REPORT

PLASTIC BUSTERS MPAS

MARINE LITTER PILOT ACTIONS

Thermaikos Gulf Protected Areas

Establishing a derelict fishing gear management scheme and promoting co-responsibility to tackle fisheries & aquaculture-related litter

Citation

MIO-ECSDE & iSea, 2021. Plastic Busters MPAs Marine Litter Pilot Actions - Thermaikos Gulf Protected Areas. Establishing a derelict fishing gear management scheme and promoting co-responsibility to tackle fisheries & aquaculture-related litter.

Table of Contents

1. Plastic Busters MPAs in a nutshell

Plastic Busters MPAs is a 4-year-long Interreg Mediterranean funded project aiming to contribute to maintaining biodiversity and preserving natural ecosystems in pelagic and coastal marine protected areas (MPAs), by defining and implementing a harmonized approach against marine litter. The project entails actions that address the whole management cycle of marine litter, from monitoring and assessment to prevention and mitigation, as well as actions to strengthen networking between and among pelagic and coastal MPAs.

The Plastic Busters MPAs consolidates Mediterranean efforts against marine litter by:

- Diagnosing the impacts of marine litter on biodiversity in MPAs and identifying marine litter 'hotspots';
- Defining and testing tailor-made marine litter surveillance, prevention and mitigation measures in MPAs;
- Developing a common framework of marine litter actions for Interreg Mediterranean regions towards the conservation of biodiversity in Med MPAs.

The Plastic Busters MPAs project deploys the multidisciplinary strategy and common framework of action developed within the Plastic Busters initiative led by the University of Siena and the Sustainable Development Solutions Network Mediterranean. This initiative frames the priority actions needed to tackle marine litter in the Mediterranean and was labelled under the Union for the Mediterranean (UfM) in 2016, capturing the political support of 43 Euro-Mediterranean countries.

Figure 1-1. Plastic Busters MPAs in a nutshell.

2. The Plastic Busters MPAs marine litter prevention and mitigation actions

Marine litter prevention and mitigation actions lie at the heart of the Interreg Med Plastic Busters MPAs project. Working for and from the perspective of an MPA manager, Plastic Busters MPAs seeks to offer concrete solutions to prevent and mitigate the impacts of marine litter by showcasing marine litter measures in 10 Mediterranean MPAs.

The demos aim at showcasing MPA-relevant marine litter measures and the collective experience of the demos will be captured in a set of comprehensive guidelines to support replication actions.

The identification of the Plastic Busters MPAs demos has been made by leveraging the work conducted by the Interreg Med ACT4LITTER project. The final short-listing of the marine litter measures to be considered for the pilots was made with a participatory process among all Plastic Busters MPAs project partners, thus ensuring full consideration of the MPAs characteristics and the role and skills of MPA managers.

The Plastic Busters MPAs shortlisted the following marine litter mitigation measures to be considered for the demo projects:

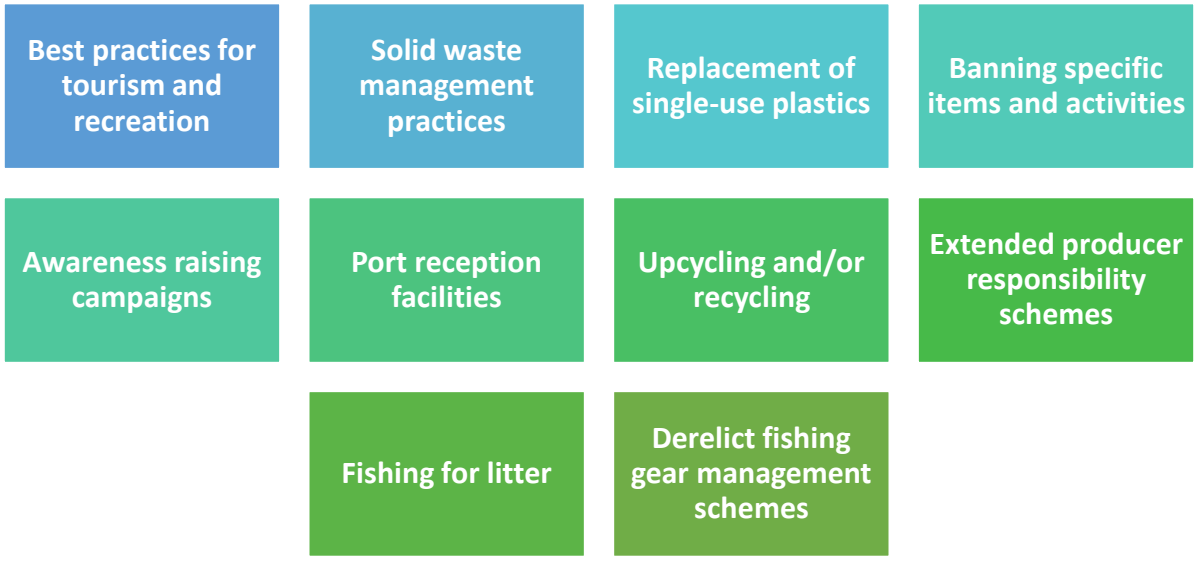

Figure 2-1. The Plastic Busters MPAs shortlisted mitigation measures.

3. Marine litter pilot action in Thermaikos Gulf Protected Areas

Within the framework of the Plastic Busters MPAs project, MIO-ECSDE* in collaboration with iSea launched a marine litter demo at the Thermaikos Gulf Protected Areas. MIO-ECSDE is a partner of the Plastic Busters MPAs project and has been leading the studying and testing activities with regard to marine litter prevention and mitigations measures.

The Plastic Busters MPAs marine litter demo in the Thermaikos Gulf Protected Area aimed at showcasing how a derelict fishing gear (DFG) management scheme can be established and how the sustainable management of such gear can be ensured with the involvement of the fisheries and aquaculture sectors.

Figure 3-1. Derelict fishing gear on the coastline of the Thermaikos Gulf Protected Areas.

This demo has been identified as a priority measure within the 'Action Plan for Marine Litter in Thermaikos Gulf Protected Areas' that was developed by the Management Authority of Thermaikos Gulf Protected Areas within the framework of the Interreg Med ACT4LITTER project, under the guidance of MIO-ECSDE. The action plan was built step-by-step, engaging all stakeholders with the aim to reflect the MPA-specific context and characteristics and define the priority measures towards effectively preventing and mitigating marine litter. Through the Plastic Busters MPAs project, the Thermaikos Gulf Protected Areas had the unique chance to operationalise one of the priority measures

The Mediterranean Information Office for Environment, Culture and Sustainable Development (MIO-ECSDE, www.mio-ecsde.org) is a non-profit Federation of 133 Mediterranean Non-Governmental Organizations working in the fields of Environment and Development in 28 countries of the Euro-Mediterranean area.

shortlisted in its action plan. The demo was implemented with the financial support of the Interreg Med Plastic Busters MPAs by iSea, in collaboration with MIO-ECSDE, and with the involvement of the Management Authority of Thermaikos Gulf Protected Areas, and BlueCycle.

The demo placed special emphasis on mussel nets; mussel nets have been identified as one of the most commonly found litter items in the Thermaikos Gulf Protected Areas. According to the Coordinator of the Management Body of the Thermaikos Gulf Protected Areas, Ms Athina Panagiotou, derelict mussel nets are a major issue for the entire coastline of the western part of Thermaikos Gulf, which hosts a large number of marine mussel farms and is responsible for almost 80-90% of the national mussel production, making it Greece's largest mussel production area. Due to the intense mussel farming activities in the area, high volumes of plastic waste of mussel nets are being generated and mismanaged.

The main causes of DFG are numerous and vary between and within fisheries and aquaculture activities. Direct causes of DFG include operational fishing factors such as weather making it more likely that gear will be left or discarded; illegal, unregulated and unreported fishing; gear retrieval and gear disposal costs; gear conflicts; vandalism and/or theft, while indirect causes include the unavailability of onshore waste disposal facilities, as well as their accessibility and cost of use. In the Thermaikos Gulf Protected Areas large amounts of mussel nets are being discarded at sea, eventually washing out onto the coastline. Illegal incineration of the nets has been reported to take place as well.

Figure 3-2. Mussel nets collected in the Thermaikos Gulf Protected Areas.

4. Establishing a derelict fishing gear management scheme and promoting co-responsibility to tackle fisheries & aquaculture-related litter: main lines of action, results & lessons learned

The demo action was implemented in three different locations of the Thermaikos Gulf Protected Areas: the area of Alykes Kitrous, the area of Chalastra and the area of Loudias estuary. These areas host the majority of Greece's mussel farming units and they produce annually some 40,000 tons of mussels.

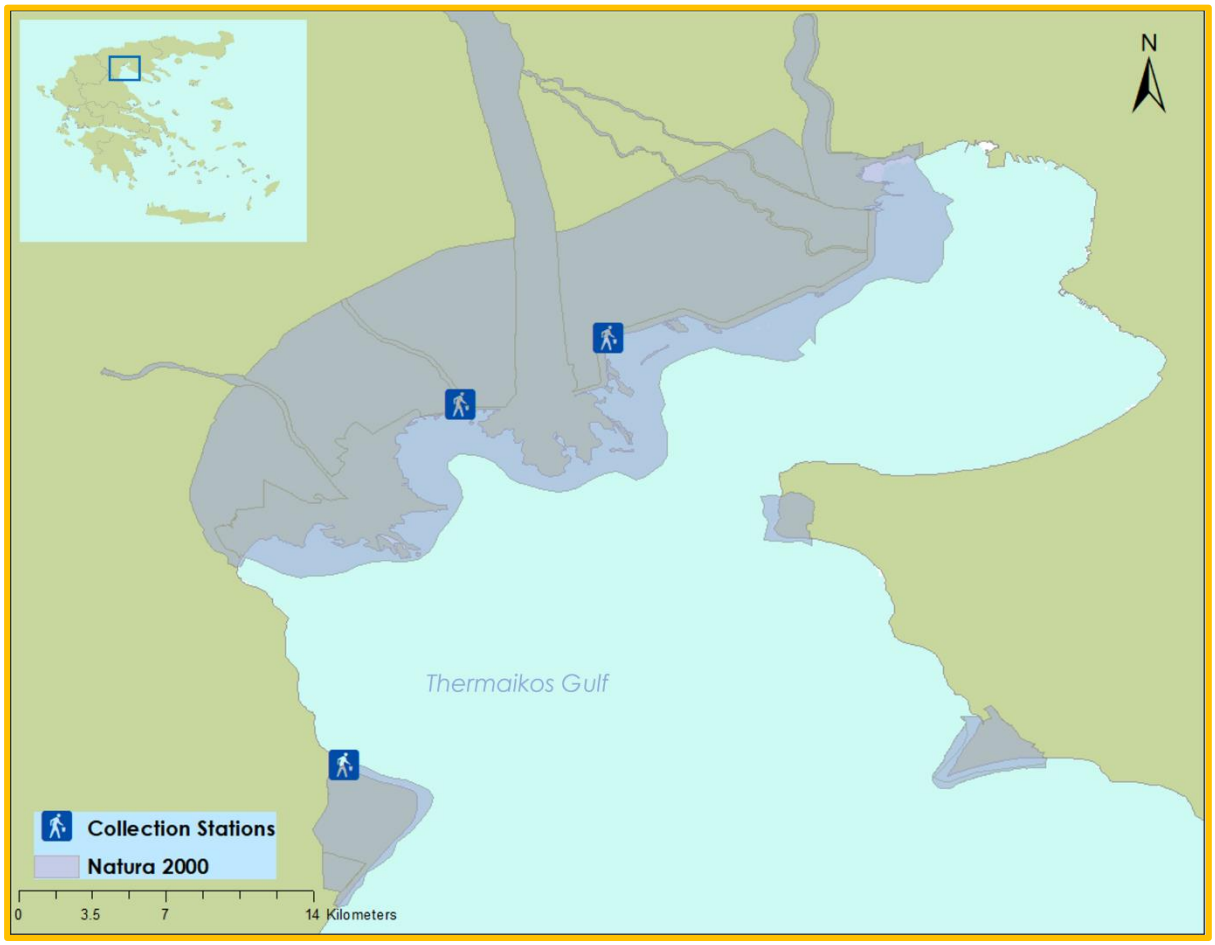

Figure 4-1. The 3 locations of the demo action.

Instrumental to the identification of the pilot areas were the inputs obtained via interviews by mussel farmers and their respective associations, as well as representatives of port authorities and local authorities. The interviews focused on issues related to the types and quantities of mussel farming related litter items, the availability of related disposal facilities, etc.

Beach litter surveys were carried out at the three pilot areas, in accordance with the methodological approach featured in the Plastic Busters MPAs marine litter monitoring toolkit. In all cases the beaches were considered as "very dirty" according to the Clean Coast Index and the European Threshold Value for beach litter (20 items per 100 meter stretch of beach). An average of more than 250 mussel nets (including pieces) were

recorded in every 100-metre transect surveyed per pilot area and more than 300 strings and cords (including pieces). The latter items, which are the most abundant items in the pilot areas, originate from the mussel farming activities; in fact, these particular strings and cords are used for tying the mussel nets and hanging them on the long lines and/or the poles. Some 73% of the total litter items surveyed were directly linked to fishing and mussel farming activities as shown in the table below. Other litter items found that are directly related to fishing and mussel farming activities included floats for fishing nets, ropes and fishing lines, sinkers, hooks, bait packaging and fish boxes.

Table 4-2. The top 10 litter items recorded in the pilot areas (expressed in percentage of total litter abundance).

	ITEM	%
1	**Plastic strings and cords (diameter less than 1 cm)**	**39.6**
2	**Mussel nets, Oyster nets**	**33.5**
3	Plastic drink bottles >0.5l	6.5
4	Floats for fishing nets	4.5
5	Plastic drink bottles <0.5l	3.4
6	Plastic cups and cup lids	3.4
7	Polystyrene pieces 2.5cm > < 50cm	2.9
8	Plastic pieces 2.5cm > < 50cm	2.3
9	Plastic shopping bags	1.9
10	Plastic caps/lids from drinks	1.6

The amounts of fisheries and mussel farming related litter items disposed of were assessed, also by means of a questionnaire targeting fishers and mussel farmers. A total number of 15 respondents (8 fishers and 7 mussel farmers) confirmed the findings of the beach litter surveys. According to the respondents, more than 3.000.000 mussel nets are used annually and a large amount of these are lost, discarded or disposed in Thermaikos Gulf. The amount of strings and cords is higher based both on the beach survey's findings and the participants' responses to the questionnaire.

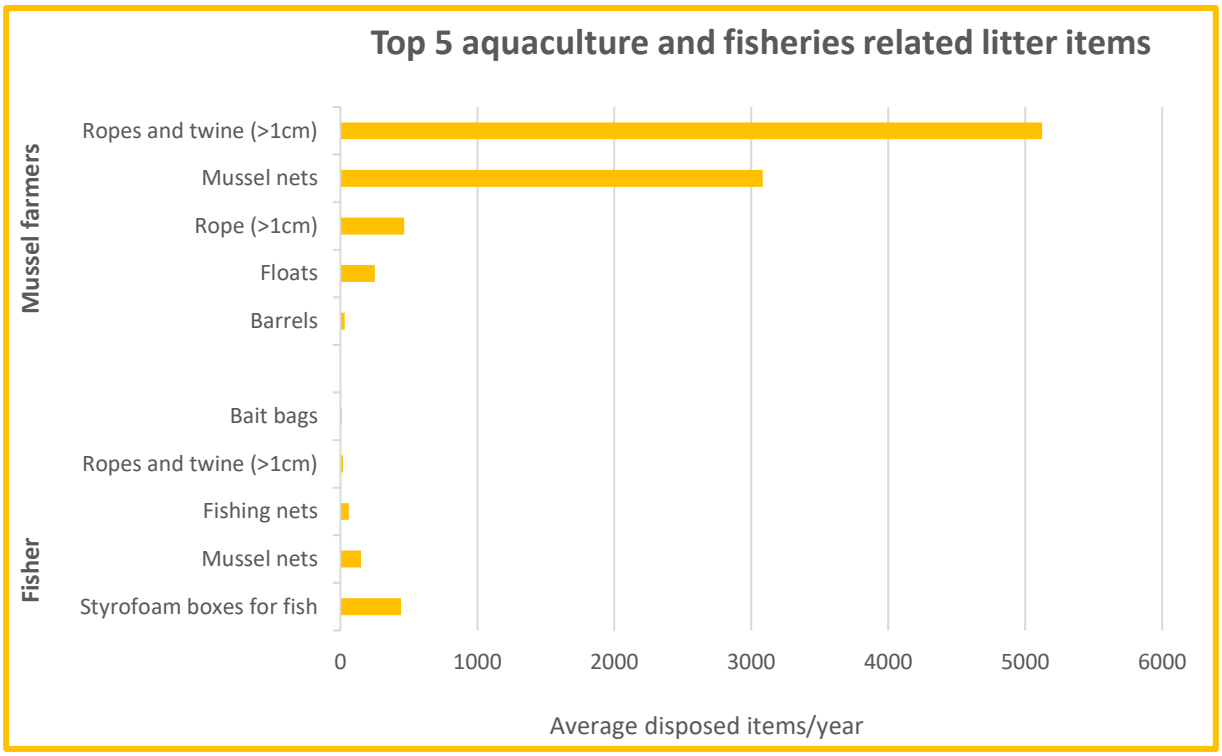

Figure 4-3. The top 5 aquaculture and fisheries related items disposed per fisher/mussel farmer annually.

The data obtained from the beach litter surveys and from the questionnaires were used to raise the awareness of local communities and engage all stakeholders in setting up a derelict fishing gear management scheme. Collection points for DFG were setup in several locations and the logistics associated with the full value chain of recycling (collection, cleaning, sorting, transportation) were defined, while best practices for the proper collection and management of DFG were disseminated to the local fisheries and the aquaculture sector.

The following results were achieved in each one of the three pilot areas:

- **Chalasta.** A total amount of 7.5 tons of disposed mussel nets were removed from the Chalastra fishing port, in collaboration with the Municipality of Delta and the Agricultural and Fishery Association of Delta Municipality. Two large collection bins for bulk waste material were installed, since there were no adequate facilities in place for the storage of the collected DFG and their subsequent transfer to the BlueCycle facilities for recycling.
- **Loudias estuary**. A total of 14.3 tons of abandoned mussel nets were removed from the estuary of Loudias, in collaboration with the Municipality of Delta, the Agricultural and Fishery Association of Delta Municipality, the Region of Central Macedonia.
- **Alykes Kitrous**. A roadmap with the exact number and areas identified for the installation of separate bins for DFG was elaborated, in collaboration with the Municipality and the local mussel farming association. The bins selected were similar to the ones already used for the municipal solid waste, considering that the Municipality provides the means and facilities for the temporary storage of the collected mussel nets until their final transportation to the BlueCycle facilities

for recycling. The role of each stakeholder involved is defined in a common collaboration agreement and the separate collection of the area's disposed mussel nets will begin upon official signature of the agreement from the competent authorities.

Figure 4-4. The end product from the mechanical recycling of mussel nets.

In order to ensure the sustainability of the demo, every action was designed and implemented in order to meet the beneficiaries' needs and capacities. Within this context, the DFG collection stations were decided to be installed close to the areas where the mussel farmers and fishers already dispose of their nets. These areas can easily be reached by boat and are in the vicinity of the locations where the DFG processing takes place, right before they are shipped off to the recycling facility. Furthermore, the DFG collection points are placed in areas where related municipal facilities are located such as waste storage places, waste collection machines and transportation vehicles.

One of the biggest challenges of the demo implementation was related to the logistics involved in the collection, storage and transportation of the DFG. Due to the large volume of the mussel nets collected in the demo areas, finding a cost-effective way for their transportation to the recycling plant located in Athens was not easy, considering that the profit from the recycling of mussel nest is lower than their transportation cost. For a long-term implementation of the measure piloted additional resources for the transportation of the collected mussel nets need to be allocated.

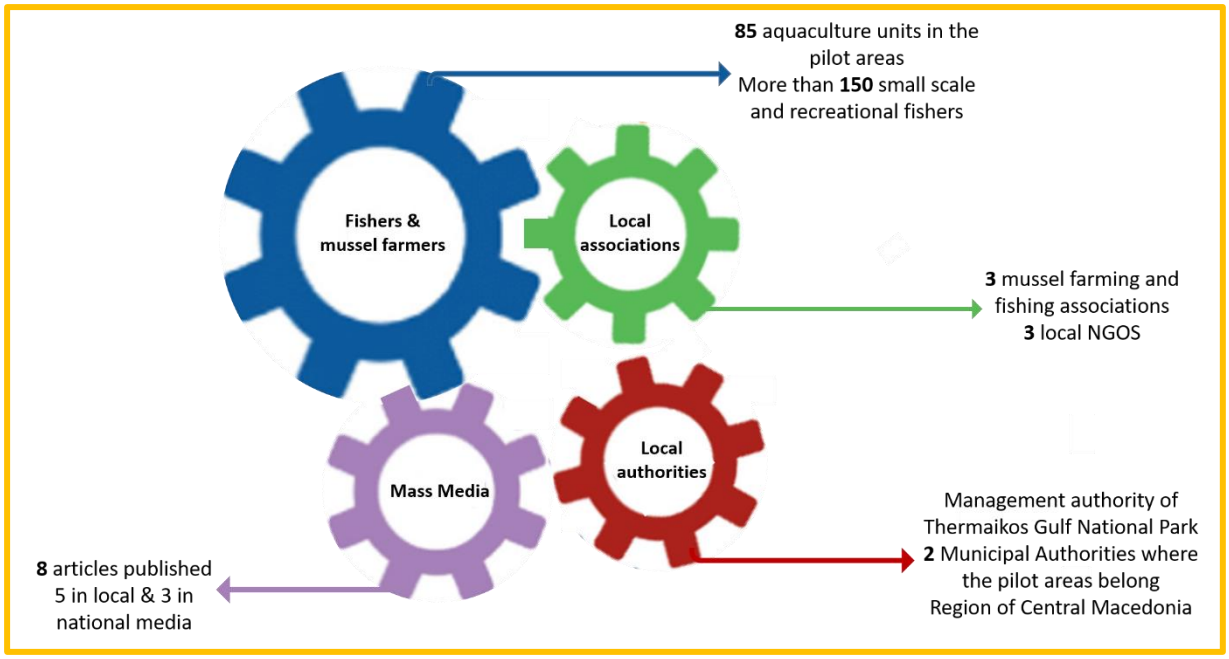

Figure 4-5. Stakeholders directly reached by the action

Apart from the challenges relevant to the logistics, conflict of interest among different stakeholders in the area emerged. A collaborative conflict resolution approach coupled with a bottom-up approach, proved to be the most efficient way to address the issue. The involvement of different stakeholders in all the steps process, was extremely valuable for the elaboration of a sound and suitable design for the DFG scheme, while it also induced teamwork towards a common goal, softening the disagreements that arose.

Consultations and interaction among different stakeholders not only led to common decisions, but also proved to be a means of pressure for drawing attention to the issue by the decision makers. In addition, it set the baseline for involving stakeholders in environmental issues with the aim to develop their pro-environmental attitude and behaviour within the context of their activities. Finally, managing to create an alliance among key players for local issues provides further opportunities for participating in processes towards the improvement of environmental issues of the area.

Annex I. Measure factsheet

TITLE	**Establishing a derelict fishing gear management scheme and promoting co-responsibility to tackle fisheries & aquaculture-related litter**
Implementing partners	▶ Non-profit non-governmental Organization for the Preservation of the Aquatic Ecosystems (Lead) ▶ Management Authority of Thermaikos Gulf Protected Areas ▶ BlueCycle
Plastic Busters MPAs coordinating partner	▶ MIO-ECSDE
Brief description	This is a measure that refers to the involvement of the fisheries and aquaculture sectors in the collection and proper management of abandoned, lost and discarded derelict fishing gear (ALDFG). The causes of ALDFG are numerous and vary between and within fisheries and aquaculture. Direct causes of ALDFG include operational fishing factors, such as weather, making it more likely that gear will be left or discarded; illegal, unregulated and unreported fishing; gear retrieval and gear disposal costs; gear conflicts; vandalism and/or theft. Indirect causes include the unavailability of onshore waste disposal facilities, their accessibility and cost of use. Within this measure special emphasis will be placed on Styrofoam boxes – this has been identified as one of the most commonly found litter items in the Thermaikos Gulf Protected Areas.
Lines of action	▶ Monitor and assess the presence of ALDFG; ▶ Promote best practices among the fisheries and aquaculture sectors for the proper collection and management of ALDFG; ▶ Set up a derelict fishing gear management scheme and install collection bins in selected sites; ▶ Organize stakeholder engagement and awareness-raising activities targeted also to the local communities.
Target groups	▶ Mussel farmers, professional and recreational fishermen; ▶ Port authorities, local authorities and other competent authorities; ▶ NGOs and associations; ▶ Citizens; ▶ Media.
Expected results	▶ Deepened knowledge on the amounts, types, composition and sources of marine litter found on the protected areas' coastline; ▶ Reduced inputs of ALDFG in the protected areas' coastal and marine environment; ▶ Enhanced awareness of the fisheries and aquaculture sectors and also of the local communities on the marine litter issue;

	▶ Strengthened collective consciousness, social action and community participation.
Performance indicators	▶ Number of marine litter datasets collected; ▶ Number of mussel farmers, professional and recreational fishermen reached and trained; ▶ Number of ALDFG collection bins installed; ▶ Amount of ALDFG collected, sorted, recycled and/or upcycled; ▶ Number of stakeholder engagement and awareness-raising events organized; ▶ Number of individuals reached.