CleanAtlantic

Tackling Marine Litter in the Atlantic Area

DELIVERABLE 7.2–Fishing for Litter

WP 7: Tackling Marine Litter

Interreg Atlantic Area European Regional Development Fund
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Clean Atlantic

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DISCLAIMER

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1. Background

Marine litter is one of the key anthropogenic impacts on ocean life and affects marine life from the organism to the ecosystem level. Although prevention of new entrances of residues in the sea is the primary action to tackle this environmental problem it is also of most importance to reduce existent marine litter in order to protect biodiversity and restore marine ecosystems. The collaboration of fishermen and sea professionals in this task is crucial and the so-called Programme "Fishing for Litter" where fishermen collect and bring ashore the plastics, ghost gears and other debris that gather in their nets during normal fishing activities has turned out a very successful system to reduce marine litter, monitor its presence and raise awareness.

1.1. Objective

The CleanAtlantic project aims to protect biodiversity and ecosystem services in the Atlantic Area by improving capabilities to monitor, prevent and remove marine litter. Work package 7 is aimed directly at preventing and reducing marine litter and framed on it, action 7.2 is addressed to implement fishing for litter and other marine litter retrieval pilot actions with the involvement of the fishing sector. The objective of this pilot action was to implement a fishing for litter scheme with the engagement of artisanal fleets and shellfish gatherers operating in the Ria de Arousa. It also aims to gain knowledge on key issues leading to successful involvement of coastal communities in tackling marine litter. The collaboration of the Galician Institute of Aquaculture (IGAFA) located in the Arousa Island by carrying out marine litter removal actions during training activities is also described to illustrate how different actors of the community can contribute to the protection of the marine environment. In this report we describe the area of study, the different steps to set up the pilot action and its main results and conclusions.

2. Area of study

2.1. Ria of Arousa

The region of Galicia (NW Iberian Peninsula, Spain) has about 1720 km of coastline, characterized by the presence of deep sea inlets called rias. This topographic feature was defined as ancient drowned tectonic valleys covered by the sea. The Galician Rias are normally classified into the "Rias Altas" ("upper Rias") located in the North of the region, and the four "Rias Baixas" ("Low Rías") which are located in the Western coast and are the largest ones in area and depth. The Ria of Arousa, where this pilot action took place, is the biggest one with a surface of 230 km^2, approximately 33 km of length and a maximum width of 10 km. Depth average is 19 m with a maximum of 63 m at its mouth. The coastline is divided into 10 different municipalities that represent a population of approximately 165,000 inhabitants.

The Rias Baixas are characterised by an extensive mussel culture and support the highest mussel production in Europe. There are currently more than 3,500 mussel rafts in their waters and almost 70% of them are located in the Ria of Arousa, distributed among 24 different production polygons. Besides, approximately 3,218 small scale vessels and 1,600 on foot shellfish gatherers are grouped in the 12 fishermen's guilds are established in its coastal area.

For the purpose of this pilot action, CETMAR established a collaboration with two of these fishermen guilds, that of Illa de Arousa and that of Cambados and with the Galician Institute of Aquaculture.

Figure1. Ria of Arousa with the location of the two fishermen involved in the Fishing for litter activities.

2.2. The Illa de Arousa

The Illa de Arousa (English: Arousa Island) is a small island of about 7 km², located in the middle of the Ria de Arousa. It has 36 km of coast, which includes 11 km of sandy shoreline spread over 60 small beaches and 5 ports. It constitutes a municipality and since 1985, it is connected to the mainland by a 2 km bridge. According to the Spanish National Statistics Institute (2018) the island's population is approximately 5,000 inhabitants, most of them working in the fishing and aquaculture (mussel farm industry) sectors.

• Illa de Arousa fishermen guild

Based on the information provided by the Galician Ministry of the Sea (2021) (https://www.pescadegalicia.gal/) the Illa de Arousa is the home port of 155 aquaculture service vessels, mainly dedicated to mussel farming in rafts and 402 polyvalent small-scale boats (< 12 m), shifting between different fishing gears throughout the year. This fleet uses "minor gear" such as pots, artisanal longlines and a large variety of artisanal gillnets. Part of the fleet is also engaged in shellfish gathering, using special designed rakes to collect different species of bivalve molluscs. Depending on the fishing gear used and the season these vessels may work in the subtidal area around island's coast or in other fishing grounds inside the Ria of Arousa. In addition, 215 "on-foot" shellfish gatherers collect infaunal bivalve molluscs, mainly cockles, clams and razor clams, using agriculture tools like hoes and sickles. They work in the island's coastal fringe during the low tide, which represent a surface of 2,150,688.50 m². Both fishermen and shellfish gatherers, approximately 1,000 persons, are affiliated to the local fishermen guild.

Figure 2. Walking shellfish gatherer and small-scale vessel in the Isla of Arousa.

• Galician Institute for Aquaculture Training

The Galician Institute for Aquaculture Training (IGaFA), is located in the Arousa Island. This educational centre, dependent on the Galician Ministry of the Sea, was inaugurated in 1992 and become the "National Centre for Occupational Professional Training in the Aquaculture Area" in 2005. In 1999 this centre started teaching professional diving and currently intermediate level (VET) cycle in underwater and hyperbaric operations are taught in their facilities.

Figure 3. IGaFA facilities in the Illa the Arousa Coastline.

2.3. Cambados

Cambados is a town of around 15,000 inhabitants located in the South bank of the Ria of Arousa, in the vicinity of the Island of Arousa. It is also characterised by an important fishing industry articulated around a fishermen guild that is made up of more than 900 members. Among them there are 211 shellfish gatherers that mainly collected clams and cockles. Its fleet comprises 48 aquaculture auxiliar vessels, 17 purse seine vessels and 200 small-scale boats (https://www.pescadegalicia.gal/) that as in the case of the Arousas' Island guild shift between several gears throughout the year. Around 35 of these artisanal boats are allowed to use small traditional towed gears that works in different areas of this ria, mainly in the proximity of the mussel rafts polygons. They are non-selective gears that catch a variety of demersal and benthonic fishes and invertebrates.

Figure 4. Catch onboard fished with a towed gear installed on a vessel of the Cambados' fleet.

3. Collaboration with Fishermen Guild of The Illa de Arousa

In the framework of CleanAtlantic a collaboration was established between CETMAR and the Illa de Arousa Fishermen guild. A first approach was made in a meeting with the association of fishermen guilds of the province of Pontevedra (NW Spain) in January 2019, when the project and the idea to develop a pilot action in the Illa of Arousa was presented to all the guilds. This was followed later by a meeting with the president of the Illa de Arousa guild, where he reaffirmed their commitment to tackle this environmental problem through marine litter awareness raising and retrieval actions, in which the guild associates had already experience. After this meeting that concluded with the guild commitment to participate in CleanAtlantic, preparatory works and logistic provisions were initiated.

3.1. Methodology

A list of the associates interested in collaborating in the fishing for litter action, both shellfish gatherers and fishermen, was provided to CETMAR. Basic material like bags of different size to place the litter collected during their working days were distributed among the guild affiliates. Besides, in collaboration with the guild representatives and Portos de Galicia[1] the best port area to store the residues coming from fishing for litter actions was selected. Four containers were eventually installed near the entry of the fish auction, where fishermen and shellfish gatherers sell their daily catches.

Periodically, from June 2019 to February 2020, CETMAR staff visited the port facilities to quantify and classified, both in number of items and weight, the litter retrieved by the guild members. Having noticed at the begining of the action that most residues would come from on foot shellfish gatherers, we decided to classify debris in 11 general categories (plastic, metal, rubber, glass, ceramic, cloth, wood, paper/cardboard, sanitary waste, wax and other items) and in 114 subcategories based on the standardized OSPAR Marine Litter Monitoring Survey Form. Due to the increasing involvement of the guild associates, as the project evolved, it turned out that the capacity of the garbage containers was not enough to store the amount of litter retrieved. Thus, since February 2020 the four plastic containers were substituted by a 5 tons metallic

[1] Public body dependent on the Galician Ministry of the Sea and in charge of 122 ports managed by the Autonomous Regional Government

waste dumpster. From that time, only the total weight of marine litter retrieved was recorded with the assistance of the waste manager.

Figure 5. Containers and waste dumpster installed in the Illa of Arousa harbour during the project.

3.2. Results

Until February 2020, **1,611** items and **513.72** kg of marine litter were quantified and classified according the categories aforementioned (figure 6). As in other marine litter studies, plastic residues were predominant by weight (58.71 %), followed by rubber (16.72%) and clothes (12.87%). The proportion of plastic by number of items was even higher (84.11%), being glass the second most important category (9.31%).

Fishing and aquaculture related debris are a specific marine litter category in the master list used to classify the retrieved debris and it includes 27 types of items that are directly related to both sea sectors. This subcategory accounted for 62% and 58% of the total of items retrieved, in number and weight respectively.

The main typologies of debris stored in the containers by the guild members confirmed the assumption that they mostly came from the intertidal area, being collected by the on foot shellfish gatherers that actively collaborated in the fishing for litter scheme.

In Table I we reported the top ten of litter items retrieved and the percentage they represent in relation to the total amount of litter. As in the majority of the coastal clean-ups worldwide, the ten most common items were mainly made of plastic. In our case, more than 80% both in terms of weight and number of items.

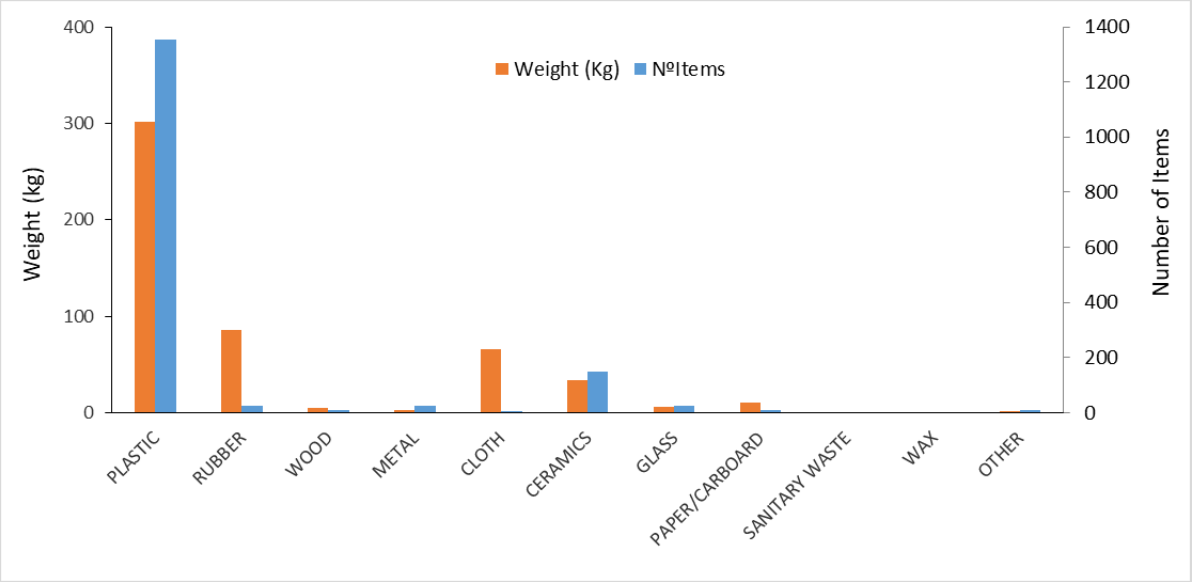


Figure 6. Main marine litter categories in number of items and weight.

Category type	Subcategories	%Nº. Items
P	Mussel bags and pegs	35,82
P	Plastic bottles	16,82
P	Other Plastic items	9,06
M	Other Metal pieces < 50 cm	4,72
P	Plastic/Polystyrene pieces 2.5-50 cm	4,22
P	Rope (diameter more than 1 cm)	3,48
M	Fishing weights	3,17
P	Floats buoys	1,92
G	Glass bottles	1,49
P	Cleaner bottles, containers and drums	1,43
TOTAL		**82,12**

Category Type	Subcategories	%Weight (Kg)
P	Mussel raft ropes	38,15
P	Other fishing gears (mixture of nets, lines, ropes, etc.)	17,46
O	Processed wood	16,86
P	Ropes	8,28
P	Trap plastic net	6,22
R	Tires	5,64
M	Other metal pieces	1,75
P	Boxes, baskets, drums, gas cans, barrels, etc.	1,10
M	Drums, buckets, Paint tins, barrels, etc.	0,86
M	Electric appliances	0,86
TOTAL		**97,16**

Table I. Ranking of the top ten subcategories of marine litter in terms of number of items and weight. Main categories are represented as follow: Plastic (P), Metal (M), Rubber (R) Glass (G) and (O) Other items.

As mentioned earlier, since February 2020, marine litter retrieved by the Illa de Arousa guild members was not further sorted in categories according to the type of material. From this date a 5 tonnes waste dumpster was installed in the port premises by a waste manager that approximately each month and a half, picks up the container, and transports it to the waste treatment plant where the residues are weighted. From then on, the total amount of litter registered represent **13,130** kg.

Although a list of the associates interested in collaborating in the fishing for litter action was provided at the beginning, due to a number of factors such as the large number of people that daily work in the intertidal

and subtidal coastal waters, the shifting between fishing gears and the variable degree of involvement, it was not possible to establish with precision the number of seafarers that actually contributed to the marine litter removal. Nevertheless, the involvement of on foot shellfish gatherers was especially remarkable.

4. Collaboration with the Fishermen Guild of Cambados

As in the case of the Illa de Arousa, the first contact with the fishermen guild of Cambados was established through the association of fishermen guilds of Pontevedra (NW Spain) in January 2019, during the meeting held between CETMAR and representatives of most guilds integrated in this association.
Afterwards, several meetings were held with the president and technical staff of Cambados fishing guild in order to gather information on the presence of marine litter in their fishing areas as well as on the characteristics of its small-scale fleet that operates inside of the ria. They informed us that two traditional towed gears, "bou de vara" (beam trawler) and "rastro de vieira" (scallop rake), were used every year during winter and spring months. Based on their experience, both gears are characterised by a high capacity to collect seafloor litter, mainly between November and December when the fishing season starts and the debris accumulated during the last half year are retrieved mixed with the fishing catch. A subsequent meeting was organised with several representatives of these fleets, in order to present them the project, learn more about their perception of marine litter and organize and launch the pilot action at the end of the year 2019.

4.1. "Bou de Vara": methodology and results

The Bou the Vara gear is characterized by the fact that its mouth is opened by the effect of a cross beam (figure 7). The method of fishing relies on approximately 15 minutes hauls, then the net is brought on board and emptied in the boat deck. Main target species are queen scallop, sepia, hake, spider crab, flat fishes, velvet crab, flatfishes and octopus.

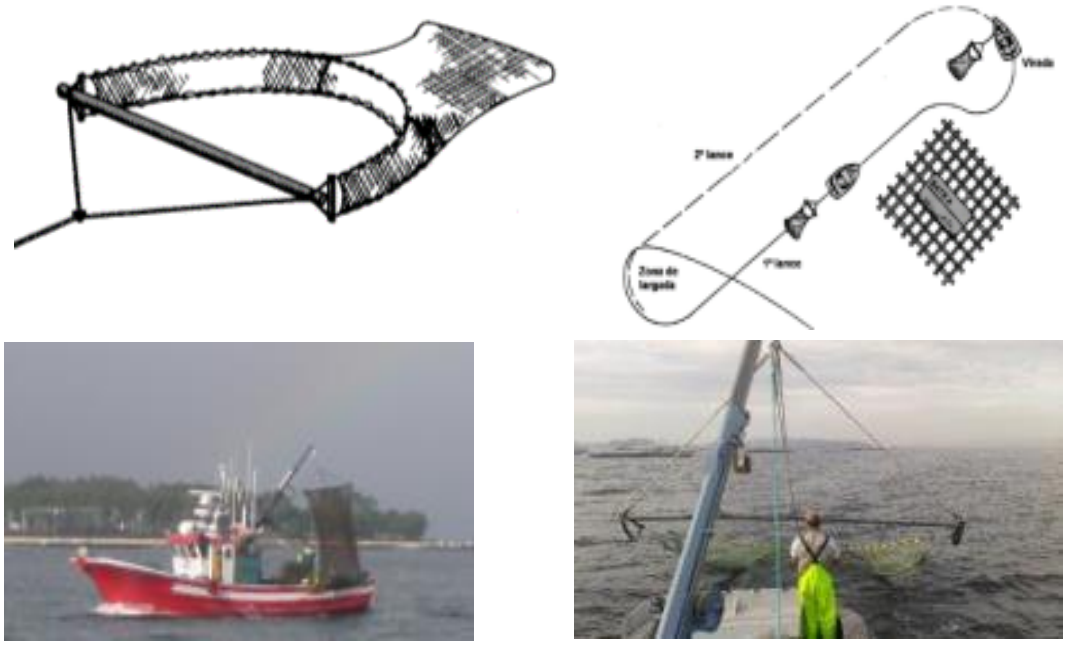


Figure 7. "Bou de vara" design and fishing operation. Cambados artisanal vessel using this fishing gear.

The fishing for litter action with this towed gear took place in the first week of the winter fishing session, between 4th and 7th November 2019. Previously, with the support of the guild staff, "big bags" to place the debris retrieved were distributed among the participant crews that received indications to carry out the litter retrieval actions. Thus, after each haul, fishermen separated the fishing catch from the mixed debris that was stored in the project "big-bags" or in plastic buckets normally used in those vessels during their working activities. To facilitate the operations, the fleet was supported by a wide deck aquaculture auxiliary vessel equipped with a crane, which was daily anchored in the Cambados' harbour entrance. Approximately half of this fleet (around 15) actively participated during the four days, using the auxiliary vessel as point of storage of all the marine litter retrieved during each working day.

The classification of all the collected residues was carried out on this auxiliary vessel where CETMAR staff categorized, counted, weighted and recorded them. This classification system was the same as that used in previous fishing for litter projects implemented in the Galician coasts ("Nada pola Borda" and PESCAL), that was based in the categories of items used in other programmes (ICES/OSPAR) but adapted to the characteristics of the predominant marine litter found in Galician waters

A This classification system (ANNEX II) includes six main groups related to their composition (plastic, metal, rubber, glass/ceramic, natural products and other items) and 53 more specific subcategories.

Figure 8. Marine litter retrieved by the "bou de vara" fishing fleet registered and stored in the auxiliary vessel deck.

The total amount of marine litter retrieved was approximately **2,800** kg and **477** items. Plastic was the dominant category, both in weight and number, representing around the 70% of the total marine litter retrieved (figure 9). The most common items in this category were mussel nets, different types of ropes, traps as well as plastic bags and bottles.

Regarding the items associated to the fishing and aquaculture sectors, their contribution reached the 56% and 77% in terms of number and weight respectively.

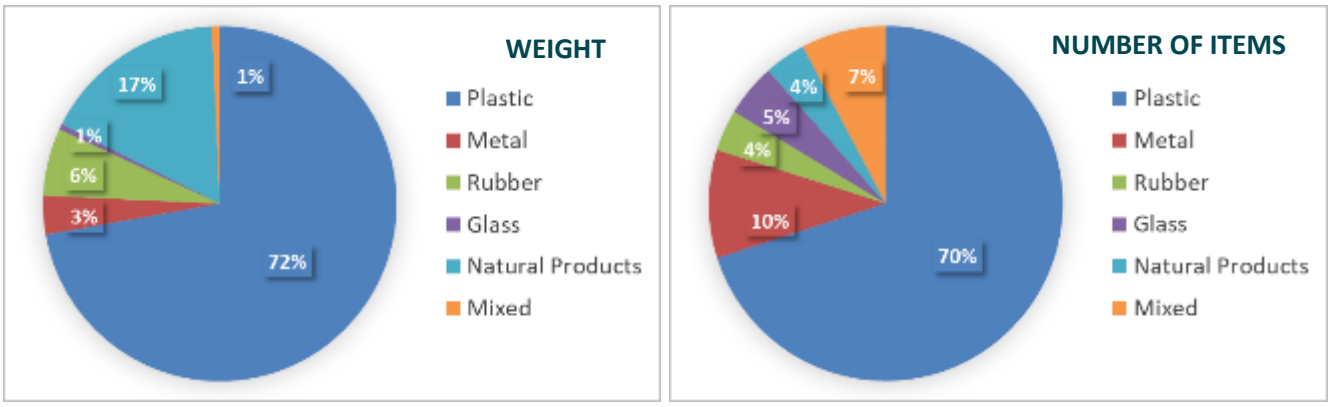


Figure 9. Percentage of the contribution of the main categories in weight and number of items.

In table II we report the top ten litter items retrieved. In terms of number of items, more than half (6) of the most dominant categories belong to the typology of plastics. (Table II). Other materials also contributed to the top ten list with items like clothing/rags, processed wood or beverage cans. Similarly, there are five plastic subcategories in terms of weight that contribute to the top ten list. Other typologies like metal, rubber or natural products that include heavy items like tyres, barrels or electric appliances where also placed in that list.

Category type	Subcategories	%Nº. Items
P	Mussel nets	15,72
P	Mussel raft ropes	14,26
P	Trap plastic net	10,69
P	Ropes	7,97
P	Plastic bottle	7,76
O	Clothing/Rags	5,66
P	Plastics bags/Remains of plastic bags	5,03
M	Cans (beverage)	4,19
N	Processed wood	3,77
G	Glass Bottles	3,14
TOTAL		**78,20**

Category Type	Subcategories	%Weight (Kg)
P	Mussel raft ropes	38,15
P	Other fishing gears (mixture of nets, lines, ropes, etc.)	17,46
N	Processed wood	16,86
P	Ropes	8,28
P	Trap plastic net	6,22
R	Tires	5,64
M	Other metal pieces	1,75
P	Boxes, baskets, drums, gas cans, barrels, etc.	1,10
M	Drums, buckets, Paint tins, barrels, etc.	0,86
M	Electric appliances	0,86
TOTAL		**97,16**

Table II. Ranking of the top ten subcategories of marine litter in terms of number of items and weight. Main categories are represented as follow: Plastic (P), Metal (M), Rubber; (N) Natural products, (O) Other items, Rubber (R) and Glass (G).

A waste management company was contracted to support this pilot action by providing a truck equipped with a crane and an 8 t waste dumpster (figure 10), where the marine litter retrieved was disposed and further transported to the waste treatment plant.

Figure 10. Marine litter retrieved and stored in the waste manager dumpster.

4.2. Rastro de Vieira methodology and results

One month later the same fleet shifted to a different gear, traditionally called “rastro de vieira”. This is a small towed gear characterised by a metallic structure that include a row of metallic teeth that digs in the substrate, introducing into the net cod different epibenthic and infaunal fishes and invertebrates. The principal targeted species are scallop, queen scallop sepia, spider crab, flat fishes, velvet crab and flatfishes.

Figure 11. “Rastro de Vieira” design. Cambados artisanal vessel using this fishing gear.

During three days (3, 4 and 5 December 2019) and with a similar approach to that applied with the Bou de Vara, an aquaculture auxiliary vessel gave support to the participating vessels, being used as a temporal storage site of the marine litter retrieved. Residues were classified by CETMAR staff on board. Also in this case, the number of involved boats was approximately 15.

The total amount of marine litter retrieved was approximately 1,700 kg and 885 items. Attending to the established typologies, plastic was also the dominant one, accounting for more than 75%, both in weight and in number of items (Fig 12). A mixed category, that includes items like clothing/rags, carpets or shoes, was the second in importance in both classifications. The specific category that includes fishing and aquaculture related debris, represent 48 % of the number of items and the 68 % of the total weight.

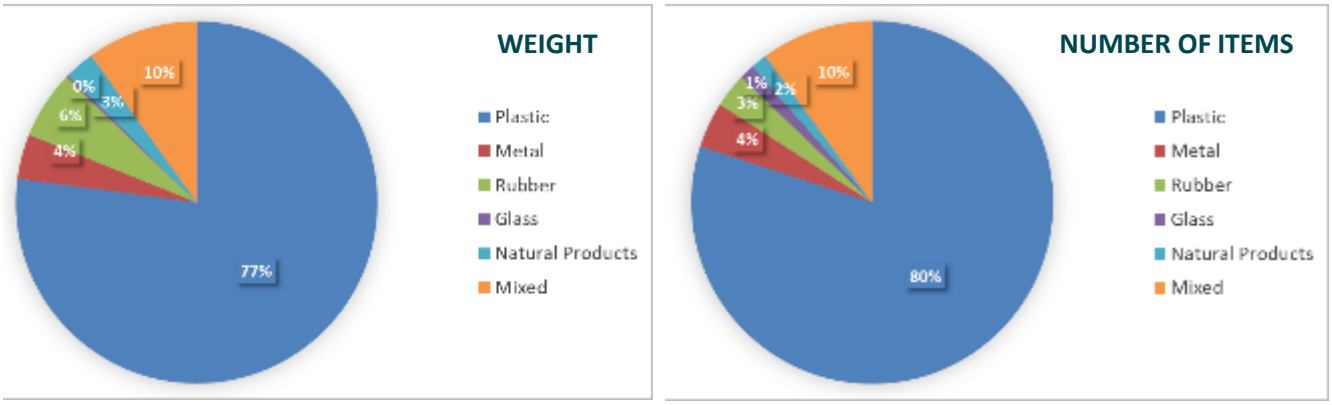


Figure 12. Percentage of the contribution of the main categories in weight and number of items.

As shown in the list of the top ten items (Table III), in addition to plastics, that represent half of the most dominant categories, there are several items belonging to other typologies like metal (cans, buckets, electric appliances, etc.), natural products (processed wood) or glass (bottles). They represent, both in number of items and in weight, around the 30% of those ten dominant subcategories.

Category type	Subcategories	%Nº. Items
P	Mussel raft pegs	20,94
O	Other items	10,57
G	Glass Bottles	9,86
N	Processed wood	9,68
P	Mussel raft ropes	6,35
P	Mussel nets	6,16
R	Tires	5,65
M	Cans (beverage)	4,79
P	Plastic bags	2,97
P	Trap plastic net	2,73
TOTAL		**79,73**

Category Type	Subcategories	%Weight (Kg)
P	Mussel raft ropes	45,43
O	Other items	11,70
R	Tires	7,72
N	Processed wood	7,01
G	Glass bottles	6,66
P	Fishing items (hooks, etc.).	4,70
P	Nylon gillnet	4,01
P	Trap plastic net	3,19
M	Other metal items	2,45
P	Other plastic items	2,07
TOTAL		**94,95**

Table III. Ranking of the top ten subcategories of marine litter in terms of number of items and weight. Main categories are represented as follow: Plastic (P), Metal (M), Rubber; (N) Natural products, (O) Other items, Rubber (R) and Glass (G).

It is remarkable that after the pilot action, fishermen from this guild continued bringing ashore the marine litter retrieved during their working days. Since February 2020 a waste dumpster container was installed by the fishermen guild and debris are periodically collected and transported by a waste management company that is in charge of their treatment.

5. Collaboration with the Galician Institute for Aquaculture Training

CETMAR contacted the management team of the Galician Institute for Aquaculture Training at early 2019, in order to introduce them the project main objectives and explore the possibility of a collaboration for marine litter retrieval, coupled to their subaquatic training activities. Later that year, several meetings were held with the scuba diving department in order to identify how they could implement diving for litter actions within the framework of field training activities carried out throughout the school year. As a result of these interactions, a formal collaboration agreement was set up between both parties.

5.1. Diving for litter. Methodology and Results

Before carrying out the diving activities a data sheet for monitoring seabed litter was drafted and further refined and agreed with the diving department teachers, including seven typologies and thirty-one subcategories. It was prepared based on the master list of categories of litter items (ANNEX I) used with the Fishermen's guild of Cambados, taking also into account the specific characteristics of this type of clean-ups and the information provided by the teacher of this training centre regarding the predominant items normally found in the surveyed area. . (ANNEX II). It was planned that the litter removal activities were coupled with the student training sessions and that different surveys would be carried out in the seashore areas around the Arousa Island coast.

A first activity took place on October 2019, involving 15 students, when a snorkelling trial was carried out in the vicinity of the IGaFA premises. Starting from the dock located in the coastal area close to the Institute, two transects were conducted at a depth ranging between 2 and 10 meters, one oriented to the North and another one to the South, surveying around 7,000 m^2. Approximately 30 items were found and retrieved. Cans, debris from fishing or aquaculture, batteries, tyres or plastic bags were registered in the data sheet, being especially noticeable the number of ceramic fragments located in this area. All the items were classified and quantified and additional information and pictures (Figure **13**) were used to complete a brief report produced by the teachers in charge of this diving department.

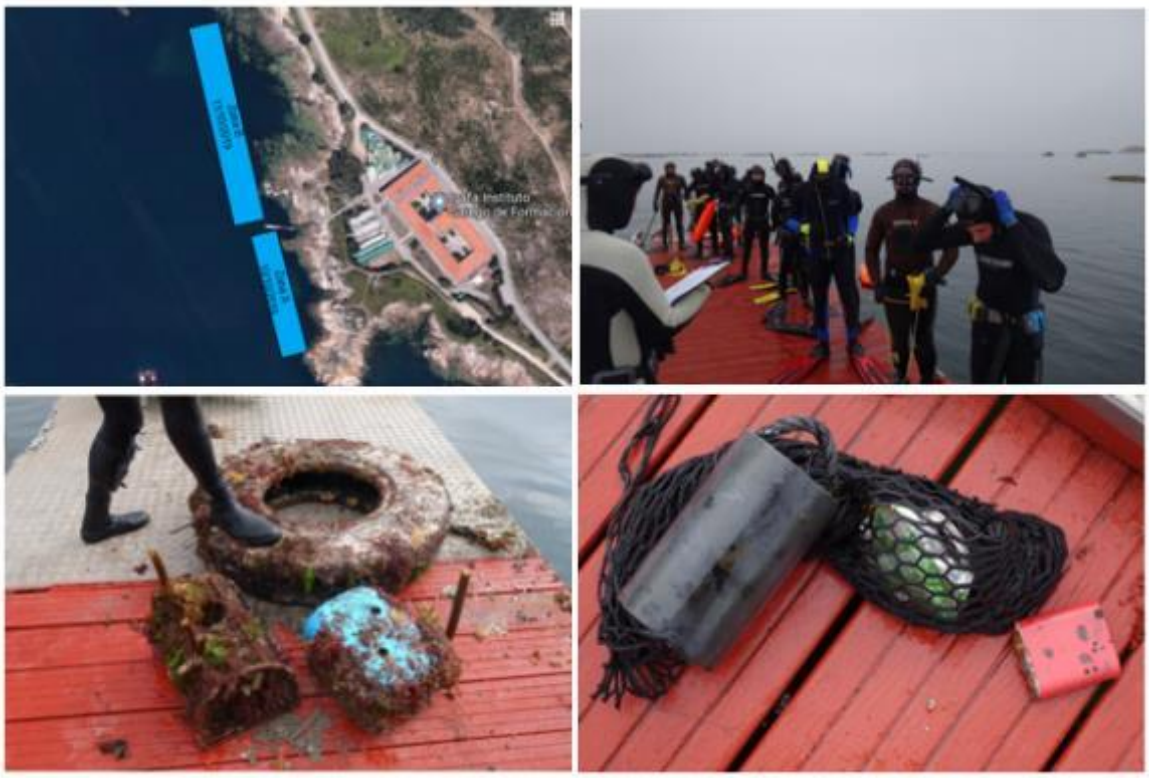


Figure 13. Surveyed area, diving participants and different items retrieved.

Although additional activities had been planned for the following spring, since March 2020 the COVID-19 pandemic outbreak led to the closure of educational face-to-face activities during the scholar year. IGaFA live practical and theoretical classes started again in October 2020, but many restrictions regarding the number of students participating in the field trips and changes in the school schedule made it difficult to fit the project with their training activities. Eventually two new surveys were developed in December 2020. The first one was carried out in an area placed between the coast and a mussel raft polygon. A surface of approximately 200 m^2 was surveyed and as in the previous cases the number of items retrieved and recorded in the data sheet was reduced. Item's categories retrieved included ropes, nets, traps, tyres, plastic bags or batteries.

The second diving survey consisted in a clean-up that was carried out under the mussel-raft that the institute uses in their aquaculture practices. It is a 400 m^2 area, placed between 15 and 22 meters depth. In this occasion a large number of objects were retrieved, requiring the participation of an auxiliary vessel equipped with a crane. Most of the registered items were related to aquaculture and fishing practices like ropes, traps, octopus pots, oyster baskets, mussel nets as well as tyres that serve as pneumatic vessel fenders (figure 14).

Figure 14. Surveyed area, diving participants and different items retrieved.

6. Conclusions

• The pilot action carried out at the Ria of Arousa demonstrated that the Fishing for Litter operational scheme fits well with the normal fishing and shellfish gathering operations but participation should be kept as simple as feasible, as additional efforts may reduce participation.

• Adequate collections systems, mainly containers, should be provided at no cost and installed in places easily accessible and close to the areas where catches are daily landed or sold, like at the entrance of the docks or the auctions. Other materials like bags of different size can be also made available to the participant seafarers, but depending on the fishing modality and/or vessel dimension, some of them may prefer to use their own stuff like plastic buckets or nets.

• As it could be expected, the capacity to retrieve marine litter was very dependent on the specific fishing gear used, with artisanal trawling gears giving the highest yields. The contribution of on foot shellfish gatherers (mainly women) in terms of collecting litter during their working activity was also remarkable.

• Quantitative assessment of marine litter along the Illa de Arousa coastline and in the shallow subtidal areas of this ria showed that the most dominant typology was plastic, that in terms of number of items and weight represented more than the 50% of the top ten subcategories recorded. Many of them can be classified as litter originated from sea based sources, what is in accordance with the intense aquaculture and fishing activities concentrated in this area. Collected materials were mixed and very dirty at times which would make recycling processes extremely difficult or unfeasible.

• The participation of ports and harbour authorities is crucial, as the port area act as the temporary storage point for the waste collected. They have to be fully involved in the decision about the most suitable location for the containers in order to facilitate cargo and download operations without disrupting the normal activities of the port. Waste managers must be also informed and engaged from the very beginning. A smooth and constant communication with all the stakeholders involved should be maintained to ensure that all the marine litter management operations (download, storage, subsequent transport and treatment) are properly handled.

• Awareness and training activities with small-scale fishermen and shellfish gatherers have to be set up before implementing the fishing for litter scheme. General information about the harmful effect of marine litter in the marine and coastal ecosystems should to be coupled with practical instructions regarding which types of materials are considered marine litter and how they must be collected and stored. In the case of vessel crews, emphasis should be made on not mixing waste coming from fishing for litter with the vessel galley and operational waste, and in the importance of storing both separately. Concerning the shellfish gatherers, they have to be encouraged to clearly differentiate coastal debris from other vegetable remains, like trunks or branches, which are accumulated in the shellfish beds and transported by the rivers after extreme precipitation events.

•Meetings, training and awareness activities have to be adapted to the seafarer's availability, minimizing displacements to the meeting point, alterations in their work schedule or involving an extra workload or excessive time consumption. Thus, "at pier" activities are better accepted and recommended to catch their attention and achieve a greater participation.

Establishing personal contact with the fishermen guilds members and counting with the support of their representatives is crucial for the success of the scheme. In this regard, it is noteworthy that the designation from their side of a person in charge of the collective actions, that can act as a point of contact among the

different actors and institutions involved is crucial to the success of the retrieval and management actions associated to the debris brought ashore.

• An important contribution of the Fishing-for-Litter scheme is to carry out a monitoring of the collected marine litter to investigate the type of litter and the most likely associated land or sea based sources. That is the reason why collected materials are usually quantified and categorised. However, this is time consuming, it involves the use of a Litter Monitoring Survey Form and requires training and education to avoid mistakes and over or underestimations of certain subcategories of items. Careful considerations should be made concerning the final aims of the process to be implemented (reducing marine litter, monitoring, awareness raising, some or all of them) and the available resources in order to achieve an efficient and sustainable fishing for litter scheme assumed by the fishing sector.

• Seafarer's efforts participating in marine litter retrieval activities must be visible to the society, improving their image and promoting their role as "guardians of the sea". In this regard, their appearance in the media showing their participation in marine litter retrieval and clean-ups activities, help to make their collaboration visible and also encourages the involvement of more fishermen, shellfish gatherers other actors related to the marine sector.

Although due to COVID 19, the scope of the "diving for litter" action carried out with the IGaFA was eventually much more limited in time and spatial coverage than previously planned, it demonstrated the potential and the interest of coupling training activities carried out at the sea with marine litter monitoring, retrieval and awareness raising actions.

7. ANNEXES

•Master List of Categories of Litter Items•

DATE: _____

PORT: _____ **SHIP:** _____

BIG BAG WEIGHT (kg): _____

A	PLASTIC	Nº items	Weight (Kg)
A1	Bottles		
A2	Plastic bag collective role what remains from rip-off plastic bags		
A3	Plastic caps and lids		
A4	Fishing line/monofilament		
A5	Fishing line/multifilament		
A6	Ropes		
A7	Nylon gillnet		
A8	Polyethylene trawling net		
A9	Trap plastic net		
A10	Octopus pots		
A11	Floats/Buoys		
A12	Other fishing gears *(mixture of nets, lines, ropes, etc.)*		
A13	Waterproof fishing suit		
A14	Ties, tags, clamps		
A15	Straps		
A16	Boxes, baskets, drums, gas cans, barrels, etc.		
A17	EPS boxes and fragments		
A18	Diapers/nappies		
A19	Sanitary towels/panty liners/backing strips/tampons		
A20	Mussel nets		
A21	Mussel rafts pegs		
A22	Mussel rafts ropes		
A23	Other plastic items		
	Plastic Subtotal		
B	**METAL**	**Nº items**	**Weight (Kg)**
B1	Cans (food)		
B2	Cans (beverage)		
B3	Fishing items (sweeps, brides, ropes, etc.)		
B4	Fishing items (lead, sinkers, etc.)		
B5	Fishing items (buoys, etc.)		
B6	Fishing item (hooks, etc.)		

B7	Drums, buckets, paint tins, barrels, etc.		
B8	Electric appliances (refrigerators, washers, etc.)		
B9	Car parts/batteries		
B10	Another kind of ropes		
B11	Other metal pieces		
	Metal Subtotal		
C	**RUBBER**	**Nº items**	**Weight (Kg)**
C1	Boots		
C2	Balloons		
C3	Bobbins (fishing)		
C4	Tyres		
C5	Gloves		
C6	Other rubber items		
	Rubber Subtotal		
D	**GLASS/CERAMIC**	**Nº items**	**Weight (Kg)**
D1	Jars		
D2	Bottles		
D3	Glass or ceramic fragments		
D4	Other glass/ceramic items		
	Glass/Ceramic Subtotal		
E	**NATURAL PRODUCTS**	**Nº items**	**Weight (Kg)**
E1	Processed wood		
E2	Vegetal fibre rope		
E3	Paper or cardboard		
E4	Wooden pallets		
E5	Other natural items		
	Natural products subtotal		
F	**OTHER ITEMS**	**Nº items**	**Weight (Kg)**
F1	Clothing/rags		
F2	shoes		
F3	Drink cartons (milk, juices, etc.)		
F4	Other items (Communication or electric wire, engine filter, etc.)		
	Other items subtotal		
	TOTAL ITEMS	**Nº items**	**Weight (Kg)**

ANNEX I

MARINE LITTER MONITORING - DIVING

CHARACTERISTICS OF THE SUPERVISED AREA

- **Name of the area:** **Sampling code:**
- **Sampling date:** **Start and end time:**
- **Coordinates:** Start End
- **Depth maximum and minimum** (m):
- **Approximate extension of the visited area** - Length x Width:
- **More relevant oceanographic and meteorological conditions:**

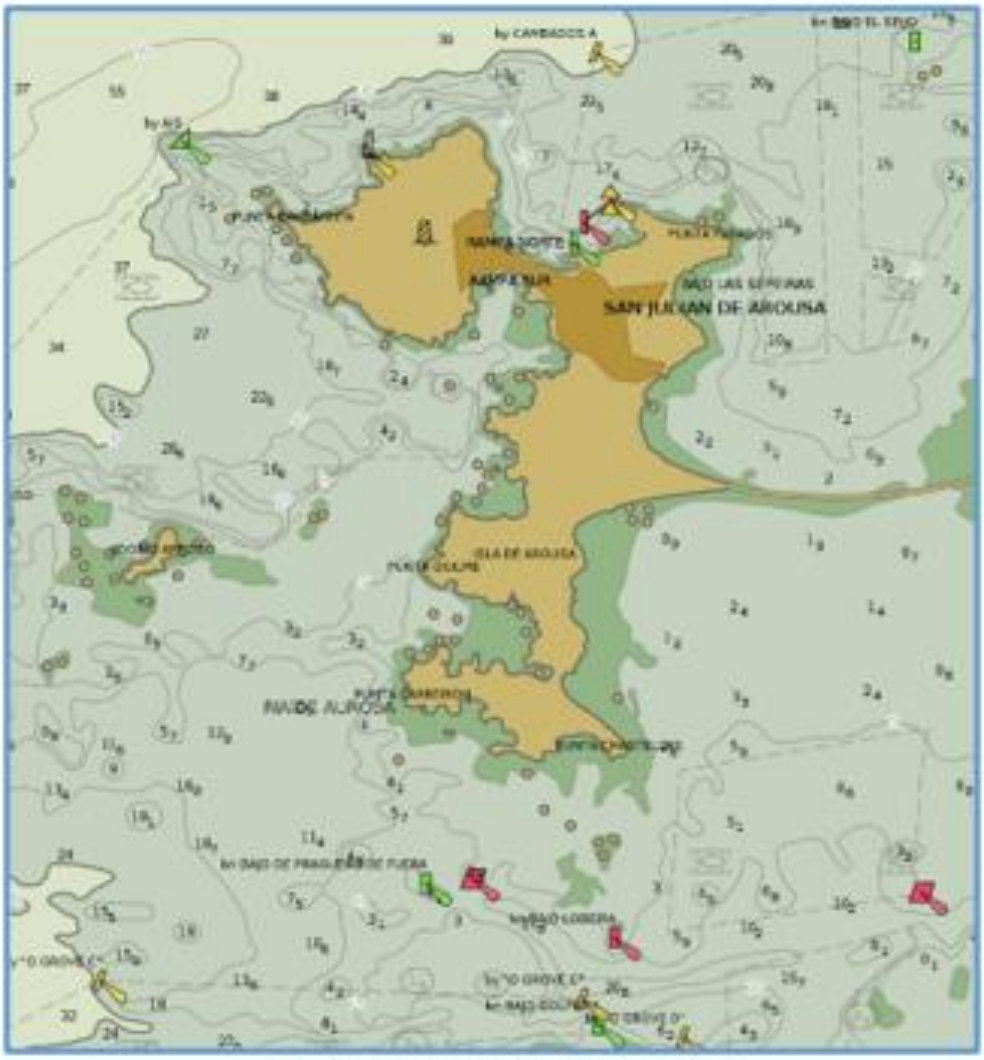
Groundswell ☐ Turbidity ☐ Wind ☐ Other (indicate which)

- **Type of sea ground:**

Rocky☐ Sandy☐ Muddy☐ Seagrasses☐ seaweed☐ Other (please indicate)

- **Sea ground topography:**

Plate☐ Slight slope☐ Steep Slope☐ Irregular☐ Other (Please indicate)



Locate the diving zone on the map

Typology	PLASTIC	Nº
	Plastic bags, plastic bags remains or plastic sheets	
	Plastic bottles	
	Boxes, containers, buckets, etc.	
	Ropes	
	Nets and fishing lines	
	Traps	
	Octopus pots	
	Buoys	
	Mussel nets	
	Mussel raft pegs	
	Other	
Typology	**RUBBER**	**Nº**
	Tyres	
	Debris from other marine activities (clothing, buoys, etc.)	
	Other	
Typology	**METAL**	**Nº**
	Cans (food or beverage)	
	Debris from fishing or aquaculture	
	Other	
Typology	**ORGANIC**	**Nº**
	Processed wood	
	Paper or cardboard	
	Cigar butts	
	Other	
Typology	**HYGIENIC/SANITARY**	**Nº**
	Cotton ear buds	
	Other hygienic material (nappies, pads, tampons, etc.)	
	Other	
Typology	**GLASS**	**Nº**
	Bottles and jars	
	Ceramic fragments or bricks	
	Other	
Typology	**OTHER ITEMS**	**Nº**
	Shoes	
	Clothing, rags, etc.	
	Drink cartons (milk, juices, etc.)	
	Other items	

Observations (Presence of accumulations of debris or other relevant that should be highlighted.

ANNEX II