icat mar
Institut Català de Recerca per a la Governança del Mar

Report on the marine litter collected by bottom trawlers in Catalonia

2024

Generalitat de Catalunya

Generalitat de Catalunya
Departament d'Acció Climàtica, Alimentació i Agenda Rural

CSIC
Consejo Superior de Investigaciones Científicas

Institut de Ciències del Mar

This report contains information on the marine litter fraction of the catch of the bottom trawl fleet of the northern GSA 6, gathered through ICATMAR's fisheries monitoring program.

Scientific team: Marc Balcells, Marta Blanco (Coord.), Ferran Bustos, Marta Carreton, Joan B. Company, Pablo Couve, Eve Galimany (Coord.), Juan García Marina, Mariona Garriga-Panisello, Mireia G. Mingote, Cristina López-Pérez, Adrià Martí Comas, Begoña Martínez, Joan Mir-Arguimbau, Patricia Poch, Xènia Puigcerver-Segarra, Marta Pujol, Laura Recasens, Jordi Ribera, Alberto J. Rico, Alba Rojas, Iván Ruiz, Joan Sala, Ricardo Santos-Bethencourt, Mireia Silvestre, Laia Viure.

How to cite this document
Institut Català de Recerca per a la Governança del Mar (ICATMAR) (2025). Report on the marine litter collected by bottom trawlers (Fishing for litter) 2024. ICATMAR, 25-09; 23 pp, Barcelona. DOI: https://doi.org/10.20350/digitalCSIC/17689

Table of contents

Introduction and Methods

The Catalan Research Institute for the Governance of the Sea (ICATMAR) has developed, in the framework of the 2030 Maritime Strategy of Catalonia, a monitoring program in collaboration with the commercial bottom trawling fleet to characterize all fractions of the catch, including marine litter. Data collection began in 2018 and will continue to offer the data needed to sustain fisheries and improve management plans. This report presents the data collected and analyzed throughout the year 2024 as an overview of the marine litter fraction of the catch passively caught by bottom trawlers in the Catalan coast.

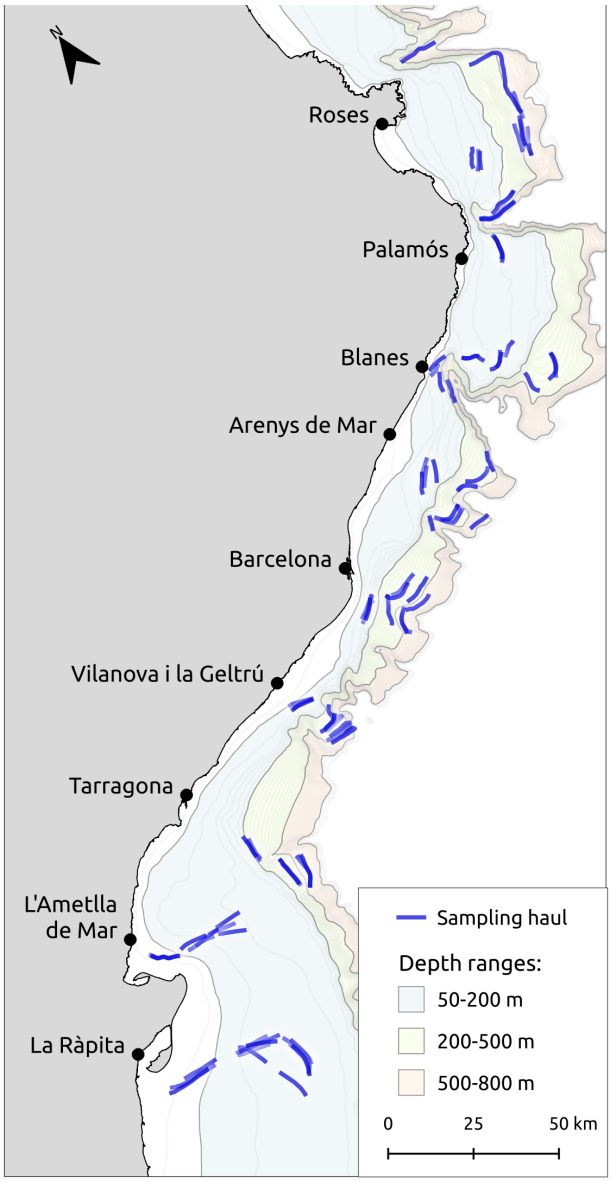

Figure 1. Study area and main fishing ports of ICATMAR bottom trawl fisheries monitoring program in the Northern GSA 6.

Data on catch composition for the bottom trawl fishery are shown by port for each of the nine ports sampled. The object of study is macro-benthic marine litter, in other words, the debris big enough to be caught by the bottom trawling which is accumulated on the seafloor. The Catalan coast was divided in the three defined provinces, i.e., Girona, Barcelona and Tarragona, with a total of 9 base ports sampled, that is three ports from each province. From north to south, the ports were Roses, Palamós, Blanes, Arenys de Mar, Barcelona, Vilanova i la Geltrú, Tarragona, L'Ametlla de Mar and La Ràpita (Figure 1). Each zone was sampled monthly with a quarterly frequency per port.

All fishing surveys comprised a total of 3 hauls, each at different depth strata, included in the following classification: coastal shelf (<75m), deeper shelf (75 - 200m), upper slope (200 - 500m) and lower slope (500 - 800m). Each haul was GPS-recorded with a start and end point, fishing time and gear width. These measurements allowed the calculation of the fishing area to standardize marine litter catches for comparison. The total catch, or a fraction in the case of a very abundant catch, was taken to the ICM-CSIC laboratory to classify and weigh (wet) all marine litter caught in the nets, as described in Table 1. Details on methodology can be found in ICATMAR 25-05.

Table 1: Classification of the marine litter categories in the laboratory.

Category	Description
Metal	Items or pieces made with ferrous and non-ferrous metals, i.e. cans, lids
Plastic	Items or pieces made with plastic, i.e., bags, containers, including sanitary and hygienic waste such as wet wipes
Rubber	Items or pieces made with rubber, i.e., balloons, boots, tires
Textiles	Clothes and pieces of fabric
Wood	Items and pieces made with wood, i.e., corks, boxes or poles
Other waste	All other marine litter which does not fit in the specific categories, i.e., batteries

Clinker, the residue from coal-burning steamships, has been an item described on the Mediterranean Sea floors and may be also accidentally caught by the bottom trawler nets. However, this item indicates the presence of steamboats in the area but it is not manufactured anymore. Therefore, it has been removed from the data analysis as it may outweigh the importance of current pollutant items such as plastics.

Marine litter from the bottom trawl fishery in Catalonia

In 2024, a total of 101 bottom trawl sampling hauls were conducted. Of the total catch, 2% was natural debris mass and 2% was marine litter (Figure 2). Within the marine litter fraction, the main identifiable category was metal, as seen in Figure 3. This contrast previous findings, most likely because there was a big metallic dumpster fished in one haul and its big weight masks the weigh of the plastic fraction, which tends to be the most common one.

The average marine litter mass was 2% for the period 2020-2023 (Figure 2). Within the marine litter fraction, the categories with the highest proportions was plastic (Figure 3). For detailed data on the marine litter mass standardized by squared kilometer see Table 2.

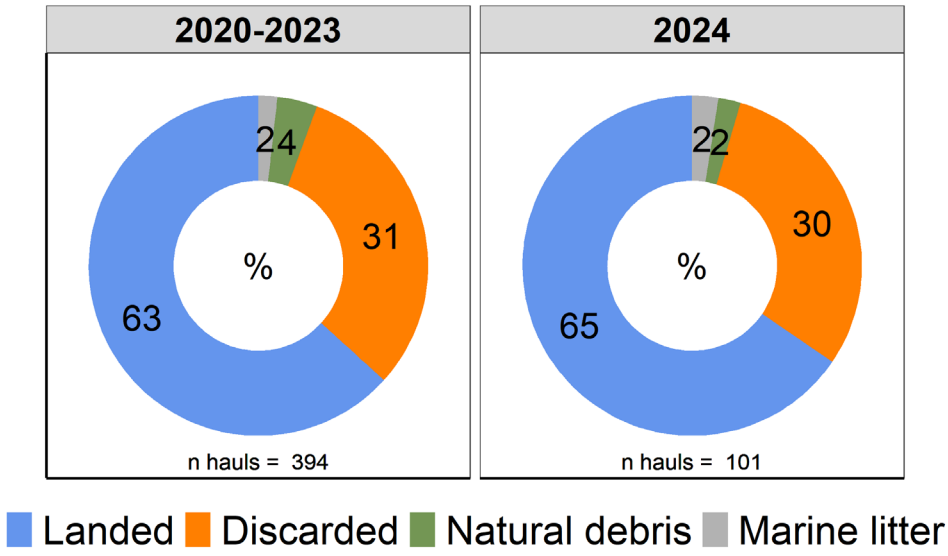

Figure 2. Catch composition in Catalonia. Percentage by weight of landings, discarded, natural debris and marine litter.

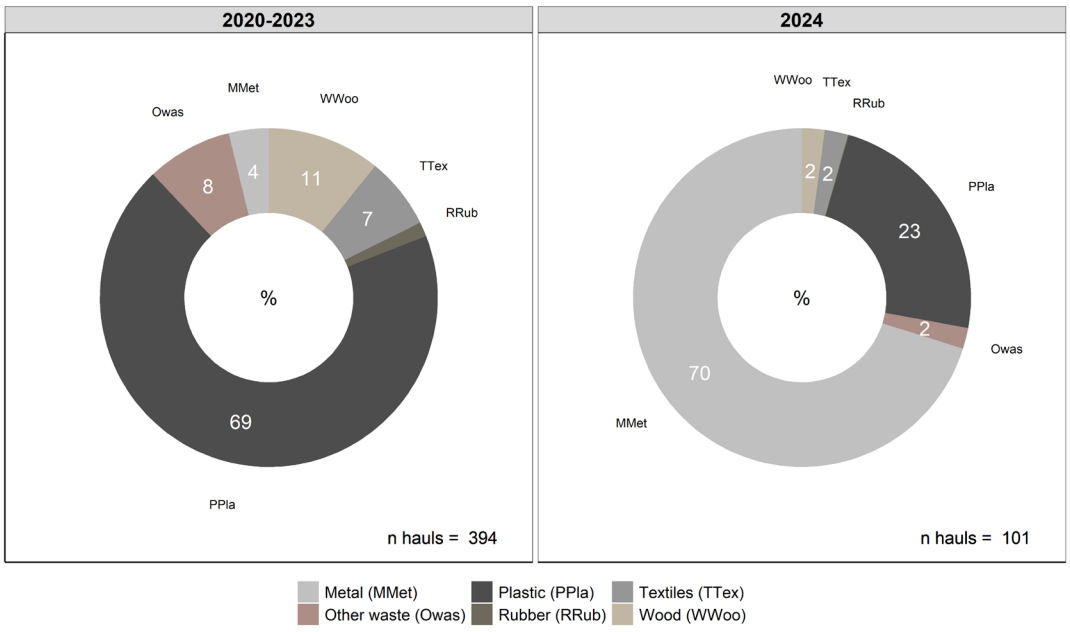

Figure 3. Categories of marine litter by mass including all hauls in each year.

Table 2. Marine litter mass for the previous 5 years (2020-2023) and for the year analyzed (2024). SE: standard error.

Marine litter mass (kg km^{-2})	2020-2023		2024	
Type	Mean	SE	Mean	SE
Plastic	5.08	0.79	3.56	0.96
Wood	0.80	0.16	0.33	0.22
Textiles	0.51	0.11	0.34	0.10
Metal	0.28	0.13	10.67	10.41
Rubber	0.10	0.04	0.01	0.01
Other waste	0.60	0.15	0.31	0.15

Marine litter composition by depth and zone

When analyzing the composition of marine litter at different depths, plastic was the category that accounted for the highest proportion in most strata except for the deeper shelf in 2024 (Figure 4 left panel). At this depth, as previously mentioned, appeared a heavy metallic dumpster which outweighed the other litter categories. Wood is another relevant category in terms of mass, especially in the period 2020-2023, as this type of items are heavy (Balcells et al., 2023). For detailed data on the marine litter mass standardized by squared kilometer by depth see Table 3.

The marine litter composition was analyzed by zone, matching the three different administrative provinces, is plotted in Figure 4 (right panel). Similar to what previously described, plastic is the most commonly fished item except in 2024 in the zone of Girona, where the metallic dumpster was trapped in the fishing nets. Nonetheless, in general, Girona seems to be the zone with less plastic fraction overall whereas Barcelona seems to be the zone with most plastics in its fishing grounds. For detailed data on the marine litter mass standardized by squared kilometer by depth see Table 4.

Table 3. Marine litter mass for the previous 5 years (2020-2023) and for the year analyzed (2024) by depth. SE: standard error.

2020-2023 Marine litter mass (kg km^{-2})	Coastal Delta shelf		Middle Delta shelf		Coastal shelf		Deeper shelf		Upper slope		Lower slope	
Type	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Plastic	3.21	1.60	1.11	0.35	7.96	3.36	10.71	2.33	2.62	0.45	2.15	0.53
Wood	1.14	0.81	0.87	0.41	0.35	0.28	1.35	0.39	0.60	0.24	0.25	0.11
Other waste	0.71	0.44	1.07	0.82	0.06	0.05	0.93	0.39	0.40	0.16	0.30	0.14
Textiles	0.51	0.26	0.13	0.07	1.02	0.64	0.75	0.26	0.29	0.07	0.50	0.25
Metal	0.05	0.03	0.05	0.03	0.04	0.04	0.42	0.18	0.07	0.03	0.48	0.45
Rubber	0.00	0.00	0.00	0.00	0.03	0.03	0.23	0.11	0.10	0.08	0.00	0.00
2024 Marine litter mass (kg km^{-2})	**Coastal Delta shelf**		**Middle Delta shelf**		**Coastal shelf**		**Deeper shelf**		**Upper slope**		**Lower slope**	
Type	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Metal	0.07	0.05	0.01	0.01	1.75	1.41	36.34	36.04	0.04	0.03	0.07	0.04
Plastic	0.89	0.34	1.99	1.12	8.01	3.02	7.43	3.04	1.28	0.29	0.91	0.36
Textiles	0.22	0.21	0.00	0.00	1.51	0.90	0.42	0.16	0.22	0.13	0.10	0.08
Wood	0.00	0.00	0.02	0.02	0.31	0.25	0.78	0.74	0.08	0.08	0.26	0.20
Other waste	0.08	0.07	0.01	0.01	0.00	0.00	0.75	0.49	0.31	0.21	0.03	0.02
Rubber	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00

Figure 4: Categories of marine litter by mass. Percentage in weight including all hauls within each period. Left panel: categories by depth strata; right panel: categories by zone.

Table 4: Marine litter mass for the previous 5 years (2020-2023) and for the zone analyzed (2024) by zone. SE: standard error.

2020-2023 Marine litter mass (kg km^{-2})	Girona		Barcelona		Tarragona	
Type	Mean	SE	Mean	SE	Mean	SE
Plastic	2.02	0.36	10.88	2.14	2.35	0.75
Wood	0.74	0.25	0.92	0.33	0.74	0.22
Other waste	0.58	0.19	0.59	0.33	0.64	0.25
Textiles	0.38	0.09	0.90	0.30	0.23	0.06
Metal	0.54	0.35	0.25	0.14	0.05	0.02
Rubber	0.09	0.07	0.20	0.11	0.01	0.01
2024 Marine litter mass (kg km^{-2})	**Girona**		**Barcelona**		**Tarragona**	
Type	Mean	SE	Mean	SE	Mean	SE
Metal	32.03	31.53	0.27	0.22	0.02	0.01
Plastic	4.18	1.84	5.11	2.08	1.21	0.36
Textiles	0.47	0.25	0.35	0.12	0.20	0.11
Wood	0.05	0.05	0.80	0.62	0.10	0.07
Other waste	0.39	0.21	0.11	0.10	0.43	0.41
Rubber	0.00	0.00	0.00	0.00	0.03	0.03

Marine litter composition by port

This section contains information on the composition in weight of the marine litter fraction of the catch by port, for the 9 ports sampled (from north to south). For detailed data on the marine litter mass standardized by squared kilometer by port see Table 5.

(Figures 5 – 22. General catch composition and marine litter composition by port)

Roses

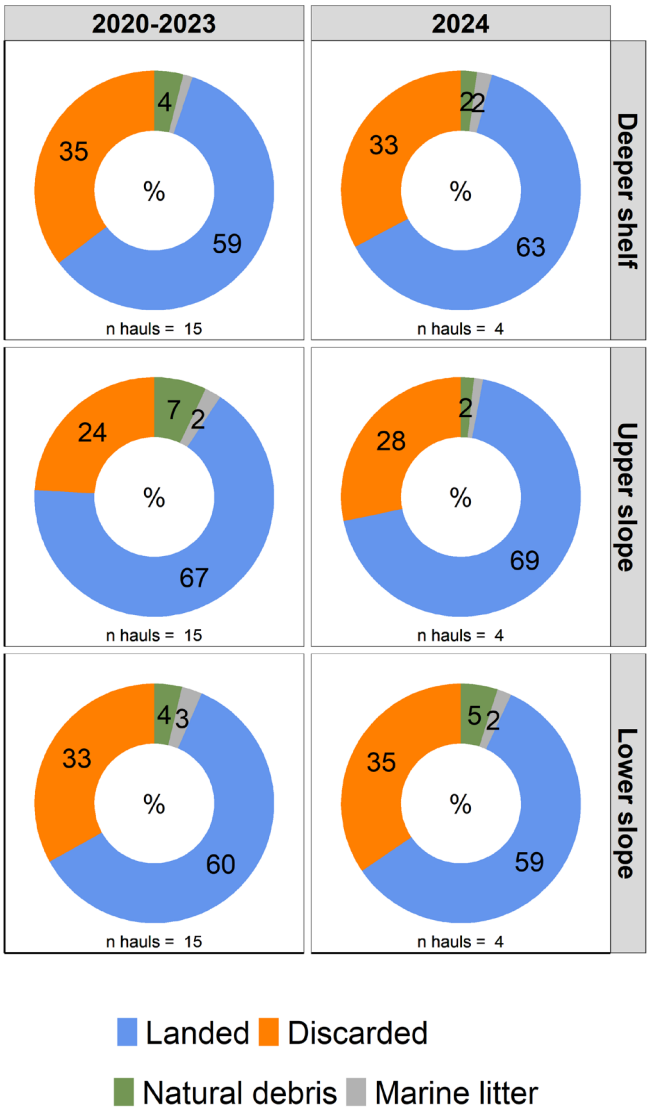

Figure 5: Catch composition in Catalonia. Percentage by weight of landings, discarded, natural debris and marine litter.

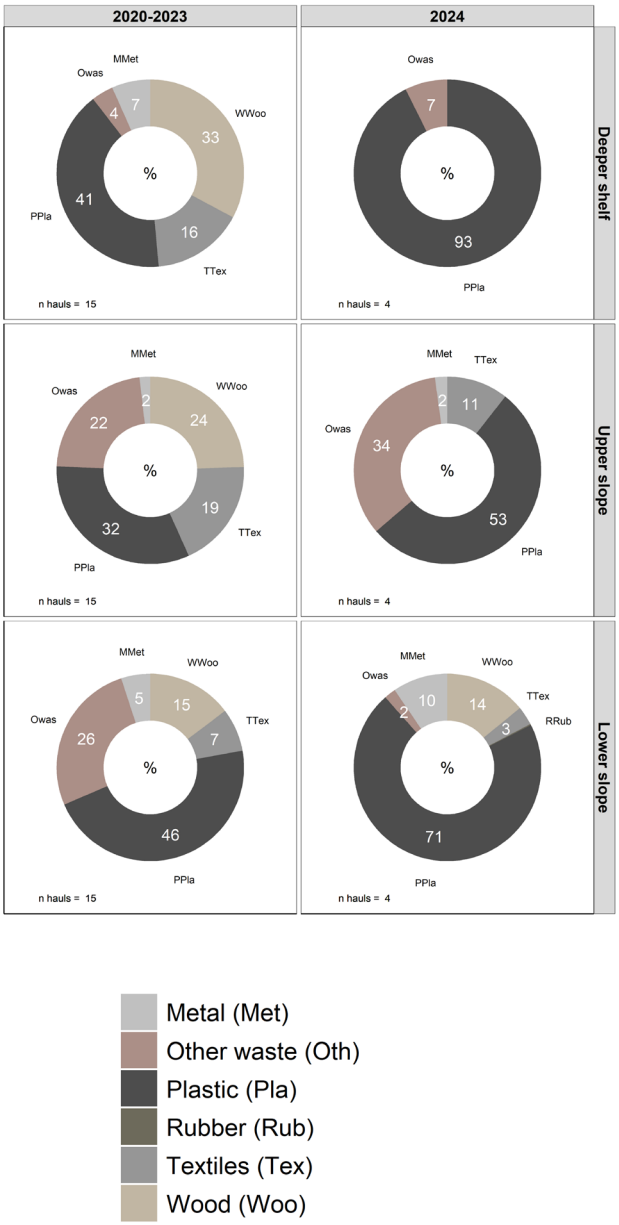

Figure 6: Categories of marine litter by mass at each depth including all hauls each year.

Palamós

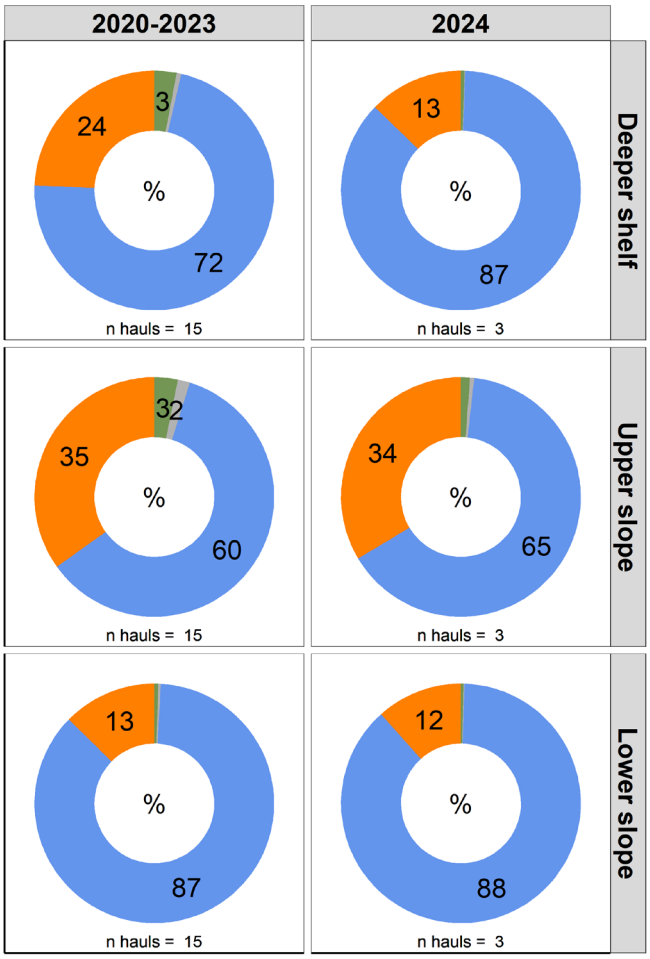

Figure 7: Catch composition in Catalonia. Percentage by weight of landings, discarded, natural debris and marine litter.

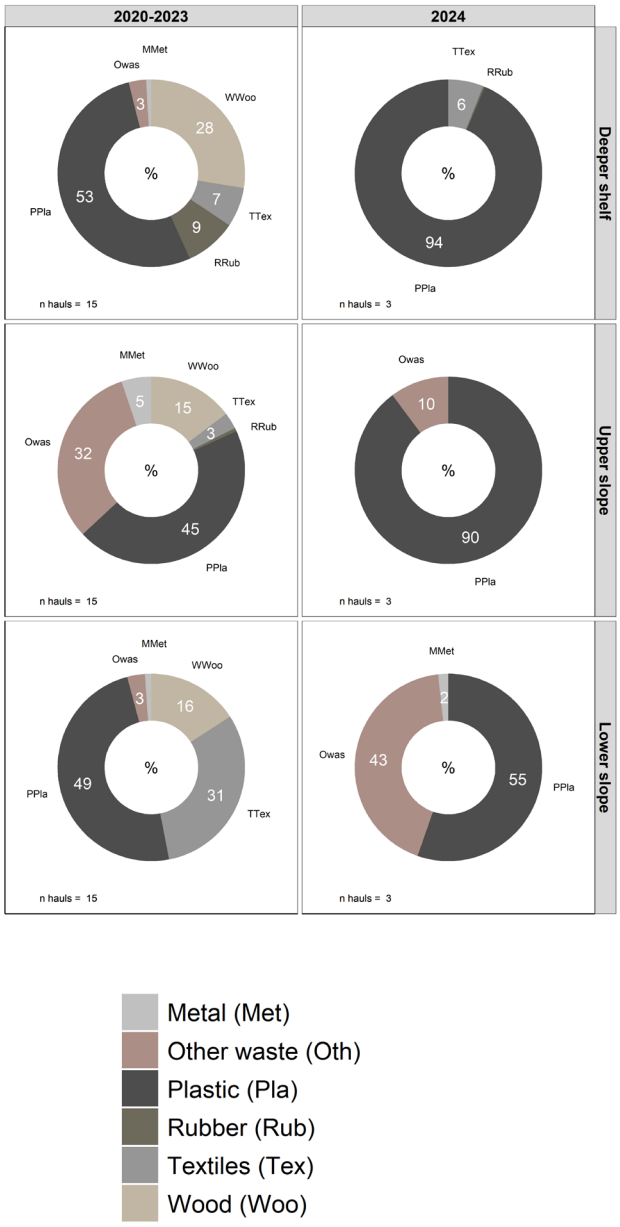

Figure 8: Categories of marine litter by mass at each depth including all hauls each year.

Blanes

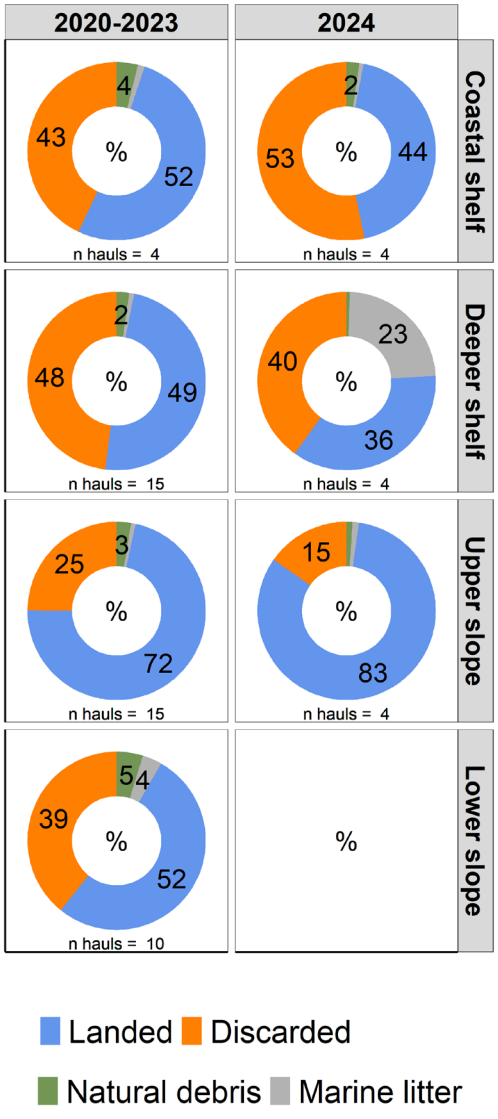

Figure 9: Catch composition in Catalonia. Percentage by weight of landings, discarded, natural debris and marine litter.

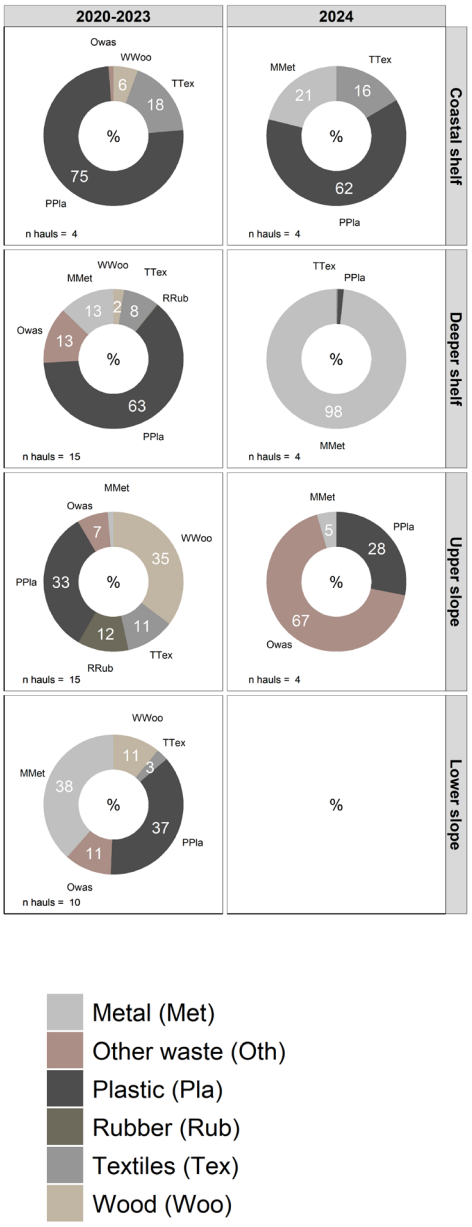

Figure 10: Categories of marine litter by mass at each depth including all hauls each year.

Arenys de Mar

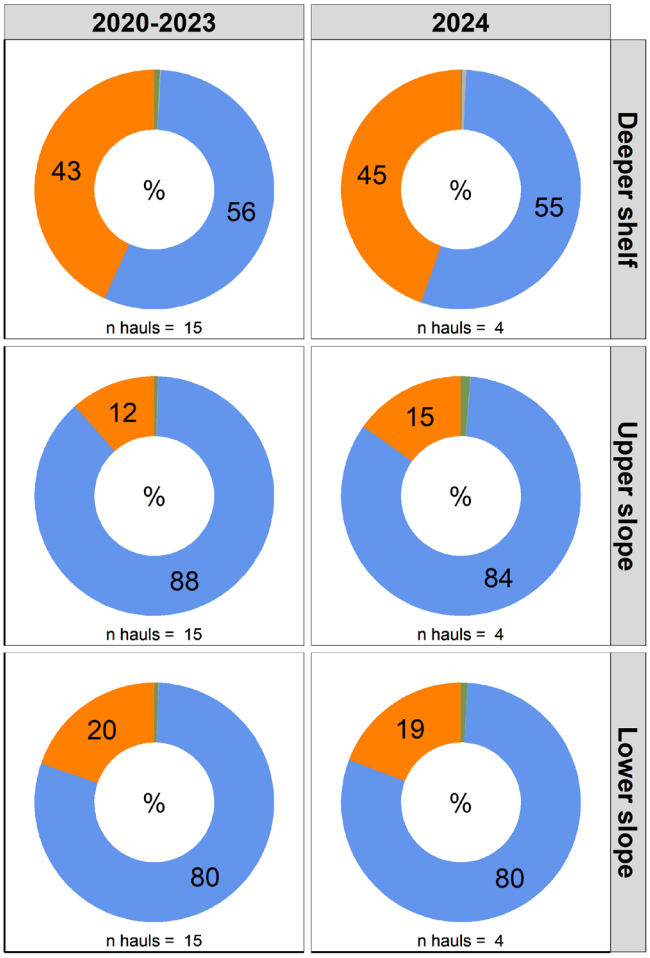

Figure 11: Catch composition in Catalonia. Percentage by weight of landings, discarded, natural debris and marine litter.

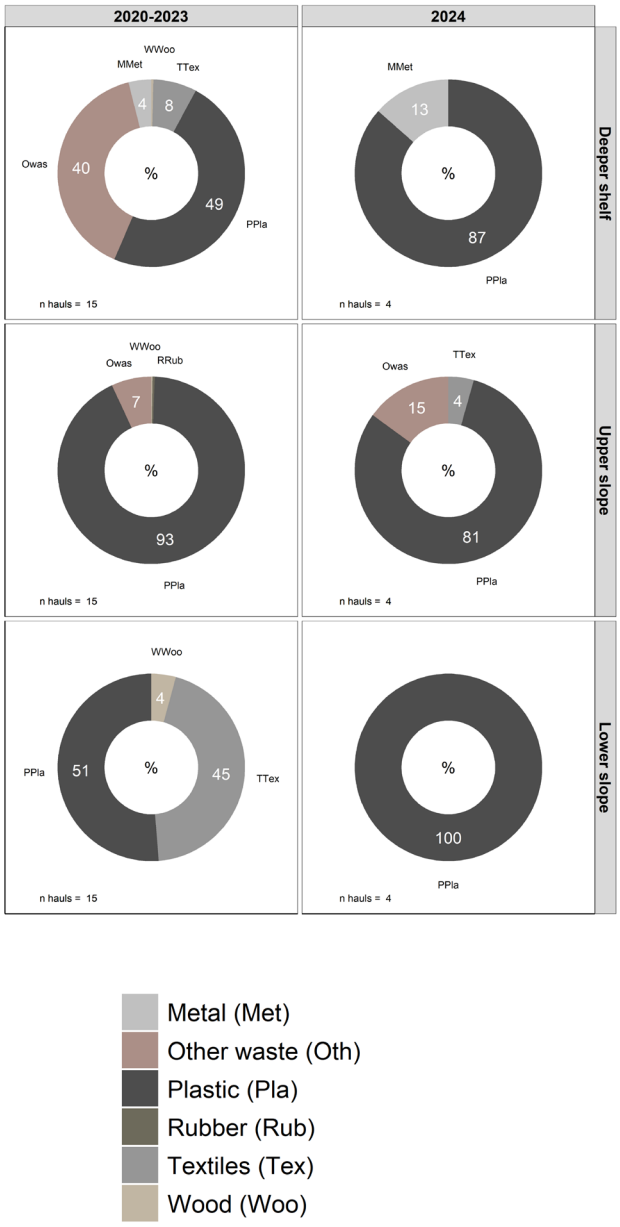

Figure 12: Categories of marine litter by mass at each depth including all hauls each year.

Barcelona

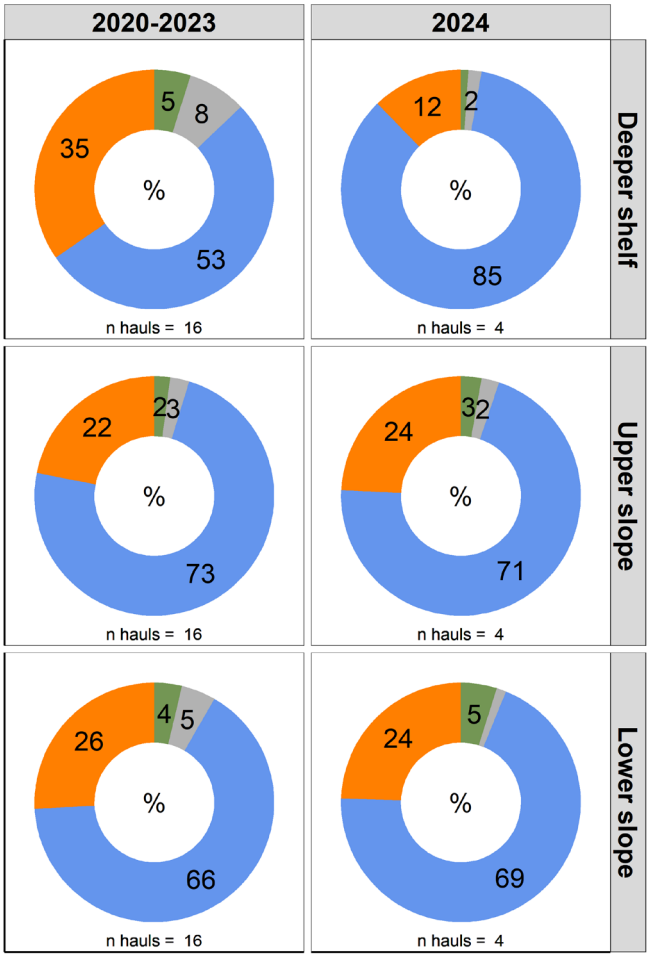

Figure 13: Catch composition in Catalonia. Percentage by weight of landings, discarded, natural debris and marine litter.

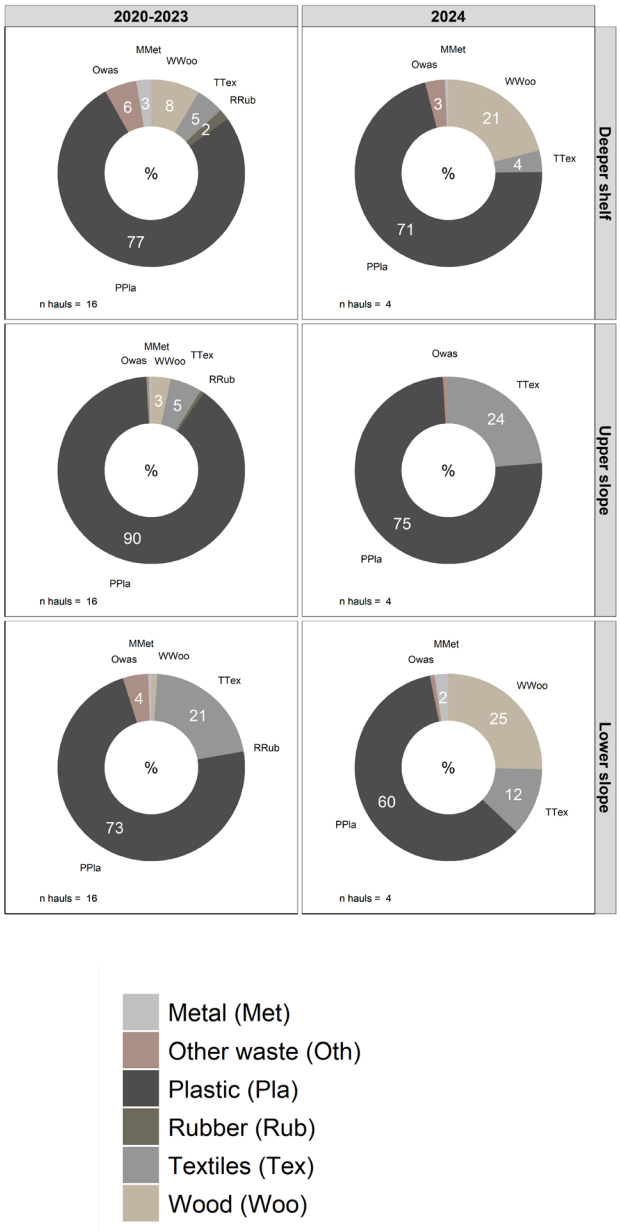

Figure 14: Categories of marine litter by mass at each depth including all hauls each year.

Vilanova i la Geltrú

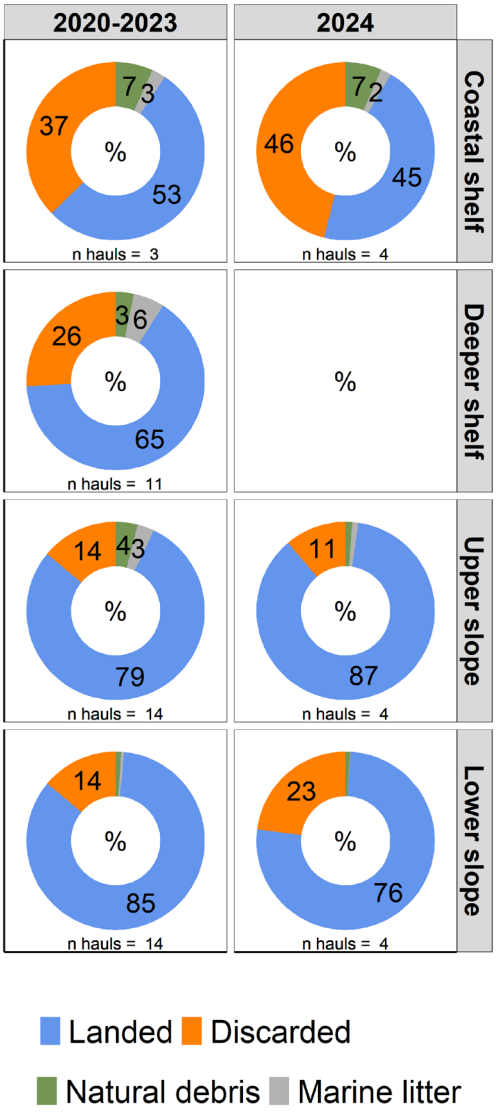

Figure 15: Catch composition in Catalonia. Percentage by weight of landings, discarded, natural debris and marine litter.

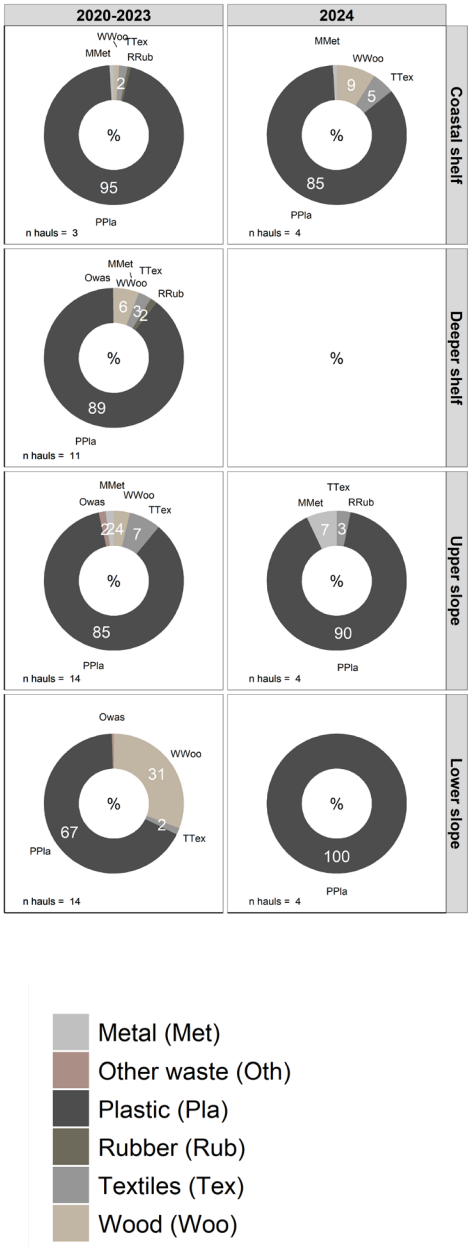

Figure 16: Categories of marine litter by mass at each depth including all hauls each year.

Tarragona

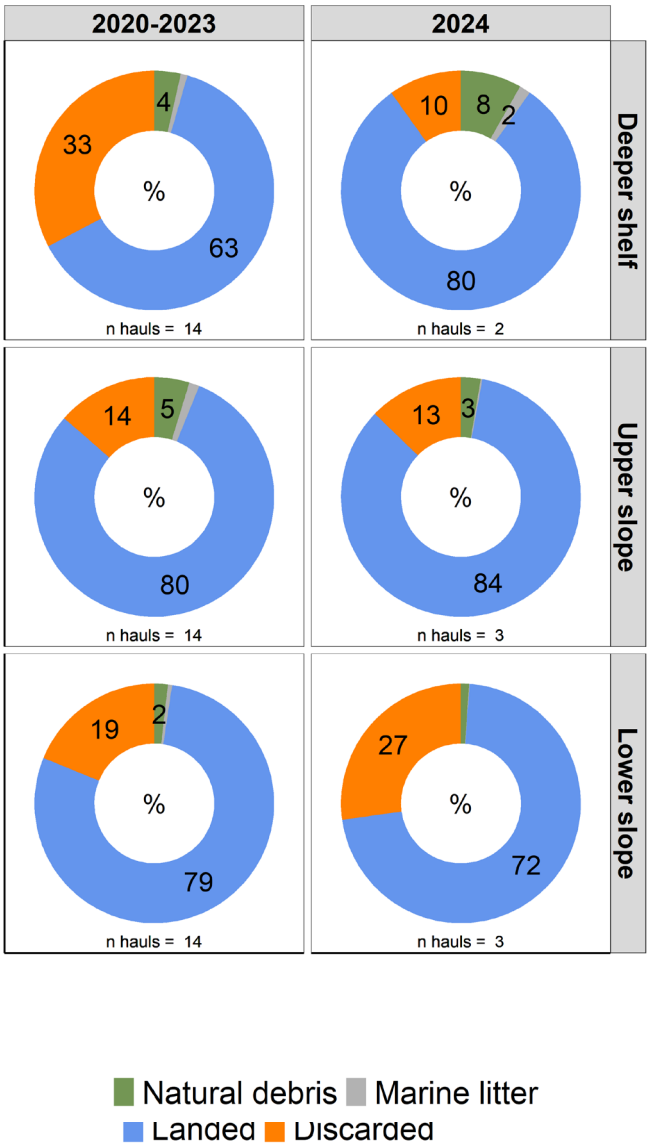

Figure 17: Catch composition in Catalonia. Percentage by weight of landings, discarded, natural debris and marine litter.

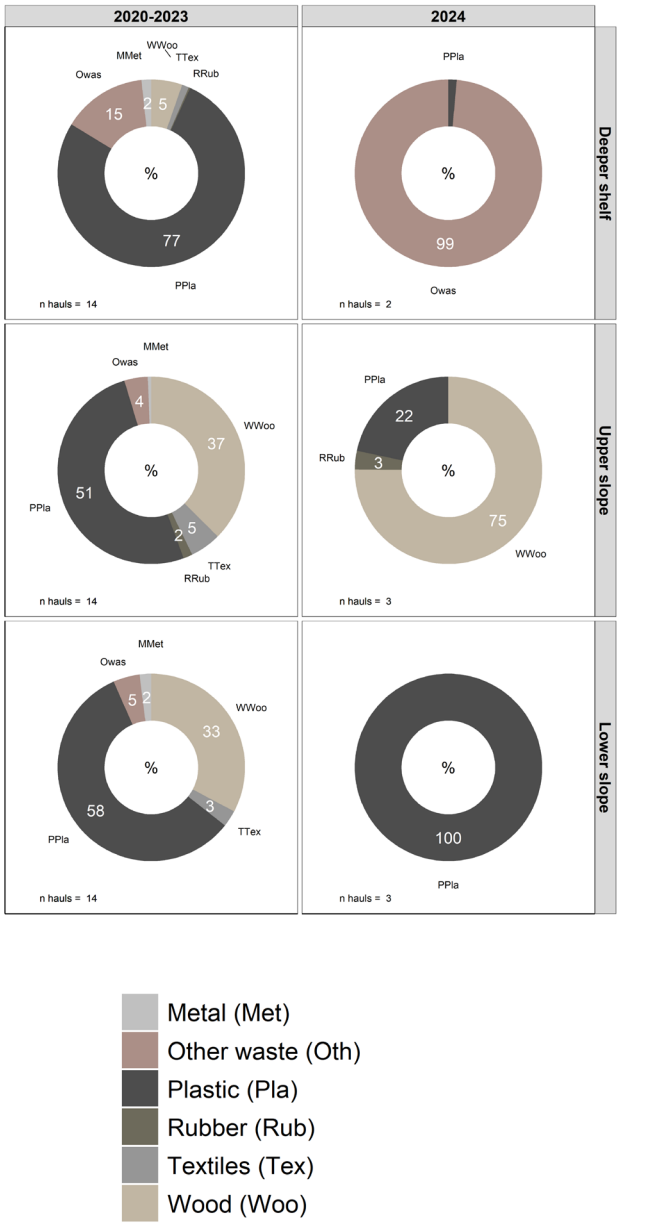

Figure 18: Categories of marine litter by mass at each depth including all hauls each year.

L'Ametlla de Mar

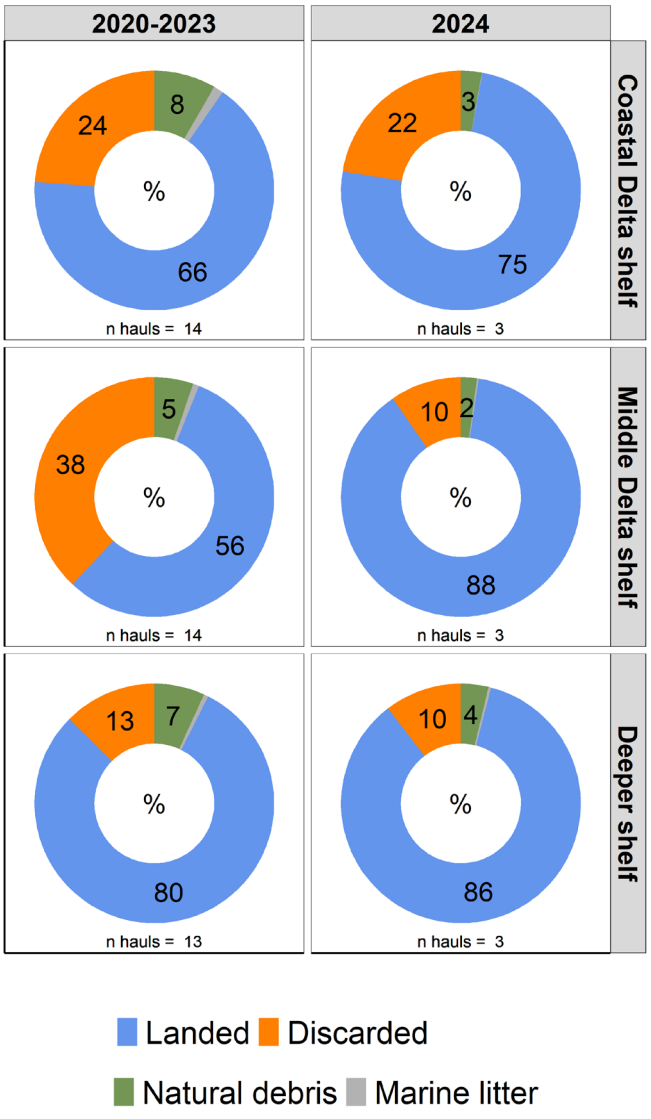

Figure 19: Catch composition in Catalonia. Percentage by weight of landings, discarded, natural debris and marine litter.

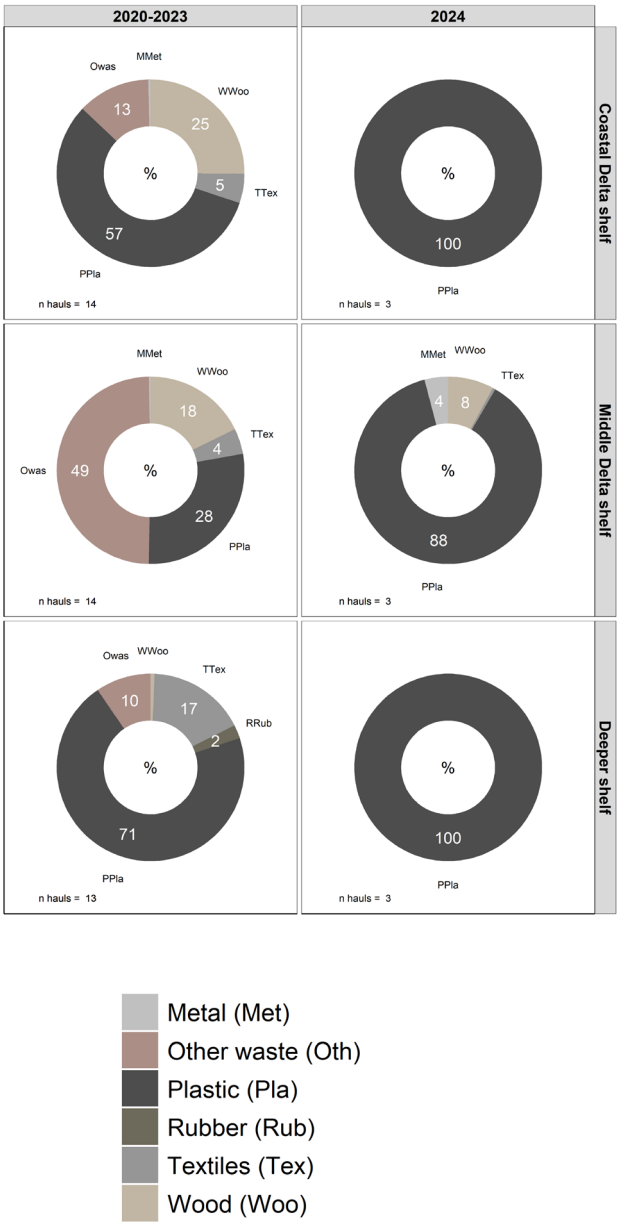

Figure 20: Categories of marine litter by mass at each depth including all hauls each year.

La Ràpita

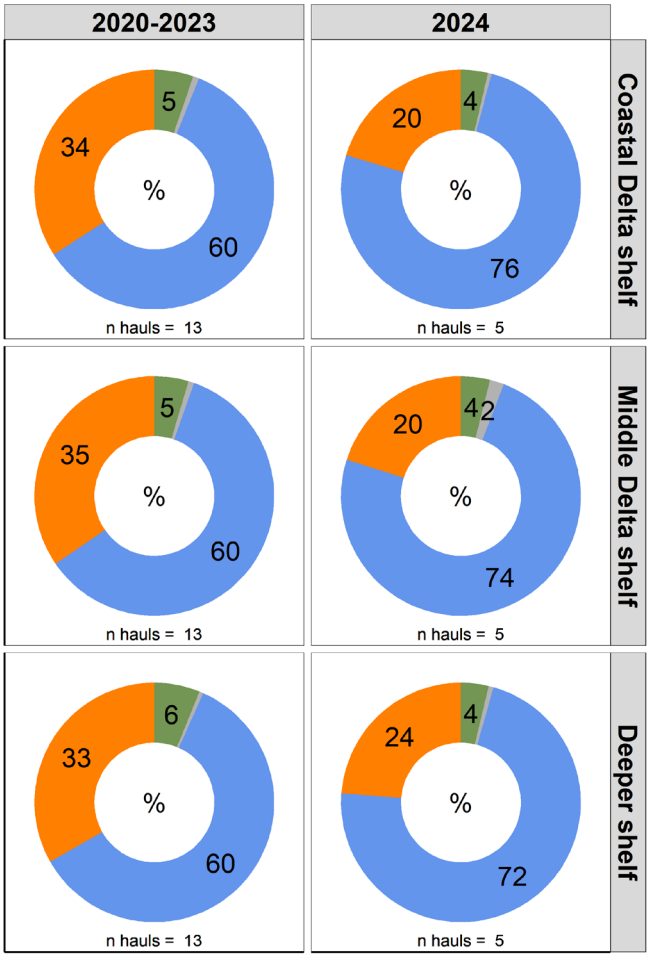

Figure 21: Catch composition in Catalonia. Percentage by weight of landings, discarded, natural debris and marine litter.

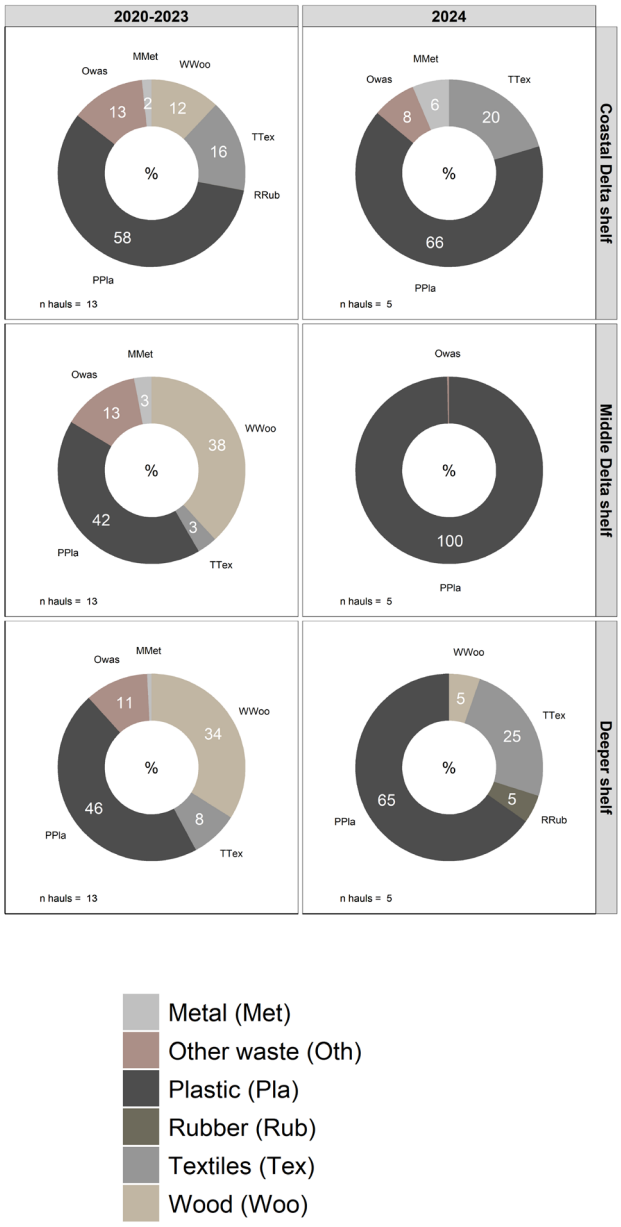

Figure 22: Categories of marine litter by mass at each depth including all hauls each year.

Table 5: Marine litter mass for the previous 5 years (2020-2023) and for the year analyzed (2024) by port. SE: standard error.

2020-2023 Marine litter mass (kg km^{-2})	Plastic		Wood		Metal		Textiles		Rubber		Other waste	
Port	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Roses	1.10	0.27	0.74	0.47	0.14	0.09	0.40	0.21	0.00	0.00	0.36	0.15
Palamós	1.28	0.51	0.49	0.27	0.11	0.06	0.13	0.05	0.07	0.06	0.63	0.35
Blanes	3.72	0.86	0.98	0.54	1.38	1.07	0.62	0.17	0.20	0.19	0.74	0.42
Arenys de Mar	0.22	0.07	0.00	0.00	0.01	0.01	0.03	0.01	0.00	0.00	0.09	0.08
Barcelona	23.40	4.98	2.10	0.84	0.64	0.36	2.14	0.77	0.47	0.27	1.48	0.88
Vilanova i la Geltrú	6.22	1.83	0.40	0.19	0.04	0.02	0.27	0.10	0.08	0.07	0.03	0.02
Tarragona	3.24	1.96	0.50	0.23	0.07	0.04	0.09	0.03	0.02	0.01	0.56	0.44
L'Ametlla de Mar	1.94	0.97	0.75	0.50	0.01	0.01	0.25	0.08	0.01	0.01	0.88	0.54
La Ràpita	1.84	0.40	1.00	0.38	0.06	0.03	0.37	0.18	0.00	0.00	0.46	0.22
2024 Marine litter mass (kg km^{-2})	Plastic		Wood		Metal		Textiles		Rubber		Other waste	
Port	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Roses	6.00	4.38	0.14	0.14	0.10	0.07	0.07	0.04	0.00	0.00	0.55	0.41
Palamós	0.53	0.16	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.07	0.05
Blanes	5.17	2.47	0.00	0.00	93.05	91.65	1.28	0.69	0.00	0.00	0.48	0.45
Arenys de Mar	4.83	4.55	0.00	0.00	0.74	0.74	0.00	0.00	0.00	0.00	0.01	0.01
Barcelona	7.80	4.54	2.06	1.73	0.08	0.05	0.84	0.30	0.00	0.00	0.31	0.28
Vilanova i la Geltrú	2.66	0.94	0.21	0.17	0.07	0.05	0.14	0.09	0.00	0.00	0.00	0.00
Tarragona	0.16	0.04	0.24	0.24	0.00	0.00	0.00	0.00	0.01	0.01	1.60	1.60
L'Ametlla de Mar	0.62	0.25	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
La Ràpita	2.09	0.68	0.07	0.07	0.03	0.02	0.41	0.22	0.06	0.06	0.04	0.03

Conclusions

Marine litter is a global problem, also found along the Catalan coast, at all studied depths and zones. Fishing for Litter strategies can provide useful information and help identify the type and location of the marine litter accidentally caught by bottom trawlers. Using this strategy, the main findings include:

• Marine litter represent the lowest fraction of the catch for bottom trawlers in the Catalan continental shelf, both historically and at present time;

• The category Plastic, even if they are items made of out a very light material, represented the greatest proportion of the marine litter fraction, with an average of 5.08 kg/km^2 for the period 2020-2024. In contrast, in 2024, the greatest proportion was comprised by the category Metal. The reason for this change is that in Blanes, on the deeper shelf stratum, one metallic dumpster was fished once. This very heavy item outbalances the classic proportions of plastic being the most caught material in the Catalan coast;

• When analyzed by port, the amount and type of marine litter varies along the coast. The greatest amounts, though, were observed in the central area of Catalonia, with the plastic fraction dominating the marine litter.

References

M. Balcells, M. Blanco, A. I. Colmenero, C. Barría, R. Santos-Bethencourt, D. Nos, C. López-Pérez, J. Ribera-Altimir, J. Sala-Coromina, M. Garriga-Panisello, A. Rojas, E. Galimany (2023). Fishing for litter, accidental catch in bottom trawl nets in the Catalan coast, Northwestern Mediterranean. Waste Management 166: 360–367. DOI: 10.1016/j.wasman.2023.05.021

E. Galimany, E. Marco-Herrero, S. Soto, L. Recasens, A. Lombarte, J. Lleonart, P. Abelló, M. Ramón (2019). Benthic marine litter in shallow fishing grounds in the NW Mediterranean Sea. Waste Management 95: 620–627. DOI: 10.1016/j.wasman.2019.07.004

Institut Català de Recerca per a la Governança del Mar (ICATMAR). State of fisheries in Catalonia 2024, Part 1: report on the monitoring of the commercial fishing fleet (ICATMAR, 25-05) 222 pp, Barcelona. DOI: 10.20350/digitalCSIC/17393

Institut Català de Recerca per a la Governança del Mar

www.icatmar.cat

Co-funded by the European Union

Generalitat de Catalunya
Departament d'Acció Climàtica, Alimentació i Agenda Rural

CSIC
Consejo Superior de Investigaciones Científicas

Institut de Ciències del Mar