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FishNoWaste

D1.1.1 - REPORT ON CROATIAN LEGISLATION

WP1 – Activity 1.1 - State of the art of the Italian and Croatian legislation on waste management

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SUMMARY

1 INTRODUCTION

1.1 Aim of the work

Many human activities generate waste, which later presents environmental and ecological problems. It is of fundamental importance that ships, and fishing vessels bring their operational waste and old fishing gear back to land instead of illegally dumping it into the sea, where it affects the marine environment and wildlife. Improved waste management regulations and services in ports, such as port reception facilities and transparent cost recovery structures, as well as information and training for staff can make a difference in reducing marine litter from such sea-based sources.
Fishing communities also play a significant role in this process as fishermen often catch waste (mostly made of plastic) while working at the sea. So called Fishing for Litter activities encourage fishing communities to collect and discharge this waste on land instead of throwing it back into the ocean. This is done through incentives, connection to recyclers and by providing information on marine protection. Project FishNoWaste cooperates with various partners to identify good practices and find new solutions for fishing for litter as well as for waste management in ports, drawing on European experiences.
During previous projects, the existence of numerous laws and regulations related to waste management was identified, as well as the lack of specific regulations related to marine litter. This gap led to challenges in comprehending legal constraints and their practical implementation. The purpose of this document is to analyze the current state of Croatian legislation concerning waste management, specially focusing on a targeted analysis of the available legal frameworks at the European, national, regional and/or local level defining the disposal supply chain for all types of waste produced in Croatian fishing ports. The aim of regulatory analysis carried out at the European, national and regional level is to improve and facilitate the application of legislation both on the Italian and Croatian side. Moreover, this analysis endeavors to shed light on the diverse strategies outlined for the comprehensive management of waste within fishing ports, encompassing waste generated aboard fishing vessels, including marine litter. By comparing measures adopted by the partner countries involved in the project, which will be done in another document, the ultimate goal is to propose effective waste management for individual ports, to increase the level of awareness and foster regional consistency regarding this crucial topic.
The document has the scope to analyze the State of The Art of the current legislation regarding the theme of the removal and treatment of waste in the marine-coastal environment. The regulatory analysis realized at European, regional and national level aims to improve and facilitate the application of legislation of both the Italian and Croatian side. Moreover, carrying out this analysis allows us to understand the different measures planned for the management of all waste generated in the fishing ports including the marine litter, comparing those provided by the partner countries involved in the project, with the aim of increasing the level of awareness and consistency for this relevant actual theme.

1.2 General Introduction

Recognized as an environmental concern since at least the 1990s, marine plastic pollution has emerged as a widely acknowledged and extensively discussed global issue in recent decades. Plastic is an important

and ubiquitous material with multiple functions that allow us to address various challenges that our society faces. However, the current methods of plastic production, use, and disposal does not always allow the economic advantages of a more "circular" approach and damages the environment. The detrimental effects on ecosystems and their services represent a threat to the well-being of individuals, societies, and economies alike. The substantial volume of debris in our oceans is not just a matter of aesthetic problem, it poses a threat to wildlife, leading to entanglement and animals mistaking plastic waste for food. Moreover, plastic ingested by marine animals enters the food chain potentially impacting human health. Plastic waste also causes economic loss for sectors and communities dependent on marine products, including manufacturing: only 5% of the value of plastic packaging remains in the economy - the rest is literally thrown away, making the need for a recycling and re-use approach even more evident (EU Parliament, 2021). The results of today's single-use, throw-away plastic culture can be seen on sea shores and in oceans worldwide. Plastic waste is increasingly polluting the oceans and according to available data, it's estimated that by 2050, the oceans could contain more plastic than fish by weight.

The European Union has drawn up a list of the most frequent objects found in marine waters, either floating on the surface, deposited on the seabed or washed on the coast. Plastic objects constitute the largest group including plastic cutlery, bottles, cigarette butts and cotton buds. Together, these items account for more than half of total marine litter frequently observed during the monitoring activities (UNEP, 2015). Despite the green policies proposed over the years with the aim of improving the quality of the environment, Europe still ranks among the world's most polluting regions in terms of the amount of plastic material produced and poured into the sea (NRC - National Research Council, 2018). The massive production of plastic associated with minimal recycling rates is leading to a scenario that may be difficult to reverse over our lifetimes. However, what legislative measures are being taken to reverse this trend? What has been done so far, and what steps should we take moving forward? In order to address these questions, it is necessary to analyze the existing state of marine litter legislation at European level and subsequently at national and regional level. It is important to understand the progress made so far and how legislation has evolved over the years in addressing the problem of pollution in the seas in order to determine the direction for future steps. Sometimes legislative obstacles have slowed down the implementation of laws across different regions. A well-defined legislative framework helps avoid the dispersion of information and reinforces the necessity for continuous interchange enabling intelligent efforts towards a common goal.

The disposal of waste generated on fishery harbors is becoming increasingly important due to the growth of this sector and Croatia's accession to the European Union. These issues are governed by EU regulations, national norms and international agreements.

The fishing industry makes a significant contribution to the marine litter problem and overall waste generation. In general, waste is defined as waste generated onboard vessels, including discarded and lost fishing gears. Such waste encountered in the marine environments, including the waste of terrestrial origin such as that brought by rivers that is caught by fishing gears, is often referred to as marine litter. The United Nations Environment Programme (UNEP) defines marine litter as "any persistent manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment". Reintegrating waste and litter into the economy transforms into a resource, aligning with the principles of transitioning from a linear to a circular economy. This approach emphasizes reducing waste generation, followed by reusing, repairing, and recycling waste into new production. Incineration and landfill disposal are considered last-resort options in a circular value chain. Poorly managed waste that is unaccounted for often becomes litter. An estimated 8 million tons of plastic waste enters the oceans every year, becoming litter, a volume expected to double by 2030 and again by 2050. Estimates suggest that over 150 million tons of plastics have accumulated in the world's oceans (UNEP, 2015).

Although removing and processing plastic litter is feasible, it remains labor-intensive, expensive, and inefficient.
Preventing plastics from entering the oceans requires an appropriate legal framework, effective implementation and enforcement, robust waste management practices, and equally important, attitudes and behaviors that ensure individuals and companies comply with legislation supporting non-polluting practices. Preventing plastic pollution at its source is essential for transitioning from linear to circular economic principles.
The protection of the sea from ship-generated pollution is highlighted in several strategic documents as a top priority. This strategic approach is clearly outlined in the Pre-Accession Maritime Strategy, developed in accordance with the opinion on Croatia's application for full membership in the European Union. One of the objectives of this strategy is to ensure that ports are equipped with adequate facilities for the reception of oily water, waste and cargo residues. This includes establishing the necessary infrastructure and arrangements for implementation, monitoring and control. More formally, Croatia must fulfill its obligations under the MARPOL Convention.
The Republic of Croatia became a party to the MARPOL Convention by notification of succession in 1991. To date, Croatia has incorporated the provisions of the MARPOL Convention into its legal system, as well as the provisions of European Directive 2000/59/EC on port facilities for the reception of waste generated by ships and cargo residues as part of the process of accession to the European Union. While both the Directive 2000/59/EC and MARPOL Convention aim to achieve similar objectives, the Directive specifically focuses on the activities of ships in ports and regulates in detail the legal, financial and practical responsibilities of the various actors involved in the unloading of waste and residues.
The following text lists legal documents that pertain to fishing ports and waste management within them. The documents are organized from international and European to national, attempting to follow the chronological order of their enactment.

2 INTERNATIONAL LEGAL FRAMEWORKS

2.1 Litter prevention at sea

There are three global international conventions established in the early 1970s to address plastic waste issues in the marine environment: the United Nations (UN) Convention on the Law of the Sea (UNCLOS, 1982), the International Convention for the Prevention of Pollution from Ships (1973) as modified by the Protocol of 1978 (MARPOL 73/78) and the Convention on the Prevention of Pollution by Dumping of Wastes and Other Matter (London Convention or LC, 1972).
UNCLOS is the most overarching legal framework regarding marine plastic pollution. It covers various aspects such as international seabed and marine scientific research, marine environmental protection and safety, development and transfer of marine technology. UNCLOS provides guidance and adjudication on territorial disputes, natural resource management, and pollution treatment of maritime areas around the world. MARPOL 73/78, the most significant international agreement regarding sea-based litter pollution, specifically addresses pollution from ships. Annex V of MARPOL 73/78 imposes a general ban on the deliberate discharge of plastics at sea, although discharge during normal operation is not considered dumping within this context. The London Convention aims to regulate marine pollution by controlling the dumping of persistent plastics and other synthetic materials at sea. It was ultimately replaced by the London Protocol (LP, 1996), which adopts a more

restrictive precautionary principle with a reverse list approach, replacing the black- and gray-lists used in the LC. Due to the issues surrounding marine microplastics and their connection with diverse waste streams under the LC/LP, the Secretariat will commission a "Review of the current state of knowledge regarding marine litter in wastes dumped at sea under the London Convention and Protocol" under the framework of the UN Environment Programme (UNEP) – led Global Partnership on Marine Litter (GPML). In addition, other important international agreements, frameworks, and initiatives such as the UN Food and Agriculture Organization Code of Conduct for Responsible Fisheries, Agenda 21: The UN Program of Action from Rio de Janeiro and the Johannesburg Plan of Implementation, and the Convention on Biological Diversity (1992), with the Jakarta Mandate on the Conservation and Sustainable Use of Marine and Coastal Biological Diversity (1995), also aim to protect the marine environment from marine debris. Under the umbrella of UNEP, global initiatives like the Regional Sea Programme (RSP, 1974) and Global Programme of Action (GPA, 1995) were established to organize and implement regional activities in 12 pilot regional seas (Baltic Sea, Black Sea, Caspian Sea, East Asian Seas, Eastern Africa, Mediterranean Sea, Northeast Atlantic, Northwest Pacific, Red Sea and Gulf of Aden, South Asian Seas, South East Pacific, and Wider Caribbean). These initiatives respond to the threats posed by marine litter in 2003, with tasks that include:

- reviewing and assessing the status of marine litter in each region
- organizing regional meetings of national authorities and experts on marine litter
- preparing regional action plans or strategies for the sustainable management of marine litter in each region
- participating in regional clean-up days within the framework of the International Coastal Clean-up Campaign
- provide a platform for establishing partnerships, cooperation and coordination of activities for the global control and sustainable management of marine litter.

2.1.1 The United Nations General Assembly and the United Nations Convention on the Law of the Sea (UNCLOS)

The United Nations Convention on the Law of the Sea (UNCLOS) provides the overarching framework for all the activities conducted in the oceans and the seas. It entered into force in November 1994 and has 167 parties, including the European Union. Many provisions of the Convention, such as Article 192, reflect customary international law, making them binding even on states that are not parties to the Convention. Part XII of UNCLOS addresses protection and preservation of the marine environment. It requires states to take all necessary measures, individually or jointly, to prevent, reduce and control marine pollution from any source. These measures must use the best practicable means at their disposal, be consistent with their capabilities, and aim to harmonize policies. Measures must include efforts to minimize the release of toxic, harmful or noxious substances to the fullest extent possible. Part XII also includes detailed provisions on pollution from land-based sources, vessels, seabed activities, dumping, and atmospheric sources. However, UNCLOS has notable gaps regarding marine litter and microplastics. It does not explicitly address marine plastic litter nor microplastics but instead speaks to different sources of pollution in general.
The urgent need to reduce marine pollution, including marine microplastics, has become a focal point of global environmental governance in recent years. A multitude of global frameworks and initiatives have been established, either directly or indirectly, to address this pressing issue. In 2012, the Manila

Declaration was adopted by 64 countries and the European Commission under the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities. This declaration aimed to prevent marine litter from land-based sources and led to the establishment of the Global Partnership on Marine Litter (GPML), aiming to include sea-based sources of marine debris. The significance of marine litter was further recognized by the G7 world leaders in 2015, with a commitment to prioritize actions on this issue. The G7 meeting on "Enhancing Maritime Security – Connecting Regions – Governing the Commons" mainly focused on: maritime domain awareness and surveillance; peaceful dispute settlement; illegal, unregulated and unreported fishing; and networking maritime security. The G7 Summit in 2015 adopted an Action Plan to combat marine litter, covering both land-based and sea-based sources, as well as awareness raising, outreach, and removal actions. More recently, the G20 Summit in 2017 reaffirmed and updated the G20's Sustainable Development Goals Action Plan on the 2030 Agenda – the G20 Marine Litter Action Plan is one of three major initiatives related to the environment. Additionally, adopting a "circular economy" approach for recycling and reusing materials and reducing waste presents an effective strategy for preventing land-based waste from entering the oceans.

The first session of the United Nations Environment Assembly (UNEA I, 2014) brought attention to the growing problem of plastics, including the rapid increase of microplastics in the marine environment, ultimately adopting Resolutions 1/6 on marine plastic debris and microplastics. It also called for a comprehensive study on marine plastic debris and microplastics. Moreover, the Secretariats of the Stockholm Convention, the Basel Convention, and relevant organizations were invited to participate in pollution control, chemicals and waste management, to contribute to this study. Subsequently, UNEA II (2016) approved Resolution 2/11 on marine plastic debris and microplastics under the overarching theme of advancing the environmental dimension of the 2030 Agenda for Sustainable Development (17 Goals). Goal 14, sets target 14.1 to "prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution", by 2025. Recognizing the importance of cooperation between UNEP and conventions and international instruments related to preventing and minimizing marine pollution from waste, it stresses that prevention and environmentally sound management (ESM) of waste are essential for long-term success in combating marine pollution, including marine plastic debris and microplastics. The resolution also calls for an assessment of the effectiveness of relevant international, regional, and sub-regional governance strategies and approaches to combat marine plastic litter and microplastics. In the recent UNEA III (2017), Resolution 3/7 on marine plastic debris and microplastics was adopted, stressing the importance of the long-term elimination of litter and microplastics discharge into the oceans, as well as the avoidance of detrimental effects on marine ecosystems and human activities dependent on them. It urges all actors to intensify actions to "prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution", by 2025, and encourages all Member States to prioritize relevant policies and measures.

Plastic waste and microplastics issues have been incorporated into the workstream of the Basel Convention (Basel Convention on the Transboundary Movements of Hazardous Wastes and their Disposal) at the 13th Conference of Parties in 2017. This initiative aims to encourage interested regional and sub-regional centers to work under the Convention on the impact of plastic waste, marine plastic litter, microplastics, to take measures for prevention and ESM, and to introduce the detailed new work outlined above into the 2018–2019 work program

2.1.2 MARPOL Convention

MARPOL Annex V of the IMO MARPOL Convention provides regulations to prevent pollution by waste from ships. It prohibits the discharge of waste into the ocean from all vessels, except as provided in specific regulations. A revised version of Annex V entered into force on 1 January 2013, following a review by an intersessional correspondence group of the Marine Environment Protection Committee (MEPC). This review considered the UN General Assembly resolution 60/30, which invited IMO to conduct a review in consultation with relevant organizations and assess its effectiveness. The MEPC also adopted the 2012 Guidelines for the development of waste management plans (resolution MEPC.220(63)). Under the revised MARPOL Annex V, waste includes "all kinds of food, domestic and operational waste, all plastics, cargo residues, incinerator ashes, cooking oil, fishing gear, and animal carcasses generated during the normal operation of the ship and liable to be disposed of continuously or periodically. Waste does not include fresh fish and parts thereof generated as a result of fishing activities undertaken during the voyage, or as a result of aquaculture activities". The main drawback of the document regarding marine litter and microplastics is that the requirement to carry an onboard waste management plan applies only to vessels of 100 GT or more and ships certified to carry 15 persons or more. Additionally, a waste record book is required only for ships of 400 GT and ships certified to carry 15 persons or more. The effectiveness of compliance with MARPOL discharge requirements largely depends on the availability of adequate port reception facilities.

2.1.3 London Convention and Protocol

The „Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972" (i.e. The London Convention, LC) came into force in 1975. Its objective is to provide effective control of all sources of marine pollution and to take all practical steps to prevent pollution caused by dumping of wastes or other matter at sea. Currently, 87 states are Parties to the Convention. To modernize and eventually replace the Convention, the London Protocol (LP) was agreed in 1996. The Protocol came into force in March 2006, and there are currently 46 Parties to it. Under the Convention, wastes are categorized using a black- and gray-list approach. Dumping of wastes on the black-list is prohibited, while dumping of wastes on the gray-list is allowed, provided a special permit is issued by a designated authority, and occurs under strict controls. All other non-list materials can be dumped, provided a general permit is issued. Annex V also obliges Governments to ensure „the provision of adequate reception facilities at ports and terminals for the reception of waste without causing undue delay to ships, and according to the needs of the ships using them". Under the Protocol, a precautionary approach is adopted, whereby all dumping is prohibited unless explicitly permitted (the „reverse list" approach). The LC and LP prohibit the disposal at sea of persistent plastics and other synthetic materials, such as netting and ropes (LC annex I, paragraph 2 and LP annex 1). The export of waste for dumping and incineration at sea is also prohibited. States are obligated to ensure that waste disposal at sea is carried out in accordance with the LC/LP, equivalent regional agreements or UNCLOS (Article 210). One area of concern has been the potential for plastics and microplastics to become associated with various waste streams under the LC/LP. Accordingly, the Secretariat of the LC/LP commissioned a „Review of the current state of knowledge regarding marine litter in wastes dumped at sea under the London Convention and Protocol". This work, undertaken within the framework of the UNEP-led Global Partnership on Marine Litter (GPML), aims to stimulate further discussion about the nature and extent of marine litter in the waste streams under the LC/LP, particularly plastics and microplastics. Sewage sludge and dredged material are

most likely found to contain plastic litter. The main gaps concerning marine litter and microplastics is that the regulations are limited to the intentional disposal of plastics at sea from ocean sources.

2.1.4 Litter prevention from land-based sources – GPA

The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) is the only global intergovernmental mechanism directly addressing the connectivity between terrestrial, freshwater, coastal and marine ecosystems. It provides conceptual and practical guidance from national and/or regional authorities to devise and implement sustained action to prevent, reduce, control and/or eliminate marine degradation from land-based activities. UNEP hosts the GPA and coordinates some activities in support of the programme. Intergovernmental Review Meetings are held every five years to review the progress made by countries in the implementation of the GPA through their respective National Action Plans. Marine litter is identified as a priority source category under the GPA.

2.2 Regulation of harmful substances - Chemicals and waste-oriented agreements

2.2.1 The Stockholm Convention

The Stockholm Convention on Persistent Organic Pollutants (POPs) was adopted in 2001 and came into force in May 2004. The convention entered into force on 17 May 2004 with ratification by an initial 128 parties and 151 signatories UN states. It aims to protect human life and the environment from chemicals that persist in the environment, bioaccumulate in humans and wildlife, cause harmful effects and have the potential for long-range environmental transport. POPs, as classified under the Convention, have a number of undesirable effects, including disruption of the endocrine system, carcinogenicity and damage to the central and peripheral nervous system. While POPs are widespread in the environment, they tend to be more concentrated in organic matter, such as seabed sediments. Many POPs are lipophilic, meaning they are readily absorbed by oils and fats, resulting in higher concentrations in oily fish compared to non-oily fish in the same waters. Consequently, plastics which absorb organic contaminants often contain POPs. Some additive chemicals used in plastic production years ago to modify the properties of plastics (e.g. to make the plastic resistant to fire), are now classified as POPs, making plastics carriers of POPs in the ocean. A system is in place to periodically review and add new chemicals to the Annexes of the Convention as appropriate. A global monitoring plan has been designed to provide comparable datasets on a regional and global basis, fostering synergy between POPs monitoring under the Stockholm Convention and the monitoring of plastic particles. An annual meeting ensures cooperation and coordination between regional centers under the Basel and Stockholm Conventions.

2.2.2 The Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was adopted in March 1989 and came into force in 1992. This United Nations treaty was primarily driven by the growing awareness in the 1970s and 1980s of the extensive trafficking of toxic wastes to Africa and other developing regions. As of June 2024, there are 191 parties to the convention. In addition, Haiti and the United States have signed the convention but did not ratify it. This trade was motivated by a desire to reduce disposal costs in the context of low environmental

awareness and inadequate regulation and enforcement in Eastern Europe and the developing world. The Basel Convention is particularly relevant because much of the waste trade involves plastics, some of which contain high levels of additive chemicals listed in Annex I or II of the Convention. These chemicals have known toxicological effects and serious human health implications. The Convention also requires Parties to: „ensure that the generation of hazardous wastes and other wastes are minimized".

2.2.3 The Rotterdam Convention

The Rotterdam Convention, another United Nations treaty, covers the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade13 and serves as another critical measure against unregulated waste trade. As of October 2018, the convention has 161 parties, which includes 158 UN member states, the Cook Islands, the State of Palestine, and the European Union. Non-member states include the United States.
Plastics may be included under this convention if they contain substances listed in its Annexes.
Most of the aforementioned instruments focus on marine litter and pollution in general, primarily addressing secondary microplastics that result from the fragmentation of larger plastic items. While secondary microplastics are a very important source of microplastics in the sea, there is a notable gap in global instruments specifically addressing primary microplastics.

2.3 Honolulu Commitment (2011)

The 5th International Conference on Marine Litter held in Honolulu, Hawaii in March 2011, brought together representatives of governments, large companies and researchers from 35 countries with the aim of building a first step towards a global strategy and action plans to address plastic pollution in marine environments. During the conference, it became evident that under-developed waste management systems in many countries pose a significant challenge, as they are primarily contributors to the transfer of plastic waste from land to the marine environments. This issue is exacerbated by the lack of coordination between global and regional marine pollution management programmes, gaps in the implementation of existing international and national regulations. Moreover, the current pattern of production and consumption exacerbate the problem. One of the main outcomes of the Hawaii conference was the adoption of "The Honolulu Commitment", a final declaration proposing a cross-sectoral approach to mitigating marine litter and its adverse impacts on marine habitats, biodiversity, economy and human health. To improve waste management worldwide, the Honolulu Commitment encourages sharing of market-based technical and legal solutions to reduce the amount of marine litter and improve local and regional awareness of the problem's impact.
According to the United Nations Environment Programme (UNEP), the elements outlined in the Honolulu Final Declaration mark the initial phase in the development of a global platform for the prevention, reduction and management of marine litter. The proposed "Honolulu Strategy" draft aims to provide a strategic framework for coordinating action plans designed to reduce and manage marine litter globally. It sets forth a framework for reducing the impact of marine litter over the next 10 years, relying on the collective commitment of global, regional, national, local and individual stakeholders. During the conference, marine debris was defined as waste of any anthropogenic origin, manufactured or processed solid material, regardless of size, that is discarded, disposed of, or abandoned in the environment. This includes all waste materials found at sea, on the beaches, or

indirectly carried to the sea by rivers, sewage, stormwater, or wind. Plastic in the oceans was identified as a constant threat to the environment, exacerbating economic costs incurred to human health, safety and the tourism and fishing sectors.
The declaration also outlines several clear goals, with the primary objective the creation of a Global Waste Management Partnership to foster close cooperation among all stakeholders to mitigate the damage to the marine environment:

- working in partnership with public and private entities to prevent marine litter;
- working with the scientific community to better understand the origins, extent, and impact of marine litter and possible solutions to the problem;
- promoting science-based global policies and enforcing existing laws to prevent marine litter;
- promoting the best waste management practices, especially in coastal regions;
- improving plastic product recovery solutions through recycling and energy recovery;
- overseeing the transportation and distribution of plastic raw materials and products to its customers and promoting this practice throughout the supply chain

2.4 The 2030 Agenda for Sustainable Development (2015)

The 2030 Agenda for Sustainable Development is an action programme designed to promote people, the planet and prosperity. Signed on September 25, 2015, by the governments of the 193 member countries of the United Nations, and approved by the UN General Assembly. The Agenda consists of 17 Sustainable Development Goals (SDGs) within a broader framework of 169 targets to be achieved across environmental, economic, social and institutional fields by 2030. While the programme does not solve all the problems, it provides a solid basis for building a more sustainable world, offering everyone the opportunity to live sustainably from environmental, social and economic perspectives. The sustainable development objectives have a global applicability, concerning and involving all countries and sectors of society, from private companies and the public sector to civil society and media and cultural organizations. The 17 Goals refer to a set of important development issues, balancing the three dimensions of sustainable development - economic, social and ecological. They aim to end poverty, combat inequality, tackle climate change, and build peaceful societies that respect human rights. In particular, the objective n. 14 "Underwater Life: Conserve and use in a lasting way the oceans, the seas and the marine resources for a sustainable development" highlights the problem of marine litter pollution through three specific objectives:

- Objective 14.1 – by 2025 it is necessary to prevent and significantly reduce marine pollution of all types, in particular from land-based activities, including marine litter and nutrient pollution of water
- Objective 14.2 – by 2020 sustainably manage and protect marine and coastal ecosystems to avoid significant negative impacts, including by strengthening their resilience and take action for their restoration, to achieve healthy and productive oceans
- Objective 14.5 – by 2020, conserve at least 10% of coastal and marine areas, consistent with national and international law and based on best available scientific information

3 REGIONAL COOPERATION

3.1 The Barcelona Convention

The Barcelona Convention was adopted on 16 February 1976 in Barcelona and entered into force in 1978; amended in 1995 and renamed as the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean. The amendments to the Barcelona Convention entered into force in 2004. The Barcelona Convention and its seven Protocols adopted in the framework of the Mediterranean Action Plan (MAP) constitute the principal regional legally binding Multilateral Environmental Agreement (MEA) in the Mediterranean. "The Contracting Parties to the Barcelona Convention agree to individually or jointly take all appropriate measures in accordance with the provisions of the Convention and the Protocols in force to which they are party to prevent, abate, combat and to the fullest possible extent eliminate pollution of the Mediterranean Sea Area and to protect and enhance the marine environment in that Area so as to contribute towards its sustainable development. They cooperate in the formulation and adoption of Protocols, prescribing agreed measures, procedures and standards for the implementation of this Convention."

3.1.1 Dumping Protocol

The Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft, was adopted in 1976 and entered into force in 1978. Its objective is for Contracting Parties to take all appropriate measures to prevent, abate and eliminate to the fullest extent possible pollution of the Mediterranean Sea by dumping of wastes or other matter. In 1995, the Dumping Protocol was amended, and renamed Protocol for the Prevention and Elimination of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft or Incineration at the Sea. The amendments to the Dumping Protocol have not yet entered into force. The Protocol, as amended in 1995, prohibits all dumping activities with the exception of wastes or other matters listed in the Protocol: dredged material, fish wastes, vessels (until 31 December 2000), platforms, and inert, uncontaminated geological material. The Mediterranean Pollution Assessment and Control Programme (MED POL) assists Contracting Parties in meeting their obligations under the Dumping Protocol, including through the development of specific Guidelines containing step-by-step procedures to evaluate wastes and other matter considered for disposal at sea: dredged material; fish waste or organic materials resulting from the processing of fish and other marine organisms; platforms and other man-made structures; and inert uncontaminated geological materials.

3.1.2 Prevention and Emergency Protocol

The Protocol Concerning Cooperation in Combating Pollution of the Mediterranean Sea by Oil and other Harmful Substances in Case of Emergency was adopted in 1976 and entered into force in 1978. The Protocol was replaced by the Protocol Concerning Cooperation in Preventing Pollution from Ships and, in Cases of Emergency, Combating Pollution of the Mediterranean Sea, which was adopted in 2002 and entered into force in 2004. The Prevention and Emergency Protocol provides a regional framework for international cooperation and mutual assistance in preparing for and responding to oil and hazardous noxious substances (HNS) pollution incidents. Parties to the Prevention and Emergency Protocol are required to maintain contingency plans, either nationally or in cooperation with other countries, backstopped by a minimum level of response equipment, communications,

regular training and exercises. This applies to ships, platforms and ports. Parties to the Protocol are also called to provide assistance to others in the event of a pollution emergency and provision is made for the reimbursement of any assistance provided. The Protocol provides for the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC) to play an important coordinating role, including in assisting Parties to implement the Regional Strategy for the Prevention of and Response to Marine Pollution from Ships (2016-2021).

3.1.3 Land-Based Sources Protocol

The Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources, was adopted in 1980 and entered into force in 1983. In 1996, the LBS Protocol was amended and renamed Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources and Activities. The amendments to the LBS Protocol entered into force in 2008. The objective of the LBS Protocol is to take all appropriate measures to prevent, abate and eliminate to the fullest extent possible pollution of the Mediterranean Sea by from land-based sources and activities, by the reduction and phasing out of substances that are toxic, persistent and liable to bioaccumulate listed in the Protocol. Under the LBS Protocol point source discharges and pollutant releases are subject to an authorization or regulation osystem by countries, taking into account factors ranging from the characteristics and composition of the discharges to the potential impairment of marine ecosystems and sea-water uses. Regional Action Plans and National Action Plans, containing specific measures and timetables, have been developed to implement the LBS Protocol. These address Persistent Organic Pollutants (POPs); the Reduction of Biochemical Oxygen Demand (BOD5); the Reduction of Inputs of Mercury; the Management of Marine Litter; and Sustainable Consumption and Production in the Mediterranean. The Regional Plan on Marine Litter Management in the Mediterranean is notable in that it is a legally binding instrument, setting specific measures and operational targets to achieve Good Environmental Status in the Mediterranean Sea, including a basin-wide marine litter reduction target of 20% of beach litter by 2024. The Mediterranean Pollution Assessment and Control Programme (MED POL) assists Contracting Parties in meeting their obligations under the LBS Protocol.

3.1.4 Offshore Protocol

The Protocol for the Protection of the Mediterranean Sea against Pollution Resulting from the Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil was adopted in 1994 and entered into force in 2011. The Offshore Protocol addresses all aspects of offshore oil and gas activities in the Mediterranean and includes measures to reduce pollution from all phases of offshore activities, to respond to offshore pollution incidents and concerning liability and compensation. The Protocol provides for the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC) to play an important coordinating role, in support of its implementation. The Offshore Protocol is complemented by the 2016 Mediterranean Offshore Action Plan.

3.1.5 Hazardous Wastes Protocol

The Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal was adopted in 1996 and is in forced since 2008. The overall

objective of the Hazardous Waste Protocol is to protect human health and the marine environment against the adverse effects of hazardous wastes. The provisions of the Protocol address the following principal aims: the reduction and, where possible, the elimination of hazardous wastes generation; the reduction of the amount of hazardous wastes subject to transboundary movement; and a regulatory system applying to cases where transboundary movements are permissible. The Mediterranean Pollution Assessment and Control Programme (MED POL) assists Contracting Parties in meeting their obligations under the Hazardous Wastes Protocol.

3.1.6 Integrated Coastal Zone Management Protocol

The Protocol on Integrated Coastal Zone Management in the Mediterranean, (ICZM Protocol) was adopted in 2008 and entered into force in 2011. The ICZM Protocol provides the legal framework for the integrated management of the Mediterranean coastal zone. Under the Protocol, Parties are called to take the necessary measures to strengthen regional cooperation in order to meet the objectives of integrated coastal zone management. Such measures include those aimed at protecting the characteristics of certain specific coastal ecosystems (e.g. wetlands and estuaries, marine habitats, coastal forests and woods and dunes), those aimed at ensuring the sustainable use of the coastal zone, and those aimed at ensuring that the coastal and maritime economy is adapted to the fragile nature of coastal zones. The Priority Actions Programme Regional Activity Centre (PAP/RAC) assists Contracting Parties in meeting their obligations under the ICZM Protocol. The Contracting Parties adopted in 2012 the Action Plan for the implementation of the ICZM Protocol. They also adopted the Common Regional Framework for ICZM in 2019.

3.2 Regional sea bodies

Regional Seas Conventions and Action Plans (RSCAPs) play a critical role in fostering cooperation and coordination among countries that share common marine resource. There are 18 Regional Seas Conventions and Action Plans, six of which are directly administered by UNEP: Mediterranean (Barcelona Convention), Wider Caribbean (WCR), East Asia Seas, Eastern Africa (Nairobi Convention), Northwest Pacific (NOWPAP), and West and Central Africa (WACAF). These RSCAPs are the key instrument in supporting the implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) at regional levels. Several RSCAPs have developed or are in the process of developing regional action plans on marine litter. These plans are tailored to the specific environmental, social, and economic context of each region, varying in detail and the extent to which actions are required or recommended by Member States. For example, the strategic framework for management of marine litter in the Mediterranean contains legally binding obligations to take measures to prevent and reduce the impacts of litter from both land and sea sources.

3.3 Major transboundary river basins

River systems and other waterways are a major route for transporting waste, including plastics, to the ocean. When a waterway crosses a national boundary, it is defined as a transboundary waterway. Nearly half of the Earth's land surface (excluding Antarctica) falls within transboundary basins, which include rivers, groundwater and lakes. There are numerous multilateral agreements addressing transboundary river basins, some of which focus on environmental concerns. These agreements

provide mechanisms that could potentially be utilized to reduce the introduction of plastic and microplastics into waterways, thereby minimizing their transport to the ocean. For example, the International Commission for the Protection of the Danube River (ICPDR) provides a comprehensive legal instrument for cooperation and transboundary management of the Danube. It covers a range of issues, including water quality and the transboundary transport of hazardous substances, and has been ratified by 15 contracting parties. The ICPDR Joint Action Plan includes measures specifically aimed at reducing water pollution.

3.4 Regional action plans on marine litter

One of the most relevant strategic documents related to marine litter in the Mediterranean region is the Regional Plan on Marine Litter Management in the Mediterranean, adopted by the Contracting Parties to the Barcelona Convention and its Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and Activities (LBS) in December 2013, became binding on July 2014. The timetable for the implementation of the Regional Plan measures is between 2016 and 2025, with most of the measures to be implemented by 2020. It is the first plan fully based on the Ecosystem Approach principles to achieve Good Environment Status, making the Mediterranean region a pioneer in adopting legally binding measures on marine litter. The Regional Plan addresses the complex challenges posed in the Mediterranean region by marine litter, a global issue dramatically affecting marine and coastal environments. The problem of marine litter is rooted in current prevailing production and consumption patterns and originates from land- and sea-based activities. Land-based marine litter in the Mediterranean results mainly from recreational and tourism activities, and household waste. Meanwhile, important knowledge gaps have been identified with regard to marine litter generated from sea-based sources in the region. With this Plan, the Mediterranean region is pioneering the adoption of legally binding measures on marine litter. Out of nine regional plans already adopted within the framework of the LBS Protocol, the Regional Plan on Marine Litter Management in the Mediterranean is the first to be fully based on the Ecosystem Approach principles to achieve Good Environment Status. The entry into force of the Plan coincides with the update of National Action Plans (NAPs) to combat pollution from land based sources and activities. With this Regional Plan Mediterranean countries will be able to elaborate national policies and action plans on pollution control and prevention that will contribute to addressing one of the most difficult environmental issues in the Mediterranean sea. The impacts of marine litter are not only environmental, but also economic, health- and safety-related, and cultural. Regardless of its size, marine litter refers to any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment. Plastics, floating, on beaches, and on the seafloor, make up to 83.0% of the land-based marine litter in the Mediterranean in addition to textiles, paper, metal and wood (17%). Moreover, marine litter from smoking related activities in the Mediterranean is much higher than the global average.

The North-East Atlantic Environment Strategy (2010 – 2020) committed OSPAR to develop appropriate programmes and measures to reduce amounts of litter in the marine environment. To fulfill this objective, OSPAR agreed on a Regional Action Plan (RAP) for Marine Litter for the period 2014-2021. This RAP contained 23 national actions and 32 collective actions aimed at addressing both land-based and sea-based sources, as well as education, outreach and removal actions. One notable initiative, Fishing for litter, engages fisheries to actively remove marine litter caught in their fishing nets from the seabed.

(www.ospar.org/html_documents/ospar/html/marine_litter_unep_ospar.pdf)
Among other action plans, we can mention Regional Action Plan on Marine Litter for the Baltic Sea adopted in March 2015 by HELCOM (Helsinki Convention) Contracting Parties, which includes actions aiming to reduce land-based waste ending up in the sea and combat sea-based sources of marine litter, such as waste from fishing (www.helcom.fi). Also, some plans that pertain to remote areas such as Regional Action Plan on Marine Litter for the Wider Caribbean Region (RAPMaLi), approved in 2008 and revised in 2014, Northwest Pacific Action Plan on Marine Litter from 2008, Pacific Regional Waste and Pollution Management Strategy 2016-2025 where marine debris has been identified as a priority area.

4 EUROPEAN UNION

The European Union (EU) has adopted a number of measures on waste management, packaging and environmental protection aimed at reducing marine plastic debris. The EU has a wide range of instruments directly and indirectly targeting the issue of marine plastic litter and microplastics. These instruments include several directives and strategies that apply to all EU Member States. An overview of the European Commission (EC) policies, legislation and initiatives related to marine litter was published in 2012 (EC 2012). These initiatives encompass both specific measures within the EU and broader international obligations. For example, the requirement for states to provide port reception facilities, as mandated by MARPOL Annex V, is incorporated into a Directive 2000/59/EC (EC 2000). The European Union (EU) actively participates and substantially contributes to international efforts aimed at preventing and reducing marine litter, as well as mitigating its impacts. It has introduced a number of policies, legislation and initiatives focused on marine litter strategies, among which the EU Marine Strategy Framework Directive (MSFD) as the key European legislation addressing marine debris (European Union Commission, 2017). Adopted on June 17, 2008, the MSFD serves as the first EU-wide legislative instrument related to the protection of marine biodiversity. The main objective of this Directie is to enable a coherent and harmonious development of strategies that should lead to a programme of measures to achieve or maintain a Good Environmental Status (GES) in European Seas by 2020. The development of these strategies is the main goal of the Marine Directive. The Directive defines GES as: “The environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive”, while GES for marine litter under MSFD is defined as: “Properties and quantities of marine litter do not cause harm to the coastal and marine environment” (EU, 2016). To help interpret what GES means, eleven descriptors were set out, with marine litter described in Descriptor 10. For each of eleven descriptors, a number of criteria and associated indicators for assessing good environmental status were defined. In addressing marine litter, two criteria and four indicators were defined, covering both large marine litter and microplastics:

Criteria 10.1. Characteristics of litter in the marine and coastal environment; indicators:

- trends in the amount of litter washed ashore and/or deposited on coastlines, including analysis of its composition, spatial distribution and sources (10.1.1)
- trends in the amount of litter in the water column (including floating at the surface) and deposited on the seafloor (10.1.2)

- trends in the amount, distribution and where possible composition of microparticles (in particular microplastic) (10.1.3)

Criteria 10.2. Impacts of litter on marine life; indicators:

- trends in the amount and composition of litter ingested by marine animals (e.g. stomach analysis) (10.2.1)

Annex III of the Directive was amended in 2017 to establish stronger links between ecosystem components, anthropogenic pressures, and their impacts on the marine environment, aligning them with the MSFD's 11 descriptors and the new Decision on GES. Additionally, the EU and the European Commission (EC) have developed a set of detailed criteria and methodological standards to assist Member States in implementing MSFD and other European legislation concerning marine litter. This includes Directive on port reception facilities for ship-generated waste and cargo residues (EC2000/59), Bathing Water Directive (76/160/EEC and 2006/7/EC), Urban Waste Water Treatment Directive (91/271/EEC and 98/15/EC), Environmental Liability Directive (2004/35/EC), Directive on Packaging and Packaging Waste (2004/12/EC), and European Strategy on Plastic Waste in the Environment (Green Paper, EC 2013).

Other significant directives include the Waste Framework Directive (2018/851), the Single-Use Plastics Directive (SUP) (2019/904) and the Directive on Port Reception Facilities (2019/883) to tackle sea-based litter. In 2013, the EC published a European Strategy on Plastic Waste in the Environment as a Green Paper (EC 2013). This strategy examined various aspects of plastics production, use, waste management, recycling and resource efficiency, posing a series of questions to facilitate the development of more effective waste management guidelines and legislation. Subsequently, existing legislation has been revised, such as the reducing of lightweight plastic bags consumption (< 50 µm thick), which was adopted in April 2015 (EU 2015/720). The EC has commissioned several studies on the generation of marine litter, more specifically marine plastic litter, and potential impacts and mitigation measures. In addition, the EC is currently developing regulations concerning intentionally added microplastics. In 2015, the European Union adopted a Circular Economy Package, which includes a Strategy for Plastics featuring specific elements aimed at preventing marine litter and microplastics pollution. The SUP Directive is a result of this Strategy, as well as the restriction proposal by the European Chemicals Agency (ECHA) concerning the use of intentionally added microplastic particles in consumer or professional use products of any kind. If adopted, this proposal could serve as an important instrument in addressing the use of microplastics in products across Europe.

4.1 Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues (2000)

Directive 2000/59/EC, issued in 2000, aims to reduce discharge of waste from ships into the sea and improve the availability and use of port reception facilities for such waste, thereby strengthening the protection of the marine environment. This European directive introduces the concepts of "ship-generated waste" and "port reception facilities". "Ship-generated waste" encompasses all waste, including wastewater and residues other than cargo residues, produced during the service of a ship and falling within the scope of Annexes I, IV and V to MARPOL 73/78. It also includes waste associated with cargo as referred to in the Guidelines for the implementation of Annex V to MARPOL 73/78. "Port reception facilities" refer to any structure, fixed, floating or mobile, that is capable of receiving the waste produced by ships or the cargo residues. When calling at an EU port, ships must deliver all waste to the port facilities. An exemption to this rule is applied for ships with sufficient capacity to

store the waste accumulated during their intended voyage until they reach the next port of call. This Directive defines how to determine whether a ship has sufficient storage capacity for this exemption to apply. In order to reduce the amount of waste produced on board, the Directive requires that port fees are lower for ships that produce reduced quantities of waste, and manage it in a sustainable and environmentally sound manner. This Directive defines the criteria for determining when a ship is entitled to a reduced fee for producing less waste and managing it well. Member States are required to inspect 15% of ships calling in their ports to verify compliance with waste rules. When doing so, Member States must target those ships for which the risk of non-compliance is highest. This Implementing Regulation defines a mechanism for the selection of ships for inspection, based on common criteria, so that the selection is made in the same way across the EU. Environmental protection is a priority in this Directive. It mandates that an appropriate waste collection and management plan be drawn up and implemented for each port. Furthermore, Article 7 specifies that if waste cannot be delivered to a collection facility and there is a risk of it being discharged into the sea, all Member States must take the necessary measures to prevent marine pollution.

4.2 Directive 2008/56/CE of the European Parliament and of the Council of 17 June 2008 a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) (2008)

The Marine Strategy Framework Directive (MSFD-2008/56/EC) is an important instrument for the governance of the sea system, promoting the adoption of complex strategies aimed at safeguarding the marine ecosystem to achieve a Good Environmental Status – GES.
Given the transboundary nature of marine environments, regional cooperation among States bordering the same sea is essential. The MSFD aims to develop effective governance by developing shared and consistent methods for analysis and monitoring. Within this framework, cooperation is particularly important for setting common goals and actions, involving all countries sharing the same basin, including non-EU countries, to overcome the problem of marine litter.
The Directive divides European marine waters into four regions: the Baltic Sea, the North-East Atlantic Ocean, the Mediterranean Sea and the Black Sea, with some regions further subdivided into sub-regions. Three sub-regions have been identified:

a) the western Mediterranean,
b) the Adriatic Sea,
c) the Ionian Sea and the central Mediterranean.

Alongside other European Directives, in particular the Habitats Directive (92/43/EEC), Wild birds Directive (2009/147/EC), Water Framework Directive (2000/60/EC) and other regulatory instruments like Common Fisheries Policy (CFP, Reg. EU 1380/2013), the Marine Environment Strategy provides a robust political and legal framework for fulfilling international commitments to marine biodiversity protection. These include the Convention on Biological Diversity (CBD) and the Barcelona Convention for the Protection of the Mediterranean (UNEP/MAP).

4.3 Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (2008)

This Directive initiated a new approach to waste management, emphasizing extended producer responsibility (Article 8) and advocating for sustainable production throughout the product life cycle. Member States are encouraged to implement legislative or non-legislative measures to strengthen

reuse, prevention, recycling and other recovery operations of waste. Producers are encouraged to establish acceptance points for end-of-life products, participate in waste management and assume financial responsibility for these activities. They are also required to make information publicly available regarding the reusability and recyclability of their products. Appropriate measures should be taken to promote product design that minimize environmental impact and waste generation during production and use. These measures may support the development, production and marketing of products for multiple use, technical durability and environmentally safe end-of-life management.
The policy options presented in this section adopt a life-cycle approach, starting with plastic design. It is evident that design of plastics and plastic products plays a key role in sustainability, influencing all subsequent stages of the plastic life-cycle. For example, plastic recycling heavily depends on the composition of plastic materials and the design of plastic products.

4.4 GREEN PAPER on a European Strategy on Plastic Waste in the Environment (2013)

The GREEN PAPER contributes to assessing the actual risks to the environment and human health associated with plastics when products become waste, addressing their functional eco-design. In addition, the document reflects on the issues of uncontrolled plastic waste disposal and marine waste. It provides an overview of the current situation, evaluates the interests of the various stakeholders, and invites them to freely submit comments and proposals for improvement. The GREEN PAPER acknowledges that despite the increasing environmental impact, plastic waste is not specifically addressed by EU legislation, only the Packaging Regulation 94/62/EC sets a specific recycling target for plastic packaging. Meanwhile, the Waste Framework Directive 2008/98/EC, although it enshrines the principles of producer responsibility and the waste hierarchy, still leaves a significant gap between regulatory obligations and current waste management practices.
From the technical summaries carried out over the years, the GREEN PAPER emphasizes the increasing urgency of the problem and the need for further coordinated research to ensure a unified approach to monitor and mitigating this problem. The Commission has initiated a dialogue with stakeholders, including plastics manufacturers, recycling managers, packaging industry, port and maritime authorities and NGOs. The goal is to establish voluntary partnerships and initiatives to combat marine litter. Discussions have been initiated to set policy-oriented targets, with ongoing projects expected to develop a reference scenario for the EU by 2013. These projects aim to help establish milestones and policy objectives to effectively address the problem of marine litter.

4.5 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Closing the loop – An EU action plan for the Circular Economy (2015)

The use of plastics in the EU has grown steadily, but less than 25% of collected plastic waste is recycled, while approximately 50% ends up in landfills (EU, 2015). Significant quantities of plastics also end up in the oceans, contributing to marine pollution. The 2030 Sustainable Development Goals aim to prevent and significantly reduce all kinds of marine pollution, including marine litter. Enhancing separate collection and implementing certification schemes for collectors and sorters are critical steps to divert recyclable plastics from landfills and incineration towards recycling. However, the presence of hazardous chemical additives poses technical challenges, and the emergence of innovative types of plastics raises additional questions, such as concerns about biodegradability.

Despite these challenges, innovation in plastics can support the circular economy. Advances in plastic technology can better preserve food, improve recyclability and reduce the weight of materials used in vehicles. To address these complex and important issues, Europe introduced the first Circular Economy Package, comprising an action plan with 54 initiatives designed to accelerate the transition to a circular economy. The actions foreseen in the Circular Economy Action Plan include:

- making sustainable products the standard in the EU
- empowering consumers and public buyers
- focusing on sectors that use most resources and have high potential for circularity such as:
  - batteries and vehicles;
  - electronics and ICT;
  - packaging;
  - plastic materials;
  - textiles;
  - construction and buildings;
  - food;
  - water and nutrients;
- ensure less waste
- making the circularity work for people, regions and cities
- to direct global efforts towards the circular economy

The EU commission will prepare a strategy addressing the challenges posed by plastics throughout the value chain, considering their entire life-cycle. This strategy also includes actions to fulfill the objective to significantly reduce marine litter. As part of the 2016 revision of the Directive on port reception facilities, the Commission would also address the issue of marine litter from ships and examine options to increase its delivery to and proper treatment by port reception facilities.
Several other elements of this action plan would also contribute to increasing plastics recycling, including:

- the Ecodesign Directive or Sustainable Design
- the Ecolabel, label of voluntary ecological quality
- Green Public Procurement (GPP EU), environmental policy instrument aimed at fostering the development of a market for products and services with reduced environmental impact

The European Commission considers various concepts for promoting the circular economy and environmental respect such as recyclability, biodegradability, the presence of hazardous substances of concern in certain plastics, especially in marine litter

4.6 Proposal for a Directive of the European Parliament and of the Council on the reduction of the impact of certain plastic products on the environment (2018)

On January 16, 2018, the European Commission published a communication laying out a strategy for plastics within a circular economy, focusing on reducing the impact of certain plastic products on the environment. The strategy identifies key challenges, including the low reuse and recycling rates of plastic waste, the excessive use of disposable plastics, the greenhouse gas emissions associated with plastics production and incineration, and the presence of plastic waste (including microplastics) in oceans. The Commission proposes its 'vision for Europe's new plastics economy', which includes a goal for all plastic packaging to be designed for recyclability or reusability by 2030.

Moreover, in its resolution of September 13, 2018, on the European strategy for plastics in a circular economy (2018/2035(INI)), the European Parliament welcomed the proposal and urged the Commission to take several actions. These include:

- introducing requirements for minimum recycled content for specific plastic products put on the EU market
- swiftly developing quality standards for recycled plastics to build trust and incentivise the market for secondary plastics
- banning intentionally added microplastics in cosmetic products as well as oxo-degradable plastics by 2020
- setting minimum requirements in product legislation to significantly reduce the release of microplastics at source, particularly for textiles, tyres, paints and cigarette butts
- reviewing the essential requirements laid out in the Packaging and Packaging Waste Directive by the end of 2020.

The resolution emphasized that although biodegradable and compostable plastics can help support the transition to a circular economy, they cannot be considered a remedy against marine litter or legitimize unnecessary single-use applications.

4.7 Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment – "The SUP Directive" (2019)

The SUP Directive is a regulatory intervention by the European Union, which must be transposed by the Member States. In May 2019, the EU approved this Directive to combat marine pollution caused by the dispersion of plastic. This regulatory intervention, known as the SUP Directive, targets the types of plastic objects, particularly disposable ones, most commonly found among waste on European beaches.

The SUP Directive aims to prevent and combat the creation of marine litter by addressing the issue at its source – prohibiting and discouraging the production and marketing of certain disposable plastic items. Building on existing EU legislation, the directive establishes restrictions for products and packaging among the ten most frequently found on European beaches. Member States have given two years from the directive's approval to transpose it into their national legal frameworks. Effective from 2021, the Directive prohibits the use of the following disposable plastic products or packaging for which market alternatives exist:

- cotton bud sticks
- cutlery (forks, knives, spoons, chopsticks)
- plates (both plastic and paper with plastic film)
- straws
- beverage stirrers
- balloon sticks (excluding for industrial or professional use)
- food containers with or without lid (cups, trays with closures) in expanded polystyrene (EPS) for immediate consumption (fast-food) or removal (take-away) of food without further preparation
- beverage containers and cups made of EPS, including their caps and lids all disposable articles in oxo-degradable plastic

The Directive also prohibits the use of oxo-degradable plastic.

The SUP Directive explicitly states in Article 3 that the only polymers excluded from the prohibition are natural ones that have not been chemically modified. This means that bioplastics and vegetable-based plastics, whether derived from renewable sources (wholly or partially) or from petrochemicals, are considered chemically modified polymers and therefore among the prohibited materials.
Conversely, non-chemically modified natural polymers are exempt from the ban. These include natural organic fibers that have not undergone chemical changes, such as sugarcane, bamboo, hemp, cellulose, rice, rubber and coconut fibers. Plastic bottles and glasses are not included in the list of prohibited items. The reason for excluding plastic bottles lies in the goal of enhancing the recyclability of PET, the material from which they are made. Glasses, on the other hand, are not addressed by the Directive and their inclusion in the ban depends on the legislation adopted by individual Member States.
In addition, the SUP Directive establishes separate collection goals and design requirements for disposable plastic bottles:

- the directive sets a collection target of 90% for the recycling of disposable plastic bottles by 2029, with an intermediate target of 77% by 2025
- the material used to produce these bottles should consist of at least 25% recycled plastic from 2025 for PET bottles, and 30% from 2030 for all bottles
- bottles with plastic caps and lids may only be placed on the market if the caps and lids remain attached to the containers for the duration of the intended use of the product
- implementing Decision (EU) 2021/1752 lays down detailed rules for the calculation, verification and reporting of data on the separate collection of waste from single-use plastic bottles for beverages.

4.8 European Green Deal (2019)

The European Green Deal is a comprehensive roadmap for making the EU economy sustainable. It represents a global plan proposed by the European Union (EU) to tackle climate change and achieve carbon neutrality by 2050. The main objective of the Green Deal is to transform the EU economy into a sustainable, low-carbon and circular economy that benefits both the environment and society. The Green Deal focuses on several key areas, including:

- climate action: reduce greenhouse gas emissions by at least 55% by 2030 and achieve carbon neutrality by 2050.
- sustainable energy: increase the share of renewable energy in the EU energy mix and to improve energy efficiency.
- sustainable transport: promote sustainable transport, including the development of electric vehicles and the use of alternative fuels.
- circular economy: promote a circular economy that reduces waste and promotes reuse and recycling of materials.
- biodiversity: protect and restore biodiversity and ecosystems, including forests, oceans and fresh waters.

The Green Deal is a significant and ambitious initiative that requires a collective effort from all EU Member States, businesses and citizens to achieve its objectives.

4.9 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – A NEW CIRCULAR ECONOMY ACTION PLAN for a cleaner and more competitive Europe (2020)

The European Commission adopted the New Circular Economy Action Plan (CEAP) in March 2020. The new action plan outlines initiatives across the entire life cycle of the product, serving as a crucial step toward achieving the EU's 2050 climate neutrality target and halting biodiversity loss. Similar to the previous Circular Economy Action Plan, the new one promotes circular economy processes and aims to prevent waste. However, in contrast to the previous plan, the Commission commits to implementing all 35 actions listed in the new action plan. Monitoring progress towards a circular economy and addressing its direct and indirect benefits is crucial. This allows both the EU and national authorities to evaluate policy effectiveness and identify best practices. In 2023, the Commission revised the circular economy monitoring framework, initially adopted in 2018. The revision adds new indicators on:

- material footprint and resource productivity - to monitor material efficiency
- consumption footprint – to ensure that EU consumption fits within planetary boundaries

The updated framework supports the EU's circular economy and climate neutrality ambitions under the European Green Deal.

4.10 Europe adopts measures for the application of the Circular Economy on various themes (2020-2023)

4.10.1 Zero Pollution Action Plan (2021)

The EC adopted the EU Action Plan "Towards a Zero Pollution for Air, Water and Soil" on 12 May 2021, as a key deliverable of the European Green Deal. The zero pollution vision for 2050 is to reduce the level of air, water and soil pollution to no longer be considered harmful to health and natural ecosystems, creating a toxic-free environment. This translates into key 2030 targets to speed up pollution reduction at its source. These targets include:

- improving air quality to reduce the number of premature deaths caused by air pollution by 55%
- improving water quality by reducing waste, plastic litter at sea by 50% and microplastics released into the environment by 30%
- improving soil quality by reducing nutrient losses and chemical pesticides' use by 50%
- reducing by 25% the EU ecosystems where air pollution threatens biodiversity
- reducing the number of people chronically disturbed by transport noise by 30%
- significantly reducing waste generation and by 50% residual municipal waste

The Action Plan provides a framework to integrate pollution prevention in all relevant EU policies, enhance the implementation of the relevant EU legislation and identify potential gaps.

4.10.2 Fit for 55 (2021)

To ensure that the EU can reach its 2030 target, in 2021 the Commission proposed a set of proposals known as "Fit for 55" (55% ready). These proposals aim to revise and update EU legislation and introduce new initiatives to align EU policies with the climate objectives agreed by the Council and

the European Parliament. The Fit for 55% package includes 13 related legislative reforms and 6 climate and energy bill proposals. "Ready for 55%" refers to the EU's target to reduce net greenhouse gas emissions by at least 55% by 2030. This objective encompasses various sectors, including maritime transport with a "zero emission or low emission ships".

4.10.3 Proposal for a regulation on microplastics (2023)

The adoption of several initiatives under the Circular Economy Action Plan includes measures to reduce the impact of microplastic pollution on the environment. This initiative aims to tackle microplastics unintentionally released into the environment, emphasizing labeling, standardization, certification and regulatory measures for the main sources of these plastics.
It aims to:

- improve scientific understanding regarding the risks and occurrence of microplastics in the environment, tap water and food
- reduce environmental pollution and potential health risks, while respecting the principles of the single market and encouraging competitiveness and innovation.

This document aims to inform the public and stakeholders about the Commission's upcoming legislative endeavors, allowing them to provide feedback on the Commission's understanding of the problem and possible solutions. This document is for information purposes only. It represents a proposal and does not prejudge the final decision of the Commission regarding whether this initiative will be pursued or its final content. All elements of the initiative described, including its timing, are subject to change. The proposal highlights several issues concerning microplastics:

- absence of market incentives for operators to take measures aimed at reducing unintentional microplastics releases into the environment
- absence of EU comprehensive approach to address unintentionally released microplastics
- knowledge gaps regarding the risks and occurrence of microplastics in the environment, drinking water and foods still need to be explored. Methods for sampling, processing, data analysis and reporting are not adequately harmonized.
- insufficient information reduce ability to choose sustainable products and manage them sustainably
- market fragmentation: some Member States and regional entities, including Regional Sea Conventions, are considering or implementing measures to address microplastic pollution. Giving examples, microfibre filters for new washing machines will become mandatory in France by 2025, although concerns have been raised about the potential risk of consumers washing such filters and releasing microplastics to wastewater.

Environmental pollution from microplastics is transboundary, meaning that unintentional emissions from one Member State can contribute to pollution in another. Without EU action, there is a risk of a proliferation of measures, which could potentially harm the internal market without fully solving the problem. Therefore, harmonized EU measures could bring economies of scale, reduce regulatory and administrative burdens and create a level playing field among responsible operators.
About this proposal, Commission adoption is upcoming.

4.10.4 Nature Restoration Law (2024)

The European Commission's proposal for a Nature Restoration Law is the first continent-wide, comprehensive law of its kind. It stands as a key element of the EU Biodiversity Strategy, which calls

for binding targets to restore degraded ecosystems, particularly those with the greatest potential to capture and store carbon and to prevent and reduce the impact of natural disasters.
Europe's nature is experiencing an alarming decline, with more than 80% of habitats in poor condition. Restoring wetlands, rivers, forests, grasslands, marine ecosystems, and the species they host will help:

- increase biodiversity
- secure the essential services provided by nature, like cleaning our water and air, pollinating crops, and protecting us from floods
- contribute to limiting global warming to 1.5°C
- enhance Europe's resilience and strategic autonomy, preventing natural disasters and reducing risks to food security

The law recognizes the importance of reducing all forms of marine pollution, such as nutrient loading, noise pollution and plastic waste, which are considered to be restoration measures.

5 CROATIAN LEGAL AND INSTITUTIONAL FRAMEWORK

The protection of the sea from ship-related activities is highlighted in several strategic documents as an activity of the greatest importance. In this regard, a well-defined strategic approach is presented in the Pre-Accession Maritime Strategy, developed in alignment with Croatia's application for full membership in the European Union. One of the goals of the Pre-Accession Maritime Strategy is to ensure availability of adequate port facilities for the reception of oily water, garbage and cargo residues, including the establishment of necessary structures and arrangements for implementation, monitoring and control. More formally, Croatia is obligated to fulfill its duties under the MARPOL Convention.
The Republic of Croatia became a party to the MARPOL Convention by notification of succession in 1991 (although as part of Yugoslavia since 1973). To date, Croatia has integrated the provisions of the MARPOL Convention, as well as the provisions of European Directive 2000/59/EC on port facilities for the reception of waste generated by ships and cargo residues, into its legal system as part of the process of accession to the European Union. Directive 2000/59/EC aims to achieve the same objectives as the MARPOL Convention. However, the Directive focuses on the ship activities in ports and elaborately regulates the legal, financial and practical responsibilities of the various actors involved in the unloading of waste and residues in ports.
As a party to the International Convention for the Prevention of Pollution from Ships since 1973, and specifically adhering to the 1978 Protocol modifications, Croatia has significant obligations regarding marine environmental protection. Given its Mediterranean Sea coastline, which is designated as a special area under Annex I of MARPOL, Croatia must provide facilities for reception and treatment of all waste, including dirty ballast and tank washing water from oil tankers visiting its oil loading terminals and repair ports. Additionally, Croatia is required to offer adequate reception facilities for other oily residues and mixtures from all ships visiting its ports. In the context of its EU accession and as a signatory to the Paris Memorandum of Understanding on Port State Control, Croatia has transposed the provisions of the MARPOL Convention, the EU Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues and the Guidelines on port State control into its national legal system.

Therefore, Croatia has established a regulatory framework that addresses the obligations and requirements for ships regarding the notification, reporting and delivery of ship-generated waste, as well as obligations and requirements for ports related to the collection of such wastes. For example, ships are required to notify the port prior to arrival about the quantities of both solid and liquid wastes they have for delivery, and certain categories of ships are required to keep an oil record book and a garbage record book, and to have a garbage management plan. On the other hand, public ports must have a waste management plan, and provide port reception facilities for different types of waste. Marinas along the Croatian coast and on the islands are also required to provide reception facilities for different categories of wastes. National regulations in the field of environment protection specify the requirements that companies engaged in waste collection, handling, treatment and disposal must comply with.

Monitoring, control and enforcement of compliance with these regulations are ensured by several authorities: on the maritime side by Harbour Masters' Offices and to a lesser extent by Port Authorities, although their specific duties and responsibilities are not always clearly defined; and on the environmental side by inspection services from former Ministry of Environmental Protection, Physical Planning and Construction, know as Ministry of Environmental Protection and Green Transition and by municipal inspections. The cost recovery regime for services related to the collection of ship-generated wastes shall be outlined in port waste management plans and concession agreements. These agreements are made with relevant Port Authorities and other legal entities, such as state ferry operators, and certain shipping companies. Regional cooperation with other countries in the Adriatic region and beyond is primarily conducted through Port State Control under the framework of the Paris MoU. This cooperation helps ensure consistent enforcement of maritime regulations and environmental protection standards across the region.

5.1 General legal status of ports in the Republic of Croatia

The general legal status of ports in the Republic of Croatia is governed by the Law on Maritime Property and Sea Ports (OG 158/03, 100/04, 141/06, 38/09, 123/11, 56/16, 98/19), which regulates the legal status of maritime property, defines its boundaries, manages and protects maritime property, specifies its use, classifies seaports and port areas, establishes port administrations, oversees port activities and their performance, defines construction and usage of port superstructure and substructure, and addresses important issues related to the order in sea ports. According to the same Law, a port is generally defined as "sea and land area directly connected to the sea with built and unbuilt shores, breakwaters, devices, plants and other facilities intended for berthing, anchoring and protection of ships, yachts and boats, loading and unloading of passengers and goods, storage and other manipulation of goods, production, refining and finishing of goods and other economic activities that are in economic, traffic or technological connection with these activities". Furthermore, based on their purposes, ports are divided into two categories: ports open for public traffic and special purpose ports. A port open for public traffic is a marine port that, under equal conditions, can be used by any physical or legal entity according to its intended purpose and within its capacity limits. Such ports provide a public service. In contrast, special purpose ports are designated for specific uses or economic activities by private or public entities. These include nautical tourism ports, industrial ports, shipyard ports, fishing ports and military ports. Public service is not provided in special purpose ports. For example, a fishing port is used by a fishing cooperative of several fishermen who have the concession to manage part of the coastline. This port serves the needs of its members, providing

facilities for mooring, winterizing, maintaining, and repairing vessels, as well as supplying ships and unloading catches.

According to their significance for the Republic of Croatia, special purpose ports are divided into: ports of national significance and ports of county significance. Ports open for public traffic, as stipulated by the provisions of the mentioned Law, are managed by port authorities as special public institutions. The Republic of Croatia is the founder of port authorities that manage ports of special (international) economic interest, while county port authorities manage ports of county and local significance. In contrast, special purpose ports are managed by a concessionaire. A concession grants the right to partially or completely exclude part of the maritime property from general use, allowing individuals and legal entities to utilize it for specific purposes or economic activities, in accordance with spatial plans. The port authority and concessionaires in special purpose ports are obliged to equip the port with appropriate equipment and facilities for handling and receiving solid and liquid waste, ship cargo residues, oily water and sewage, as defined by the provisions of the MARPOL Convention 73/78 as amended. Although the Convention does not explicitly mandate it, implementing a system for collecting waste from the sea, such as a by-catch from trawl fishing, would be ideal in these areas.

5.2 General legal framework and area of jurisdiction

Regarding the legislative issue of waste disposal in ports, there is significant overlap, depending on specific obligation and regulation involved.

- At national level, the Ministry of the Sea, Transport and Infrastructure maintains an information system and records waste declared and delivered by ships to the port. This applies primarily to larger ships and major ports, which are open-type ports rather than fishing ports. However, since fishing ports are sometimes part of open ports, they can share the same manager or concessionaire. The Ministry reports according to the MARPOL Convention and the Port Reception Facilities (PRF) Directive related to waste.
- The Ministry of Agriculture, specifically the Directorate for Fisheries, has jurisdiction over fishing ports and landing places. They maintain records, including data on lost fishing gears.
- The Ministry of Environmental Protection and Green Transition is responsible for waste management at the state level. According to the Waste Act (Official Gazette 178/04 and 111/06), the Ministry oversees the implementation of this law and its associated regulations. This includes administrative supervision of the actions and activities of state administration bodies, as well as local and regional government units. The Waste Act also stipulates that the Ministry's environmental protection inspectors, including those in its regional units, conduct inspection supervision to ensure compliance with the law, regulations, individual acts, conditions and methods of work of supervised legal and natural persons. At the central state administration level, there are two additional institutions in the field of waste management:
  a) the Croatian Environmental Protection Agency, which is responsible for collecting and processing data in accordance with the Waste Act, maintaining the waste management information system, and preparing relevant reports on waste management.
  b) The Fund for Environmental Protection and Energy Efficiency, which provides additional financial support for projects, programs and activities in environmental protection. It also handles decisions related to fee payments and maintains records of fee payers.

Furthermore, the Directorate of Water Management and Sea Protection is responsible for the MSFD strategy and implementation program, including Descriptor 10, which involves monitoring marine litter.

- The Ministry of Environmental Protection and Green Transition, Waste Management Sector prepares the national waste management plan, drafts and interprets regulations in the waste management sector. Under the Waste Management Act, it adopts by-laws that implement obligations of the SUP Directive, regulating waste fishing gears through the Regulation on packaging and waste packaging, single-use plastic products and fishing gear containing plastic (Official Gazette 137/23). This Regulation establishes a system of extended producer responsibility for fishing gear and waste fishing gear, which will be prepared and managed by the Environmental Protection and Energy Efficiency Fund.
- The Ministry of Environmental Protection and Green Transition, the Institute for Environmental and Nature Protection maintains data according to the Waste Management Act, maintains a database of waste generated by waste producers, such as ports, and waste handed over for management. This Institute also reports data according to the European Commission, including those related to the SUP directive, and produces general waste statistics.

Recently, Croatia has successfully established a comprehensive legal framework, incorporating specific provisions for the installation and management of receiving facilities for ship-generated waste and cargo residues. The most important laws that define the status of maritime transport and related issues are listed below.

5.2.1 Maritime Code (OG 181/04, 76/07, 146/08, 61/11, 56/13, 26/15, 17/19)

The provisions of this Code determine the marine and underwater areas of the Republic of Croatia and regulate legal relations within them. It ensures the safety of navigation in internal sea waters and the territorial sea of Croatia, the protection and preservation of natural marine resources and the marine environment. Additionally, it covers basic substantive legal relations regarding vessels, contractual and other mandatory relations related to ships, registration of vessels, limitation of shipowner's liability, enforcement and insurance on ships. This Code incorporates the following European Union acts into Croatian legislation:

1. Directive 2000/59/EC of the European Parliament and the Council of November 27, 2000 on port facilities for receiving ship-generated waste and cargo residues (OJ L 332, December 28, 2000),
2. Directive 2000/60/EC of the European Parliament and the Council of 23 October 2000 on the establishment of a framework for Community action in the field of water policy (OJ L 327, 22 December 2000),
3. Directive 2002/59/EC of the European Parliament and the Council of June 27, 2002 on the establishment of the navigation surveillance system and the Community information system and the repeal of Council Directive 93/75/EEC (OJ L 208, 5 August 2002) as last amended by Commission Directive 2014/100/EU of October 28, 2014 amending Directive 2002/59/EC of the European Parliament and of the Council on the establishment of a navigation surveillance system and a Community information system (OJ L 308, 29 October 2014),
4. Council Directive 2009/13/EC of February 16, 2009 on the implementation of the Agreement concluded by the European Community Shipowners' Association (ECSA) and the European

Transport Workers' Federation (ETF) on the 2006 Seafarers' Labour Convention, and amending Directive 1999/ 63/EC (OJ L 124, 20 May 2009),

5. Directive 2009/18/EC of the European Parliament and of the Council of April 23, 2009 on the determination of basic principles on the investigation of accidents in the field of maritime transport and on the amendment of Council Directive 1999/35/EC and Directive 2002/59/EC of the European Parliament and of the Council (OJ L 131, 28 May 2009),
6. Directive 2009/20/EC of the European Parliament and of the Council of April 23, 2009 on the insurance of shipowners for maritime claims (OJ L 131, 28/05/2009),
7. Directive 2009/21/EC of the European Parliament and the Council of April 23, 2009 on the fulfillment of flag state requirements (OJ L 131, May 28, 2009),
8. Directive 2012/35/EU of the European Parliament and the Council of 21 November 2012 amending Directive 2008/106/EC on the minimum level of training for seafarers (OJ L 343, 14 December 2012),
9. Directive (EU) 2017/2110 of the European Parliament and the Council of November 15, 2017 on the system of inspections for the safe operation of navigation on the regular line of ro-ro passenger ships and high-speed passenger vessels and amending Directive 2009/16/EC and on placing out of force Council Directive 1999/35/EC (OJ L 315, 30.11.2017).

The Maritime Code ensures the implementation of the following regulations and directives of the European Union:

1. Council Regulation (EEC) 3577/92 of December 7, 1992 on the application of the principle of freedom to provide services in maritime transport within member states (maritime cabotage) (OJ L 364, December 12, 1992),
2. Regulation (EC) 883/2004 of the European Parliament and the Council of April 29, 2004 on the coordination of the social security system (OJ L 166, April 30, 2004),
3. Regulation (EC) 392/2009 of the European Parliament and the Council of April 23, 2009 on the liability of carriers in the transport of passengers by sea in the event of an accident (OJ L 131, 28 May 2009),
4. Regulation (EU) 2017/352 of the European Parliament and the Council of February 15, 2017 on the establishment of a framework for the provision of port services and common rules on the financial transparency of ports (OJ L 57, 3/3/2017),
5. Directive (EU) 2019/883 of the European Parliament and of the Council of April 17, 2019 on port facilities for the reception of shipping waste, amending Directive 2010/65/EU and repealing Directive 2000/59/EC (OJ L 151, 7.6 .2019, pp. 116–142.),
6. Commission Implementing Regulation (EU) 2022/92 of 21 January 2022 laying down rules for the application of Directive (EU) 2019/883 of the European Parliament and of the Council with regard to methodologies for monitoring data and forms of reporting on passively caught waste. Port reception facilities for the delivery of waste from ships are defined there, where Member States must ensure the collection of monitoring data on the quantity and amount of passively fished waste and reporting to the Commission. Eurostat's handbook on waste statistics should serve as a source of high-quality, harmonized and efficient waste statistics that allows comparison of data between Member States. Furthermore, the electronic reporting of an advanced waste notification that includes information on passively fished waste requires a specific methodology to collect information on passively fished waste from fishing vessels subject to Directive (EU) 2019/883 but excluded from the scope of Directive 2002/59/EC. As it is not always possible or cost-effective to measure both mass and volume of passively fished

waste, Member States should therefore be allowed to estimate mass as a function of volume or volume as a function of mass using an estimate of the density of passively fished waste appropriate to their circumstances.

Considering the specific issues addressed by this document, the Maritime Code prohibits the discharge and discard of solid and liquid waste, oily water, feces and cargo residues from a maritime facility into the sea and onto the coast. This prohibition also extends to any other substances that pollute the sea, air or coast. Vessels and floating objects are only allowed to dispose of solid and liquid waste, oily water, feces and cargo residues at designated places within the ports or at specific sites equipped with reception facilities for these substances. The same applies to cargo residues that can only be handed over to port reception facilities.

The port authority and special purpose port concessionaires are obliged to:

- equip the port with appropriate equipment and facilities for handling and receiving solid and liquid waste, cargo residues from vessels, oily waters and feces, as defined by the provisions of the MARPOL Convention 73/78
- adopt and implement the Plan for reception and handling of waste and cargo residues
- ensure the efficient acceptance and collection of waste from vessels.

Only individuals or entities authorized by special regulation have the right to collect and dispose of waste from the port. The signatories of the MARPOL Convention must submit information about their systems to the International Maritime Organization, which for this purpose has established a database on port reception facilities (Port Reception Facility Database - PRFD) within its Global Integrated Ship Information System (GISIS).

5.2.2 Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues incorporated into the Croatian legislation

In November 2000, the European Parliament and the Council of the European Union declared their intention to protect the marine environment " by reducing the discharge of ship waste and cargo residues into the sea" (Directive 2000/59/EC). This goal was to be achieved by implementing a common policy focused on improving the availability and use of receiving facilities and enhancing the implementation regime.

This Directive is therefore designed to establish a framework for meeting basic environmental protection standards while allowing member states to decide the best methods for implementing these requirements within their own systems. Key stipulations of the directive include:

- environmental protection requirements apply to all ships, regardless of the flag they sail under
- adequate reception facilities must be available in every port of the Community
- such adequate port reception facilities must meet the requirements of users from the largest merchant ship to the smallest excursion boat

To achieve the outlined general requirements for environmental protection, the Directive mandates member states to focus on five key areas in waste management. These measures aim to enhance the efficiency of the port reception facilities system, reduce the discharge of ship waste, and apply the 'polluter pays' principle. These significant areas refer to:

- Article 5. Waste reception and handling plans – an appropriate plan for receiving and disposing of waste will be created and implemented for each individual port after consultation

with all interested parties. Detailed requirements for these plans are set out in Appendix I of the Directive.

- Article 6. Notification – the master of a ship, other than a fishing vessel or recreational craft authorized to carry no more than 12 passengers, must complete and submit the form about waste contained in Appendix II of the Directive to the competent authority. The submission should occur:
  - at least 24 hours before arrival at the port, if the port of call is known
  - as soon as the port of call is known, if this information is available less than 24 hours prior to arrival
  - at the latest upon departure from the previous port, if the duration of the voyage is less than 24 hours
- Article 7. Delivery of ship-generated waste – all ships must deliver their waste to port reception facilities before leaving the port, unless they have sufficient storage capacity to transport waste to the next port without the risk of discharging it at sea.
- Article 8. Fees for ship-generated waste – Member States shall ensure that the costs of port reception facilities for ship-generated waste, including the treatment and disposal of the waste, shall be covered through the collection of a fee from ships, so all vessels entering the port will be required to contribute to the costs of these facilities, regardless of their actual use. Fees may be reduced if the ship's environmental management, design, equipment and operation are such that it can be demonstrated that it produces reduced quantities of ship-generated waste. To ensure the fees being fair, non-discriminatory, transparent, and encouraging the proper collection of waste, the basis for calculating the fee amount will be clearly visible to all port users.
- Article 9. Exemptions – applies to ships engaged in scheduled traffic with frequent and regular port calls and with sufficient evidence of insured delivery of ship waste and payment of fee in some other port.

In 2021 the Republic of Croatia adopted a new *Ordinance on the terms and methods of maintaining order in ports and other parts of the internal sea waters and the territorial sea of the Republic of Croatia* and thus transposed the new regulations on these Directive delivery and handling of ship-generated waste into the Croatian legal system.

5.2.3 Waste Management Act

Waste Management Act (OG 84/2021) prescribes the manner of waste management and incorporates European Union directives into the legal framework of the Republic of Croatia. Waste management is based on respect for the principles of environmental protection as outlined by the environmental protection laws, EU legal acquis, the principles of international environmental protection law, scientific knowledge, the best available practices, and professional standards. The Act particularly emphasizes the following principles:

1. "the polluter-pays principle" - the waste producer or the waste holder shall bear the waste management expenses and shall be financially responsible for the implementation of remedial measures to be taken due to damage caused or likely to be caused by waste;
2. "the principle of proximity" - waste shall be treated in the appropriate facility or device nearest to the source of its generation, considering the cost-effectiveness and environmental soundness;

3. "the principle of self-sufficiency" - waste shall be managed in a self-sufficient manner and shall enable independent attainment of national level targets, considering the geographical circumstances or the need for specialized installations for special categories of waste;
4. "the principle of traceability" - tracing waste back to its source by reference to the product, packaging and the producer of that product, including the possession of that waste and its treatment.

According to this Act, marine waste is defined as waste in the marine environment and coastal areas in direct contact with the sea, which is generated by land-based or sea-based human activities, and is found on the sea surface, within the water column, on the seabed or washed ashore (as tidewrack). Waste dumping is defined as the disposal of waste from vessels or aircraft into the sea, including disposal, storage or burial of waste on the seabed or in the subsoil. The Act prescribes that the management of waste in the marine environment includes managing waste resulting from the exploration and exploitation of the continental shelf, the seabed and the subsoil, as well as the sinking of waste from vessels and aircraft. It also encompasses the management of marine waste. Furthermore, while the Act prohibits dumping of waste in its provisions and the regulations adopted under it, and mandates that the minister prescribe the conditions for dumping waste on the seabed, burying waste in the seabed from a vessel or aircraft, and the types of substances permitted to sink into the sea based on a waste management permit, this was not addressed in the Regulation on methods and conditions of waste disposal, categories and working conditions for waste disposal sites (OG 114/15). Additionally, a special regulation for the management of marine waste as a specific waste category has yet to be adopted, despite the minister being obliged to do so within 12 months from the law's entry into force, i.e. by July 23, 2014. The Law on Sustainable Waste Management stipulates that local self-government units ensure the waste disposal prevention in their areas in a manner consistent with the law. They are also responsible for implementing measures to remove improperly discarded waste, including washed-up marine waste. The method of implementing these measures is governed by the decision made by the representative body of the local self-government unit.

5.2.4 Law on Maritime Property and Seaports (OG 83/23), and Regulation on the Conditions and Methods of Maintaining Order in Ports and Other Parts of the Internal Seas and Territorial Sea of the Republic of Croatia (OG 90/05)

The Law on Maritime Property and Seaports is in force from June 29, 2023. It regulates the legal status of maritime domain, determining its boundaries, management and protection of the maritime domain, proper use, sort of sea ports, port area, sustainable port use practice, the establishment of port authorities, port activities and their performance, construction and use of port superstructure and infrastructure, and other essential questions related to the seaports and necessary responsibilities. The aim of this Act is to establish an integrated, high-quality and transparent system for the protection, management and use of maritime property in the Republic of Croatia. The provisions of this Act regulating the provision of port services, financial transparency and fees for port services and use of port infrastructure in the ports of the trans-European transport network, as listed in Annex II of the Regulation (EU) 1315/2013, align with the Act on the Implementation of Regulation (EU) 2017/352 of the European Parliament and the Council of February 15, 2017. This regulation establishes a framework for the provision of port services and common rules on the financial transparency of ports (OG 66/19).

Additionally, the Act incorporates specific provisions related to the installation and management of receiving devices for ship waste and cargo residues, which have already been integrated into its legislation.

Law on Maritime Property and Seaports (OG 83/23)

- Article 83 – Installation of reception facilities
  "The port authority and concessionaires in special-purpose ports are obliged to equip the port with appropriate devices for handling and receiving solid and liquid waste, cargo residues from ships, oily water and feces as defined by the MARPOL Convention 73/78 with amendments.". The same obligation is reiterated in Article 3, Item 6 of the Regulation on conditions to be met by ports (OG 110/04).

Regulation on the Conditions and Manners of Maintaining Order in Ports and Other Parts of the Internal Seas and Territorial Waters of the Republic of Croatia (OG 90/05)

- Article 61. – Applicability of provisions
  "The provisions cited below apply to all ships, yachts and boats, regardless of flag of registry, entering Croatian ports, except for warships and public vessels, and to all ports where the maritime vessels, listed in the previous point, are entering. Ships exempted from the provisions of this chapter are obliged, as much as possible, to deliver ship waste and cargo residues in accordance with the provisions of the Regulation."
- Article 62. – Waste management plans in ports
  "All ports open to public traffic, as well as special-purpose ports, must develop and implement a Waste Reception and Handling Plan as defined in Article 3 item 7 of the Regulation on conditions to be met by ports".
- Article 63. – Prior registration
  "The master of a ship, except for fishing vessels, when sailing into Croatian ports, must fully and accurately submit information about ship waste and cargo remains at least 24 hours before arrival at the port".
- Article 64. – Unloading of waste from ships
  "The ship's captain, yacht captain or boat manager must hand over all ship waste to the port reception facilities before leaving the port. Exceptionally, the ship can proceed to the next port without delivering waste if it is evident from the data that there is sufficient space on board to store all waste generated and to be generated during the intended voyage to the port where such waste will be delivered to reception facilities.".
- Article 65. – Fees for waste generated by ships
  "The costs of waste reception in ports, including processing and disposal of waste, are covered appropriately through fees for the use of reception facilities. The amount of the fee is determined by the Minister upon proposal of the port authority and is based on gross tonnage, category and type of the ship. The fee can be reduced depending on the ship's equipped facilities for waste processing. The fee applies to all ships except fishing vessels. The port authority is obliged to announce the decision on the fee amount, applicable in the port, in an appropriate manner and at a suitable place."
- Article 66. – Exemptions

"If ships operating in domestic scheduled passenger traffic have handed over waste and paid the fee at one of the ports of a certain shipping line, they are exempt from the obligation to hand over waste and pay the fee in other ports on that line."

The responsibility for the implementation and enforcement of the aforementioned provisions lies at the central state level with the Ministry of the Sea, Transport and Infrastructure, while at the local level the same responsibility is delegated to the Port Authority Offices and Port Authorities. Regarding the legal framework governing waste management, including the management of waste collected in ports, and particularly the transportation, treatment and final disposal of ship waste, overall responsibility for implementation and enforcement lies at the central state level with the Ministry of Environmental Protection, Spatial Planning and Construction. The Ministry serves as the competent regulatory body, issuing necessary approvals and permits, and establishing technical and environmental protection standards.

5.2.5 Regulation on the Conditions and Manner of Maintaining Order in Ports and Other Parts of Internal Seas and Territorial Waters of the Republic of Croatia (OG 72/21)

In order to transpose Directive (EU) 2019/883 of the European Parliament and of the Council of April 17, 2019, on port facilities for the reception of ship-generated waste, and Directive 2010/65/EU of the European Parliament and of the Council of October 20, 2010, on the reporting formalities for ships arriving in and/or departing from ports of the Member States and repealing Directive 2002/6/EC (Text relevant for the EEA), into the legal framework of the Republic of Croatia, an amended Regulation was adopted on June 29, 2021.

This important legislative document covering the issue of waste disposal in port facilities is based on Article 56, paragraphs 2 and 3, Article 56b, paragraphs 8 and 9 and Article 57, paragraph 4 of the Maritime Code (OG 181/ 04, 76/07, 146/08, 61/11, 56/13, 26/15 and 17/19), as well as Article 38, paragraphs 2 and 3 of the State Administration System Act (OG 66/19). The Regulation prescribes the conditions and procedures for maintaining order in ports, as well as in other areas of internal sea waters and the territorial waters of the Republic of Croatia. It covers safety of condition for navigation within the ports, methods for determining these conditions, and the maintenance of port registers. The Regulation also outlines obligations regarding the reporting, handover, acceptance and disposal of ship waste and cargo residues from maritime facilities. It specifies the contents of waste and cargo residues acceptance and handling plans for port facilities, requirements for ship waste information, methods and deadlines for waste delivery and storage certificate issuance, deadlines for complaints submissions, and procedures for addressing objections. Furthermore, it sets criteria for determining fees for waste reception and collection, along with specific criteria, amounts and payment methods applicable to fishing vessels, yachts and boats.

According to this Regulation, the body managing the port is obliged to ensure that the port is equipped with appropriate facilities and devices for the separate collection of waste, in line with the provisions of the MARPOL Convention and regulations governing waste management. The port facilities designated for receiving waste from paragraph 1 of this article must be capable of separately handling the types and quantities of waste from ships using the port, ensuring minimal disruption to ship operations while considering the commercial requirements of port users, the port's size and geographical location, the type of ships frequenting or utilizing the port. These provisions also consider exemptions outlined in Article 65, paragraph 2, Article 67 and Article 77 of this Regulation.

- Article 6. – Port infrastructure development
  The body that manages the port is obliged to ensure that:
  1. Port reception facilities are installed in sufficient quantities and are practical for use to avoid unnecessary delays for ships.
  2. Fees for the use of port reception facilities should be fair, transparent, easily determinable, non-discriminatory, reflecting the actual costs of the facilities and services provided.
  3. Port reception facilities enable the management of ship waste in an environmentally acceptable manner, in accordance with the provisions of the Law on Sustainable Waste Management and relevant regulations derived from it. This includes compliance with stricter requirements introduced by Regulation (EC) 1069/2009 for managing catering waste from international traffic.
  4. Regarding paragraph 3 of this article, the port authority ensures conditions for separate collection to facilitate the reuse and recycling of ship waste in ports, in accordance with the provisions of the Law on Sustainable Waste Management and regulations adopted under that law. To facilitate this process, port reception facilities can separately collect different waste fractions in accordance with the waste categories defined in the MARPOL convention, considering its guidelines.
  5. The body that manages the port ensures that operations involving delivery or acceptance of ship waste are conducted with adequate safety measures to avoid risks to the safety of people and the environment in the ports covered by this chapter of the Regulation.

5.2.6 Waste reception and handling plan in ports

Each port authority, or concessionaire of the port is obliged to adopt a Waste Reception and Handling Plan, which specifies the procedures for registration, delivery, reception, collection, storage and processing of waste from ships entering the port area under their management or concession. The Plan will be supplemented based on Article 56a of the Maritime Code (OG 181/04, 76/07, 146/08, 61/11, 56/13, 26/15 and 17/19), Article 3, paragraph 1, points 6 and 7 of the Regulation on the conditions to be met by ports (OG 110/04), Article 61 of the Regulation on the conditions and methods of maintaining order in ports and other parts of internal seas and the territorial waters of the Republic of Croatia (OG 72/2021), Directive (EU) 2019/883 of the European Parliament and of the Council of April 17, 2019 on port facilities for the delivery of ship-generated waste, Directive 2010/65 of the European Parliament and of the Council of October 20, 2010 on official registration procedure for ships arriving in and/or departing from the port of member states, MARPOL Convention 73/78 as amended.
The Plan should regulate the methods and procedures for ship waste management which should include provisions related to selective collection and separation of waste for secondary utilization, controlled waste disposal, prevention of irresponsible waste management, education on handling waste, and avoiding unnecessary delays of ships when taking over waste. The Plan should apply to all ships, regardless of the flag they sail under, that dock and stay in the port area managed by the Port Authority. Exceptions should apply to ships performing the following port services: fuel supply, cargo handling, mooring, collection of ship waste and cargo remains, pilotage and towing. Also, the

plan does not apply to marine waste, as defined by a special regulation on sustainable waste management.
According to the definition, ship waste encompasses all waste, including cargo residues generated during the operation of the ship or during loading, unloading and cleaning activities. This is included in the scope of annexes I, II, IV, V and VI of the MARPOL Convention, as well as passively caught waste which refers to the waste collected in nets during fishing activities. In the port area, it is strictly forbidden to discharge ship waste into the sea or deposit it on land outside the prescribed port facilities for waste reception. Data on the locations of port receiving devices are publicly available on the official website of the Port Authority. Additionally, an eco-set is a port device or a fixed facility for receiving waste from ships. It should include containers for receiving waste motor oil, oily water, used batteries and accumulators, oily packaging, oily filters and rags.

Types and method of collecting waste from vessels
The method, amount and transportation of waste collection from vessels that usually arrive in the Port Authority's jurisdiction depend on the waste category, required handling procedures and the designated waste collection location.

Shipboard municipal waste (MARPOL Annex V category C)
Upon ship's arrival, an authorized operator usually collects municipal waste from the ship using specialized trucks. The waste is then deposited separately in municipal waste containers, which are emptied by specialized waste collection vehicles. All municipal and non-hazardous technological waste collected in the port area is disposed of at the municipal waste disposal site. Smaller vessels, fishing boats and yachts with up to 12 crew members can deposit small amounts of municipal waste in designated municipal waste containers without prior notice.

Oily solid and liquid waste (MARPOL Annex I)
Oily waste from ships will be accepted in accordance with Rule 19 of Annex I of the MARPOL Convention. Solid oily waste must be properly packed in marked bags or in non-returnable containers. After a chemical-physical analysis, oily wastewater is collected by specialized tank trucks operated by an authorized service provider. Smaller vessels, fishing boats and yachts with up to 12 crew members can dispose of small amounts of waste oil and solid waste in designated containers upon notification to the harbour steward. Oily waters and various oily wastes collected on ships are taken to authorized waste processors for chemical-physical or thermal treatment.

Cargo residues on ships (MARPOL Annex V category G)
Depending on the type and amount of waste, cargo residues are disposed of in an appropriate manner as agreed upon with the authorized operator. The cargo recipient is responsible for the disposal costs of the cargo residues from the ships.

Hazardous waste (MARPOL Annex I, II, IV, V and VI)
The disposal of various types of hazardous waste, not specifically listed in this Plan, is possible upon prior agreement with an authorized operator. Hazardous waste is collected and processed by authorized waste processors.

Fecal waters (MARPOL Annex IV)

Sanitary wastewater is planned to be collected by tanker trucks immediately, without retention at the location of origin or possibility of temporary storage. The authorized operator will transport the wastewater for final disposal in accordance with the legal regulations of the Republic of Croatia. Wastewater is collected directly from the vessels by the authorized operator upon request and agreement between the shipowner, the responsible person at the port authority and the authorized operator. The technology and conditions for receiving and removing wastewater from ships, as well as the necessary equipment and machinery, are provided by the authorized operator in accordance with technical and technological conditions at the location, applicable legal regulations, and all marine and environmental protection measures.
The authorized operator submits a Certificate of the amount of ship waste collected to the County Port Authority. For by-products of animal origin that are not intended for human consumption (MARPOL Annex V category B and H), the ship must not dispose of such product in municipal waste. Instead, these by-products must be handed over separately to an authorized operator for proper disposal and harmless removal, as needed.

5.2.7 Regulation on packaging and waste packaging, single-use plastic products and fishing gear containing plastic (OG 137/2023)

This regulation prescribes measures aimed primarily at preventing the generation of packaging waste and, as additional core principles, promoting the reuse, recycling and other forms of recovery of packaging waste. These efforts are geared towards reducing the final disposal of such waste, therefore supporting transition to a circular economy. This Regulation also prescribes measures to prevent and reduce the environmental impact of certain plastic products, especially on aquatic environments and human health. It also encourages the transition to a circular economy through innovative and sustainable business models, products and materials, thus enhancing efficient functioning of the internal market. The provisions of this Regulation specifically apply to fishing gear containing plastic. Holders of commercial fishing privileges at sea and holders of aquaculture licenses for marine organism cultivation listed in the license register are obliged to hand over plastic-containing waste fishing gear to the port facility operator or to the person specified in Article 54, paragraph 1 of this Regulation. The port facility operator, managed by the port authority or any legal or physical person authorized by the port authority under port activity regulations or by commercial contract in a specialized port, is responsible for receiving waste fishing gear containing plastic within its jurisdiction. The operator must ensure the separate collection, transport and processing, including recycling, of this waste as part of routine operations. The management of plastic-containing waste fishing gear must achieve a minimum annual collection rate for recycling, in accordance with the Regulation

6 MARINE LITTER ISSUES IN CROATIA

The availability of national level data on regulations, policies and guidelines referring to all types of waste produced in ports, including marine litter, varies significantly among countries. Croatia, as a member and signatory of a number of global and regional conventions such as UNCLOS, MARPOL and the Barcelona Convention, has obligations at both international and European Union (EU) levels. These include implementing EU directives aimed at marine protection. However, the practical

application of existing international and national legislation regarding marine litter is not at a satisfactory level. Efforts to prevent marine litter typically operate within the framework of current legal and strategic documents focused on land-based waste management. In Croatia, marine litter was first categorized and addressed under the umbrella Act on Sustainable Waste Management, where it holds a distinct status as a special waste category (Article 53).

The most important EU directive addressing these issues is the Marine Strategy Framework Directive (MSFD), which establishes a framework for community action in marine environmental policy. Member states were obligated to implement measures aimed at achieving or maintaining Good Environmental Status (GES) in marine waters by 2020, including those related to marine litter as significant pressure on the marine environment. Croatia transposed obligations from the MSFD into national legislation. These include the adoption of the Decree on the Establishment of a Framework for the Action of the Republic of Croatia in the Protection of the Marine Environment (OG 136/11) and subsequent updates such as the Decree on the Development and Implementation (OG 112/14, 39/17 and 112/18), which replaced the previous one. These decrees transpose the provisions of the MSFD and related EU Commission Decisions 2010/477/EU and 2017/848/EU, setting criteria and methodological standards for achieving and assessing GES, and also the Protocol to the Barcelona Convention on Integrated Coastal Zone Management in the Mediterranean (OG – International Agreements, No. 8/12, ICZM Protocol). These Decrees regulates the starting points and criteria for drafting, developing, implementing and monitoring the implementation of the Strategy for the Protection of the Marine Environment and Coastal Areas, as mandated by the Environmental Protection Act (OG 80/13, 78/15, 12/18 and 118/18). The Decree also sets the framework for coordination and integration of the management planning process for both the maritime area (in accordance with the MSFD) and coastal area (in accordance with the ICZM Protocol) of the Republic of Croatia.

According to the provisions of the MSFD, the Program of Measures for the Protection and Management of the Marine Environment and the Coastal Area (OG 97/17) was adopted in 2017. The program outlines measures necessary to achieve and maintain GES, including specific objectives for marine environment and coastal zone management. Strategic Priority 3 of the Program focuses on enhancing the implementation of instruments for achieving good status of the marine environment and coastal area, with a particular emphasis on marine litter. Specifically, Objective 3.3. under strategic priority 3 aims to improve the marine litter management system, with Measure defined within specific objective 3.3.1. calling for development of a national marine litter management plan. The program of measures includes key measures that involve pilot actions for cleaning and disposing of marine litter, encompassing both coastal and marine areas through diving actions and trawling. The so-called “Fishing for Litter” initiative is a key component aimed at reducing seabed litter, including one of the key stakeholders—the fishery sector. Efforts to remove marine litter deposited on the coast and seabed mainly relied on local environmental initiatives involving volunteers from NGOs and diving clubs. However, these efforts have lacked harmonized coordination, standardized methodology and data collection and analysis. As a result, the collected data are not comparable, hindering the ability to assess trends and draw appropriate conclusions about the past and current situation.

The fisheries sector can make a significant contribution to the removal of marine litter accumulated on the seabed. “Fishing for Litter” practices refer to the collection of marine litter caught in nets during trawling as by-catches, disposal of it ashore in appropriate containers, and subsequent disposal within existing waste management systems. This method could potentially remove significant

amounts of litter that entered and/or enter the sea. Such efforts are certainly valuable, especially since they can contribute to filling the database gaps regarding the quantities of marine litter accumulated on the seabed. Implementing such initiative across the entire Croatian Adriatic region could serve as a significant program and measure to reduce overall marine litter. However, challenges such as undefined legislation, bureaucratic complexities, the lack of organized management and accountability structures, and insufficient funding sources pose significant obstacles. These factors currently limit the success of this initiative to individual efforts and the willingness of diverse stakeholders to collaborate, thereby jeopardizing its long-term implementation. Although continuous monitoring of marine litter from different compartments (beaches, floating litter, seabed litter, beach sediment, and ingested microplastics) has been conducted since 2017, the data remains insufficient for a comprehensive assessment of current status and trends. Most published data come from scarce and spatially dispersed scientific research or cleaning actions carried out off-season mainly initiated by local governments, counties, concessionaires, and environmental NGOs (such as "Sunce," "Green Action," etc.). Scuba diving clubs are also engaged in activities of removing marine litter, usually larger bulky waste along the shores and waterfronts of smaller settlements. Such voluntary beach cleaning and scuba diving environmental actions form part of NGO's regular seasonal activities in cooperation with local governments. These efforts aim to preserve habitats, raise awareness within local communities about marine litter issues affecting beaches and seabed, and promote sustainable solutions for preserving the natural marine environment. Non-governmental organizations (NGOs) have a deep understanding of marine litter issues in practice, arising from the needs of local communities. They operate independently and demonstrate flexibility in adapting their activities, unlike government ministries which often implement changes slowly. Despite years of practical experience, there has been no formal evaluation of the potential and strengths of NGOs and citizen science initiatives in Croatia. While annual clean-up operations are regularly carried out along the coast and islands, in almost every small town, there remains a lack of organized data collection and storage for the future. There is currently no systematic coordination of marine litter collection activities, nor is there a mechanism for recording and monitoring data on the composition, spatial distribution, and potential sources of the collected litter. In most cases, the data collected are reported simply as the total amount of marine litter collected by material type, lacking further classification of specific items. Certainly, with the implementation of appropriate protocols, methodologies, and training, volunteers and citizen scientists could significantly contribute to data collection on marine litter, thereby improving the national research program.

Given the social benefits of community engagement, investing in environmental protection through collaboration between state administration and interested members of the public could yield substantial value. It is certainly advisable for Croatia to plan such an investment. However, in the current context of limited funding, there is a lack of established guidelines for best practices, leading to many activities being carried out without a structured and systematic plan. Consequently, many projects face challenges, usually due to inadequate funding, logistical constraints, low participant motivation, and insufficient data. Regarding raising awareness about the role of NGOs in combating marine litter, which is an important measure within the EU, Croatia has yet to align its policies effectively to enhance cooperation with NGOs. The lack of strong and organized state support has resulted in citizen science initiatives remaining at low organizational levels. They have not sufficiently taken root or gained the recognition they deserve.

The cross-border effects of marine litter are already a known issue in Croatia, with floating litter drifting around regardless of the state or administrative borders. The DeFishGear project recognized the importance of a regional approach to tackle marine litter as a transboundary challenge, emphasizing multi-stakeholder engagement, coordination, and cooperation. It stressed the need to strengthen the science-policy interface, harmonize monitoring and methodologies, and prioritize a holistic approach to managing marine litter. Despite numerous international and regional initiatives facilitating cooperation on marine litter issues, and high-level bilateral state meetings, ongoing transboundary marine litter arrivals indicate inadequate cooperation and insufficient state efforts. Economic constraints have hindered the implementation of effective waste management systems in Adriatic-bordering countries, although some have recently banned the use of plastic bags. The primary causes of this ongoing problem are poor cooperation and limited involvement of particular border states in international and regional initiatives aimed at addressing marine litter.

6.1 Obligations to the EU

Based on obligations derived from the Marine Strategy Framework Directive and transposed into national legislation during the drafting and implementing the Marine Environment and Coastal Zone Management Strategy, Croatia was obliged to conduct several key processes documented as follows: assess the current situation regarding marine litter (including quantities, composition, distribution, and sources across sea sections; beaches, sea surface, seabed, as well as microplastic in sea surface, beach sediment, and ingested), determine the good environmental status (GES) concerning marine litter, set targets related to marine litter, develop and implement monitoring framework, define and implement measures addressing marine litter. Reflecting on insights gained from the initial cycle of the strategy's implementation, it has been challenging to determine the current status and trends of marine litter in the Croatian Adriatic due to insufficient knowledge about the state, quantities, properties, and environmental impacts of litter. Therefore, alongside the overarching goal of reducing marine litter in the Croatian Adriatic, there is a recognized need to further develop indicators and methodological approaches for monitoring the quantities and trends of litter and microlitter (microplastics) on the seabed, ingested by marine organisms, and their impact on marine ecosystems and human health. Two action programs have been adopted by the Croatian government: The Monitoring and Observation System for Continuous Assessment of the State of the Adriatic Sea and the Program of Measures for the Protection and Management of the Marine Environment and Coastal Zone. These programs have underscored the significant gaps in essential information needed to assess the status and pressures related to marine litter, drawing insights from the legally binding UNEP/MAP Regional Marine Litter Management Plan in the Mediterranean. However, Croatia currently lacks a systematic model for marine litter management and there is no dedicated strategic document or legal act exclusively addressing marine litter. Efforts to mitigate marine litter are carried out within the framework of existing legal and strategic documents focused on waste management.

6.2 Marine Litter Monitoring in Croatia According to EU Obligations

Until 2017, Croatia did not systematically collect and record data from field research related to marine litter. However, since mid-2017, Croatia has implemented a systematic monitoring model for all elements of marine litter as part of the Monitoring and Observation System for Continuous Assessment of the Adriatic Sea. This includes the litter deposited on beaches, floating on the sea

surface, sunk on the seabed, and microplastics in sandy sediment on beaches, the sea surface, and ingested by fish. During this period, Croatia conducted monitoring and observation activities to meet the requirements of descriptor D10 - Marine Litter of the Marine Strategy Framework Directive. This was the first successful implementation on the Croatian side of the Adriatic according to the defined methodology. The monitored parameters included:

a) quantity and composition of bulky waste deposited on the shore;
b) quantity and composition of bulky waste on the surface and on the seabed;
c) quantity, distribution, and composition of microplastic on beaches and the sea surface;
d) quantity and composition of ingested marine litter.

All parameters were monitored at designated locations using specific methodologies tailored to each type of litter. This included determining and analyzing the status of the predicted indicators. However, due to insufficient financial resources in 2017 and 2018, sampling and analyses were performed on a smaller scale than originally planned under the Monitoring and Observation System for Continuous Assessment of the Adriatic Sea.

Given the lack of a previous systematic database and the short period of systematic monitoring, the knowledge of marine litter in Croatia remains insufficient. One of the main shortcomings in evaluating the environmental impact of the monitored parameters is the absence of an established system of threshold values, a gap also evident at the EU level. Consequently, it is not yet possible to reliably assess the degree of burden. However, by comparing the results of the monitored parameters with existing preliminary data from the DeFishGear project and other available data for the Mediterranean area, it can be estimated that the monitored data are below the values reported for these areas. Despite this, the data are insufficient for a broader expert assessment of the state of marine litter. The results of monitoring all parameters were entered into the existing indicators database (http://baltazar.izor.hr/azopub/bindex), which will require further adjustment to accommodate the specific structure and peculiarities of the individual parameters. All results were recorded and prepared in the format and values recommended by the EC MSFD Technical Subgroup on Marine Litter (TG10) Guidance on Monitoring of Marine Litter in European Seas [56], according to the draft "UNEP/MAP MEDPOL Monitoring Guidance" document on Ecological Objective 10: Marine Litter (2014). The applicability of this guidance on the Croatian coast was tested in the field through the DeFishGear project.

6.3 Specific regulations regarding marine litter in Croatia

6.3.1 Decree on the establishment of a framework for the action of the Republic of Croatia in the protection of marine environment (OG 136/11)

With the adoption of this Regulation, along with the subsequent Regulation on the Development and Implementation of Documents of the Strategy for Marine Environment and Coastal Area Management (OG 112/14, 39/17, 112/18), the Marine Strategy Framework Directive 2008/56/EC was transposed into national legislation. This decree regulates the starting points and benchmarks for the creation, development, implementation and monitoring of the MSFD, which is legally mandated by the Environmental Protection Act (OG 80/13, 78/15, 12/18, 118/18). The main purpose of the Directive transposed through this Decree is to achieve and maintain a good environmental state (GES) of the marine environment by 2020 through the achievement of the general objectives for the protection of the marine environment, which include:

- protection, preservation, recovery and restoration of marine and coastal ecosystems and sustainable use of ecosystem services
- preservation of marine protected areas and ecologically significant EU NATURA 2000 sites
- reducing pollution in the marine and coastal environment to preserve human and ecosystem health, and to enable sustainable use of the sea and coast
- establishing and/or maintaining a balance between human activities and natural resources through the application of an ecosystem approach

As part of the Strategy, a number of preparatory documents and action programs have been adopted:

- Initial assessment of the marine environmental condition (July 2012)
- Good environmental status (GES) of the marine environment and a set of environmental protection goals with related indicators (October 2014)
- Socio-economic analysis of the use and cost of deterioration of the marine environment and coastal area (June 2015)
- Updated Strategy documents (September 2019)
- Monitoring and observation system (October 2014)
- Program of measures for the management of marine environment and coastal area (October 2017)
- MSFD action program – Monitoring and observation system for continuous assessment of the state of the Adriatic Sea 2021-2026 (March 2021)
- Program of measures for the protection of marine environment and coastal area 2022-2027 (April 2024)

6.3.2 Waste Management Act (OG 84/21)

Upon enactment of this Act, the Sustainable Waste Management Act (OG 94/13, 73/17, 14/19, 98/19) ceased to be valid. This is the first legal document in the Republic of Croatia addressing the issue of marine litter. It defines it as follows:

- Article 4. Terms
  (28) marine litter refers to waste in the marine environment and coastal areas in direct contact with the sea, generated by land-based or sea-based human activities, and found on the sea surface, within the water column, on the seabed or as tidewrack.
- Article 89. Waste from maritime objects, cargo residues and marine litter
  (1) The provisions of the law regulating maritime affairs apply to the collection, delivery and acceptance of waste generated by maritime objects and residues from ship cargo, into port reception facilities.
  (2) Monitoring of marine litter is carried out within the framework of the Sea Reference Centre program in accordance with the regulation governing environmental protection.

- Article 113. Decision on prevention of waste disposal
  (1) The representative body of the local self-government unit shall adopt a decision on the prevention of waste disposal, which includes measures to prevent illegal waste disposal and measures for the removal of illegally discarded waste, and where applicable, measures for the removal of marine litter.

(2) The measures referred to in paragraph 1 of this Article include recording the locations of illegally discarded waste and establishing a system for receiving notifications on discarded waste.

- Article 181. as the part of the transitional and final provisions
  (5) Measures for achieving reduction in consumption of single-use plastic products stipulated under this Act and subsidiary regulations enacted based on it must be an integral part of plans or programs of measures established in accordance with specific regulations in the field of water protection, marine environment and maritime affairs, during their first subsequent update.

6.3.3 Directive (EU) 2019/904 of the European Parliament and of the Council (2021)

The SUP Directive on reducing the environmental impact of certain plastic products introduces new obligations for monitoring and collecting data, targeting single-use plastic products commonly found on beaches, as well as lost and abandoned fishing gear. Member states are required to monitor the consumption of these products, report on measures taken, and report progress to the EC. The Directive also foresees that producers cover the costs of waste management clean-up, data collection and awareness-raising for certain products.
At the Croatian national level, the SUP directive has been transposed through a new Waste Management Act adopted in 2021, with detailed provisions to be adopted in the following period.
Certain components of the current system require improvement to address weaknesses and harmonize practices across different ports within the country. This includes enhancing control and monitoring of waste streams from the ships to final disposal, and ensuring fair cost allocation for services provided to ships.

7 CONCLUSIONS

Recently, Croatia has established a comprehensive legal framework that includes specific provisions governing the installation and management of reception facilities for ship waste and cargo residues that have been integrated into national legislation. Specifically:

1. Installation of reception facilities
Under Article 83 of the Law on Maritime Property and Sea Ports (OG 158/03, 141/06), port authorities and concessionaires in special-purpose ports are obliged to equip ports with appropriate facilities for handling and receiving liquid and solid waste, cargo residues from ships, oily water and feces, as defined by the MARPOL Convention. This obligation is also reiterated in Article 3, Item 6 of the Regulation on conditions to be met by ports (OG 110/04).

2. Waste management plans in ports
Under Article 62 of the Regulation on the conditions and method of maintaining order in ports (OG 90/05), all ports open to public traffic and special-purpose ports must develop and implement a plan for the reception and handling of waste and cargo residues, as defined in Article 3, Item 7 of the Regulation on the conditions that must be met by ports.

3. Prior registration

Under Article 63 of the Regulation on conditions and methods of maintaining order in ports, the master of a ship, except for a fishing vessel, sailing to Croatian ports must submit complete and accurate information about ship waste and cargo residues to the port captain and port management body at least 24 hours before arrival.

4. Unloading of waste from ships

Under Article 64 of the Regulation on the conditions and manner of maintaining order in ports, the master of the ship, yacht or boat manager must hand over all ship's waste to port reception facilities before leaving the port. Exceptionally, if it is evident from the data that there is enough space onboard capacity to store all generated waste until reaching the next port where it can be delivered to reception facilities, the ship can proceed without immediate delivery.

5. Fees for waste generated by ships

Under Article 65 of the Regulation on the conditions and manner of maintaining order in ports, the costs of accepting waste in ports, including processing and disposal, are covered through fees for the use of reception facilities. The fee amount is determined by the Minister upon proposal of the port management authority, based on gross tonnage, category and type of ship. Depending on the waste treatment equipment onboard, the fee can be reduced. The fee applies to all boats except fishing vessels. The port management authority is obliged to announce the fee decision prominently and appropriately within the port area.

6. Exemptions

According to Article 66 of the Regulation on the Conditions and Ways of Maintaining Order in ports, the ships operating in domestic liner passenger traffic are exempt to hand over waste and pay fees in other ports of their shipping line, if they fulfilled this obligation in one port on that line.

7. Applicability of provisions

Article 61 of the Regulation on the conditions and manner of maintaining order in ports specifies to whom aforementioned provisions apply to all ships, yachts and small boats, regardless of their flag, entering Croatian ports, except for warships and public ships and to all ports where the vessels mentioned in the previous point dock. Ships exempted from the provisions of this chapter are obliged, as far as possible, to deliver ship waste and cargo residues in accordance with the Regulation.

8. Responsibilities

The responsibility for the implementation and enforcement of the aforementioned provisions lies centrally with the Ministry of the Sea, Transport and Infrastructure. At the local level, this responsibility falls upon the Offices of the Port Authority and the Port Authorities. Regarding the legal framework governing waste management, including the management of waste collected in ports, and particularly the transportation, treatment and final disposal of ship waste, overall responsibility for implementation and enforcement lies centrally with the Ministry of Economy and Sustainable Development (MINGOR). MINGOR acts as the competent regulatory body in this domain, issuing necessary approvals and permits, and establishing technical and environmental protection standards.

The main characteristics of maritime traffic in Croatian ports include:

- a large predominance of domestic traffic compared to international traffic (93% vs. 7%)
- a significant part of international traffic involves travel to and from other ports in the Adriatic (67%)
- the most important part of domestic traffic is passenger (ferry) traffic between the mainland and islands (80-85%), with one operator offering most of the services
- a large number of sailings by ships under 300 GT (up to 45 %)
- significant increase in passenger traffic during the summer season, including cruise ships (triple)

Main features of the current Croatian system of port reception facilities include:

- a modern legal framework is in place
- port waste management plans are established
- regularly availability of services for collecting liquid oily waste and general waste
- cost reimbursement is based on a direct billing regime
- port authorities do not directly engage in waste collection but issue concessions to waste collection companies
- specialized authorized companies handle the collection of liquid oily waste from ships
- municipal waste removal companies handle the collection of general waste from ships
- local harbors and marinas are generally equipped with small tanks for liquid oily waste and trash tanks
- some Croatian ports lack fixed reception facilities, relying instead on mobile units for waste removal services
- liquid oily waste is processed and disposed of outside the port
- general waste is disposed of at municipal waste disposal sites
- processing and disposal of liquid oily waste generally adhere to modern standards, whereas waste processing is below modern standards

It was also found that, although all Croatian ports and Port Authorities follow the same legal framework for resolving the issue of port reception facilities, there are differences in implementation, leading to the lack of harmonization in practices and systems. The characteristics of the current system and the practices of Croatian ports and Port Authorities can be outlined as follows:

- Ports and Port Authorities are not directly engaged in the collection of oily wastes from ships and the services are provided by private sector companies (registered concessionaires).
- Fixed reception facilities in ports do not exist, instead, oily waste collection is carried out by mobile units (tank trucks and/or vessels).
- The treatment and disposal of oily wastes occur outside the ports' boundaries.
- Most service providers (except a single company) do not have their own oily waste treatment plants and rely on third parties for the treatment of collected oily liquids.

Observations and weaknesses

- The application of the legal regime is not always satisfactory; there are different interpretations, and some provisions are not applied due to a lack of control and implementation procedures.
- Monitoring and control of the entire process of waste collection from ships are not clearly defined and consistently applied, leading to differences between ports in the application of fee and tariff regimes.

- Fees differ significantly and are generally higher than those in other Adriatic ports. Companies collecting waste often mix different types of waste that were previously separated on the ship.
- Procedures (practices) for collection, separation, treatment, recycling and disposal of solid waste must be reviewed and improved.
- All companies collecting liquid oily waste on the northern part of the Croatian coast currently rely almost entirely on the processing capacities of the INA Refinery Rijeka. Attention must be given to the availability of specialized equipment for the processing and disposal of such waste in that part of the country.

8 REFERENCES

- Croatian Parliament. Act on Sustainable Waste Management. Official Gazette, 2013, (94); 2017, (73); 2019(14); 2019, (98). Available online: https://www.zakon.hr/z/657/Zakon-o-odr%C5%BEivom-gospodarenju-otpadom (accessed on 10 March 2021)
- Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive). OJL 2008, 164, 19–40.
- EU, (2015) Closing the Loop - an EU Action Plan for the Circular Economy Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Brussels (2015) 2.12.2015. COM(2015) 614 final. Com 2
- Galgani, F., Hanke, G., Werner, S., Oosterbaan L., Nilsson, P., Fleet, D., Kinsey, S., RC, Thompson, Van Franeker, J., Vlachogianni, T., Scoullos, M., Veiga, J., Palatinus, A., Matiddi, M., Maes, T., Korpinen, S., Budziak, A., Leslie, H., Gago, J., Liebezeit, G. (2013). MSFD Technical Subgroup on Marine Litter. Guidance on Monitoring of Marine Litter in European Seas: A guidance document within the Common Implementation Strategy for the Marine Strategy Framework Directive; European Commission, Joint Research Centre: Luxembourg, 2013; p. 128.
- Government of the Republic of Croatia. Action Program of the Marine Environment and Coastal Zone Management Strategy: Monitoring and Observation System for Continuous Assessment of the Adriatic Sea. Official Gazette, 2014. Available online: https://narodne-novine.nn.hr/clanci/sluzbeni/dodatni/434153.pdf
- Luttenberger A., Rukavina B. (2006) Regulations on discharge of waste and cargo residues from ships in the context of Croatian accession to the European Union. Energy and the Environment (Proceedings) / Franković, B. (ur.), 83-90.
- Ministry of Environmental Protection and Energy of the Republic of Croatia. Program of Measures for the Protection and Management of the Marine Environment and Coastal Zone, Zagreb, Croatia. 2017. Available online: https://mingor.gov.hr/UserDocsImages/Uprava_vodnoga_gospodarstva_i_zast_mora/Strategija_upravljanja_morem/program_mjera_zastite_i_upravljanja_morskim_okolisem_i_obalnim_podrucjem.pdf (accessed on 10 March 2021).

- Primorac Ž. (2021) Sustavi pokrivanja troškova rada lučkih uređaja za prihvat i obradu brodskog otpada prema rješenjima Direktive (EU) 2019/883, Zbornik radova 3. međunarodne znanstvene konferencije iz pomorskog prava, 227-241
- Rukavina, B. (2022) Overview of new regulations on reception and handling of ship waste. Naše More 69(3): 159-167
- Slišković M., Ukić Boljat H., Jelaska I., Jelić Mrčelić G. (2018). Review of generated waste from cruisers: Dubrovnik, Split, and Zadar Port case studies. Resources 7(4): 72; https://doi.org/10.3390/resources7040072
- Škevin Ivošević, B. (2018) Marine litter. Hrvatska Vodoprivreda 222, 85–89.
- UNEP (2013) Regional Plan for the Marine Litter Management in the Mediterranean. Available online: https://www.cbd.int/doc/meetings/mar/mcbem-2014-03/other/mcbem-2014-03-120-en.pdf (accessed on 8 March 2021)
- UNEP (2015) Biodegradable plastics and marine litter. Misconceptions, concerns and impacts on marine environments. United Nations Environment Programme (UNEP), Nairobi. Available at: https://wedocs.unep.org/bitstream/handle/20.500.11822/7468/-Biodegradable_Plastics_and_Marine_Litter_Misconceptions,_concerns_and_impacts_on_marine_environments-2015BiodegradablePlasticsAndMarineLitter.pdf.pdf?sequence=3.