trawl values were used for the north-western Iberian Coast and the Gulf of Cadiz so that the gear type was comparable across those regions.
- The data format was not in an appropriate form for easy analysis. For every haul, there was a new line for each litter item found. The data format was modified and a data file was produced where every line is a haul and where there are columns for the number of litter items found in each haul as well as many explanatory variables about the haul.
- It is better to use wingspan rather than door spread to summarise the cross-sectional area. However, there was more complete information for door spread (140 missing entries) than wing spread (802 missing entries). The following was used to define haul 'area': $\text{area} = 1000\,000 \times \text{litter} / (\text{door spread distance})$ km². The "1000 000" is because distance is measured in metres. This value may not give the best measurement of haul area but it does provide a measurement of relative area that is comparable across regions and years.
- To more accurately predict the number of items per km² the mean of the door / wing ratios (4.18) was used as an approximate conversion factor.
- If a haul contained no litter items, then a code (RECO-LT) was given to say this and all litter counts for that trawl were set to zero. There are two lines with this code for which the number of litter items in the original data set was 1. These were set to 0.
- There were two ways of coding the litter types: the older format (C-TS) and the revised (C-TS-REV) format. The vast majority of entries in the original file used the old method (6614) as opposed to the new method (358). Having two entry methods increases the difficulty of getting the data into an appropriate form for analysis.

Presentation of results

The figures presented in the results show spatially smoothed predictions of litter type at points on a grid. The grid used to produce the figures is 200 (longitude) by 127 (latitude) of equally spaced points. Grid points that are more than 20 km from a monitoring station are not used. The plots were smoothed using a Generalised Linear Model (Wood, 2006) with longitude and latitude as the explanatory variables. The counts were modelled using a negative binomial family and the litter per

km² values were $\ln(x+1)$ transformed in an attempt to get them approximately Gaussian (with limited success). For the litter per km² plot, the smoothed values were back-transformed using an exponential minus one transformation. The plots are thus approximately median levels on the original scale. For the power studies the trend.power function in the R library emon (Barry and Maxwell et al., 2015) was used. The Manly approach (Manly et al., 2007), a nonparametric randomisation test, was used to make comparisons between surveys and OSPAR areas. For total litter and for plastic, 95% bootstrap confidence intervals are also given using the percentile method (see **Table c** and **Table d**) (Manly et al., 2007).

Results

The distribution and abundance of marine litter on the seafloor in the OSPAR Maritime Area were investigated on the basis of data collected by trawl surveys from seven Contracting Parties (**Figure 1**). Benthic trawls are designed to capture marine biota on or near the seafloor over a range of different seafloor types. As a result, some trawl designs plough through the seafloor while others roll over the seafloor. The amount of litter captured during a survey is influenced by the type of interaction with the seafloor and the mesh size of the nets. Therefore, the sampled quantities are not absolute amounts, but 'relative' amounts. However, they still allow comparisons between regions sampled with similar gear. The number of stations monitored determines the confidence that can be applied to assessments and defines the time (number of years of data) needed to obtain an acceptable confidence level.

Widespread distribution of litter items, especially plastics, was discovered on the seafloor of the Greater North Sea, the Celtic Sea, the Bay of Biscay, the Iberian Coast and the Gulf of Cadiz. The assessment mostly focuses on the Greater North Sea, Celtic Seas and Eastern Bay of Biscay (excluding the Iberian Coast and the Gulf of Cadiz) which were sampled with a Grande Ouverture Verticale (GOV) trawl. For this area, the abundance of litter items (litter items per km²) on the seafloor increases from north to south (**Figure 2**). In 2014, of all litter items recorded the percentage of plastic items was 68% for the Greater North Sea, 58% for the Celtic Sea and 98% for the Eastern Bay of Biscay. Nearly all trawls in the Eastern Bay of Biscay contained at least one plastic item; the area also has the highest levels of recorded litter within the assessment area.

It was not possible to directly compare the results for the Greater North Sea and Celtic Seas, which used a GOV trawl, with the results of the assessment of the Iberian Coast and Gulf of Cadiz, which were sampled with a BAK otter trawl (see **Figure 1**). A map of relative abundance of litter items for the Iberian coast and Gulf of Cadiz, similar to **Figure 2** could not be created as the samples were clustered near the coast, due to the topography.

There is moderate confidence in the methodology and low to moderate confidence in the data.

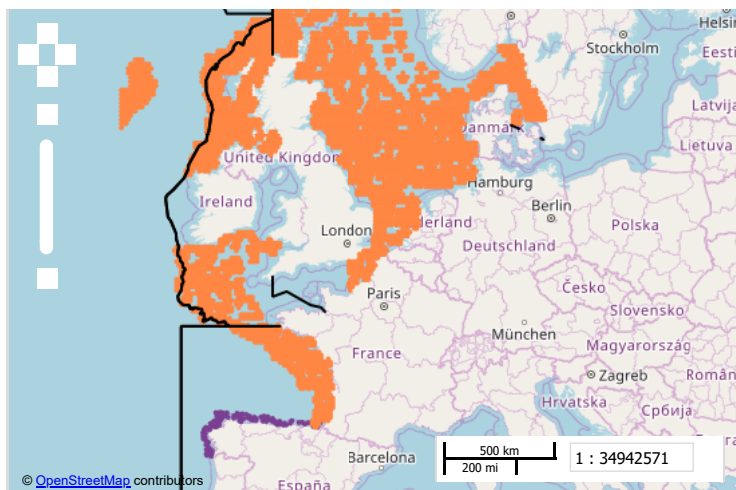


Figure 1: Stations used for the assessment covering Greater North Sea, Celtic Seas and the Eastern Bay of Biscay (GOV) (orange) and the assessment covering the Iberian Coast and Gulf of Cadiz (BAK) haul locations (purple)

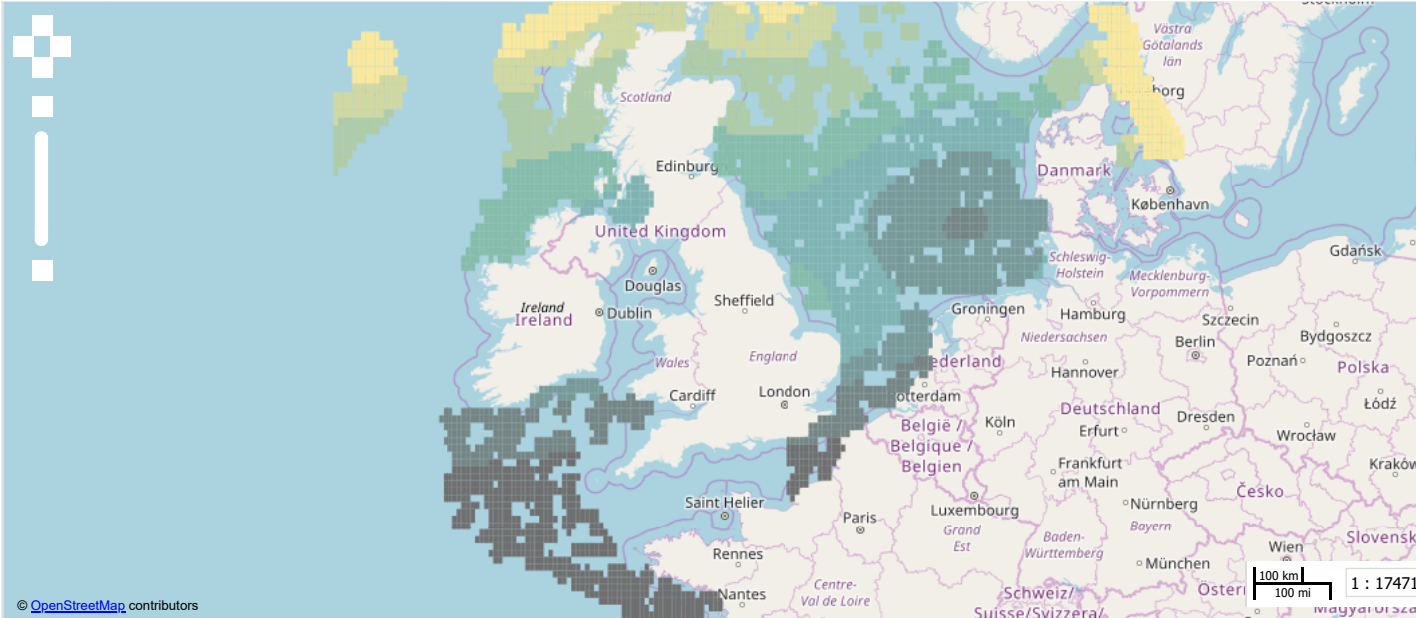


Figure 2: Relative number of litter items per km2 seafloor across the Greater North Sea, Celtic Seas and the Eastern Bay of Biscay, based on the number of items caught as by-catch in fisheries trawls.

Results (Extended)

Data analysis

The distribution and abundance of marine litter on the seafloor in the OSPAR Maritime Area was investigated on the basis of data generated by trawl surveys from seven countries (Denmark, France, Germany, the Netherlands, Spain, Sweden and the United Kingdom). Two separate assessments were made: one using Grande Ouverture Verticale (GOV) trawl data and one for data collected by BAK trawl (**Figure 1**). The GOV assessment was based on 670 hauls in 2012, 790 hauls in 2013 and 794 hauls in 2014. These were undertaken across three OSPAR regions: the Greater North Sea, the Celtic Seas and the Bay of Biscay. For the Spanish BAK assessment there were 182 hauls in 2012, 197 hauls in 2013 and 160 hauls in 2014 across two sub-regions: the Iberian Coast and the Gulf of Cadiz. For GOV trawls, the numbers of hauls by region and year are summarised in **Table a**.

Widespread distribution of litter items, especially plastics, was discovered on the seafloor of the Greater North Sea, the Celtic Seas, the Eastern Bay of Biscay, the Iberian Coast and the Gulf of Cadiz. **Table b** shows the proportion of all litter items that are plastic by year and region for the GOV data. The Celtic Seas have a particularly high proportion of plastic items. Ideally, the number of items found would be standardised to the area of the haul. This is effectively the distance of the haul multiplied by the cross-sectional area of the net (**Figure a**). Although it would be better to use wing spread to determine the cross-sectional area of the net, due to missing data values this was not possible and door spread was used instead, with the mean of the door / wing ratios (4.18) used as an approximate conversion factor to generate wing spread values. **Table c**, **Table d** and **Table e** present data showing how the litter items collected in the GOV trawls changed over the three years of the study for each region. Although there appear be differences between years, at least five years of data are required to be able to make confident statements regarding trends.

Table a: Numbers of GOV hauls by year and region

	Celtic Seas	Greater North Sea	Eastern Bay of Biscay
2012	254	358	58
2013	225	496	69
2014	210	503	81

Table b: Proportion of plastic items in GOV hauls by year and region

	Celtic Seas	Greater North Sea	Eastern Bay of Biscay
2012	0.90	0.62	0.66
2013	0.93	0.75	0.76
2014	0.95	0.85	0.87

Table c: Mean number of items per km2 by type, year and region for the GOV trawl data. 95% bootstrap confidence intervals are given for Total and Plastic (in brackets), using a wing spread correction of 4.18.

Region	Celtic Seas			Greater North Sea			Eastern Bay of Biscay		
Year	2012	2013	2014	2012	2013	2014	2012	2013	2014

Region	Celtic Seas			Greater North Sea			Eastern Bay of Biscay		
Year	2012	2013	2014	2012	2013	2014	2012	2013	2014
Total	13.794 (10.868, 16.72)	48.07 (30.514, 71.06)	48.906 (35.948, 63.954)	28.842 (25.08, 32.604)	30.932 (27.588, 34.276)	38.038 (34.276, 41.8)		96.14 (78.166, 115.786)	230.736 (149.644, 325.622)
Plastic	11.704 (9.196, 14.212)	44.726 (28.006, 66.044)	46.398 (33.022, 62.7)	17.974 (15.466, 20.064)	22.99 (20.9, 25.498)	32.186 (28.842, 35.948)		75.658 (62.7, 88.198)	203.566 (129.58, 299.288)
Metal	0.29	0.88	0.79	1.30	0.84	0.96	-	1.46	0.96
Rubber	0.17	0.79	0.38	1.13	1.05	1.21	-	1.05	1.55
Glass	0	0.04	0	0.42	0.84	0.38	-	2.59	0.67
Natural	0.67	1.17	0.59	6.06	3.51	2.13	-	13.38	16.72
Misc	0.84	0.50	0.54	2.09	1.46	1.21	-	2.09	7.11

Table d: Mean items per haul by type, year and region for the GOV trawl data. 95% bootstrap confidence intervals are given for Total and Plastic (in brackets), using a wing spread correction of 4.18.

	Celtic Seas			Greater North Sea			Eastern Bay of Biscay		
	2012	2013	2014	2012	2013	2014	2012	2013	2014
Total	7.9 (6.3, 9.6)	13.0 (9.2, 18.8)	14.21 (10.0, 18.0)	6.7 (5.9, 7.5)	7.5 (6.7, 8.8)	9.6 (8.4, 10.5)	28.8 (18.8, 44.7)	31.4 (19.2, 28.8)	57.7 (35.1, 66.9)
Plastic	7.1 (5.9, 8.80)	12.1 (7.9, 17.1)	13.8 (7.9, 18.0)	4.18 (3.8, 4.6)	5.9 (5.4, 6.3)	7.9 (7.1, 9.2)	19.2 (15.5, 22.6)	23.8 (19.2, 28.8)	50.1 (34.4, 66.9)
Metal	0.17	0.25	0.25	0.29	0.21	0.25	0.42	0.42	0.29
Rubber	0.04	0.21	0.13	0.25	0.25	0.29	0.08	0.38	0.42
Glass	0.04	0.00	0	0.13	0.17	0.08	0.21	0.96	0.21
Natural	0.33	0.33	0.17	1.42	0.88	0.59	0.88	4.84	4.64
Misc	0.21	0.13	0.17	0.46	0.38	0.29	8.28	0.79	1.92

Table e: Mean percentage of hauls containing specific litter types by year and region for the GOV trawl data. 95% bootstrap confidence intervals are given for Total and Plastic (in brackets)

	Celtic Seas			Greater North Sea			Eastern Biscay of Biscay		
	2012	2013	2014	2012	2013	2014	2012	2013	2014
Total	61 (54,67)	59 (52,65)	64 (58,70)	64 (59,69)	70 (66,74)	71 (67,75)	95 (88,1)	100 (100,1)	100 (100,1)
Plastic	59 (53,65)	56 (49,62)	58 (51,64)	55 (50,61)	64 (60,68)	68 (63,72)	93 (86,98)	97 (93,1)	98 (94,1)
Metal	4	5	5	7	5	6	10	9	7
Rubber	1	5	2	6	6	7	2	7	9
Glass	0	0	0	2	3	2	5	4	1
Natural	4	6	4	16	13	10	3	23	31
Misc	5	2	3	10	7	6	16	14	25

There is wide variation in terms of abundance, with higher amounts of litter and plastic per km² in the Eastern Bay of Biscay. **Figure 2** and **Table c** show the number of litter items per km² for all GOV trawls. The Eastern Bay of Biscay is the area of most litter, particularly for plastic items. **Figure c** and **Table d** and give similar information, except that the figures are based on the number of items caught per haul only, **Figure d** shows also show just the total number of plastic items caught per haul. Not weighting by haul area does not have a major effect on the assessment outcomes because most hauls are of similar area. **Table e** gives the percentage of hauls in which each of the litter types was found at least once. The results for the Eastern Bay of Biscay are notable with nearly all of the trawls in the Eastern Bay of Biscay contained at least one plastic item (**Figure b**).

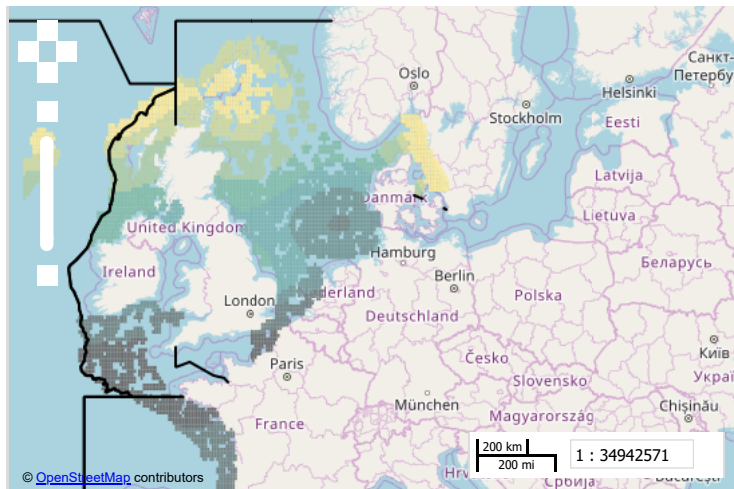


Figure b: The modelled probability that a haul will contain plastic (from 1 where you will always find plastic to 0 where you will never find plastic)

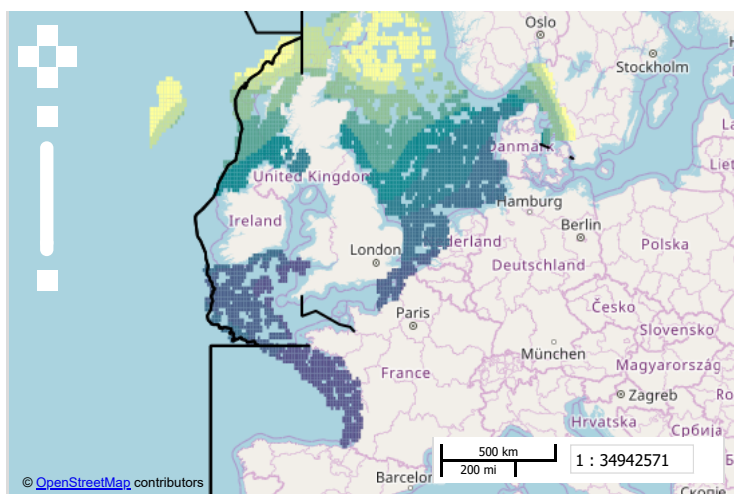


Figure c: Total counts of litter items caught per trawl in the Greater North Sea, Celtic Sea and the Eastern Bay of Biscay

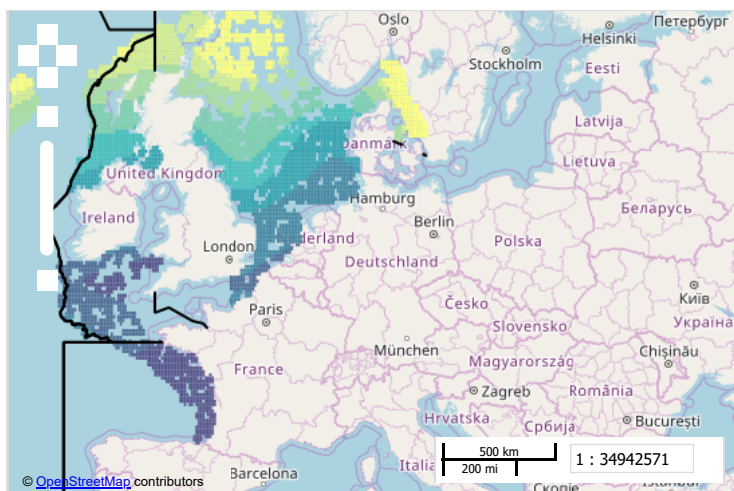


Figure d: Total counts of plastic items caught in trawls in Greater North Sea, Celtic Sea and the Eastern Bay of Biscay

The statistical power (the likelihood that a study will detect an effect when there is an effect there to be detected) was calculated with total litter counts for each of the three areas: Celtic Seas, Greater North Sea and the eastern Bay of Biscay. The sample size for each year was fixed at the following values (which correspond with the number of stations surveyed each year), 225 stations in the Celtic Seas, 500 stations in the Greater North Sea and 75 stations in the eastern Bay of Biscay. A starting mean for each region corresponding to the observed 2012 mean was assumed. The statistical power was then calculated for 10%, 20% and 30% increases over 5, 10, 15, 20, 25 and 30 years. A negative binomial distribution was assumed for the distribution of numbers of items per haul. The results are shown in **Figure e**. The Greater North Sea is the only region where there are sufficient stations to detect 20% or 30% changes with a statistical power of more than 90% (**Figure e**).

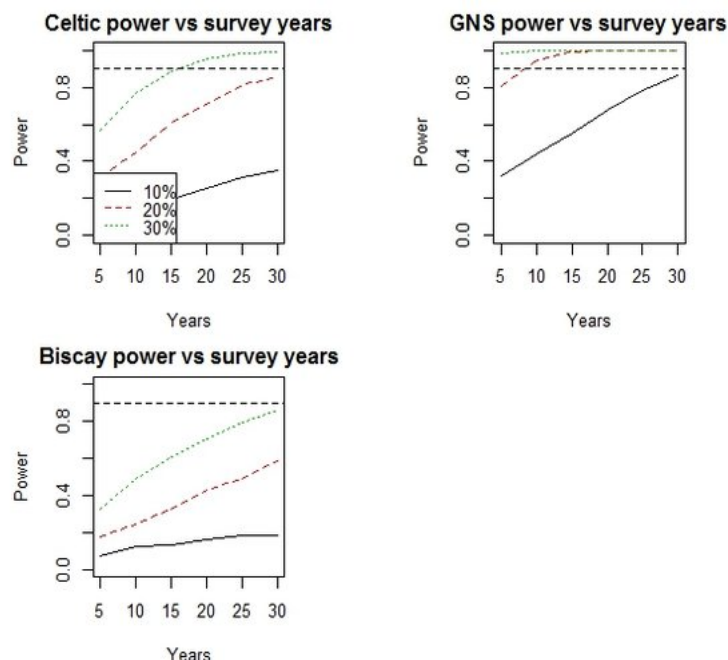


Figure e: Power plots for total litter items per haul for the Greater North Sea, Celtic Seas and the Eastern Bay of Biscay. The x-axis is the number of years of survey and the different lines represent linear changes in trend

A separate assessment was undertaken, using only the Spanish BAK hauls. The sampling locations are shown in **Figure 1**. There were 182 hauls in 2012, 197 hauls in 2013 and 160 hauls in 2014. Similar summary results to those provided for the other regions are shown in **Table f**, using a door / wing spread ratio of 5.00. There is quite a lot of litter, but not as much as in the eastern Bay of Biscay. The proportions of litter items monitored that were plastic were 60% (2012), 50% (2013) and 65% (2014). The statistical power results for Spain, assuming a sample size of 182 are shown in **Figure f**. The statistical power results for the BAK trawls indicate that in order to detect changes of 30%, with more than a 90% statistical power, a further 15 years of data are required (**Figure f**).

Table f: Summary results for Spain (BAK). 95% bootstrap confidence intervals are given for Total and Plastic (in brackets), using a wing spread correction of 5.00

BAK Trawls	Litter per km2			Items			Percentage of hauls		
Year	2012	2013	2014	2012	2013	2014	2012	2013	2014
Total	-	198 (149.5, 256)	54.5 (41.5, 67.5)	3.6 (3.0,4.4)	8 (6.5,9.6)	3.1 (2.7,3.7)	79 (73,85)	92 (88,95)	84 (78,89)
		198 (149.5,256)	54.5 (41.5,67.5)						
Plastic	-	118 (93.5, 145)	42 (30.5, 53.5)	2.2 (1.8,2.6)	4 (3.2,4.8)	2 (1.7,2.4)	68 (60,74)	81 (76,86)	70 (63,78)
		118 (93.5,145)	42 (30.5,53.5)						
Metal	-	8.95	1.6	0.35	0.42	0.21	24	28	19
Rubber	-	1.55	0.4	0.05	0.05	0.05	4	3	4
Glass	-	3.7	0.4	0.14	0.27	0.13	5	15	10
Natural	-	58.5	5.5	0.8	2.88	0.41	23	49	27
Misc	-	7.5	4.55	0.12	0.42	0.32	8	13	15

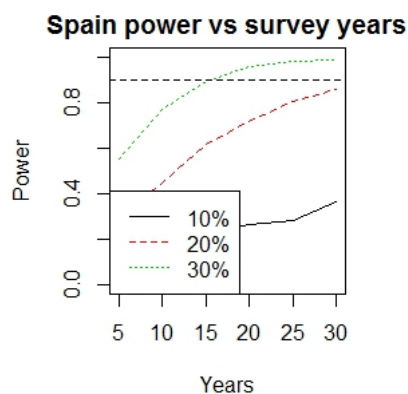


Figure f: A separate power plot for total litter items per BAK haul on the Spanish Coast. The x-axis is the number of years of survey and the different lines represent linear changes in trend

There is moderate confidence in this methodology. There is consensus within the scientific community and the methodology has been used before for this type of assessment and has been published in scientific journals. However it is acknowledged that some aspects require further development, such as inter-comparison between trawl types used in different regions (BAK – GOV) to allow a complete assessment of the relative amounts of litter per km² to be undertaken.

There is low to moderate confidence in the data availability. The data are a by-product generated by fish stock assessment surveys. There is currently no quality assurance and quality control procedures in place for this data stream, although this will be addressed in the future, and therefore there is some variability in the data quality across some assessment areas (e.g. the English Channel). Also, data have only been collected for the full spatial area covered by the assessment since 2012 so temporal coverage is currently limited, although this will improve with time.

Conclusion

Litter is widespread on the seafloor across the areas assessed, with plastic the predominant material encountered. In the areas assessed, higher amounts of litter and plastic are found in the eastern Bay of Biscay, southern Celtic Sea and English Channel than in the northern Greater North Sea and Celtic Seas. This could be due to larger anthropogenic inputs, rivers, prevailing winds and / or currents. Previous studies have shown the Bay of Biscay to receive large amounts of litter from local rivers and transport that may result from large-scale circulation in the sub-region as a whole. Floating and sinking litter follow different pathways, and gather in different hotspots, which do not necessarily overlap. For example, the beach litter hotspot in the Skagerrak is not replicated in the seafloor litter. For most of the OSPAR regions, except the Greater North Sea, more survey stations or longer datasets are needed in order to detect a significant change in the abundance of seafloor litter. The OSPAR Regional Action Plan identifies actions to reduce marine litter and should lead to a reduction in seafloor litter.

Knowledge Gaps

There are a number of areas where further knowledge could improve the assessment. Information concerning seasonal influences, weather patterns and changes in currents, all of which could affect the distribution of litter, are not taken into account. Although only surveys using similar gear are used, the sampling design could also have an influence (fixed and random stratified sampling stations). Furthermore, there is a need to compare how different gear types capture litter (e.g. GOV and BAK trawls) if relative amounts of litter per km² are to be compared across the whole region in the future. Several data issues slowed down the assessment and these could be improved in following years.

Knowledge Gaps (Extended)

A longer time series or more survey stations are required to detect trends in individual items or types of litter, therefore these will only be included in future assessments. However, for the Greater North Sea there are sufficient monitoring stations to detect changes of 20% or 30% in seafloor litter abundance, as a result of implemented litter reduction measures. For the Celtic Seas, the Eastern Bay of Biscay, the Iberian Coast and Gulf of Cadiz, there are fewer monitoring stations. An additional 15 to 30 years of monitoring data will be required to predict similar changes (20% or 30% in seafloor litter abundance) in these areas, unless more monitoring stations are added.

To assess the effectiveness of measures through changes in seafloor litter abundance will require more monitoring stations and/or longer data series. Future litter assessments should include modelling to determine sources and pathways. Better knowledge of the fragmentation rates and mechanisms is needed to understand seafloor litter trends and behaviour.

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Assessment Metadata

Sheet reference	EIHA17/D1001
Assessment type	Intermediate Assessment
Context (1)	Biological Diversity and Ecosystems - Management of specific human pressures
Context (2)	OSPAR Agreement 2017-XX, CEMP Guidelines for Litter on the Seafloor
Context (3)	D10 - Marine Litter
Context (4)	D10.1 - Characteristics of litter in the marine and coastal environment
Point of contact	Thomas Maes, Jon Barry
Email	secretariat@ospar.org
Metadata date	2017-03-27
Title	Composition and Spatial Distribution of Litter on the Seafloor
Resource abstract	Monitoring of seafloor litter on the back of existing fish stock assessments.
Topic category	Environment
Indirect spatial reference	L3.2.1.1; L3.2.1.2; L3.2.1.3; L3.2.1.4; L3.2.1.5; L3.2.1.6; L3.2.1.7; L3.2.1.8; L3.2.1.9; L3.2.1.10; L3.2.1.11; L3.2.1.12; L3.2.1.13; L3.2.1.14; L3.2.1.15; L3.2.1.16; L3.2.1.17; L3.2.1.18; L3.2.1.19; L3.2.1.20; L3.2.1.21; L3.2.1.22; L3.2.1.24; L3.2.1.25; L3.2.1.26; L3.2.1.27; L3.2.1.28; L3.2.2.1; L3.2.8.1; L3.2.8.2; L3.2.8.3; L3.2.5.1; L3.2.5.2; L3.2.5.3; L3.2.5.4; L3.2.5.5; L3.2.5.6; L3.2.5.7; L3.2.5.8; L3.2.5.9; L3.2.5.10; L3.2.5.11; L3.2.5.12; L3.2.5.13; L3.2.5.14; L3.2.5.15; L3.2.5.16; L3.2.5.17; L3.2.5.18; L3.2.5.19; L3.2.5.20; L3.2.5.21; L3.2.5.22; L3.2.5.23; L3.2.5.24; L3.2.5.25; L3.2.5.26; L3.2.5.27; L3.2.7.1; L3.2.7.2; L3.2.7.3; L3.2.7.4; L3.2.7.5; L3.2.7.6; L3.2.7.7; L3.3.1.1; L3.3.1.2; L3.3.1.3; L3.3.1.4; L3.3.2.2; L3.3.2.3; L3.3.2.4; L3.3.2.5; L3.3.2.6; L3.3.2.7; L3.3.2.8; L3.3.2.9; L3.3.2.10; L3.3.2.11; L3.3.2.12; L3.3.2.13; L3.3.2.14; L3.3.2.15; L3.3.2.16; L3.3.2.17; L3.3.2.18; L3.3.2.19; L3.3.2.20; L3.3.2.21; L3.3.2.22; L3.3.2.23; L3.3.2.24; L3.3.2.25; L3.3.2.26; L3.3.2.27; L3.3.2.28; L3.3.2.29; L3.3.2.30; L3.3.2.31; L3.3.2.32; L3.3.2.33; L3.3.2.34; L3.3.3.1; L3.3.3.2; L3.3.3.3; L3.3.3.4; L3.3.3.5; L3.3.3.6; L3.3.3.7; L3.3.3.8; L3.3.3.9; L3.3.3.10; L3.3.3.11; L3.3.3.12; L3.3.3.13; L3.3.3.14; L3.3.3.15; L3.3.3.16; L3.3.3.17; L3.3.3.19; L3.3.3.20; L3.3.3.21; L3.3.3.22; L3.3.3.23; L3.3.3.24; L3.3.3.25; L3.3.3.26; L3.3.3.27; L3.3.3.28; L3.3.3.29; L3.3.3.30; L3.3.3.31; L3.3.3.32; L3.3.3.33; L3.4.1.4; L3.4.1.5; L3.5.2.1; L3.5.2.2; L3.2.1.29; L3.2.7.8; L3.2.5.28; L3.3.1.5; L3.2.5.29; L3.2.1.30; L3.2.7.9; L3.3.2.35; L3.3.3.34; L3.3.2.36; L3.2.7.10; L3.2.5.30; L3.2.5.31; L3.2.1.31; L3.2.1.32; L3.2.1.33; L3.2.1.35; L3.3.3.35; L3.2.7.11; L3.3.2.37; L3.3.1.6; L3.2.2.5; L3.2.1.36; L3.3.3.36; L3.3.3.37; L3.2.4.1; L3.3.3.18; L3.3.1.7; L3.2.2.2; L3.4.1.6; L3.2.1.37; L3.2.5.32; L3.2.1.39; L3.2.1.38; L3.2.1.34; L3.2.1.40; L3.2.1.41
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E Lon	13.0665752429
S Lat	36.7597263437
W Lon	-16.0908499999
Countries	BE, DE, DK, ES, FR, NL, SE, UK
Start date	2012-01-01
End date	2015-12-31
Date of publication	2017-06-30
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