

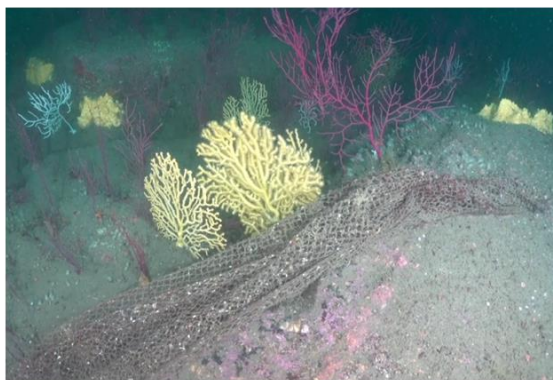
# CleanAtlantic

## Tackling Marine Litter in the Atlantic Area

### DELIVERABLE Action 7.3

Report on Pilot action for abandoned lost and otherwise discarded fishing gears (ALDFG) mapping and retrieval

### WP7: Tackling Marine Litter



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# Report on pilot action for ALDFG mapping and retrieval

## 1. Introduction

According to the FAO definition, the term “abandoned, lost or otherwise discarded fishing gear” (ALDFG), often referred as “ghost nets”, includes the fishing gear over which the operator/owner has control but is deliberately left at the sea due to force major, these that over which the operator/owner has accidentally lost control and cannot be located and/or retrieved and finally these that are released at sea without any attempt for further control or recovery. Their causes are many and variable, including direct fishing factors like bad weather conditions, illegal or unregulated fishing, gear conflicts, vandalism etc. Also, unavailability of on land waste disposal facilities and their accessibility and cost of use are among the most relevant indirect factors.

ALDFG has numerous negative impacts that include catching of target and non-target species, benthic environment modifications, hazards to navigation and safety at sea, introduction of plastic material into the marine food web, etc. From an economic point of view, derelict fishing gears represent a considerable cost related to clean-up operations and a direct impact on business activities.

To reduce ALDFG contribution to marine debris, actions and solutions need to address different types of measures that comprise preventative, mitigating and curative activities. In the case of the curative measures, retrieval operation has to be seen as sequential process that consists of several phases. Firstly, the identification of target areas, normally based on the information provided by fishermen, coastguard authorities and recreational divers’ clubs among others. Prior to undertake the retrieval of a derelict fishing gear, if depth allows it, scuba divers surveying can provide valuable information about its fishing capacity, the ecologically substrate features (sensitive areas) and the potential environmental impacts of the removal. During this planning phase, the use of additional technologies as ROV or side scan sonar can also contribute to gather more precise evidences about the gear location and characteristics.

Finally, if an ALDFG retrieval is considered necessary at shallow depths, scuba divers’ participation in preparatory works can minimize the environmental disturbance. When nets are highly entangled on bottoms structures, previous manual disentanglement with a knife or a saw will reduce the risks of damaging the substrate as well as the associated plant and animal communities, facilitating the subsequent techniques of mechanical recovery. Special attention should be paid in the case of marine protected area, where specific monitoring and management actions have to be implemented to avoid ALDFG presence in their waters and retrieval actions implications have to be comprehensively evaluated.

## 2. Objective

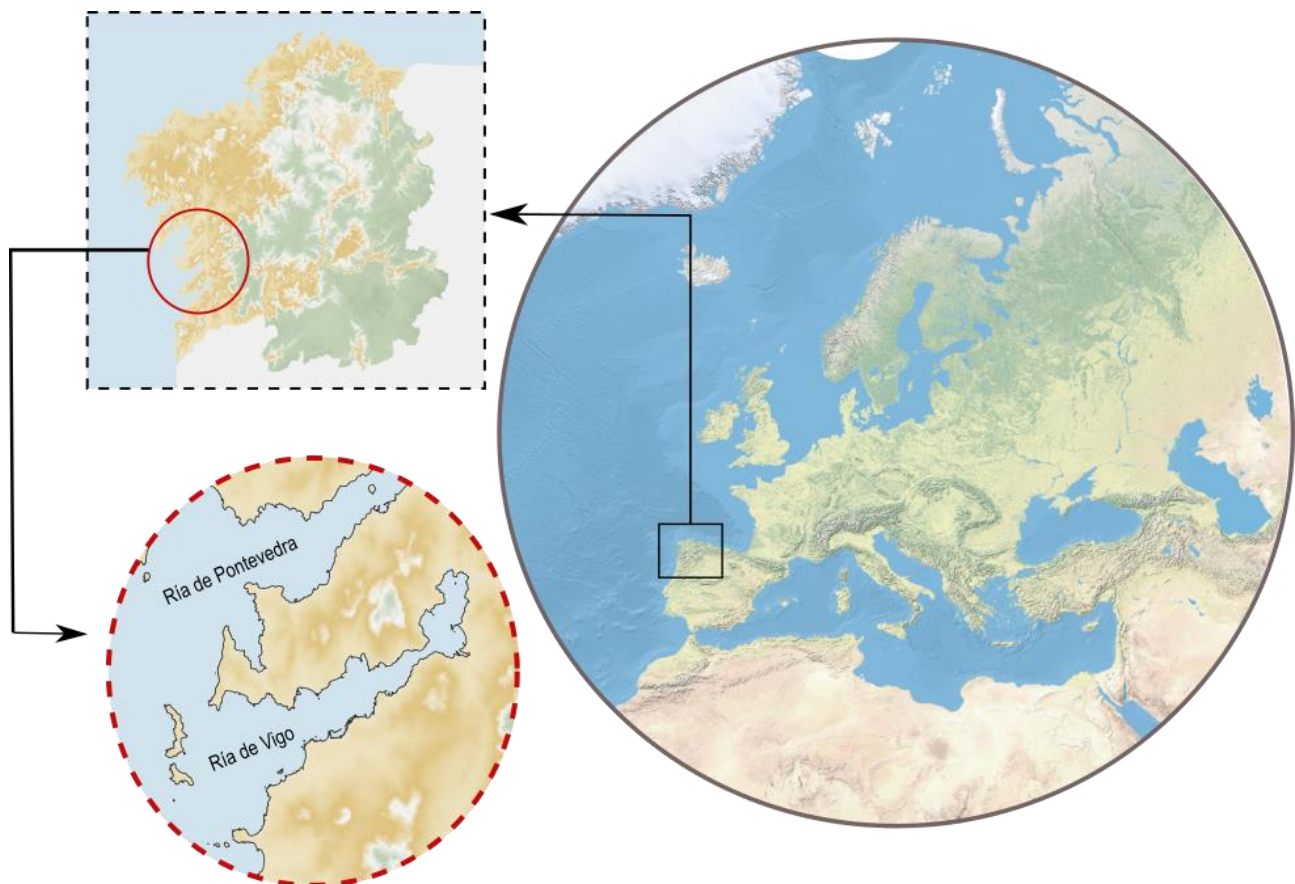
The CleanAtlantic project aims to protect biodiversity and ecosystem services in the Atlantic Area by improving capabilities to monitor, prevent and remove marine litter. Work package 7 is aimed directly at preventing and reducing marine litter and framed in it, action 7.3 aims addresses ALDFG related issues. Here we describe the pilot action and associated activities developed by CETMAR in collaboration with recreational divers to locate and map ALDFG in the Rias of Vigo and Pontevedra and to further retrieve three selected

derelict fishing gears ALDFG with the collaboration of an experienced and professional team of scientific diving and the Galician Coast Guard Service. They had already participated to retrieve an abandoned purse seine net in May 2021, during the first phase of CleanAtlantic. The process was documented with the production of video that will be used as awareness raising material.

### 3. Area of study

Taking into account the criteria of the diving team and considering the period of time available within the framework of the project extension to develop this pilot action, it was decided to focus the action on the Rías of Vigo and Pontevedra (Fig. 1), both located in the so called Rías Baixas (Galician for "Lower Rias"), a series of four estuarine inlets located on the southwestern coast of Galicia, Spain. The Ría of Vigo estuary is the deepest and southernmost of all rias. It extends in a north-easterly direction for a length of 35 km. Its width ranges between 10 and 0.6 km and its surface area is 176 km<sup>2</sup>. On the other hand the Ría of Pontevedra, has a more regular shape and is slightly smaller in size, with 23 km in length and a surface area of 145 km<sup>2</sup>.

About 1.000 small-scale and purse-seine vessels (99% of them less than 12 in length) have their fishing grounds in the waters of these two Rias. They traditionally carried out a "catch of the day" artisanal fishing activity regulated by the Galician Ministry of the Sea (Galician Regional Government) through the General Exploitation Plans that area annually published, being used as management instruments to guarantee the sustainability of fishing and shellfish resources.



*Figure 1. Area of study, Rías of Vigo and Pontevedra*

## 4. Actors' engagement

In the territorial scope of both estuaries, the diving clubs and the fishermen's guilds, specifically those gathering razor clams by compressor divers, were considered as the most relevant actors that could provide information about the locations of ALDFG on the seabed of both estuaries.

During the months of January and June 2022 a total of 14 diving clubs located in different coastal towns of both Rias were identified. Cetmar staff firstly contacted them by phone to present the main objectives of CleanAtlantic and this pilot action and to explore their willingness to participate. Eight clubs agreed on participating by providing information about areas where they had located ALDFG during their scuba dives. Face to face meetings were subsequently arranged with the representatives of these clubs to deeply explain them the characteristics of the pilot action, the information that was intended to be collected and the possibility of carrying out several net retrievals, based on the information gathered.

A form was further prepared in June 2022 (Fig. 2) to address key information about the area where the derelict fishing gears were located, their characteristics and approximate dimensions, environmental impact being produced (if any) and current status, in an attempt to map ALDFG and/or litter accumulation areas in both rias with their support. A draft version of the form, was shared with the project partners, to gather their comments and suggestions.

**GENERAL INFORMATION**

- Diving centre name:
- Contact person:
- Contact details:

Street:	
Town:	
Post Code:	
Phone:	
email:	

Please fill all the fields of this section i. Once saved, all forms you fill in later will be automatically assigned to this contact data.

**Save  
General information**

**TYPE OF MARINE DEBRIS FOUND**

ALDFG ☐ Marine Litter Hotspot ☐

(Full in form A) (Full in form B)

Depending on the field you choose, you will be directed to form A or B. Please, remember that you will have to fill out a form for each of the fishing gear or residue accumulations that you have found.

**ALDFG – FORM A**

The asterisk (\*) indicates the mandatory fields that need to be filled in.

- Area where the ALDFG was found:

Ría de Vigo ☐ Ría de Pontevedra ☐ Another area<sup>1</sup> ☐

- Site name:

- Location (Latitude, Longitude)\*:

Please specify the reference system.

- Average depth\*:

Figure 2. Draft form circulated among the CleanAtlantic partners.



Taking into account partner contributions, a user friendly online version was finally prepared in July 2022, with special emphasis on facilitating its completion by the divers (Fig. 3). A direct link was provided, the form could be saved before being completed, no field was mandatory and once all the information about one ALDFG had been registered it could be submitted and a new record could be filled. Additionally, pictures of the area where the ALDFG was located could be uploaded as well as those of the fishing gear itself.

The form is titled "Identificación y localización de artes de pesca perdidas o abandonadas en las rías de Vigo y Pontevedra" and is part of the "Formulario A - Características del arte de pesca". It includes the following sections:

- Identificación y localización de artes de pesca perdidas o abandonadas en las rías de Vigo y Pontevedra, en el marco del proyecto europeo Cleanatlantic.**
  - Language: Español
  - Buttons: Siguiente, Salir y borrar la encuesta, Cargar encuesta sin terminar
- Formulario A - Zona donde se encontró el arte de pesca**
  - Selection of fishing gear location: Ría de Vigo, Ría de Pontevedra, Ría de Aldán, Islas Cíes, Ons, Costa da Vela, Sin respuesta.
  - Nombre de la zona donde se encontró el arte de pesca perdida
  - Ubicación (Latitud, Longitud), por favor especifique el sistema de referencia
- Type of Seabed**
  - Selection of seabed type: Fango, Grava, Arena, Rocoso, Zosteria (ceba o seba), Algal, Maerl (Coralillo), Pécio.
  - Describe si es posible o tipo de fondo (ex.: existencia de estructuras artificiales)
- File upload**
  - Si dispone de alguna imagen de la zona de inmersión que permita caracterizar el tipo de fondo o imágenes del plotter de la embarcación indicando la ubicación del arte de pesca puede adjuntarlas.
  - Subir archivos
- Data**
  - Fecha de la inmersión en la que se tuvo conocimiento del APPA (Si desconoce el día exacto introduzca una fecha aproximada)
  - Siguiente
- Type of Fishing gear and characteristics**
  - Selection of fishing gear type: Artes de anzuelo, Arte de enmalle, Artes de arrastre, Artes de cerco, Nasas, Cacharros de pulpo, Rastros, Otro.
  - Indique de forma aproximada las dimensiones del arte de pesca encontrado (en metros)
  - ¿Considera que el arte de pesca puede ejercer efectos negativos sobre el medio y/o los organismos marinos (pesca fantasma, daños en el sustrato, contaminación por fragmentación o degradación, etc.) o riesgos para la navegación?
  - ¿Se observan organismos marinos atrapados en el arte de pesca (peces, crustáceos, moluscos, tortugas, cetáceos, etc.)?
  - ¿Considera que de ser necesaria la retirada del arte de pesca se podría acometer de forma manual o requeriría de medios mecánicos (ej. grúa)?
  - Subir archivos
  - Enviar

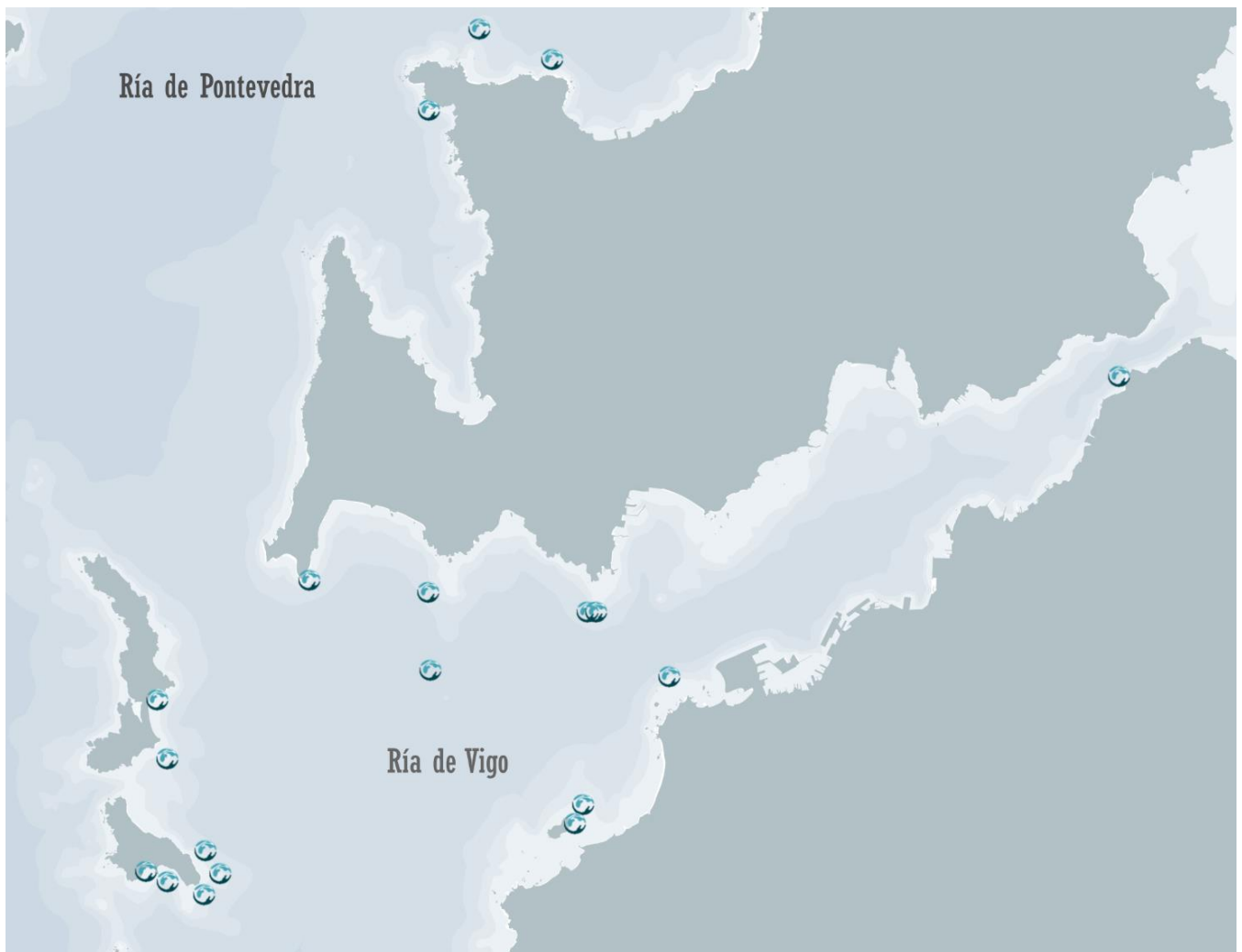
Figure 3. Online version of the form.

Razor clams gatherers associations belonging to the Cangas and Vigo Fishermen guilds, were also informed about the objectives of the project and pilot action that was being carried out in both estuaries.

Finally, a meeting was held with representatives of the Galicia's Coast Guard Service that operates under the Galician Ministry of the Sea. This organization had already provided support during the first phase of the project, with the contribution of their vessels and crews, in the retrieval of a purse seine fishing gear, also located in the Ria de Vigo.

## 5. Information gathering

During the 2<sup>nd</sup> semester of 2022 and 1<sup>st</sup> semester of 2023 all the information reported by the diving clubs and fishing guilds was gathered in a data base and subsequently represented in a GIS. Near 20 findings were included comprising both historical data from previous dives as well as those from ALDFG located during the pilot action. The GIS layer produced represents the location where each of the ALDFG was georeferenced by the divers participating (Fig. 4).



*Figure 4. Location of the ALDFG reported in the Ría de Vigo and Pontevedra.*



## 6. Preparatory operations

In order to make decisions on the suitability of carrying out retrieval operations of some of the located ALDFGs, meetings were held with the diving clubs representatives, who provided more accurate information about fishing gear characteristics and the diving spot accessibility as well as graphic material that reflected how gears were laid out on the seabed and the effects they were producing there.

After considering the aspects above, the decision was made to recover 3 derelict fishing gears located in the seabed of the Ría de Vigo. The participation in the pilot action of an experienced scientific diving team supported the decision making and allowed us to assess the risks associated with the underwater works and the potential damage that may be caused by the gears to the environment and local fauna. Issues such as the dimensions and weight of the gear and the required mechanical means for raising it were considered as well as how the ALDFG were affecting the environment and fauna, and if the retrieval operations could be us the special care to be taken to prevent and minimize any potential impact of the removal operations.

The protocol included, in all cases, a preliminary visit (Fig. 5) to the area to assess the characteristics of the fishing gear, untangle when necessary net fragments, and release the entangled organisms.



*Figure 5. Preparatory actions previous to the ALDFG retrieval.*

CETMAR contributed by organizing logistic matters and providing the human and material resources as well as the necessary equipment used during preparatory operations.

## 7. ALDFG retrieval

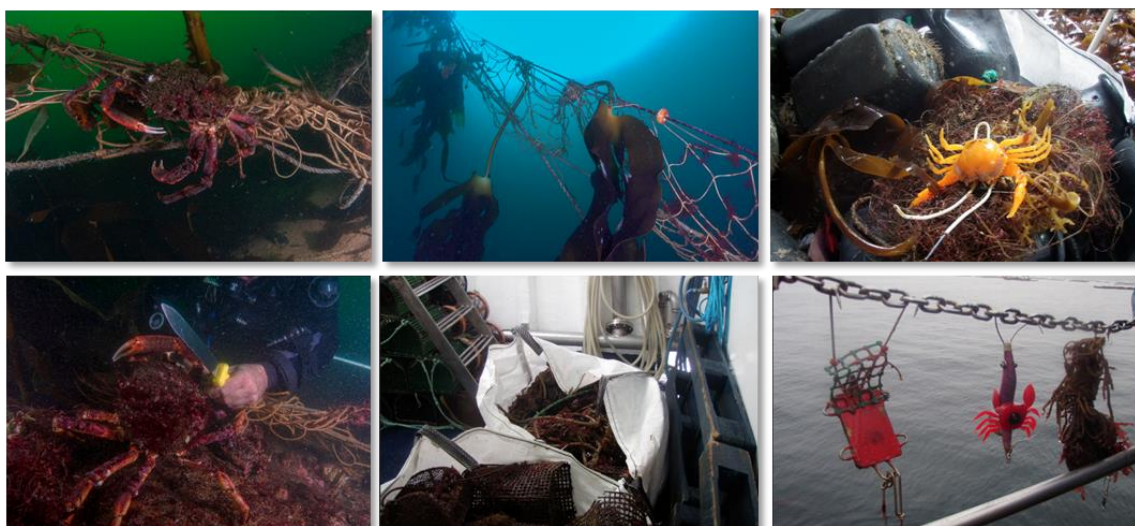
Based on the information gathered, three ALDFG retrieval actions were finally carried out during the second phase of the project, all of them located in the Ría of Vigo (Fig. 6).

The first retrieval took place on October 10<sup>th</sup>, 2022 in an area known as Borneira. A preparatory dive took place a week before, to explore the characteristics and status of the net. In this dive and also during the retrieval, different species, mainly crabs, were released before hoisting the net on-board the Galicia's Coast Guard vessel "Valentín Paz Andrade". This fishing gear was a more than 200-meter-long net and 500 kg weight, typically used to fish spider crabs. One extreme was entangled in a shipwreck and the rest over a field of algae. Seabed was predominately rocky, with an average depth of 14 meters. Vegetation was dominated by a kelp forest where spider crabs and fish species such as sea bass and haddock are abundant (Fig. 7). In addition, many mussel raft ropes, taps, pots and baits were entangled in this net, which made its retrieval even more difficult.



*Figure 6. Location of the three ALDFG retrieved in the Ría de Vigo.*

Members of “Hombre y Territorio” association also participated in this retrieval action. This environmental association collaborates with the Ministry for the Ecological Transition and the Demographic Challenge in the framework of the project Life InteMares, which includes an action focused on the elaboration of a protocol for lost or abandoned gears aiming to standardize how, to locate, evaluate and, where appropriate, retrieve and manage ALDFG. It also aims to create an ALDFG inventory (<https://www.artesperdidos.es>) that will be used as a unified database of derelict fishing gears for the 5 Spanish maritime demarcations. An online viewer with the location of the ALDFG along the Spanish coast is also available.



*Figure 7. ALDFG retrieval carried out in October 2022.*

Subsequently, on March 27<sup>th</sup> 2023, two derelict fishing gears were retrieved in the external and middle part of the Ría de Vigo. Firstly, a small bottom gillnet that was located on a coralline seabed with rocky outcrops, ranging in depth from 22 to 35 meters. This area, known as Melide, was characterised by a high biodiversity, which includes gorgonians, sponges and a large number of invertebrates. Finally, the same day, in the vicinity

of the Toralla Island, in shallow waters (less than 5 meters deep), a trammel net was recovered. It was deposited on a seagrass meadow where it was causing a significant abrasive effect (Fig. 8).



*Figure 8. The two ALDFGs retrieved in March 2023.*

## 8. Video

Based on the visual documentation recorded, a six minutes length video was produced to present the pilot action and to be used for general public awareness raising purposes. Underwater images were filmed by the diving team that was in charge of the preliminary works and the final net removals. In addition retrieval operations were recorded on-board the Galicia's Coast Guard vessel by CETMAR staff.

The video was uploaded to the CETMAR YouTube Channel, being available in the following link:

<https://youtu.be/0arxCq4J7Bw?si=Bh2v0JzS0a19lsHE>

## 9. Conclusions

- There was a positive feedback from diving clubs and razor clams gatherers. Both collectives are aware that ALDFG is an issue of growing concern.
- Most of the diving clubs contacted by the project were willing to actively participate in this initiative, informing the project about the location and characteristics of the derelict fishing gears found during their immersions. This demonstrates the potential of this group of sea users to contribute to address ALDFG issue and the interest to upscale this type of actions to map wider areas.
- Interacting with Divers Associations may multiply the impact and involvement. Facilitating the information flow is crucial for the success.
- Mapping and including the information about the most relevant ALDFG findings in a GIS layer facilitate its visualization, the detection of potential overlapping with maritime and coastal activities and further decision making on retrievals
- Data gathered contributed to feed the national ALDFG data base created by the Ministry for the Ecological Transition and the Demographic Challenge through the project Life Intemares. This illustrates the importance of the collaboration between local, regional, and national organizations sharing common goals and vision to tackle marine litter and achieve a healthier ocean.

- Retrieval actions required previous and careful preparatory actions and a risk assessment to evaluate effects, drawbacks and benefits of ALDFG retrieval actions should be also carried out. Once a decision on an intervention has been made, special care have to be taken to remove the gear in an environmentally friendly way to lessen the impact of the operations
- Collaboration of an experienced team of divers and contribution of Coastguard Service turned out crucial for the success of the operations.