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Daniel González-Fernández, Georg Hanke, Ahmet Kideys, Alicia Navarro-Ortega,, Anna Sanchez-Vidal, Antoine Brugère, Bayram Oztürk, Carla Palma, Chiara Santinelli, Daan Duijsings, et al.

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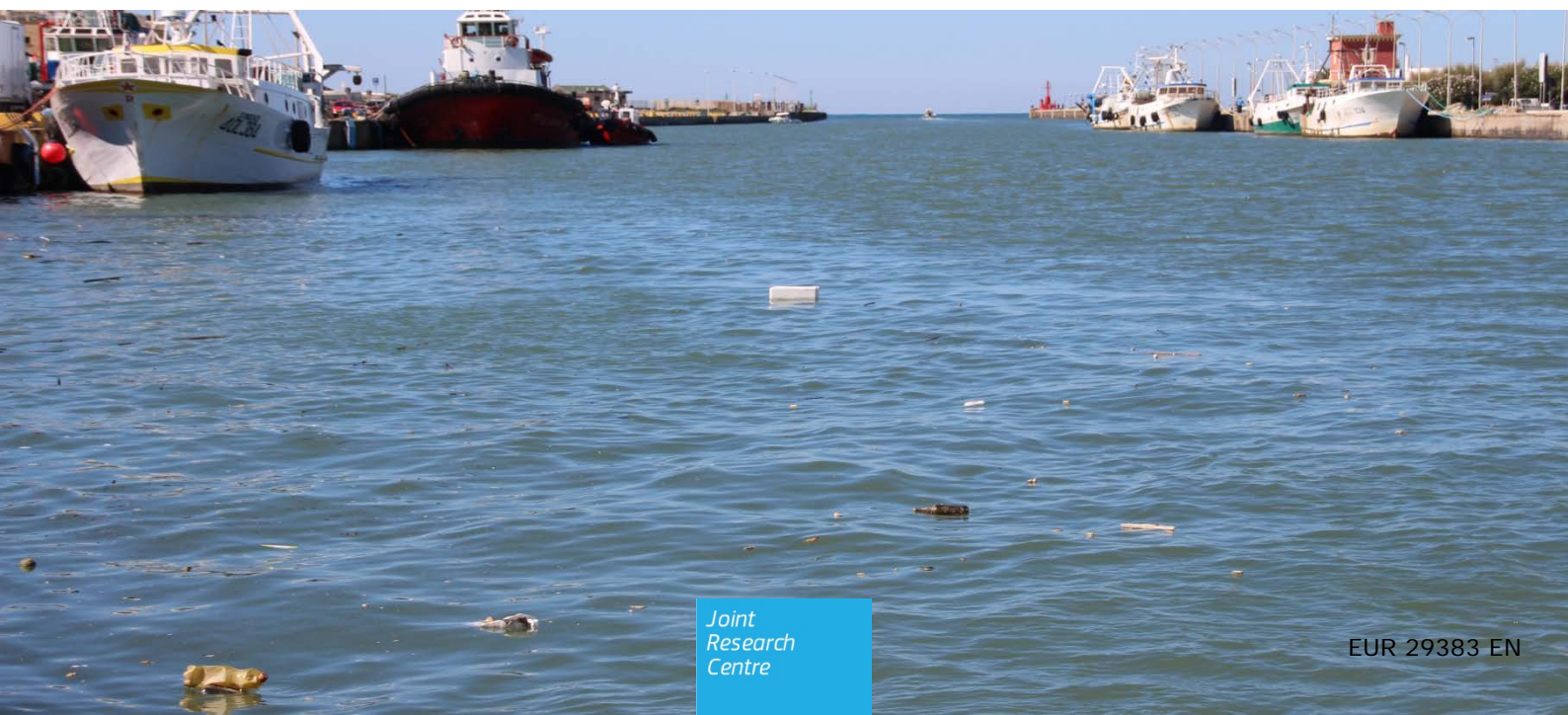
JRC TECHNICAL REPORTS

Floating Macro Litter in European Rivers - Top Items

Review and synthesis of data collected by the JRC exploratory project RIMMEL

Daniel González-Fernández, Georg Hanke and the RiLON network

2018



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Abstract

The JRC exploratory project RIMMEL provides information about litter, mainly plastic waste, entering the European Seas through river systems. RIMMEL has collected data on riverine floating macro litter inputs to the sea. Data acquisition was based on the Riverine Litter Observation Network (RiLON) activities, which collected data from rivers in the European marine basins over a period of one year (September 2016 – September 2017). Data was collected by visual observations and documented with the JRC Floating Litter Monitoring Application for mobile devices, allowing a harmonized reporting, compatible with the MSFD Master List of Categories for Litter Items. This report includes the Top Items lists of riverine floating macro litter, based on the total amount of litter items identified during RiLON activities and ranked by abundance. Top Items lists have been elaborated considering the whole database for the European Seas and further detailed for each individual European regional sea: Baltic Sea, Black Sea, Mediterranean Sea and North-East Atlantic. The North-East Atlantic and the Mediterranean Sea regions showed similar litter categories in their Top 20 Items. These two regions provided most of the available data, influencing the general Top Items list. In the Black Sea and Baltic Sea regions, where data availability was limited, the Top Items lists showed more differences among the different regions. Overall, the general Top Items list for the European Seas showed a predominance of plastic item categories (artificial polymer materials). As a whole, plastic items made up to 80.8% of all objects, with plastic and polystyrene fragments comprising 45% of the identified items in the database. Additionally, Single Use Plastics such as bottles, cover/packaging and bags were also ranked among the most frequently found floating litter. The similarities in the Top 10 and Top 20 items for the different regions, and the appearance of Single Use Plastics scoring high in the ranking, support the need for common actions against plastic pollution at EU level.

1 Introduction

Marine pollution by anthropogenic litter has become a global environmental concern. The political agenda is setting priorities on tackling plastics from land-based sources, which contribute greatly to the marine litter issue. This has been stated internationally in the United Nations Sustainable Development Goal 14 (<https://sustainabledevelopment.un.org/sdg14>), the G7 Action Plan to Combat Marine Litter (Germany, 2015; and Japan, 2016) and the G20 Action Plan on Marine Litter (Germany, 2017). In Europe, Member States have committed through the Marine Strategy Framework Directive (MSFD, 2008/56/EC) to ensure that there is no harm caused by marine litter. At EU level the European Strategy for Plastics in a Circular Economy has recently introduced the plan for key actions to limit plastic pollution (EC, 2018a).

In Europe, the MSFD Technical Group on Marine Litter (TG Litter), co-chaired by France, Germany and the DG Joint Research Centre (JRC), is providing advice to the Marine Strategy Framework Directive (MSFD, 2008/56/EC) regarding the implementation of Descriptor 10 (Marine Litter) and the EU external activities against Marine Litter, and supporting the Strategy for Plastics mentioned before. Within a series of technical reports, the TG Litter has also highlighted the importance of riverine litter input to the sea. The TG Litter has published the Riverine Litter Monitoring – Options and Recommendations – report (González et al. 2016), reviewing the existing information and providing direction for further monitoring. Currently, characteristics and quantities of plastic input from rivers to the sea remain mostly unknown. In fact, the existing modelling exercises are based on limited field data (Lebreton et al., 2017; Schmidt et al., 2017), and therefore subject to major uncertainties. The implementation of regulations to reduce marine litter requires further information on the subject to prioritize prevention and reduction measures. Thus, monitoring field data is needed in order to e.g. identify hotspots, quantify loads and characterize sources.

2 Data acquisition

The JRC exploratory research project RIMMEL (Riverine and Marine floating macro litter Monitoring and Modelling of Environmental Loading), provides observation data on floating macro litter items entering the European Seas through rivers. RIMMEL proposed a harmonized approach based on visual observations, providing a common tool for monitoring and data reporting: the JRC Floating Litter Monitoring App (González-Fernández and Hanke, 2017). The study of the macro litter fraction input was a pioneering activity in the topic of riverine litter at European level.

Within RIMMEL, a Riverine Litter Observation Network (RiLON) was set up for acquisition of field data on floating macro litter inputs to the sea. The network was a collaborative activity of 32 institutions covering rivers from 15 EU and non-EU countries in the four European Regional Seas: Baltic Sea, Black Sea, Mediterranean Sea and North-East Atlantic. Additional details on the participants in the network can be consulted in Annex I.

The RiLON participants acquired field data through short visual observation sessions (approx. 30 minutes) from bridges or other vantage points on rivers. Positions were selected close to the sea in order to monitor inputs to the marine environment as far as possible. In the case of larger rivers, observers defined their observation track width according to the distance from which they could identify litter > 2.5 cm size, thus monitoring only a part of the river section. Observers documented only litter floating or suspended in the river surface layer.

By using the JRC Floating Litter Monitoring App, the observers collected and reported data according to the MSFD Master List of Categories of Litter Items (Galgani et al., 2013). Consequently, the use of a common list allowed a harmonized data processing and analysis, facilitating the ranking of the most frequent litter items observed by the RiLON.

The RIMMEL database is the first of its kind, containing details on riverine macro litter items entering the European seas. The Top Items list provides abundance information linked to the identity of floating macro litter in European rivers. This information can be used to prioritize prevention and reduction measures, supporting the implementation of environmental regulations against marine litter, e.g. contributing to the monitoring and assessment of Descriptor 10 under the MSFD, and the EU proposal for action on 'Single Use Plastics' (SUP) on the reduction of the impact of certain plastic products on the environment (EC, 2018b).

This report reviews and synthesises the data collected by the RiLON under the JRC exploratory project RIMMEL, presenting the Top Items list for the whole database as well as for the individual regional seas. Top Items lists are described along with supporting data on number of rivers, monitoring sessions, observation time, and number of items considered in the calculations.

3 Elaboration of Top Items list

The data collection for the RiLON took place from September 2016 to September 2017. Additional datasets were collected previously (June-2016 to August-2016) during the setup of the observation network to test the methodological approach.

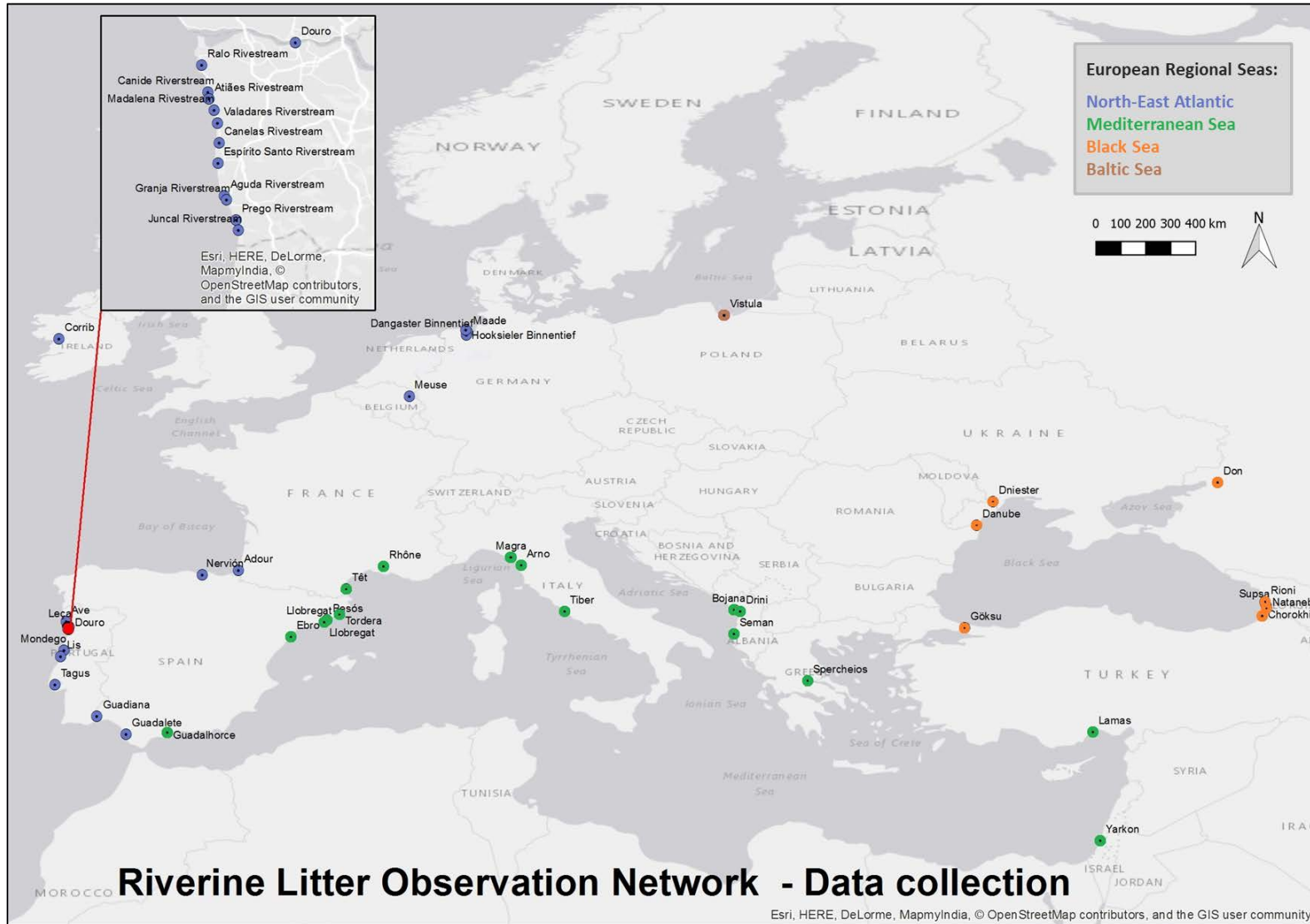
The RIMMEL database contains datasets received from 32 Scientific Institutes, Authorities, SMEs and NGOs, with spatial coverage in 15 countries (Annex I). The data analysed in this report corresponded to visual observations of floating macro litter in the final reach of 53 rivers and streams selected for the monitoring of riverine litter input to the sea*. A map with the monitoring sites is included in Figure 1.

A total of 817 valid datasets was considered in the elaboration of the Top Item lists. Each individual datasets corresponded to one observation session. Floating litter items were identified following the MSFD Official Master List (Galvani et al., 2013) for harmonization purposes. Sections 3 and 4 include further details on the data used in the elaboration of each Top Items list: European Seas (general list including all datasets) and individual Regional Seas (Baltic Sea, Black Sea, Mediterranean Sea and North-East Atlantic).

Litter items were ranked in descending order according to abundance. Results are shown as percentages, considering the total number of items for each list. Item names, materials and MSFD Codes have been extracted from the MSFD Master List of Categories of Litter Items (Galvani et al., 2013). In the tables, the 'Artificial polymer materials' category is shown as 'Plastic' (under Material). Additionally, pie charts include the distribution of items by material for the Top 10 and Top 20 items (expressed as percentages of total items).

* Except River Meuse: occasional data collected in Maastricht (Netherlands), at more than 100 km from the sea.

Figure 1. RiLON data collection - rivers and monitoring sites (colour coded by Regional Sea).

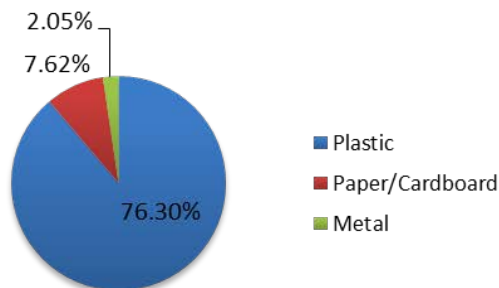


4 Riverine Floating Macro Litter – General Top Items list in the European Seas

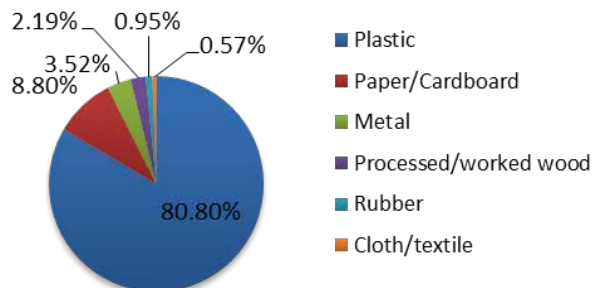
The general Top Items list in the European Seas has been elaborated using the whole RIMMEL database with data from the 53 rivers and streams included in Figure 1. The selected data corresponds to 817 datasets and 470.7 hours of monitoring. The observers identified 8599 litter items. The Top 10 items comprised up to 86.0% of total items and included the following material categories: 7 plastic, 2 paper/cardboard and 1 metal. The Top 20 items contributed up to 96.8% of total items, including the following material categories: 10 plastic, 3 paper/cardboard, 3 processed/worked wood, 2 metal, 1 rubber and 1 cloth/textile. The distribution of items by material showed a clear predominance of plastic (up to 80.8 % in the Top 20 items). Plastic and polystyrene fragments reached 45% of the total items.

General Top Items list

Ranking	Item	Material	MSFD Code	% of Total Items
1	Plastic pieces 2.5 cm > < 50cm, > 50 cm	Plastic	G79 + G80	38.59%
2	Bottles	Plastic	G6	9.55%
3	Cover / packaging	Plastic	G38	8.42%
4	Bags	Plastic	G2	7.77%
5	Polystyrene pieces 2.5 cm > < 50cm, > 50 cm	Plastic	G82 + G83	6.35%
6	Other paper items	Paper/Cardboard	G158	4.01%
7	Paper packaging	Paper/Cardboard	G149	3.61%
8	Sheets, industrial packaging, plastic sheeting	Plastic	G67	2.93%
9	Foam packaging/insulation/polyurethane	Plastic	G74	2.70%
10	Cans (beverage)	Metal	G175	2.05%
11	Other plastic/polystyrene items (identifiable)	Plastic	G124	1.98%
12	Crates and containers / baskets	Plastic	G18	1.81%
13	Other (metal)	Metal	G197	1.48%
14	Newspapers & magazines	Paper/Cardboard	G154	1.19%
15	Beams / Dunnage	Processed wood	G169	0.99%
16	Other rubber pieces	Rubber	G134	0.95%
17	Wood boards	Processed wood	G168	0.72%
18	Synthetic rope	Plastic	G48	0.71%
19	Other textiles (incl. rags)	Cloth/textile	G145	0.57%
20	Pallets	Processed wood	G160	0.48%



Top 10 Items
86.0% of total items



Top 20 Items
96.8% of total items

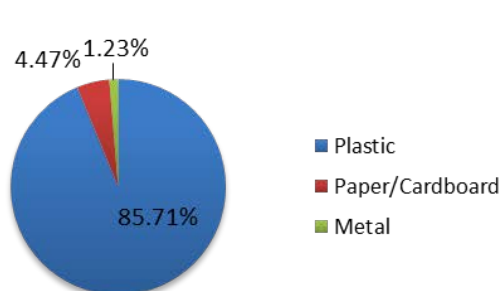
5 Riverine Floating Macro Litter - Top Items list by regional sea

North-East Atlantic

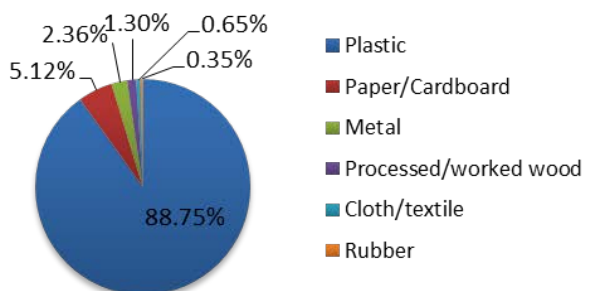
The Top Items list in the North-East Atlantic region has been compiled using data from 27 rivers and streams (see Figure 1). The selected data corresponds to 436 datasets and 230.3 hours of monitoring. The observers identified 4319 litter items. The Top 10 items made up to 91.4% of total items and included the following material categories: 7 plastic, 2 paper/cardboard and 1 metal. The Top 20 items added up to 98.5% of total items, including the following material categories: 11 plastic, 3 paper/cardboard, 2 processed/worked wood, 2 metal, 1 rubber and 1 cloth/textile. The amount of plastic items in the Top 20 made up to 88.8%. Plastic and polystyrene fragments reached 61.2% of the total items.

North-East Atlantic - Top Items list

Ranking	Item	Material	MSFD Code	% of Total Items
1	Plastic pieces 2.5 cm > < 50cm, > 50 cm	Plastic	G79 + G80	54.53%
2	Cover / packaging	Plastic	G38	7.87%
3	Polystyrene pieces 2.5 cm > < 50cm, > 50 cm	Plastic	G82 + G83	6.69%
4	Bags	Plastic	G2	5.79%
5	Sheets, industrial packaging, plastic sheeting	Plastic	G67	4.33%
6	Bottles	Plastic	G6	3.89%
7	Foam packaging/insulation/polyurethane	Plastic	G74	2.62%
8	Other paper items	Paper/Cardboard	G158	2.57%
9	Paper packaging	Paper/Cardboard	G149	1.90%
10	Other (metal)	Metal	G197	1.23%
11	Other plastic/polystyrene items (identifiable)	Plastic	G124	1.20%
12	Cans (beverage)	Metal	G175	1.13%
13	Crates and containers / baskets	Plastic	G18	0.86%
14	Synthetic rope	Plastic	G48	0.69%
15	Beams / Dunnage	Processed wood	G169	0.65%
16	Newspapers & magazines	Paper/Cardboard	G154	0.65%
17	Wood boards	Processed wood	G168	0.65%
18	Other textiles (incl. rags)	Cloth/textile	G145	0.63%
19	Other rubber pieces	Rubber	G134	0.35%
20	Fish boxes - expanded polystyrene	Plastic	G58	0.28%



Top 10 Items
91.4% of total items



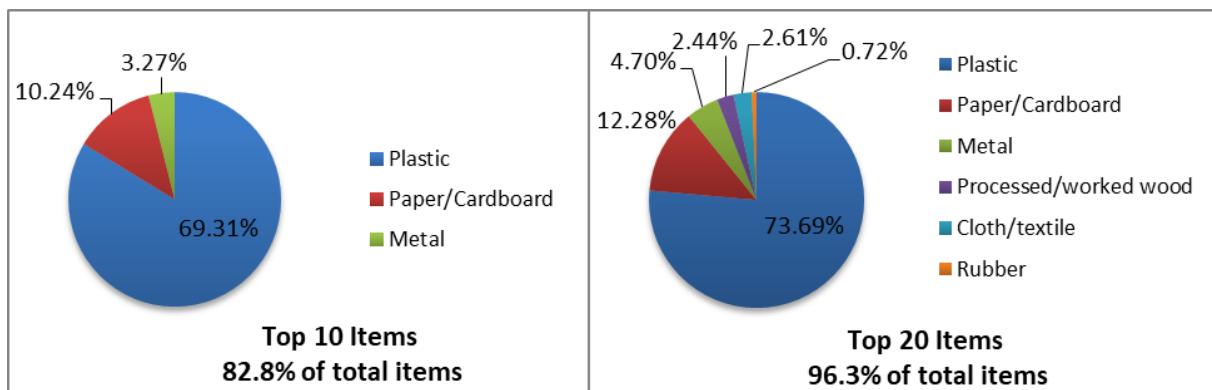
Top 20 Items
98.5% of total items

Mediterranean Sea

The Top Items list in the Mediterranean Sea region has been collated using data from 17 rivers and streams (see Figure 1). The selected data corresponds to 272 datasets and 170.6 hours of monitoring. The observers identified 3486 litter items. The Top 10 items made up to 82.8% of total items and included the following material categories: 7 plastic, 2 paper/cardboard and 1 metal. The Top 20 items comprised up to 96.3% of total items, including the following material categories: 10 plastic, 3 paper/cardboard, 2 processed/worked wood, 2 metal, 2 rubber and 1 cloth/textile. Plastic items in the Top 20 made up to 73.7% of total items. Plastic and polystyrene fragments reached 31.6% of the total items.

Mediterranean Sea - Top Items list

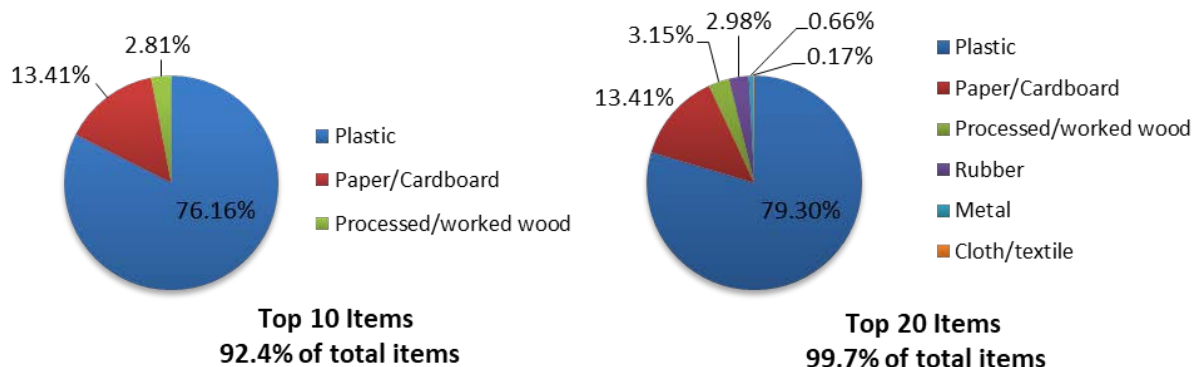
Ranking	Item	Material	MSFD Code	% of Total Items
1	Plastic pieces 2.5 cm > < 50cm, > 50 cm	Plastic	G79 + G80	25.01%
2	Bottles	Plastic	G6	13.48%
3	Bags	Plastic	G2	9.87%
4	Cover / packaging	Plastic	G38	8.61%
5	Polystyrene pieces 2.5 cm > < 50cm, > 50 cm	Plastic	G82 + G83	6.60%
6	Other paper items	Paper/Cardboard	G158	5.31%
7	Paper packaging	Paper/Cardboard	G149	4.93%
8	Cans (beverage)	Metal	G175	3.27%
9	Foam packaging/insulation/polyurethane	Plastic	G74	3.21%
10	Other plastic/polystyrene items (identifiable)	Plastic	G124	2.52%
11	Newspapers & magazines	Paper/Cardboard	G154	2.04%
12	Sheets, industrial packaging, plastic sheeting	Plastic	G67	1.81%
13	Crates and containers / baskets	Plastic	G18	1.78%
14	Other rubber pieces	Rubber	G134	1.61%
15	Other (metal)	Metal	G197	1.43%
16	Beams / Dunnage	Processed wood	G169	1.41%
17	Balls	Rubber	G126	1.00%
18	Wood boards	Processed wood	G168	0.89%
19	Fish boxes - expanded polystyrene	Plastic	G58	0.80%
20	Clothing (clothes, shoes)	Cloth/textile	G135	0.72%



Black Sea

The Top Items list in the Black Sea region has been created using data from eight rivers and streams (see Figure 1). The selected data corresponds to 58 datasets and 45 hours of monitoring. The observers identified 604 litter items. The Top 10 items made up to 92.4% of total items and included the following material categories: 7 artificial polymer materials, 2 paper/cardboard and 1 processed/worked wood. The Top 20 items made up to 99.7% of total items, including the following material categories: 11 artificial polymer materials, 3 rubber, 2 paper/cardboard, 2 processed/worked wood, 1 metal and 1 cloth/textile. In the Top 20, Plastic items made up to 79.3% of total items. Plastic and polystyrene fragments accounted for 18.2% of the total items.

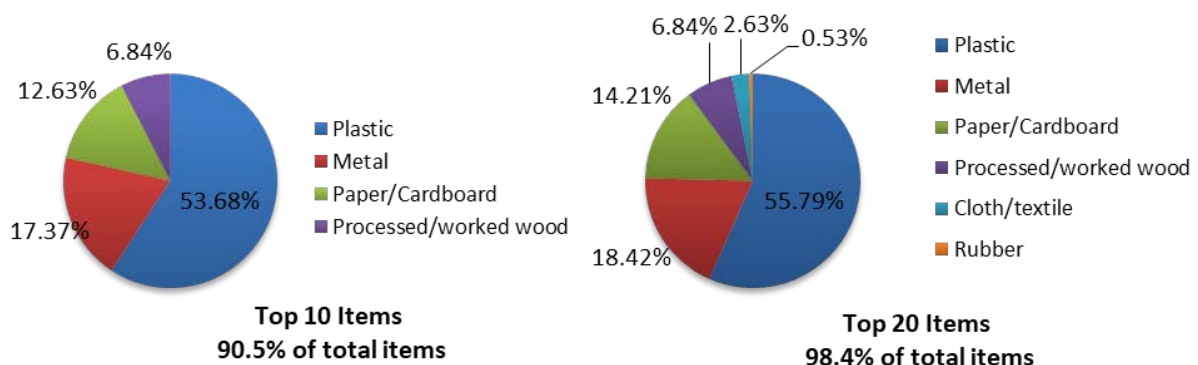
Ranking	Items	Material	MSFD Code	% of Total Items
1	Bottles	Plastic	G6	19.70%
2	Plastic pieces 2.5 cm > < 50cm, > 50 cm	Plastic	G79 + G80	13.74%
3	Cover / packaging	Plastic	G38	13.74%
4	Bags	Plastic	G2	10.43%
5	Crates and containers / baskets	Plastic	G18	9.27%
6	Paper packaging	Paper/Cardboard	G149	7.12%
7	Other paper items	Paper/Cardboard	G158	6.29%
8	Other plastic/polystyrene items (identifiable)	Plastic	G124	4.80%
9	Polystyrene pieces 2.5 cm > < 50cm, > 50 cm	Plastic	G82 + G83	4.47%
10	Pallets	Processed wood	G160	2.81%
11	Other rubber pieces	Rubber	G134	1.82%
12	Fish boxes - plastic	Plastic	G57	1.49%
13	Rubber boots	Rubber	G127	0.99%
14	Foam packaging/insulation/polyurethane	Plastic	G74	0.99%
15	Cans (beverage)	Metal	G175	0.66%
16	Sheets, industrial packaging, plastic sheeting	Plastic	G67	0.33%
17	Synthetic rope	Plastic	G48	0.33%
18	Wood boards	Processed wood	G168	0.33%
19	Tyres and belts	Rubber	G128	0.17%
20	Clothing (clothes, shoes)	Cloth/textile	G135	0.17%



Baltic Sea

The Top Items list in the Baltic Sea region has been based on data from one river (see Figure 1). The selected data corresponds to 51 datasets and 24.8 hours of monitoring. The observers identified 190 litter items. The Top 10 items made up to 90.5% of total items and included the following material categories: 4 artificial polymer materials, 2 metal, 2 paper/cardboard and 2 processed/worked wood. The Top 20 items made up to 98.4% of total items, including the following material categories: 8 artificial polymer materials, 3 metal, 3 paper/cardboard, 2 processed/worked wood, 3 cloth/textile and 1 rubber. Plastic items made up to 55.8% of total items. Plastic and polystyrene fragments amounted to 4.2% of the total items.

Ranking	Items	Material	MSFD Code	% of Total Items
1	Bottles	Plastic	G6	33.68%
2	Other (metal)	Metal	G197	12.63%
3	Synthetic rope	Plastic	G48	10.00%
4	Paper packaging	Paper/Cardboard	G149	6.84%
5	Bags	Plastic	G2	5.79%
6	Other paper items	Paper/Cardboard	G158	5.79%
7	Cans (beverage)	Metal	G175	4.74%
8	Beams / Dunnage	Processed wood	G169	4.21%
9	Plastic pieces 2.5 cm > < 50cm, and > 50 cm	Plastic	G79 + G80	4.21%
10	Pallets	Processed wood	G160	2.63%
11	Newspapers & magazines	Paper/Cardboard	G154	1.58%
12	Barrels	Metal	G192	1.05%
13	Clothing (clothes, shoes)	Cloth/textile	G135	1.05%
14	Other textiles (incl. rags)	Cloth/textile	G145	1.05%
15	Other plastic/polystyrene items (identifiable)	Plastic	G124	0.53%
16	Balls	Rubber	G126	0.53%
17	Foam packaging/insulation/polyurethane	Plastic	G74	0.53%
18	Cover / packaging	Plastic	G38	0.53%
19	Rope, string and nets	Cloth/textile	G142	0.53%
20	Fish boxes - plastic	Plastic	G57	0.53%



6 Summary - outcome

The RIMMEL initiative for data collection on riverine litter, through its observation network (RILON), has provided the first database of its kind in Europe. The use of a harmonized approach for visual observations allowed the monitoring and identification of floating macro litter (>2.5 cm) flowing down the rivers to the seas. Floating litter was classified following the MSFD Master List of Categories of Litter Items (Galgani et al., 2013), facilitating the ranking of the most frequent items observed by the network across Europe.

Data from the North-East Atlantic and the Mediterranean Sea regions prevailed in the database, and therefore influenced the general Top Items list for the European Seas. These two regions together considered data from 44 rivers in 11 countries, and presented similar litter categories in their respective Top 20 Items, but in different ranking positions. Also, the diversity in the Top 20 Items matched to a great extent with the general Top Items list, as a result of the predominant data availability from these regions. In contrast, the Baltic Sea and Black Sea regions collected a smaller amount of data from 1 and 8 rivers, as well as 1 and 4 countries, respectively. In these regions, some differences were seen in the composition of the Top 20 Items in comparison to the overall Top Items list and also among the different regions. Yet the data still managed to display the most relevant plastic items, including plastic pieces, bottles, bags and cover/packageing.

Despite the imbalance in data availability from the different regions, the general Top Items list provides valuable information on the nature of litter items entering European seas via rivers. Overall, the general Top Items list for all monitored waterways showed predominance of plastic (artificial polymer materials), with 7 plastic items in the Top 10, and 10 plastic items in the Top 20. In general, plastic items comprised 80.8% of all items, with plastic and polystyrene fragments reaching 45% of the items identified in the database. Additionally, Single Use Plastics such as bottles, cover/packageing items and bags were also ranked among the most frequently identified objects.

The similarities in the Top 10 and Top 20 items among the different regions, and the appearance of iconic Single Use Plastics scoring high in the rankings indicate the need for implementation of common actions at EU level, such as the Plastic Strategy, and in coordination with non-EU countries.

The data on Top riverine litter Items from the RIMMEL project have been provided as information in support to the implementation of the EU Plastics Strategy and been used in part 2/3 of the EC Staff Working Document (page 51) on Impact Assessment of legislation for reducing marine litter (EC 2018c).

Quantitative results and analysis of the riverine litter data will be published in a peer reviewed publication (González-Fernández et al., in preparation).

The monitoring of riverine litter input is under development. Harmonization of approaches is recommended, both for resource efficiency in developing and obtaining comparable datasets, and for prioritization of efforts between different river basins as well as with the receiving marine waters.

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Annex 1. RiLON Institutions and rivers involved in data collection

Country	River name	Contact Surname	Contact Name	Institution	Monitoring site Latitude	Monitoring site Longitude	Coordinators	Observers
Albania	Bojana	Bakiu	Rigers	Agricultural University of Tirana	41.85293	19.374094	Rigers Bakiu	Rigers Bakiu, Kristian Beqiri
Albania	Seman	Bakiu	Rigers	Agricultural University of Tirana	40.823378	19.364773	Rigers Bakiu	Rigers Bakiu, Kristian Beqiri
Albania	Drini	Bakiu	Rigers	Agricultural University of Tirana	41.76440048	19.6327877	Rigers Bakiu	Rigers Bakiu, Kristian Beqiri
France	Têt	Kerherve	Philippe	CEFREM - Centre de Formation et de Recherche sur les Environnements Méditerranéens, UMR CNRS 5110	42.7173	3.0408	Philippe Kerherve, Mel Constant	Mel Constant
France	Rhône	Castro Jiménez	Javier	MIO - Mediterranean Institute of Oceanography	43.6746667	4.6185556	Javier Castro Jiménez, Richard Sempéré	Javier Castro Jiménez, Michel Fornier, Natascha Schmidt
France	Adour	Bruge	Antoine	Surfrider Foundation Europe	43.497905	-1.482551	Antoine Bruge	Antoine Bruge
Georgia	Chorokhi	Machitadze	Nino	Tbilisi State University	41.595265	41.59573	Nino Machitadze	Nino Machitadze
Georgia	Supsa	Gelashvili	Nino	Tbilisi State University	42.023894	41.755516	Nino Machitadze	Nino Gelashvili
Georgia	Natanebi	Trapaidze	Vazha	Tbilisi State University	41.911462	41.774192	Nino Machitadze	Vazha Trapaidze
Georgia	Rioni	Maglakelidze	Akaki	Scientific Research Firm GAMMA	42.188781	41.707383	Nino Machitadze	Akaki Maglakelidze
Germany	Maade	Schoeneich-Argent	Rosanna	ICBM - Terramare, Carl von Ossietzky Universität Oldenburg	53.5604179	8.1494686	Rosanna Schoeneich-Argent	Rosanna Schoeneich-Argent
Germany	Dangaster Binnentief	Schoeneich-Argent	Rosanna	ICBM - Terramare, Carl von Ossietzky Universität Oldenburg	53.446767	8.10884	Rosanna Schoeneich-Argent	Rosanna Schoeneich-Argent
Germany	Hooksieler Binnentief	Schoeneich-Argent	Rosanna	ICBM - Terramare, Carl von Ossietzky Universität Oldenburg	53.643493	8.086542	Rosanna Schoeneich-Argent	Rosanna Schoeneich-Argent
Greece	Spercheios	Dimitiriou	Elias	HCMR - Hellenic Centre for Marine Research - Department of Inland Waters	38.855931	22.466352	Elias Dimitiriou	Elias Dimitiriou
Ireland	Corrib	Tourgeli Provata	Myrto	iSea conservation of aquatic ecosystems	53.2666667	-9.05	Myrto Tourgeli	Myrto Tourgeli
Israel	Yarkon	Segal	Yael	IOLR - Israel Oceanographic and Limnological Research	32.099102	34.777565	Yael Segal	Dory Lamdan

Italy	Arno	Santinelli	Chiara	CNR/Biophysics Institute, National Research Council	43.71	10.41	Chiara Santinelli, Yuri Galletti	Yuri Galletti
Italy	Tiber	Crosti	Roberto	ISPRA - Istituto Superiore per la Protezione e la Ricerca Ambientale	41.7708611	12.2282222	Roberto Crosti, Miriam Paraboschi (Accademia del Leviatano)	Roberto Crosti, Miriam Paraboschi, Alessandra Paoletti
Italy	Magra	Suaria	Giuseppe	CNR/ISMAR - Marine Science Institute, National Research Council	44.05	9.983333	Giuseppe Suaria	Giuseppe Suaria
Netherlands	Meuse	Duijsings	Daan	Rijkswaterstaat	50.849409	5.696097	Daan Duijsings	Daan Duijsings
Poland	Vistula	Siedlewicz	Grzegorz	IO PAN - Institute of Oceanology, Polish Academy of Sciences	54.25675	18.94671	Ksenia Pazdro, Grzegorz Siedlewicz	Grzegorz Siedlewicz, Ksenia Pazdro, Anna Malenga, Aleksandra Winogradow
Portugal	Mondego	Bessa	Filipa	MARE - Marine and Environmental Sciences Centre	40.1333333	-8.8333333	Filipa Bessa	Filipa Bessa
Portugal	Douro	Ratola	Nuno	LEPABE-FEUP, University of Porto	41.1396	-8.6093	Nuno Ratola	Arminda Alves, Lucia Santos, Sara Ramos, Daniela Capela
Portugal	Leça	Ratola	Nuno	LEPABE-FEUP, University of Porto	41.1959	-8.6824	Nuno Ratola	Mónica Santos, Marzieh Moeenfarid, Nuno Ratola, Arminda Alves
Portugal	Ave	Ratola	Nuno	LEPABE-FEUP, University of Porto	41.3512	-8.7394	Nuno Ratola	Vera Homem, Mónica Santos
Portugal	Ralo Rivestream	Pereira de Brito	Joana	Águas de Gaia Em,SA	41.1259796	-8.6663363	Fernando Ferreira, Joana Pereira de Brito	Joana Pereira de Brito
Portugal	Canide Riverstream	Pereira de Brito	Joana	Águas de Gaia Em,SA	41.1094444	-8.6624536	Fernando Ferreira, Joana Pereira de Brito	Joana Pereira de Brito
Portugal	Atiães Rivestream	Pereira de Brito	Joana	Águas de Gaia Em,SA	41.1053181	-8.6618399	Fernando Ferreira, Joana Pereira de Brito	Joana Pereira de Brito
Portugal	Madalena Rivestream	Pereira de Brito	Joana	Águas de Gaia Em,SA	41.098375	-8.6586615	Fernando Ferreira, Joana Pereira de Brito	Joana Pereira de Brito

Portugal	Valadares Riverstream	Pereira de Brito	Joana	Águas de Gaia Em,SA	41.0904806	-8.6565811	Fernando Ferreira, Joana Pereira de Brito	Joana Pereira de Brito
Portugal	Canelas Rivestream	Pereira de Brito	Joana	Águas de Gaia Em,SA	41.0786144	-8.6557915	Fernando Ferreira, Joana Pereira de Brito	Joana Pereira de Brito
Portugal	Espírito Santo Riverstream	Pereira de Brito	Joana	Águas de Gaia Em,SA	41.0661373	-8.6562485	Fernando Ferreira, Joana Pereira de Brito	Joana Pereira de Brito
Portugal	Prego Riverstream	Pereira de Brito	Joana	Águas de Gaia Em,SA	41.0316102	-8.6454195	Fernando Ferreira, Joana Pereira de Brito	Joana Pereira de Brito
Portugal	Juncal Riverstream	Pereira de Brito	Joana	Águas de Gaia Em,SA	41.0255354	-8.6438651	Fernando Ferreira, Joana Pereira de Brito	Joana Pereira de Brito
Portugal	Aguda Riverstream	Pereira de Brito	Joana	Águas de Gaia Em,SA	41.0462061	-8.6524601	Fernando Ferreira, Joana Pereira de Brito	Joana Pereira de Brito
Portugal	Granja Riverstream	Pereira de Brito	Joana	Águas de Gaia Em,SA	41.043819	-8.6511175	Fernando Ferreira, Joana Pereira de Brito	Joana Pereira de Brito
Portugal	Franceslos Riverstream	Pereira de Brito	Joana	Águas de Gaia Em,SA	41.07865524	-8.6560545	Fernando Ferreira, Joana Pereira de Brito	Joana Pereira de Brito
Portugal	Tagus	Palma	Carla	Instituto Hidrográfico	38.6943	-9.2023	Carla Palma	Carlos Borges, Carla Palma, Judite Matos, Ana Mendonça
Portugal	Guadiana	Matias	Valter	Odiana Association	37.353528	-7.440896	Tiago Agostinho, Joana Germano	Tiago Agostinho, Joana Germano
Portugal	Lis	Júlia Rigueira	Júlia	Oikos – Associação de Defesa do Ambiente e do Património da Região de Leiria	39.88046	-8.96318	Júlia Rigueira	Júlia Rigueira
Russia	Don	Pogojeva	Maria	SOI - State Oceanographic Institute, Moscow	47.2142	39.7222	Maria Pogojeva	Sergey Dolzhenko (AzNIRH - Azov Scientific Institute of fishery industry)
Russia	Aderbievka	Pogojeva	Maria	SOI - State Oceanographic Institute, Moscow	44.501361	38.13325	Maria Pogojeva	Vladimir Ocherednik (South Branch P.P. Shirshov Institute of Oceanology of Russian Academy of Sciences)

Spain	Llobregat	Köck Schulmeyer	Marianne	IDAEA/CSIC - Instituto de Diagnóstico Ambiental y Estudios del Agua, Consejo Superior de Investigaciones Científicas	41.3217528	2.1145361	Damià Barceló, Alícia Navarro Ortega, Marianne Köck Schulmeyer	Alícia Navarro Ortega, Marianne Köck Schulmeyer and 36 co-workers
Spain	Nervión	Cabrera	Maria	Paisaje limpio	43.3233611	-3.01825	María Cabrera	Amaya Alava
Spain	Besós	Cabrera	Maria	Paisaje limpio	41.4217222	2.2285556	María Cabrera	Beatriz Elguero
Spain	Guadalhorce	Cabrera	Maria	Paisaje limpio	36.6791944	-4.4722778	María Cabrera	Miguel Angel Barba
Spain	Ebro	Sanchez-Vidal	Anna	Universitat de Barcelona	40.713063	0.717427	Anna Sanchez Vidal, Miquel Canals Artigas	Judith Camps Castellà
Spain	Tordera	Sanchez-Vidal	Anna	Universitat de Barcelona	41.665708	2.765162	Anna Sanchez Vidal, Miquel Canals Artigas	Alex Garcia Parera
Spain	Guadalete	Rojo-Nieto	Elisa	Universidad de Cádiz	36.599606	-6.221545	Elisa Rojo-Nieto	Elisa Rojo-Nieto, Elena Marchante
Turkey	Göksu	Öztürk	Bayram	TÜDAV - Turkish Marine Research Foundation	41.081971	29.067675	Bayram Öztürk, Samuelle Landry Levesque (UQAR - Université du Québec à Rimouski)	Samuelle Landry Levesque
Turkey	Lamas	KIDEYS	Ahmet	METU - Institute of Marine Sciences, Middle East Technical University	36.68694	34.45694	Ahmet Kideys	Ertan Kes
Ukraine	Danube	Savenko	Oksana	UkrSCES - Ukrainian Scientific Center of Ecology of the Sea	45.397375	29.581397	Oksana Savenko	Oksana Savenko, Maxim Yakovlev, Iryna Yakovleva
Ukraine	Dniester	Savenko	Oksana	UkrSCES - Ukrainian Scientific Center of Ecology of the Sea	46.412506	30.261617	Oksana Savenko	Yulia Kotelnikova, Oksana Savenko, Iryna Tretiak

Source: JRC, RIMMEL 2017

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