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D5.1.3 - Manual with the proposals of specific agreements in order to encourage passively fished waste collection and management held by fishermen

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1. INTRODUCTION:

The United Nations Environment Programme (UNEP) defines marine litter as any solid material that is manufactured or transformed, persistent, and later dumped, abandoned, or lost at sea or along the coast. It is estimated that approximately 8 million tons of solid plastic waste are introduced into the marine ecosystem each year (Jambeck et al., 2015; UNEP/MAP, 2015; Villarrubia-Gómez et al., 2018). This material could originate from various sources including commercial and pleasure-boats, fishing, aquaculture, river discharges, urban and industrial areas, legal and illegal shoreline dumping, as well as recreational activities along the coast and harbours (Sheavly and Register, 2007). Once reached the marine ecosystem there is several factors that determine the distribution of marine litter. In fact, marine litter could accumulate on beaches, on the sea surface (Palatinus et al., 2019), and on the seafloor and sediments (Renzi et al., 2019). The Adriatic Sea is a semi-enclosed basin characterized by slow currents and extended water retention time so it is highly susceptible to pollution from marine litter, predominantly composed of plastic materials. However, all forms and compositions of marine litter are a growing concern due to their adverse effects on marine and coastal ecosystems. Marine animal species can be directly affected by marine litter through ingestion or entanglement, leading to fatal outcomes. Moreover, rubbish can be easily transferred through the trophic web (Setälä et al., 2014; Romeo et al., 2015b).

The ingestion of marine debris may induce damage to the digestive system, and lead to death from starvation and debilitation. Conversely, entanglement in nets can result in physical injuries or amputations of body parts, as well as accidental captures. Ghost nets, in particular, pose a significant threat to marine life, as they restrict or prevent movement, thereby impeding the search for food and, in some cases, breathing.

The Adriatic Sea is among the regions that are most impacted by benthic litter (Pasquini et al. 2016), and the deposition of debris on the substrate results in physical harm to the environment and the inhibition of gas exchange between pore waters and overlying seawater, leading to anoxia and hypoxia. Furthermore, marine debris has the potential to modify the composition of marine communities, upsetting the equilibrium of ecosystems and resulting in additional environmental challenges. Apart from the aforementioned factors, the socio-economic aspect also warrants attention,

encompassing reduced tourism, mechanical harm to boats and fishing gear, diminished catch and clean-up expenses, as well as a decline in aesthetic worth and public utilization of the environment. Nowadays, waste pollution is a complex and continuously expanding environmental problem with multiple sources and few straightforward solutions. Hence, addressing marine litter issues requires a joint effort from different countries, and their collaboration is essential in finding a suitable and appropriate solution.

In Europe, the issue of marine waste management has garnered more attention, particularly following the Barcelona Convention (BC) and, most significantly, with the enforcement of the Protocol for the Protection of the Mediterranean Sea from Pollution by Land-Based Sources and Activities (LBS), the ICZM Protocol, and Special areas under MARPOL Annex V (DeFishGear, 2016). However, despite the implementation of these contracts and protocols, the policy remains ineffective in many European nations, highlighting the growing need to address and find concrete solutions to the problem of marine waste.

A relatively new solution that emerged in several European and regional projects, also integrated into the measures provided by the Marine Strategy Framework Directive (MSFD) to achieve the Good Environmental State (GES), is the activity of Fishing For Litter.

Fishing for litter is the process of removing trash and waste from marine environments such as oceans, rivers, and lakes. The main goal is to prevent pollution of the marine environment and to protect marine life. Conventionally, this practice involves using specialized equipment such as nets, hooks, and traps to collect and remove various types of waste from water bodies. Additionally, fishing for litter means any kind of voluntary agreement with the fishing sector in order to engage fishermen in the removal of marine debris from marine waters and seabeds. This is a growing practice that aims to increase the involvement of fishing communities in the protection of the marine environment. Waste fishing is mainly carried out by non-governmental organizations and volunteer groups, who collaborate with local authorities and public institutions to organize clean-up campaigns of marine waters and seabeds.

Since the problem of waste in the oceans has become a globally significant issue, it requires immediate and concrete solutions. Waste fishing represents an important step forward in the fight against marine pollution, but it must be accompanied by public and private policies that promote

greater attention to waste management. By working together, fishing communities can play a critical role in preventing pollution and protecting the oceans and marine life.

In fact, the waste that lies on the seafloor or floats in the water column is commonly captured by fishing nets, especially bottom trawlers, and constitutes a variable part of the fishermen daily catch. If fishermen dispose of these items safely on land, the result is a direct removal of waste from the sea without the need for a specific cleaning action. Fishing for litter activity is built on the assumption that the activity must be as simple as possible for fishermen and that it must not have direct or indirect costs for them. There are several initiatives that facilitate the Fishing for litter activities: provides fishers with bags or bins in which to store litter and ensures that disposal facilities are established and easy to access and help fishermen to directly remove the litter from marine environments (F. Ronchi et al.2018).

This report aims to provide a comprehensive overview of the present state of coastal and maritime management in Italy and Croatia while formulating proposals for specific agreements to promote the collection and management of passively fished waste by fishermen.

2. LEGAL ASPECT

2.1 General overview in Italy.

In 1989, the CAMP projects were established as coastal management programs with the main goal of developing and implementing strategies and procedures for sustainable development of coastal areas. They aimed to identify and apply specialized methodologies and tools for managing these significant pilot areas. In Italy, the Ministry of Environment, Land, and Sea established the CAMP Italy Project, which is coordinated by the Barcelona Convention.

Under the UN Environment Mediterranean Action Plan (UNEP MAP), CAMP focuses on coastal management projects in five pilot areas located in three coastal regions (Emilia-Romagna, Sardinia, and Tuscany). The next generation of CAMP projects is based on the Barcelona Convention's Integrated Coastal Zone Management Protocol (ICZM), adopted in 2008 and in force since 2011. Its primary objective was to achieve sustainable development in coastal areas by implementing Integrated Coastal Zone Management (ICZM) in the selected pilot areas of Emilia-Romagna, Sardinia, and Tuscany.

Another critical issue regarding marine legislation is the management of waste in harbour and waste collected from the marine environment. Over the past seventy years, there has been a significant increase in the consumption of plastic materials in Italy. In the context of national waste management, a number of directives are involved, including the transposition of directives 2008/98/EC and 2000/59/EC. These directives are concerned with the management of waste produced by ships, including their disposal and the role of port authorities in their management. In Directive 2008/56/EC (Marine Strategy Framework Directive), marine litter is listed among the pressures and impacts affecting marine ecosystems and is one of the descriptors of the good ecological status. Additionally, Legislative Decree 182/2003 was introduced with the aim of reducing waste and cargo residue discharges from ships into the sea, whilst simultaneously improving the availability and use of port collection facilities for such waste and residue. On the other hand, Legislative Decree 152/2006 regulates all aspects relating to the disposal of urban and industrial waste. However, it is worth noting that while waste present on beaches or in ports is classified within the aforementioned decrees, waste collected from the sea is not mentioned. As a result, "marine litter" is not classified as either urban or industrial waste and is considered as special waste within the regulatory framework described.

Consequently, it is subject to different regulations, and contracts for its disposal were won by companies that applied much higher rates than those applied to normal waste. This caused fishermen to stop depositing it, leading to a continued accumulation of waste at sea. In alignment with EU Regulation 508/2014, the European Maritime and Fisheries Fund (FEAMP) aims to safeguard marine biodiversity and ecosystems, implementing compensation schemes for sustainable fishing activities that involve fishermen. As a part of this initiative, the FEAMP supports the collection of marine litter by fishermen, including the removal of lost fishing gear and other debris from the sea. To address environmental concerns, on February 15th, 2019, the Ministry of Environment and Territory and Sea Protection issued a Decree that updated the requirements for achieving good environmental status and defined the environmental targets of the Marine Strategy (MSFD). This decree ensures compliance with articles 9 and 10 of Legislative Decree 190/2010. A further step forward in the regulation of marine waste management was taken in 2022 when the new "Salvamare" Decree was approved. These initiatives demonstrate the commitment of the authorities to marine environmental protection and reflect the importance of preserving marine biodiversity for future generations. This decree aims to contribute to the restoration of the marine ecosystem and the promotion of the circular economy, as well as raising awareness among the community for the adoption of virtuous behavioral patterns aimed at preventing waste abandonment in the sea, lakes, rivers, and lagoons and ensuring their proper management. Additionally, it provides that waste accidentally collected by fishermen will be equated to waste produced by ships, and the cost of disposal will be included in the citizens' waste tax. Since we are still in the early stages of implementing the law, there are still some issues, therefore the change must be evaluated over time. However, at the moment we can say that this law will encourage fishermen to collect and dispose of plastic material, recognizing and valuing the activities that were previously carried out involuntarily by the fishermen themselves.

Despite the presence of a series of current regulations and legislative acts, the management of coastal and maritime areas in Italy remains fragmented among various authorities at the national, regional, and municipal levels. Currently, there is a lack of a unified approach in the management planning, both concerning Integrated Coastal Zone Management (ICZM) and the treatment and management of marine waste.

2.2 General overview in Croatia

The Republic of Croatia is a country that has signed the ICZM Protocol (Integrated Coastal Zone Management), the Barcelona Convention and its related LBS Protocol, and has incorporated the Marine Strategy Framework Directive into its legislation for the management and planning of maritime and coastal areas. By means of the Programme of Measures for the Protection and Management of the Marine Environment and Coastal Area (Official Gazette NN. 97/17), the official adoption of the national Programme of Measures for the protection and management of the marine environment and coastal region of the Republic of Croatia is declared. This program is an action plan that is part of the Strategy for the management of the marine environment and coastal zone, as presented to the Government of the Republic of Croatia by the former Ministry of Environmental Protection and Energy (at present, Ministry of Economy and Sustainable Development). Furthermore, the Republic of Croatia is bound to fulfill the obligations arising from international conventions and other legislative acts, including the EQS (Environmental Quality Standards) of the European Parliament and the Council, the Decision 2010/477/EU of the Commission concerning criteria and methodological standards for maintaining good environmental conditions of the marine environment, the Directive 2000/59/EC of the European Parliament and the Council, the MARPOL Convention and its Annex V, the London Convention and its protocol, the Dumping Protocol, the Emergency Protocol, and the Protocol for the Integrated Management of Coastal Zones in the Mediterranean, in addition to complying with specific national regulations.

Waste management is one of the most challenging sectors in environmental protection, requiring priority solutions and compliance with European Union (EU) standards. The foundations of waste management policy in the Republic of Croatia are outlined in the Law on Sustainable Waste Management (Official Gazette, nos. 84/21) and in the Waste Management Strategy of the Republic of Croatia (Official Gazette, no. 130/05), as well as in the Waste Management Plan of the Republic of Croatia for the period 2023-2028 (Official Gazette, no. 84/23).

According to the Waste Management Plan of the Republic of Croatia, marine litter falls into the category of "special" waste, but at the present, there is a lack of official data and adequate estimates concerning the amounts of marine debris in the Republic of Croatia. Therefore, it is necessary to develop a monitoring methodology for marine waste, as envisioned by the Adriatic Monitoring Plan, developed in alignment with the Decision that adopts the Action Programme of the

Strategy of Marine Environment and Coastal Area Management: Monitoring System for a Continuous Assessment of the Adriatic Sea's Status (OG 153/14). The primary objective of the Waste Management Plan of the Republic of Croatia is to establish a comprehensive marine waste management system. This can be achieved initially by identifying the locations, sources, and hotspots of marine waste. Subsequently, a prevention system will be established, followed by the promotion of intervention, collection, and proper disposal of marine waste. The Waste Management Plan 2017-2022 are adopted only for 2022. Meanwhile, a new Waste Management Plan 2023-2029 is being developed.

Currently, there is no systematic model for ML management in the Republic of Croatia, nor are we able to determine the amount of litter that reaches the sea. Activities related to the prevention of ML are carried out through the existing legal framework and strategic documents related to land-based waste management. The issue of ML is partly an integral part of the content of the umbrella Act on Sustainable Waste Management (Official Gazette, nos. 84/21), where it is considered a special category of waste (Art. 53). A strategic document/legislative act related exclusively to ML is in the preparation and has not yet been adopted. Activities related to the prevention of such litter are carried out through the application of the existing legal framework and strategic documents on waste management. Furthermore, before the DeFishGear project (2013– 2017) and ML-REPAIR project (2018 – 2019), FfL was unknown practice in the Croatia (Tutman et al., 2017; Ronchi et al., 2019).

The experience regarding FfL activities gained through the implementation of the FfL initiative within two EU projects aimed at defining new strategies for reducing Adriatic pollution by marine litter; project funded through the IPA CBC program 2007 – 2013 entitled "Derelict Fishing Gear Management System in the Adriatic Region" ("Derelict Fishing Gear Management System in the Adriatic Region"; abbreviation: DeFishGear, www.defishgear.net) implemented between 2013 and 2016 (Tutman et al., 2017); and ML-REPAIR funded through INTERREG Italy – Croatia CBC Program 2014 – 2020 (Tutman et al., 2018). The full name of the project is: "Reduction and Prevention, an integrated approach to marine waste management in the Adriatic" (REducing and Preventing, an integrated Approach to Marine Litter Management in the Adriatic Sea, www.ml-repair.eu). Experience gained in these projects served as a basis for further development of such an initiative to remove litter accumulated on the seabed in the Croatian part of the Adriatic.

Fishermen in Croatia did not receive any compensation for participating in the project, but in return they received diverse fishing clothes and footwear from the project. Each fisherman received a set of working clothes and boots/shoes that consisted of a fisherman's raincoat, winter work jackets and pants, jackets, sweatshirts, boots, work shoes and gloves, printed by a clearly recognizable logo of the project. Also, promotional leaflets that provided information on the project initiative were produced. Upon joining, captain and their crews received project information, detailed instructions and litter guidance notes. Information were distributed to keep participants informed of project activities. Exhibition materials, including banner and leaflets, were created to promote the initiative at meetings, conferences and fishing industry events.

Many diverse legislations addressing waste management and the lack of a specific ML regulation, were the main problems in the implementation of the pilot projects, resulting, i.e., in difficulties in the understanding of the legal requirements and their practical application. Due to a lack of an overarching National law addressing ML management, the legal status of ML was not defined. Therefore, it was difficult to obtain constructive support from Port and Local authorities. To overcome this difficulty, ML was temporarily classified as urban waste by the Municipalities in all Croatian ports where pilot activities were implemented, so the municipal waste management company was in charge of its disposal could handle it. Although fishermen, authorities and citizens highly appreciated the initiative, after the end of DeFishGear project, the FfL projects in Croatia were stopped because no specific national regulation supported their implementation from the administrative and financial point of view and no funds were available for disposal costs. The current problem is the lack of organized and systematic management at a higher legislative level and the lack of more permanent funding sources.

As for the Adriatic Sea, seafloor ML has been identified as a significant environmental problem (Fortibouni et al., 2019), thus FfL activities have been indicated as a significant contribution to its removal (Pavičić et al., 2015; Tutman et al., 2017; Tutman i Bojanić Varezić, 2019 a,b). Ffl activity can be easily implemented in Croatia, but is necessary to improve the ML legislation, to examine deficiencies and gaps in these policies, and to propose options for improvement.

Considering that the ML remains a critical and largely unaddressed matter, it necessitates a comprehensive approach encompassing legal and cultural dimensions. This entails promoting scientific dissemination and engaging all stakeholders to collaboratively devise a shared solution.

3. PROPOSAL TO ENCOURAGE PASSIVELY FISHED WASTE COLLECTION AND MANAGEMENT HELD BY FISHERMEN:

"Fishing For Litter" (hereinafter: FFL) constitutes a locally embraced initiative that actively engages stakeholders from the fishing industry and scientific researchers. This is simple initiative that aims to reduce marine litter by involving one of the key stakeholders, the fishing industry. It is effective way to clean up the sea by removing solid waste from seabed, which poses a threat to marine life and has negative economic and social impacts on coastal communities and tourism. This scheme is based on the assumption that the activity must be as simple as possible for fishermen, at no costs to them. They provide bags to fishermen to store litter onboard and ensure that disposal facilities on shore are easily accessible. Involved vessels are bottom-trawlers since most of the litter is on the seabed. Ffl has two main aims; the direct removal of litter and to raise awareness among fishermen and general public about the marine litter issue, leading to changes in attitudes and behaviour.

The primary objective of these endeavors revolves around the removal of debris from marine ecosystems. The initiative has granted participating fishermen a pivotal role in safeguarding the marine environment through the collection of waste during their fishing activities. This symbiotic collaboration between the fishing sector and the scientific community assumes paramount significance, as it advances a sustainable and conscientious approach to addressing the emergency of marine litter. The initiative's positive impact extends to fostering cleaner seas and preserving marine biodiversity for the prosperity of future generations. Moreover, the importance of marine litter collection activities is emphasized by their key role in scientific outreach and promoted public awareness regarding critical concerns such as marine waste pollution. However, it is noteworthy that prevailing regulations concerning appropriate marine waste management remain inadequately defined and perplexing. Consequently, the need to intensify political and social pressures emerges to establish an unequivocal and efficacious management protocol. To date, the FFL initiatives has been facilitated by local organizations and/or regional and European projects. Notably, the "DeFishGear" project (IPA Adriatic CBC program 2007-2013), titled "Derelict Fishing Gear Management System in the Adriatic Region," conducted between 2013 and 2016, played a pivotal role in disseminating these activities and establishing an effective scientific framework. Among the salient objectives of

the project was the assessment of litter composition and distribution on the seabed. Consequently, other FFL endeavors have increased in the Adriatic Sea, buoyed by the support of European projects (e.g., CleanSea Life, ML-REPAIR) and local initiatives (e.g., FEAMP). Despite the continuous growth of FFL activity, there are still areas that need to be addressed. Consequently, it is necessary to establish protocols to govern the activities themselves and to increase stakeholders' awareness and involvement. To achieve this objective, the first step is to establish a comprehensive plan that incorporates precise details about the local context. This plan will particularly focus on addressing the legal aspects, encompassing regulations and compliance requirements pertinent to the management of marine litter in the specific region. Furthermore, the plan must consider the optimal timing and location for execution, delving into the unique biological and geological aspects of the study area.

Before initiating the FFL activity, conducting a thorough situation analysis is important to comprehend the problems and limitations associated with marine litter in the study area, which may include identifying the primary sources of marine litter and assessing the involvement of socio-economic actors contributing to marine litter pollution. This comprehensive analysis will serve as a foundation for establishing clear and well-defined objectives and devising appropriate activities to accomplish them. The subsequent crucial step entails actively engaging key stakeholders, including fishermen and relevant authorities like the Coast Guard or Port Authority, with the primary objective of identifying measures that address the specific needs of fishermen and promote efficient waste management practices. The effective management of waste fishing in marine ecosystems calls for a holistic approach involving all stakeholders. A pivotal step is the establishment of an ongoing discussion table, aimed at ensuring a continuous dialogue among all involved parties, including fishermen. This open dialogue fosters the sharing of knowledge and perspectives, thereby contributing to the development of more effective and sustainable waste fishing strategies.

Furthermore, it is crucial to provide suitable equipment to facilitate both the collection and the accumulation and storage of marine debris. Access to proper tools enables the maximization of cleaning operations' efficiency and reduces the overall environmental impact. This appropriate infrastructure is fundamental to ensuring that the collected waste is managed correctly and efficiently. A highly promising approach to successfully implement these activities is direct collaboration with fishermen. Actively involving them in the design and implementation of waste fishing initiatives not

only taps into their knowledge of the marine environment but also promotes a sense of shared responsibility for safeguarding the marine environment. Moreover, seeking adequate funding is essential to ensure the long-term sustainability of these initiatives. Partnering with relevant organizations and institutions can help secure the financial and technical resources needed to support and expand waste fishing operations.

Another important action to enhance the effectiveness of FFL activities is to implement outreach efforts aimed at increasing awareness among all stakeholders and the general public. Through educational programs and outreach initiatives, the fishing community and local residents become more conscious of the environmental implications of marine litter and the role they can play in mitigating its impact. Additionally, fostering an improved knowledge of litter types and locations equips fishermen with crucial insights to target high-impact areas, thereby optimizing their efforts in marine litter recovery. Moreover, fishermen's enhanced participation in marine litter recovery is a vital indicator of the FFL activity's effectiveness. By actively involving fishermen in the collection process, the initiative not only boosts litter removal but also cultivates a sense of stewardship and ownership within the fishing community. Their increasing involvement signifies the positive outcomes of the FFL activity, further reinforcing the importance of their continued cooperation.

To ensure marine litteress coordination and sustained engagement, the appointment of a dedicated fishery manager or port manager as the marine litter activity coordinator proves beneficial. This individual can facilitate daily management tasks and maintain regular contact with participating fishermen, fostering an environment of open communication and continuous improvement. The success of the FFL initiative relies on active cooperation and the involvement of fishermen. By providing suitable equipment and incentives to adopt responsible practices regarding marine litter and by promoting their engagement, the FFL activity generates far-reaching effects, ranging from improved attitudes towards marine litter to a tangible reduction in its impact on coastal environments. By prioritizing the collaboration and participation of all the stakeholders, the FFL initiative lays the groundwork for a sustainable and cleaner marine ecosystem.

3a. Proposed model for systematically accepting ML collected during trawling activities and integrating it into the waste management system

The proposed model includes several components based on the structure of the Regional Plan on Marine Litter Management in the Mediterranean adopted under the Barcelona Convention, grouped as follows:

a. preventing the generation of ML within the fisheries sector

- preventing the waste generation from fishing and mariculture activities,
- selective collection and disposal, and possible recycling of fishing tools at the end of their active use

b. removal of existing ML and its environmentally acceptable disposal

- collection on board, landing and disposal of ML found as by-catch during fishing activities (FfL)

c. monitoring the collected amounts of ML associated with the fisheries sector

- collection of data on collected amounts of ML, and processing them qualitatively and quantitatively

d. support the implementation of measures to raise awareness, educate and inform about

ML as an environmental problem, and about the need and possibilities to remove it from the sea.

Apart from the experiences gained from the completed DeFishGear and ML-REPAIR projects, there are currently no systematic action and no legal framework in the Republic of Croatia that would ensure organizational and infrastructural prerequisites and encourage fishermen to adopt the practices that they can contribute to the prevention and removal of ML from the sea. This primarily refers to the mentioned FfL practice, and the systematic disposal of discarded, abandoned fishing tools (ALDFG – primarily nets, but also others). Given that it is a problem of several sectors; environmental protection, fisheries, port and coastal management and waste management, its effective and efficient solution requires coordinated activities in these sectors, i.e. the active involvement of key actors from all the aforementioned sectors. As a members of the EU, Italy and Croatia are bound by the Framework Directive on Marine Strategy, which obliges, among the others, to take measures to prevent and remove ML. Measures related to the disposal of litter found in fishing nets during trawl fishing, and the disposal of ALDFG are standard measures recommended in the

fishing sector. As signatories of the Barcelona Convention, Italy and Croatia have practically the same obligations under the MEDPOL Regional Plan for the Management of ML in the Mediterranean.

Marine litter belongs to the group of garbage whose collection and recovery is mostly not regulated by specific regulations, and the capacities for its processing is currently insufficient. However, Croatia, as a member state of the EU and a signatory to international Conventions and Protocols, has taken obligations arising from them, so it is imperative to take the necessary actions in order to develop an efficient system for management of this waste. The litter on the seabed lies beyond human reach, and its efficient removal requires the organization of special cleaning actions that require a significant logistical efforts and material resources. As fishermen–trawlers collect significant amounts of such waste during daily fishing, they are the only active participants in maritime transport that can contribute significantly to its removal from the seabed, thus contributing to its cleaning.

For the organized implementation of these activities, a very important goal is to establish a functioning chain of action between the fishing sector, which actively collects waste from the seabed, port authorities or other port concessionaires/landing points where waste from the sea is collected, and all facilities necessary for the implementation of this initiative have been installed, local governments responsible for waste management and municipal companies responsible for garbage collection and disposal.

3b. Proposal of a protocol for the management of ML collected by trawlers

Preparations on land

- promotional activities: development of a recognizable logo and colors, identification flags for participating boats, and brochures and information leaflets for fishermen and others,
- establishment of agreements with port authorities and local governments in whose territory the activity will take place,

- selection of fishermen and establishment of a framework cooperative agreement that defines the basic goals and purpose of cooperative effort,
- conducting short educational workshops to introduce the participating fishermen and other interested participants in the activity to the goal and purpose of the project and how to manage ML.

Collection and storage on board

- onboard it is necessary to separate ML from the catch to avoid them coming into contact with each other, and to place them in appropriate garbage bags (those with a volume of 120 L have proved best) in a free space on the deck or, depending on the space, in appropriate bins for waste,
- in order to determine the amount of ML collected daily from the seabed, it would be good if the fishermen would distribute lists in which they record the amount of waste collected from the sea, with a list of the main categories of waste as well as the collected amounts, so that later its qualitative-quantitative analysis can be done.

Management and disposal on land

- on land, a disposal place must be designated for ML collected during fishing activities. This place must be located in the port area and under the jurisdiction of the local administration (Port Authority, etc.), which will comply with the appropriate waste regulations. The place must be provided with a suitable communal container, fenced and marked, and accessible only to authorized persons,
- assess the amount of ML to determine whether it can be recycled or disposed of appropriately,
- if destined for recycling: separate the different types of waste using appropriate communal containers for separate collection of waste (plastic, glass, metal, etc.),
- if it is destined for disposal: place the waste in appropriate communal containers so that it can later be collected by the communal company.

Collection and removal/transportation to a communal landfill

- performed by companies authorized to collect, manage and process waste, or companies dealing with recycling, and agree on the method, time and amount of waste to be disposed of,
- if they are not the same, find companies authorized to transport waste and organize the transport of waste and agree on the method, time and quantities to be transported,
- comply with legal regulations related to waste traceability (Waste identification form, loading/unloading log), and handle the collected material in cooperation with authorized companies.

4. CONCLUSIONS:

The FFL program has provided valuable solutions for the management and disposal of marine litter. Based on previous experience with this programme, it has become increasingly evident that there is a pressing need to continue with these activities. The issue of marine litter has been on the rise, and its management and disposal require further advancements to address the challenges posed by it.

Within the MARLESS project, FFL actions have been carried out in Cesenatico, thanks to the valuable collaboration of the fisherman, the municipalities and the coast guard. This synergy allowed for the proper disposal of waste in suitable containers already placed in ports, in locations easily accessible to fishermen, facilitating their disposal without tax burden. However, this procedure is not feasible in all Italian and Croatian municipalities. Hopefully, with further agreements it could be easier to achieve a favorable situation for the continued implementation of waste fishing activities.

Moreover, the FFL program has highlighted the importance of addressing the issue through collaborative efforts, particularly with the fishing sector. The programme has brought together stakeholders from various sectors to work towards a common goal of managing marine litter effectively. Therefore, it is imperative to continue such initiatives to ensure that the problem of marine waste is tackled effectively. This will require sustained efforts towards developing innovative solutions for waste management, promoting responsible behavior among stakeholders, and strengthening collaboration between different sectors. By doing so, we can ensure that our marine ecosystems are protected and preserved for future generations.

The implementation of FfL activities in fishing ports in Italy and Croatia shows a strong willingness to collaborate among fishermen, who are aware of their unique role in the active removal of litter from the sea. However, in the absence of an overarching National law addressing marine litter management, its legal status has not been defined. Existing Law on Sustainable Waste Management does not specify how to handle with the collected litter. This should be regulated in a separate regulation that applies only to marine litter, but it has not been adopted to date. Thus, marine litter was temporarily classified as urban waste by the host Municipalities and the municipal waste management company was responsible for its disposal. Ffl activities can be easily implemented in Croatia, but it is necessary to improve the legislation about marine litter, to examine deficiencies and gaps in these policies, and to propose options for improvement.

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