

Marine Litter Watch – Europe’s Beach Litter Assessment



Authors:

Gašper Šubelj (TC Vode), Joana Mira Veiga (Deltares)



Cover design: EEA

Cover image © Gašper Šubelj, Single-use plastic litter on the island Korčula, Croatia

Layout: Oda Ellingsen [NIVA]

Version: 1.0

Publication Date: 3 July 2024

EEA activity: Biodiversity and ecosystems

Legal notice

Preparation of this report has been co-funded by the European Environment Agency as part of a grant with the European Topic Centre on Biodiversity and ecosystems and expresses the views of the authors. The contents of this publication do not necessarily reflect the position or opinion of the European Commission or other institutions of the European Union. Neither the European Environment Agency nor the European Topic Centre on Biodiversity and ecosystems use is liable for any consequence stemming from the reuse of the information contained in this publication.

ETC-BE coordinator: Norwegian Institute for Water Research (NIVA)

ETC-BE partners:

Federal Agency for Nature Conservation (BfN), Association BIOPOLIS (Biopolis), Brilliant Solutions Engineering & Consulting (BRIS), Danish Centre for Environment and Energy, Aarhus University (DCE-AU), Deltares, Dark Matter Laboratories B.V. (DML), Ecologic Institute (Ecologic), Environment Agency Austria (EAA), Fresh Thoughts Consulting GmbH (Fresh Thoughts), Global Footprint Network (GFN), International Council for the Exploration of the Sea (ICES), International Institute for Applied Systems Analysis (IIASA), French national institute for industrial environment and risks (INERIS), Italian Institute for Environmental Protection and Research (ISPRA), LESPROJEKT-SLUŽBY Ltd (LESP), Martin-Luther University Halle-Wittenberg (MLU), Sapienza University Rome (SAP), Seascope Belgium (SSBE), Finnish Environment Institute (SYKE), Thematic Center for Water Research, Studies and Project Development, Ltd., German Environment Agency (UBA-DE), University Duisburg-Essen (UDE), Helmholtz Centre for Environmental Research (UFZ)

Copyright notice

© European Topic Centre on Biodiversity and ecosystems, 2024

Reproduction is authorized provided the source is acknowledged. [Creative Commons Attribution 4.0 (International)]

More information on the European Union is available on the Internet (<http://europa.eu>).

DOI: 10.5281/zenodo.12633722

How to cite this report:

Šubelj, G., Veiga, J. M. (2024). Marine Litter Watch – Europe’s Beach Litter Assessment (ETC BE Report 2024/1). European Topic Centre on Biodiversity and Ecosystems.

European Topic Centre on
Biodiversity on ecosystems

<https://www.eionet.europa.eu/etcs/etc-be>

Contents

Acknowledgements	4
Key messages.....	5
1. Introduction.....	6
2. Marine Litter Watch: citizen science for cleaner seas.....	7
2.1. Which data are reported?.....	7
2.2. Which data are used for the assessment?.....	8
3. What litter is found on beaches?	9
4. Temporal and regional differences in the amount and composition of beach litter.....	10
5. MLW data and EU marine litter policies.....	13
6. List of abbreviations	16
7. References.....	17

Acknowledgements

EEA project manager:	Eda Bayar Aydın (EEA, Denmark)
Lead authors:	Gašper Šubelj (TC Vode, Slovenia) Joana Mira Veiga (Deltares, The Netherlands)
Contributors:	Eda Bayar Aydın (EEA, Denmark) Mustafa Aydın (EEA, Denmark)
Coordination:	Claudia Neitzel (NIVA, Norway)
English check:	Shane Hume (LESP, Czech Republic)

The authors would like to thank Eda Bayar Aydın (EEA), Mustafa Aydın (EEA) and Stéphane Isoard (EEA), for the valuable suggestions and constructive feedback.

Key messages

- Citizens and communities populate the EEA's MLW database with data on many 'monitoring' events, carried according to the EU Technical Group on Marine Litter (TGML) standards, supplemented by 'clean-up' events, which may follow less strict standards. This makes the MLW data set an important database for beach litter worldwide.
- A total of almost 1.5 million litter items have been recorded in MLW surveys carried out in Europe's seas' beaches between 2013-2022. Such volume allows the analysis of litter sources, materials, and spatial as well as temporal patterns. Plastic is, by far, the predominant material, making up 86% of total recorded items.
- Single-use plastic (SUP) items make up 52% of all collected litter, also representing the bulk of the top ten items. MLW data analysis reiterates the importance of an effective implementation of the EU legislation on SUP/Fisheries to reduce levels of plastic litter in the marine environment.
- Cigarette butts seem to be particularly abundant and thus problematic across all Regional Seas' beaches, contributing to as much as 23.4% of all collected and counted litter items. Together with plastic/polystyrene pieces, plastic caps/lids these are among the top ten items in all four Regional Seas.
- In general, fishing-related items are found in lower proportions than other item categories, such as SUP and plastic fragments, but are part of the top ten list in the North-East Atlantic.
- On average, beaches in the Black Sea seem to be the most polluted in terms of loads of litter (475 items/100 m), followed by Mediterranean beaches (310 items/100 m). Baltic Sea beaches have the lowest average number of litter items recorded (71 items/100 m).
- About 90% of all sites surveyed by the MLW initiative seem to have litter loads well above the MSFD GES threshold of 20 items/100 m.
- More time and more data are needed to build up confidence in the current patterns of spatial and temporal distributions. Short time series, especially those of individual beach sites, suggest caution in the interpretation of the data. Regular monitoring at the same beach sites by MLW communities is recommended.

1. Introduction

Litter is piling up in all aquatic systems, particularly on sea beaches, being the last stop of their journey. With at least 11 million tonnes of plastic ending up in the oceans every year (UNEP, 2021), plastics make up 80% of all marine debris along beaches, marine surface waters and deep-sea sediments. The Marine Litter Watch (MLW) initiative is the European Environment Agency's (EEA) project to engage citizens, communities and NGOs to collect data on litter along the beaches of Europe's seas whilst using EU guidelines. What can we learn from the data reported by citizens and communities over the last decade?

This report builds on the recently published ETC ICM report [Marine Litter and European Beaches: learning from citizen science](#) (Kıdeyş et al., 2021), updating its structure and narrative, as well as analysing the reported data of 2022. It is worth noting that the EEA also prepared a report [From source to sea: Untold story of the marine litter](#), which was built on the findings of the ETC ICM report [Marine Litter in Europe: An integrated assessment from source to sea](#) (Veiga et al., 2022). Both reports attempt the holistic evaluation of marine litter, its sources and pathways, including those from beaches, and they use the data analysed in this report, among other data sources.

Significant investments and policy efforts at the European level have been made in recent years to tackle the problem of marine litter pollution, in particular that from plastics. Analysis of the MLW database in this report provides an invaluable source of information on the status and composition of litter and plastic pollution on the beaches of the European Union, as well as non-EU beaches of the regional seas. Such information is crucial for determining the environmental status in a better way, as requested by the Marine Strategy Framework Directive (MSFD). It also helps to assess the effectiveness of EU policies and directives such as the Zero Pollution Action Plan (ZPAP) and Single Use Plastics (SUP) Directive, which target particular litter items.

This report has been made available by the beach litter data collected and reported during the period of 2013 to 2022 by more than 60 distinct communities, non-governmental and governmental organisations. Most notable contributors are Aarhus University, Denmark; Legambiente Onlus, Italy; Mare Nostrum, Romania; Marnoba, Spain; Monitoraggio Strategia Marina – Ministry of Environment, Italy; Surfrider Foundation Europe (various countries); and Swiss Litter Report, Switzerland.

2. Marine Litter Watch: citizen science for cleaner seas

Information and data on marine litter amounts and composition are essential for tackling the problem at source and monitor the effectiveness of preventive measures. The EEA developed a MLW web/mobile app to strengthen Europe's knowledge base and thus provide support to European policymaking. The initiative uses citizen science — scientific research conducted, at least partly, by members of the public — and smartphone technology to encourage and support citizen communities to provide structured data on marine litter and to clean up Europe's beaches at the same time.

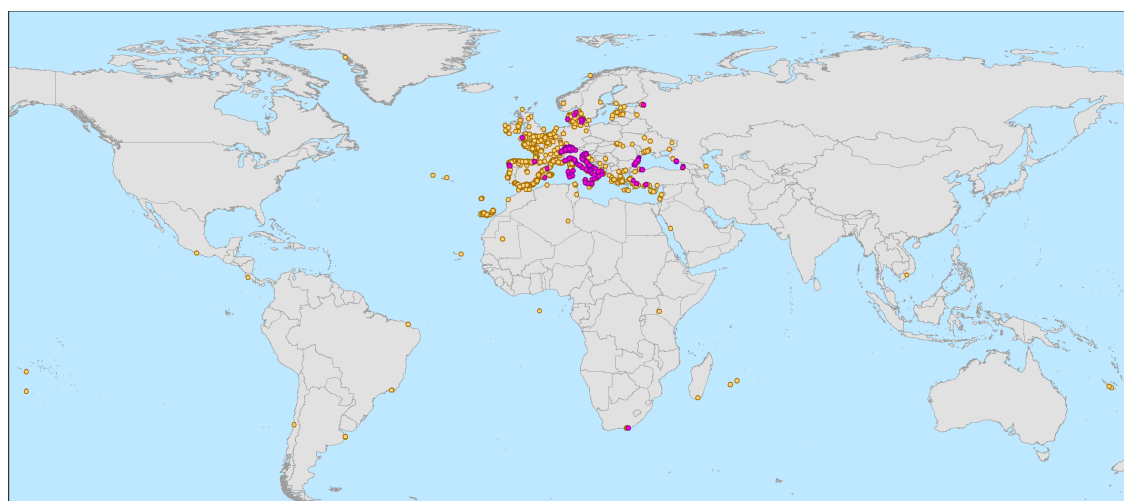
2.1. Which data are reported?

2 551 815 litter items

have been collected under the Marine Litter Watch initiative since 2013.¹

The MLW data set has been constantly growing by community inputs based on surveys of litter associated with beach clean-up events, as well as more systematic monitoring events since 2013. Until 2022, 3,817 events at 2006 beaches (Map 1) were organised by 63 different communities (citizen groups). The events have been taking place in 52 countries and territories all over the world but mostly centred in Europe.

Map 2-1 Sites with reported MarineLitterWatch event in the reference period 2013–2022.



- Beach with individual events (up to 3 events)
- Beach with a series of events (more than 3 events)

Various communities, non-governmental and governmental organisations have been contributing to the litter and data collection for the MLW. Most notably, these are: Swiss Litter Report, Switzerland and Germany, reporting on 1035 events in the period 2017-2018; Surfrider Foundation Europe, reporting on 661 events in 25 countries in the period 2013-2020;

Monitoraggio Strategia Marina – Ministry of Environment, Italy, reporting on 254 events in the period 2017-2019; Marnoba, Spain, reporting on 417 events in the period 2013-2020; Legambiente Onlus, Italy, reporting on 195 events in the period 2014-2018; Mare Nostrum, Romania, reporting on 195 events since 2014; and Aarhus University, Denmark, reporting on 167 events since 2014. Many more partners have made substantial contributions to the MLW effort, shown in detail in Annex 2.

¹ Includes all data reported and accepted to the MarineLitterWatch database, i.e. the period since 2013, all event types, all waterbody and beach types (including rivers and lakes). Only a portion of these data are used in the assessment, as described in Section 3.1.

2.2. Which data are used for the assessment?

There are two types of events covered in the MLW data set: 'monitoring' and 'clean-up'. Within the scope of the MLW initiative, the term 'monitoring' event is used to describe the data collected at preferably seasonal intervals from the same beach by the experienced MLW communities, applying the recommended methodology for monitoring marine litter on beaches in the EU (EU MSFD TGML, 2013). Since 2015, the MLW communities have been moving towards organising monitoring events to provide more reliable information in support of relevant European policies. As such, the MLW 'monitoring' data set also includes data that is officially reported by some EU Member States under the MSFD obligations. Contrastingly, 'clean-up' events may not take the MLW methodology fully into account and are typified by a relatively simple protocol and a reduction in the levels of standardisation. To make use of as much reported data as possible, both 'monitoring' and 'clean-up' event data sets have been used for this assessment. The latter compose 59% of all events used in this assessment.

For this report, a subset of MLW events was selected according to the following conditions: (i) events that took place in the period of 2013-2022; (ii) events at one of the four of Europe's seas, both in EU and non-EU countries; (iii) events at sea beaches (since the MLW data set also covers some river and lake shores); (iv) beach sites between 90 and 850m in length; and (v) data records that pass the quality control criteria (e.g. checking for duplication, location, litter count, or other data inconsistencies).

Table 2-1 presents the events used for the assessment by each European sea. Since these sites have the best data coverage collected from numerous events, they also fall under the scope for further data assessment.

Table 2-1 Overview of events at beaches of the regional seas reported to Marine Litter Watch (MLW) and used for this assessment.

Regional sea	Events (nº)	Clean-up (%)	Monitoring (%)	Total litter recorded (nº)
Baltic Sea	95	48.4	51.6	18,147
Black Sea	237	36.3	63.7	278,333
Mediterranean Sea	718	53.9	46.1	748,371
North-east Atlantic Ocean	627	74.5	25.5	384,798
Total	1,677	58.8	41.2	1,429,649

Such selection criteria yielded data from 967 beach segments in 30 countries, 17 of which are EU Member States, covering the four regional seas of Europe – with more than two thirds of all segments located in Spain (368), followed by France (161), Italy (101), and Denmark (85); and other countries with less than 50 beach segments. From these beaches, 1,677 events were recorded, with the majority taking place in 2017–2019, and a substantial decrease in 2020, probably due to the COVID-19 pandemic measures. The reference data set analysed includes about 1.43 million litter items. The number of events varies between marine regions. To compare the beach litter abundance across the events, the counts of litter items are normalised to transects of 100m.

Why do we use median values besides the mean for averaging the data?

TGML, as the main technical advising body on monitoring marine litter in the EU, has agreed to use the median as the calculation method to average beach litter data among surveys. The median is the middle value when a data set is sorted from smallest to greatest. Unlike the mean, very high or very low values do not affect the median value in the data set. Consequently, when some of the values are extreme (e.g. an anomalously high litter count), their effect on the median is smaller and hence a better averaging is achieved.

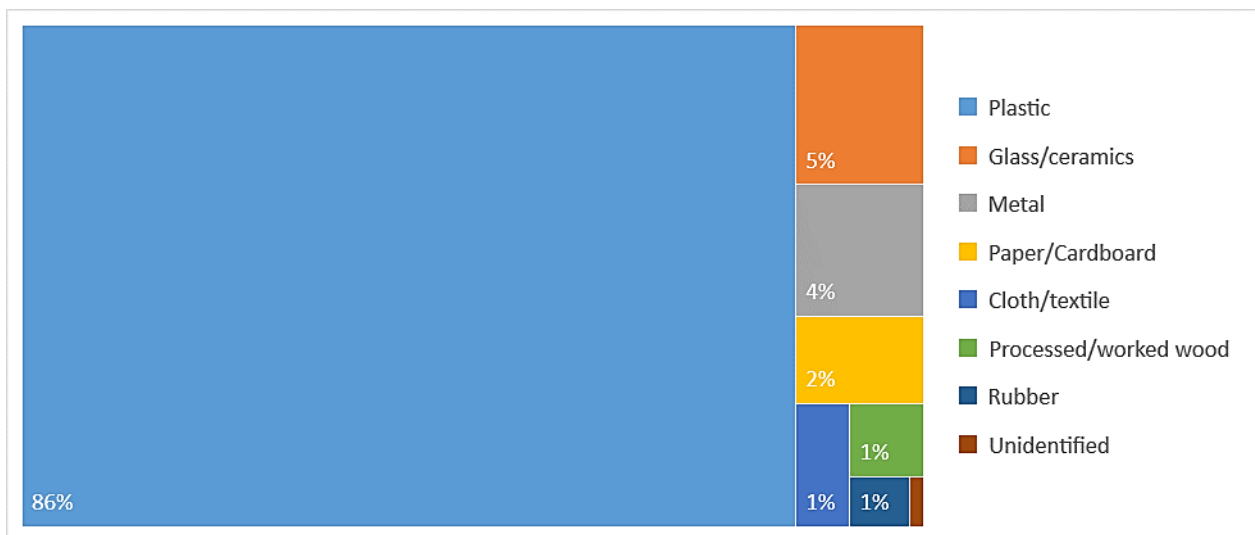
Which litter categories are recorded?

Following TGML recommendations, all beach litter items of at least 2.5cm are categorized and recorded. Currently, the MLW uses the 2013 litter categories list (known as G-codes) of the EU MSFD TGML (TGML, 2013). A new scheme for the categorisation of beach litter items (known as “Joint List”/J-codes) was proposed by the TGML in 2021 to enable comparability with other schemes and provide additional detail of litter items to inform policy (Fleet et al., 2021). MLW is expected to adopt this new scheme to harmonise it with other relevant EU databases in the near future. In the present assessment, reported litter items were clustered into SUP, fishing gear, fragments, other plastics and non-plastics.

3. What litter is found on beaches?

A total of 163 different categories of litter items were recorded in the assessment data set. Dividing the items per material type (plastic, glass/ceramics, metal, paper/cardboard, cloth/textile, processed wood, rubber and unidentified) reveals that plastic is, by far, the most commonly found material on Europe’s beaches, representing 86% of to the total marine litter items found between 2013 and 2022 (Figure 3-1).

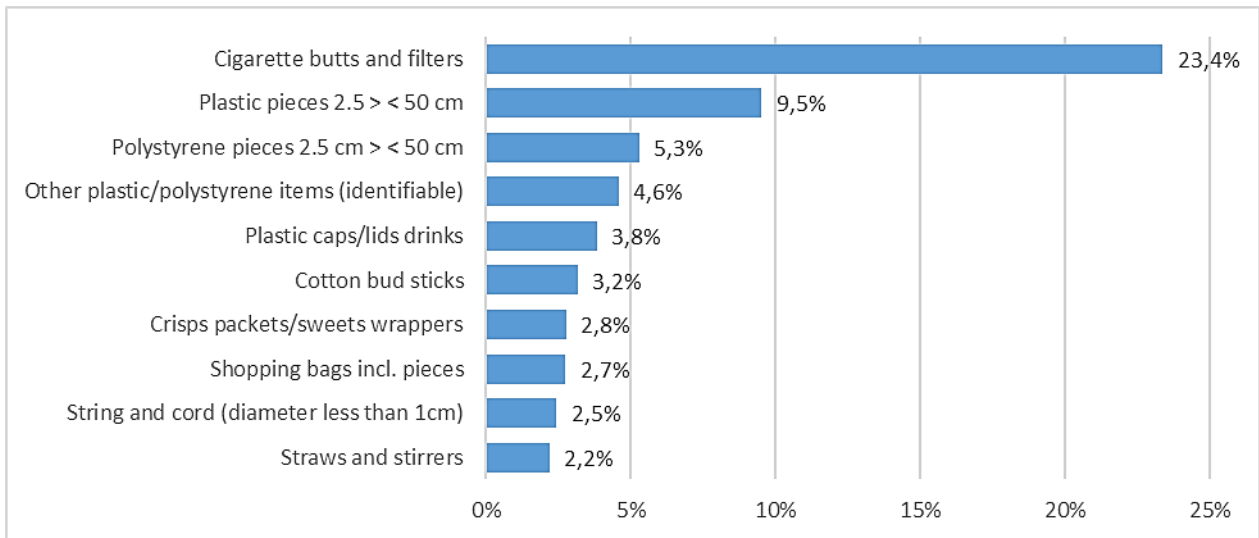
Figure 3-1 Contribution (%) of litter categories (based on total litter items per beach values) to total litter found on Europe’s beaches in 2013–2022 according to monitoring and clean-up data.



Looking at the top ten litter items in the MLW data set (Figure 3-2), which represent more than half (60%) of the total items, they are all made of plastic. Furthermore, six of the top ten items (cigarette butts, plastic caps/drink lids, cotton bud sticks, crisp packets/sweet wrappers, shopping bags including pieces, and straws and stirrers) and 20% of the total litter items recorded on EU beaches during 2013–2022 are items that are designed for single use. The only item category found in the top ten item list that could originate from fisheries is string and cords (2.5%). Note, however, that plastic and polystyrene pieces, many of which are fragments of SUP, were not accounted for as they cannot be clearly identified.

Cigarette butts are the most commonly reported item. Plastic fragments (plastic and polystyrene 2.5cm to 50cm) are the second and third most common item, accounting for 25% of the top ten items. Particular attention should be given to these plastic fragments (of an unspecified origin), as they reflect the over-time fragmentation that plastics are subject to once they are present in the environment.

Figure 3-2 Top ten items (% of all items) found on the beaches of regional seas according to monitoring and clean-up data.

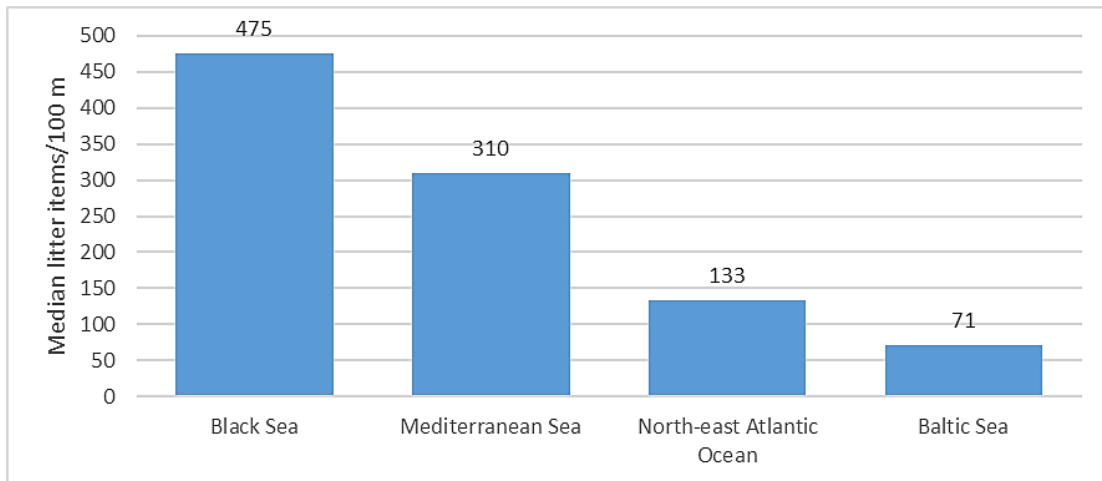


Note: The accumulated abundance of the top listed items comprises around 60% of the total items, thus less than the 80% value recommended by OSPAR when listing top ten items. The remaining items to reach 80% were omitted for brevity.

4. Temporal and regional differences in the amount and composition of beach litter

Beach litter abundance clearly differs across the four regional seas in Europe (Figure 4-1 and Map 5-1). The MLW data show that the Black Sea is the most polluted (median of 475 items/100m), followed by the Mediterranean Sea (median of 310 items/100m). Less polluted beaches are found in the Baltic Sea (median of 71 items/100m) and the North-east Atlantic Ocean (median of 133 items/100m). The higher values in the Mediterranean Sea and the Black Sea could be related to socio-economic factors such as high population density around these basins and intense coastal tourism, which, together with lower waste management performances, can lead to higher amounts of mismanaged plastic waste generated in these regions (Winterstetter et al., 2023).

Figure 4-1 Median litter levels (number of items/100m) found on the beaches of regional seas during 2013-2022 based on Marine Litter Watch monitoring and clean-up data.

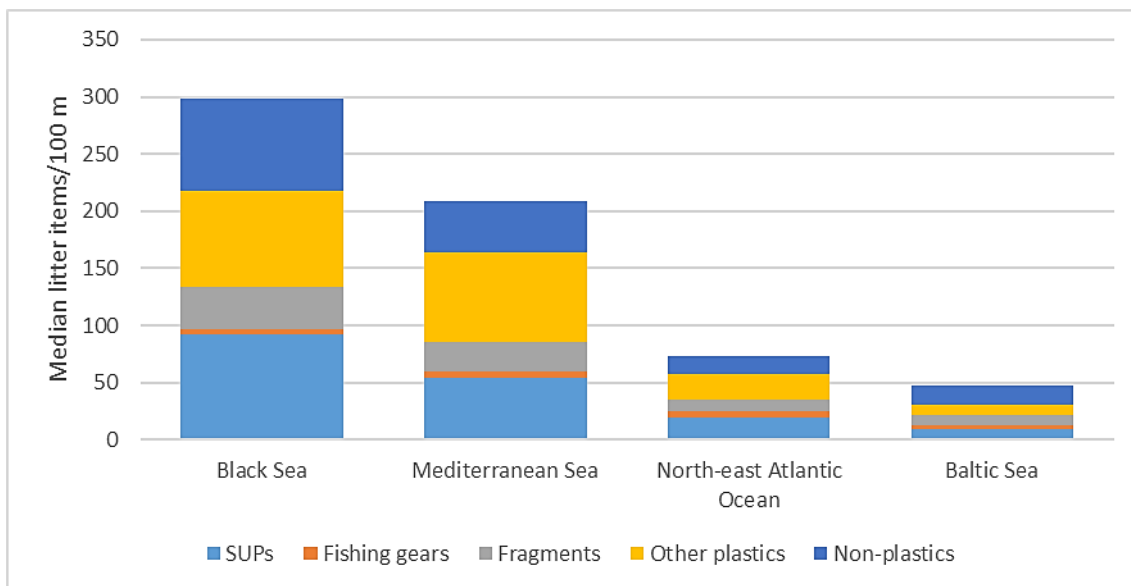


With the MLW data set spanning over a ten-year period (2013-2022), it is sufficient to derive long-term trends to some extent. Nevertheless, the difference in surveying effort and sites between the years make interpretation of temporal trends challenging.

Changes in litter abundance and composition that could be linked to the COVID-19 pandemic are likely to have occurred in 2020-2021. These changes could be affected by limited surveys (due to reduced access to beaches during lockdown measures) but also as a result of slowing down in economic activities, including tourism. However, at this point it is not possible to assess with confidence the effect of COVID-19 on beach litter.

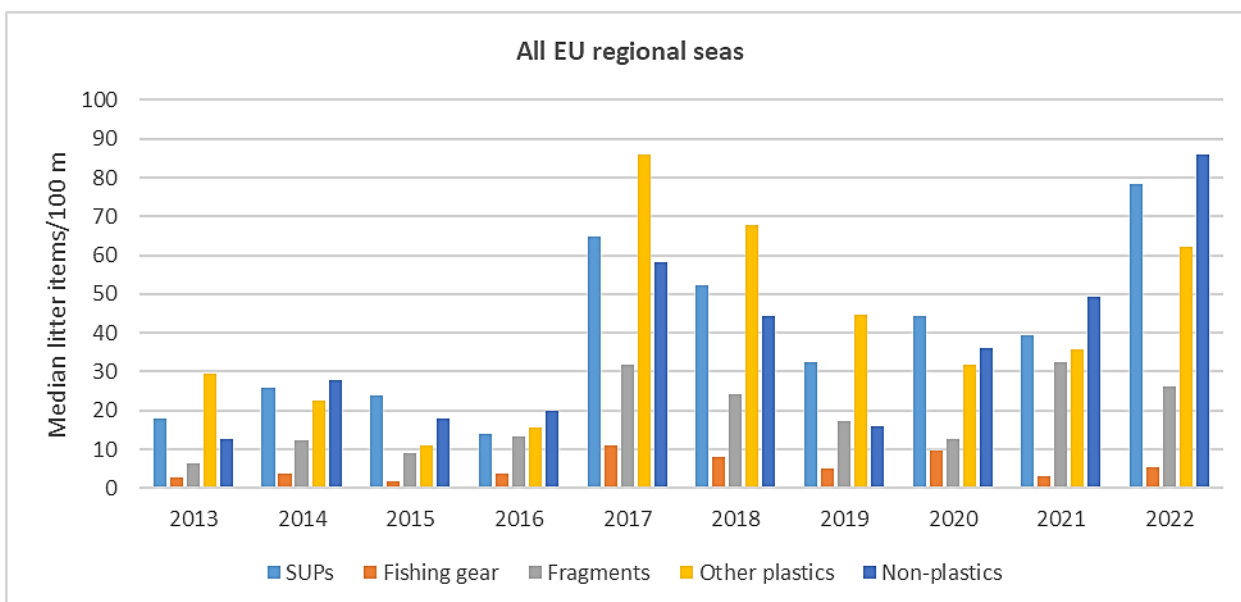
The MLW data set reveals regional differences in litter composition (Figure 4-2). Amongst the five litter groups (SUP, fishing gear, fragments, other plastic and non-plastics), SUP stands out as the most abundant type of litter found in the Black Sea (a median of 92 items/100m) In the Mediterranean Sea and the North-east Atlantic Ocean, other plastic categories dominate with 77 and 23 items/100m, respectively. In the Baltic Sea, non-plastic litter is more abundant (16 items/100m). The median number of fragments was the highest in the Black Sea (median of 49 items/100m), followed by the Mediterranean Sea (overall a median of 36 items/100m) and the Nort-east Atlantic Ocean (median of 19 items/100m). The median number of fishing gear is similar in all seas (5-6 items/100m) except for the Baltic Sea with 3 items/100m.

Figure 4-2 Median number of Single-use plastics (SUP), fishing gear, fragments (2.5 to 50cm and > 50cm plastic and polystyrene pieces combined), other plastics and non-plastic litter items found on the regional seas’ beaches for the period 2013-2022.



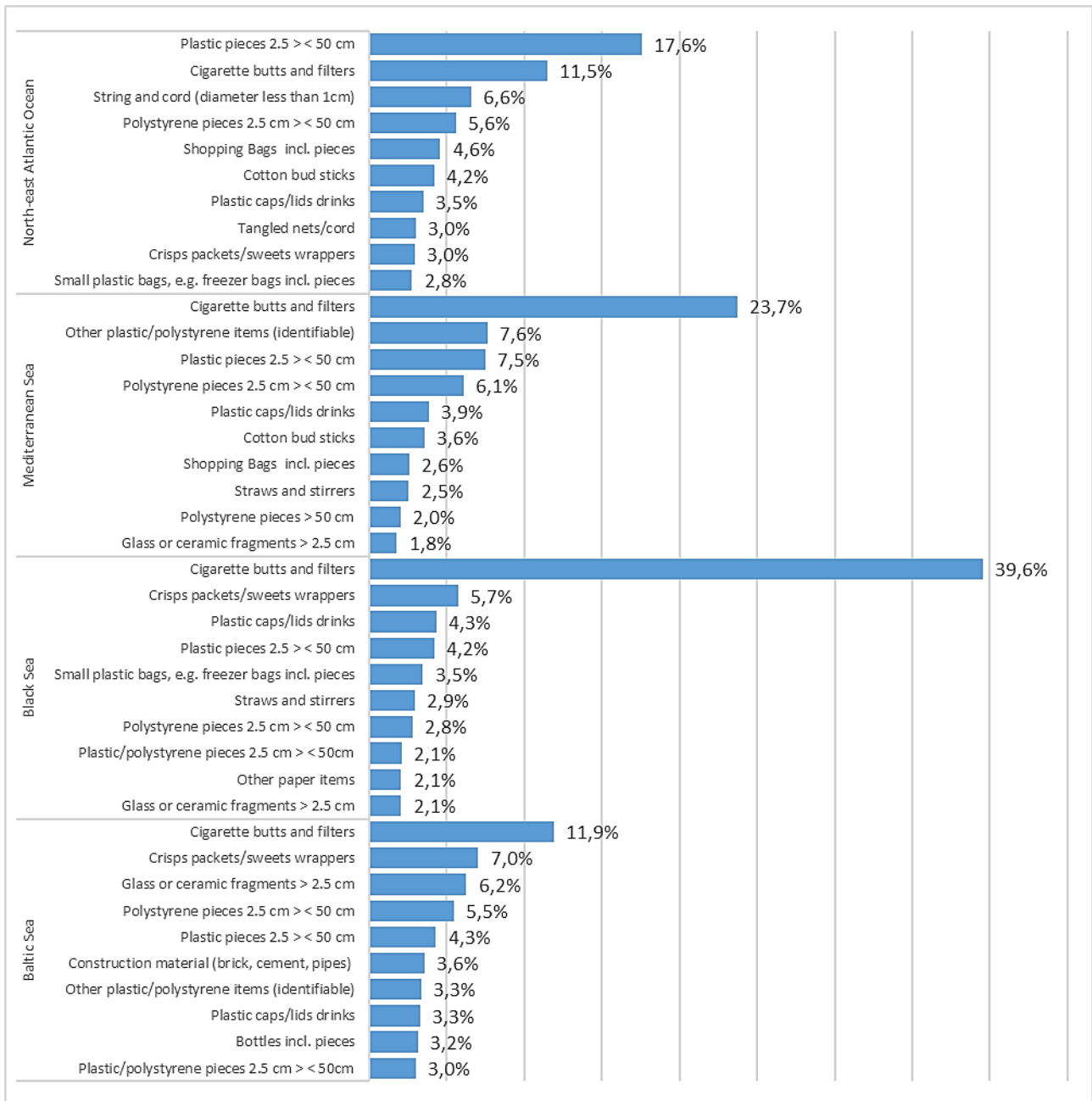
The annual evaluation of groups of litter for all the regional seas combined is shown in Figure 4-3. Overall, the MLW data set suggests an increase in SUP abundance from 2013 (a median of 18 items/100m) to 2022 (a median of 78 items/100m), in parallel with the previously described trend in total litter abundance.

Figure 4-3 Median number of Single-use plastics (SUP), fishing gear, fragments (plastic and polystyrene pieces 2.5 to 50 cm and > 50 cm combined), other plastics and non-plastic litter items found on the regional seas’ beaches for the period 2013-2022.



The list of top ten items for each of the four of Europe’s seas (Figure 4-4) reveals the prevalence of cigarette butts as the most common item found in all seas except the North-east Atlantic Ocean, where the category is the second most abundant after plastic pieces. Fisheries-related items in the top ten litter list (e.g. string and cords, and tangled nets/cord) were only found among the top ten items in the North-east Atlantic Ocean.

Figure 4-4 Top ten items recorded in the regional seas' coastlines and their contribution (% of all items) to total litter.



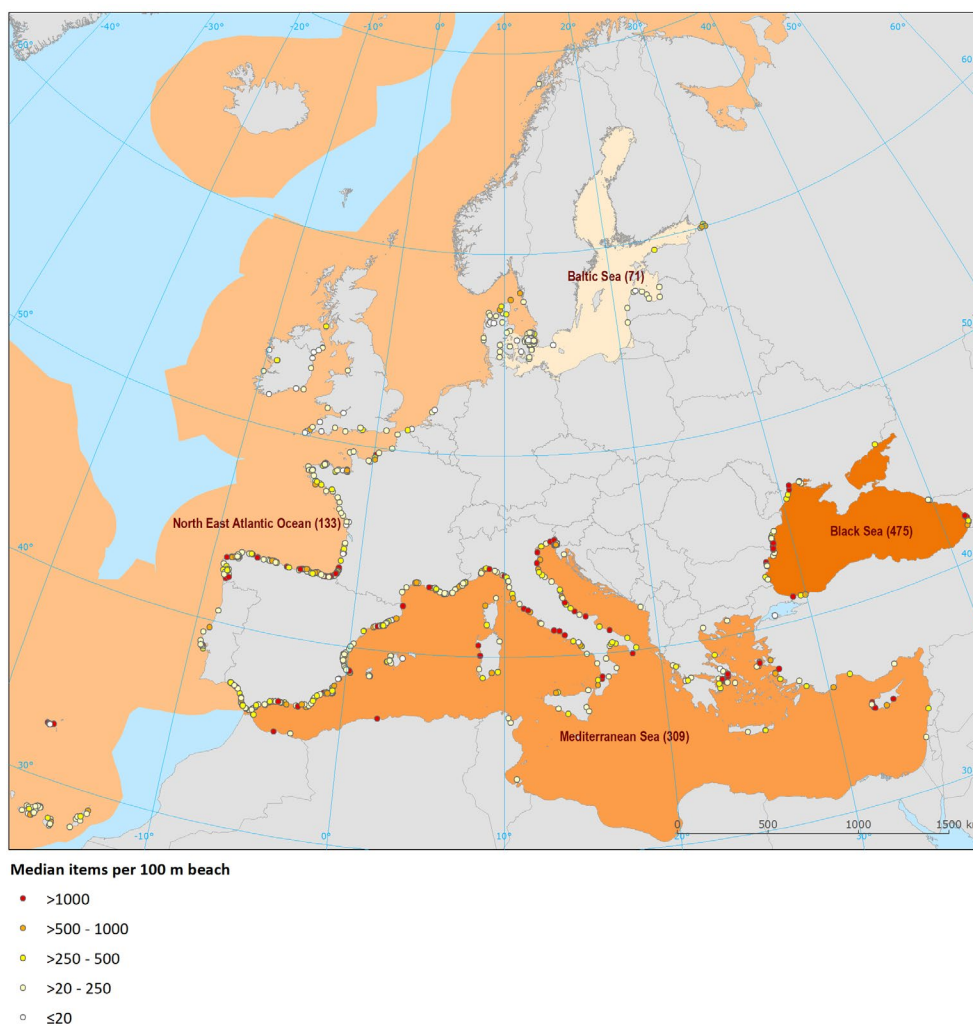
5. MLW data and EU marine litter policies

Following the recognition of marine litter as one of the major threats to the oceans, there is a need for further policy development and long-term litter monitoring programmes. The EEA MLW initiative has successfully engaged citizens in collecting a massive amount of data on the litter along the beaches of Europe's seas. The MLW data set provides a unique view of the status of litter on beaches and has revealed important regional differences among Europe's seas. Monitoring results are used to identify the types and sources of litter, as well as support policy decisions, such as those that aim to protect and restore the marine environment by introducing bans or restrictions on certain items to minimise their environmental impacts. The MSFD, the ZPAP, and the SUP Directive are amongst the most important directives and policies at the EU level that tackle the problem of marine litter.

The MSFD constitutes the EU legal framework for the protection of Europe’s seas (EC, 2023). Marine litter is included as one of the descriptors (D10) for achieving and maintaining Good Environmental Status (GES) of Europe’s marine waters and protecting marine resources. As part of the MSFD, coastal EU Member States are required to monitor marine litter, and beach litter surveying is one of the easiest and most accessible approaches. Still, Europe’s wide coastline and variation of factors affecting the amounts and distribution of litter in marine and coastal environments make it challenging to establish baselines and trends. The MLW initiative can complement the official monitoring programmes within the EU by providing the much-needed geographic and temporal coverage, particularly through its ‘monitoring’ scheme.

The achievement of GES will occur only when properties and quantities of marine litter do not cause harm to the coastal and marine environment. The threshold value for beach litter “Good Environmental Status” was defined as 20 litter items/100m of beach strip by the EU MSFD TGML, universally for all Europe’s beaches (Van Loon et al. 2020). Applying this threshold value to the MLW monitoring data set for the period 2013-2022 reveals that the overall median values of beach litter abundance exceed substantially the threshold in all four of Europe’s seas and at 91% of the included beaches (Map 5-1). However, MLW data assessment is indicative and can only be used supplementary to the MSFD monitoring data of the EU Member States. Still, MLW surveys attest to the concerning levels of litter pollution that are still prevalent and extensive on Europe’s beaches.

Map 5-1 Beach litter items per 100m, by beach and marine region. Note: the median number of litter items per regional sea is given in parentheses. Source: EEA MLW assessment data set 2013-2022.



One of the six main interim targets of the ZPAP for 2030 is reducing litter at sea by 50% (EU, 2020). Such a reduction is currently not observed in the MLW data. Nevertheless, conclusions on changes in litter loads in Europe's beaches need to be evaluated using official Member States' monitoring data, collected systematically in reference beaches.

The SUP Directive aims at preventing and reducing the impact of certain plastic products on the environment, in particular the aquatic environment (EU, 2019). This Directive was formulated as a result of the beach litter monitoring efforts, driven by the MSFD, and it targets specific plastic litter items that are commonly found in Europe's coastline. These include drink bottles, cotton bud sticks, cutlery, plates, straws, stirrers, balloon sticks, cups, food and beverage containers, cigarette butts, as well as fishing gear. Depending on the item, Member States must have measures in place to increase the collection or reduce consumption, namely through market restrictions. Countries are in different stages of adopting and enforcing such measures and, in some cases, have been delayed by the COVID-19 epidemic. It is, therefore, too early to comment on SUP item trends. The MLW monitoring data indicate that SUP items are widely prevalent in Europe's beaches and comprise 52% of the total litter items recorded. Among these, items targeted by the SUP Directive are among the top ten in all the regional seas.

More years' worth of data in the MLW data set and standardisation of the monitoring efforts will further help in the analysing of Europe's regional seas and temporal trends, therefore providing useful information to support in implementing the EU policies on marine litter.

6. List of abbreviations

Abbreviation	Name
EEA	European Environment Agency
ETC	European Topic Centre
EU	European Union
GES	Good Environmental Status
MLW	Marine Litter Watch
MSFD	Marine Strategy Framework Directive
OSPAR	Convention for the Protection of the Marine Environment in the North-East Atlantic
SUP	Single-Use Plastics
TGML	Technical Group on Marine Litter
ZPAP	Zero Pollution Action Plan

7. References

EC, 2023, 'Marine environment - EU policies to protect Europe's ocean, seas and coasts' (https://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/index_en.htm) accessed 1 December 2023.

EU MSFD TGML, 2013, *Guidance on Monitoring of Marine Litter in European Seas*, European Union Marine Strategy Framework Directive Technical Group on Marine Litter, Joint Research Centre, Ispra, Italy.

EU, 2019, 'Single-use plastics' (https://environment.ec.europa.eu/topics/plastics/single-use-plastics_en#overview) accessed 1 December 2023.

EU, 2020, 'Zero pollution action plan' (https://environment.ec.europa.eu/strategy/zero-pollution-action-plan_en) accessed 1 December 2023.

Fleet, D., Vlachogianni, T., Hanke, G., 2021, *A Joint List of Litter Categories for Marine Macrolitter Monitoring*, European Union Marine Strategy Framework Directive Technical Group on Marine Litter, Joint Research Centre, Ispra, Italy.

Kıdeys, A., Šubelj, G., Aydın, M., 2021. Marine litter and European beaches: learning from citizen science (ETC/ICM Report 1/2021). European Topic Centre on Inland, Coastal and Marine Waters).

UNEP, 2021, *From Pollution to Solution: A global assessment of marine litter and plastic pollution*, United Nations Environment Programme, Nairobi, Kenya.

Van Loon, W., Hanke, G., Fleet, D., Werner, S., Barry, J., Strand, J., Eriksson, J., Galgani, F., Gräwe, D., Schulz, M., Vlachogianni, T., Press, M., Blidberg, E. and Walvoort, D. 2020, *A European threshold value and assessment method for macro litter on coastlines*, European Union Marine Strategy Framework Directive Technical Group on Marine Litter, Joint Research Centre, Ispra, Italy.

Veiga, J.M., Winterstetter, A., Murray, C., Šubelj, G., Birk, B., Lusher, A., van Bavel, B., Aytan, U., Andersen, J., Sholokhova, A., Kideys, A., Smit, M., Arnold, M., Aydın, M., 2022, *Marine litter in Europe – An integrated assessment from source to sea (No. ETC/ICM Technical Report 05/2022)*, European Topic Centre on Inland, Coastal and Marine Waters.

Winterstetter, A., Veiga, J.M., Sholokhova, A., Šubelj, G., 2023, 'Country-specific assessment of mismanaged plastic packaging waste as a main contributor to marine litter in Europe', *Frontiers in Sustainability* 3, 1039149 (<https://doi.org/10.3389/frsus.2022.1039149>) accessed 25 November 2024.

Annex A. Overview of events by region, waterbody category, and year

The MLW initiative, its app and data flow have been running since 2013. The inflow of data had been mostly increasing until 2019, after which the data flow has seen a substantial decrease (Figure A.1.1). The large data sets of 2017–2019 are partly due to a notable volume of data for lake or river shores in Europe. In the most recent period of 2020–2022, there was a steady decrease of sea beach data for the North-east Atlantic and Mediterranean Sea.

Figure A1.1 Number of beaches by year.

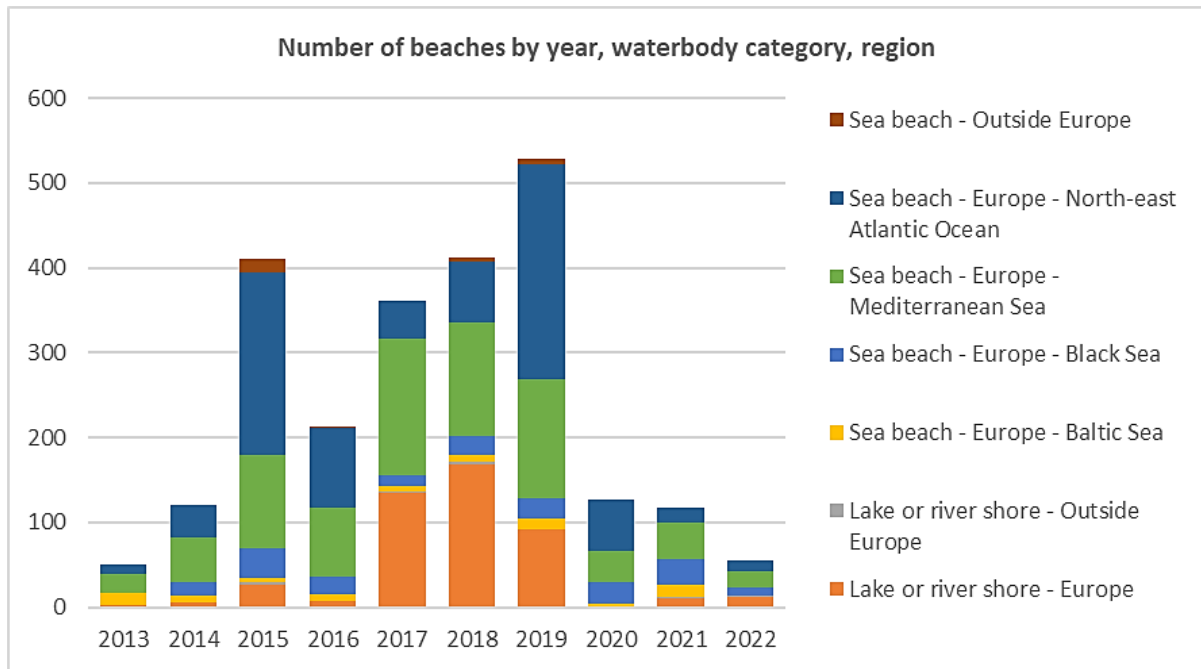


Figure A1.2 Number of events by year.

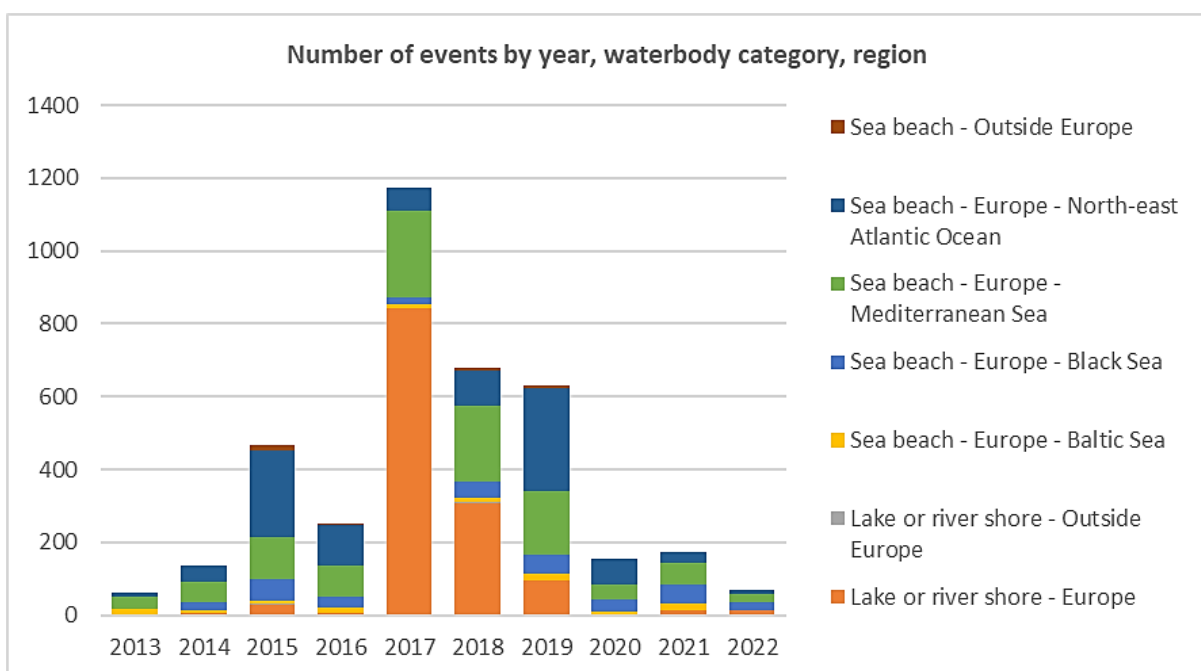
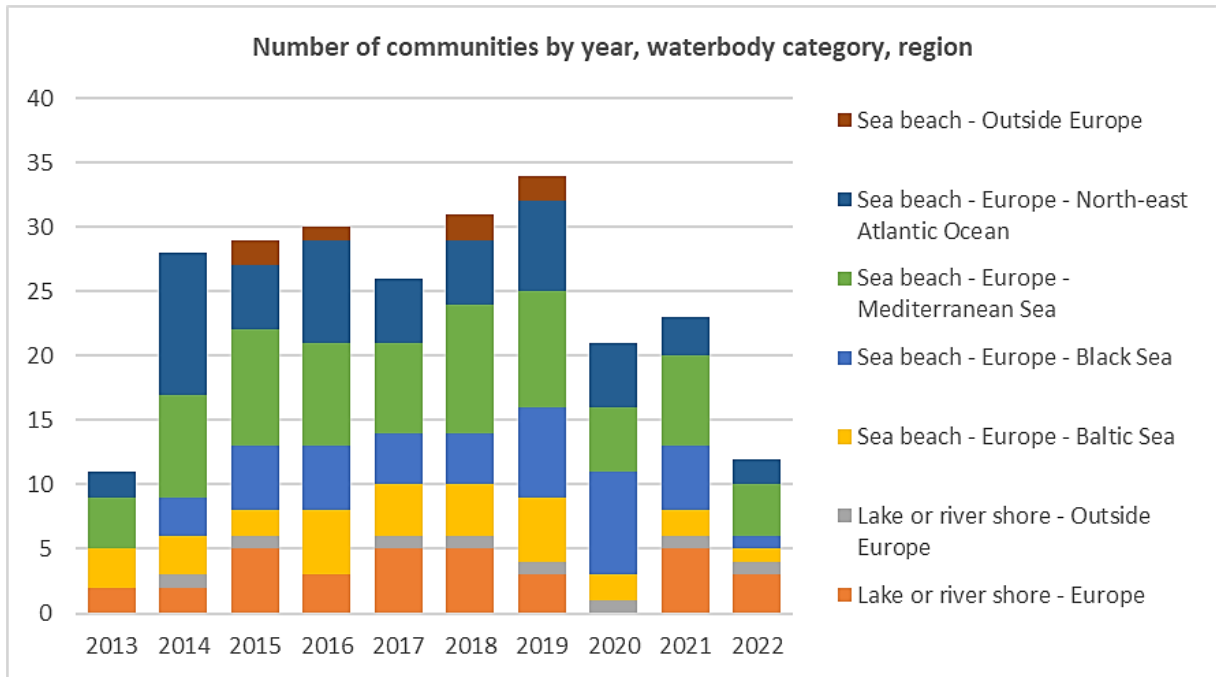


Figure A1.3 Number of communities by year.



Annex B. Overview of communities

Altogether, 60 defined communities reported data to the MLW data set. In addition, there is a series of unnamed 'communities', which generally correspond to individual and ad-hoc events. Out of 3,795 events in the data set, 345 are attributed to unnamed communities.

The largest providers are the Swiss Litter Report (1,035 events; reporting only lake/river shore data), Surfrider Foundation Europe (661 events), Marnoba (420 events), Monitoraggio Strategia Marina – Ministry of Environment (254 events), Legambiente Onlus (195 events), Aarhus University – Denmark (167 events), and Mare Nostrum (123 events).

Table B1.1 Communities with reported events by year

Community / country	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Aarhus University – Denmark		4	15	21	23	27	20	24	22	11	167
Denmark		4	15	21	22	27	20	24	22	11	166
Greenland					1						1
Aegean Greeners							1		1		2
Greece							1		1		2
Anemone							18				18
Romania							16				16
Turkey							2				2
Archipelagos			1								1
Greece			1								1
Archipelagos Institute of Marine Conservation			3								3
Greece			3								3
Athens Gouladri Natural History Museum			1								1
Greece			1								1
AwdF							1				1
Spain							1				1
Beach Cleaning Team									7		7
Greece									7		7
Black Sea Eco Academy									8		8
Georgia									8		8
Black Sea NGO Network MELTEMI			4		1	10	7	1			23
Bulgaria			4		1	10	7	1			23
Blue Flag Turkiye								5	24	7	36
Turkey								5	24	7	36
Čista obala Slovenia		2									2
Slovenia		2									2
Clean Coasts		3									3
Ireland		3									3
Clean Sea LIFE					1						1
Italy					1						1
CleanPiterCoast				1	2	2	4				9
Russia				1	2	2	4				9
Coder Dojo Dunmore East							4				4
Ireland							4				4
DeFishGear – Slovenia		15	7	4	32	14					72
Croatia			2	1		1					4

Italy		2			2					4	
Slovenia		13	5	3	30	13				64	
EMBLAS				1	2		11	5		19	
Georgia							8	4		12	
Russia				1	2		1			4	
Turkey							2	1		3	
Estonian Green Movement				1						1	
Estonia				1						1	
European Environment Agency (EEA)	8	1								9	
Denmark	8	1								9	
eXXpedition		2								2	
Italy		1								1	
Spain		1								1	
GEO BSMARINELITTER			2	1						3	
Georgia			2							2	
Turkey				1						1	
Georgia							4			4	
Georgia							4			4	
HCMR@School			6							6	
Greece			6							6	
HELMEPA - Hellenic Marine Environment Protection Association		6		5		6			1	18	
Greece		6		5		6			1	18	
Hold Danmark Rent	13	13								26	
Denmark	13	13								26	
ICES Secretariat		1								1	
Denmark		1								1	
Institute for Water of the Republic of Slovenia	12									12	
Italy	2									2	
Slovenia	10									10	
Keep Sweden Tidy				2						2	
Sweden				2						2	
KYMA							1		1	2	
Greece							1			1	
Italy									1	1	
Legambiente Onlus		14	15	32	57	77				195	
Italy		14	15	32	57	77				195	
Let's do it Ukraine								2	7	9	
Ukraine								2	7	9	
Mana Jūra								11		11	
Latvia								11		11	
Mare Nostrum		7	7	15	16	17		17	23	21	123
Romania		7	7	15	16	17		17	23	21	123
Marnoba	18	13	29	32	40	86	137	65			420
Cape Verde				3							3
Spain	18	13	29	29	40	86	137	65			417
Mediterranean Information Office for Environment, Culture and Sustainable Development (MIO-ECSDE)				3							3
Greece				3							3
Mediterranean Microplastics Project (MMP)							2				2
Croatia							2				2
MELTEMI BalkanMed						8	1				9

Greece						8	1					9
MELTEMI Exhibition Centre Chios								4				4
Greece								4				4
Monitoraggio Strategia Marina – Ministero dell’Ambiente						128	125	1				254
Italy						128	125	1				254
NIMRD Grigore Antipa							14					14
Bulgaria							2					2
Romania							12					12
OceanCare Cleanups							5					5
Italy							5					5
OceanCareErasmusProjet										1		1
Italy										1		1
ocean-R-evolution.com						6						6
Germany						3						3
Switzerland						3						3
PALS: STOP BASURAS MARINAS						1	1					2
Spain						1	1					2
Perseus	4	23	27	8		2	2	2				68
Bulgaria		2	3	1		2	2	2				12
France			1									1
Greece	4	2		2								8
Italy			1									1
Romania		12	19	5								36
Spain		3	3									6
Tunisia		2										2
Turkey		2										2
Plastic Change				15	15	14	8	4				56
Denmark				15	15	14	8	4				56
Portuguese Association for Marine Litter - APLM		1		2	2							5
Portugal		1		2	2							5
SOI								4	6			10
Russia								4	6			10
Su Urunleri Kasifleri (Seafood Explorers)-Ege University							1					1
Turkey							1					1
Sum Yazilim Community							1					1
Turkey							1					1
Surfers Against Sewage			18	4								22
United Kingdom			18	4								22
Surfrider Foundation Europe	1	5	273	28		3	348	3				661
Algeria			1	1								2
Argentina			2									2
Belgium			1	1			2					4
Brazil			1									1
Costa Rica			1									1
Denmark		1					1					2
France		3	179	11		2	258	2				455
French Polynesia			2									2
Germany			6				3					9
Greece				1								1
Italy	1		26	7		1	2					37

Kenya								1			1
Lebanon							1				1
Luxembourg							1				1
Madagascar			1								1
Mauritania			1								1
Mauritius			1								1
Morocco			2				2				4
Netherlands			4	2							6
New Caledonia			2								2
Portugal			5				4				9
Spain		1	35	5			73				114
Sweden			2								2
Switzerland			1								1
Tunisia							1				1
Swiss Litter Report						818	217				1035
Germany						62	16				78
Switzerland						756	201				957
UK Marine Conservation Society						3					3
United Kingdom						3					3
UkrSCES Institution						2		4	14	3	23
Ukraine						2		4	14	3	23
UNDEFINED	7	25	60	74	26	50	46	14	24	19	345
Algeria		1									1
Belgium							2				2
Bosnia and Herzegovina				2							2
Brazil							1	1			2
Bulgaria			26	8			2				36
Chile			1								1
Croatia								1			1
Cyprus							6		2		8
Denmark	4	7	2	4		3	4	5			29
Estonia						1					1
Finland		1									1
France		3		16	5	4	5	2	4	2	41
Georgia							4	1			5
Germany			1								1
Greece	1	3		4	2	3	2		3	11	29
Ireland		1	15	19		1					36
Israel			2								2
Italy		2	1	2	1	4	4		2		16
Malta			1				1				2
Mexico							1				1
Montenegro								1			1
Netherlands	1					1	1	1			4
Norway		1	1								2
Portugal		1	2	3		2	3	1			12
Romania		1	1								2
Russia							1	1			2
Saudi Arabia									1		1
South Africa							9	3			12
Spain		2	2	5	3	8	3	2	13	2	40

Sweden		1		2								3
Switzerland				2	7	2						11
Tunisia							1					1
Turkey							1	1				2
Ukraine									1	2		3
United Kingdom	1	1	5	7	6	1	9				1	31
Vietnam											1	1
We Clean the Beach									4			4
Spain									4			4
Wings of the Ocean									26			26
Åland									1			1
Portugal									13			13
Spain									12			12
WWF Denmark							12					12
Denmark							12					12
YOLY								1	1			2
Spain								1	1			2
Grand Total	63	135	468	252	1172	678	630	153	174	70		3795

Note: Includes data of MLW 2013–2022 Reference data set (see section 2.1), not only the data of the Assessment data set (see section 2.2).

European Topic Centre on
Biodiversity and ecosystems
<https://www.eionet.europa.eu/etcs/etc-be>

The European Topic Centre on Biodiversity and
ecosystems (ETC-BE) is a consortium of European
institutes under contract of the European
Environment Agency.

European Environment Agency
European Topic Centre
Biodiversity and ecosystems

