

NET4MPLASTIC PROJECT

Activity 3.1

D 3.1.2

Legislation guidelines for monitoring MP

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1 INTRODUCTION

1.1 Purpose of the document

The main goal of the NET4mPLASTIC project is to achieve an efficient monitoring system for plastic and MP distribution along the Croatian and Italian coastal and marine areas in order to improve the environmental coastal and marine sea quality conditions.

This document is relevant to the activity 3.1 “State of art of legal aspects, methodologies, technologies, MP and related pollutants occurrence” of the Net4mPlastic (**New Technologies for Macro and Microplastic Detection and Analysis in the Adriatic Basin**) project.

The Act 3.1 is the first activity aims to realize an accurate state-of-the-art in all the fields related to the marine macro and microplastics, and related pollutants. Different aspects will be analyzed related to the legal aspects at European, national, regional and local level as well as to the management of plastic waste. Comparison between the two countries will highlight similitudes and differences between the two systems. The analysis will also focus on the methodology used for macro and microplastics detection and identification in the marine environment and the co-presence of other pollutants. Possible existing recycling methods for plastic marine litter will be also investigated.

The purpose of this document is to be included in document D 3.1.2 – “Realization of legislation guidelines for monitoring MP” reporting an accurate state-of-the-art of legislations related to the macro and microplastics in marine environment at international and national level and summarizing the legal aspects for the usage of Remotely Piloted Aircraft System (RPAS) in Croatia and Italy.

1.1 Background information

Marine litter represents an emerging global issue, and the effects of plastic waste are particularly devastating in the marine environment and the full magnitude of marine litter is difficult to determine. It is commonly estimated that 80 percent of marine litter comes from land-based sources but the amount and composition of marine litter can vary between regions, due to differences in waste management and in economic activities such as tourism, fisheries and shipping. Furthermore, as observed by Pham et al. (2014) marine litter is has been observed in the European waters at depths ranging from 35 to 4500 meters, with plastic bags, glass bottles, and derelict fishing gear being the most prevalent.

Plastics are however estimated to make up as much as 95 percent of the marine litter found on coastlines, sea surface, and the ocean floor (Galgani, Hanke, & Maes, 2015) with about 4.8 to 12.7 million metric tonnes of plastic entered the ocean from land-based sources in 2010, and about another 8 metric tonnes has entered the oceans each year since then (Jambeck et al., 2015). Plastics, synthetic polymer component, are lightweight, strong, durable and cheap (Laist, 1987) and that why they are key materials in may sectors of the economy and daily life. Indeed, plastic industry is very important to the European economy. However, their properties make them a serious hazard to the environment (Pruter, 1987; Laist, 1987) considering that plastic does not biodegrade once in the ocean but instead breaks down to

microplastics, which have been found worldwide. Microplastics, transported by hydrodynamic process, winds and ocean currents, are highly persistent in the environment and are accumulating in different marine ecosystems at increasing rates (Woodall et al., 2014; Suaria et al., 2016; van Sebille et al., 2015) and, in particular, in estuaries and other coastal areas of heavily anthropogenic impacted regions are the ecosystems most polluted with these types of particles (Cózar et al., 2014; Eriksen et al., 2014; Galgani, Hanke, & Maes, 2015).

Nowadays it is well recognized that pollution of the sea from plastics and microplastics have a negative impact on marine life (GESAMP, 2015). One of the main microplastic exposure route for many marine species is ingestion because microplastics are confounded with prey or through water filtration and deposit feeding activities: more than 220 different marine species have been found to consume MP debris in nature causing adverse health effects (Lusher, McHugh, & Thompson, 2013; Naji, Nuri, & Vethaak, 2018). Moreover, there is a growing global concern about MPs as they have been shown to enter marine food webs since experimental evidence indicates that microplastics have the potential to be transferred between trophic levels (EFSA, 2016) considering also that microplastics can contain on average 4% of additives and can absorb chemical and toxic contaminants. Trophic transfer of contaminants, e.g. persistent organic pollutants (POPs), has been reported and biomagnification has been shown.

Marine litter can also lead to economic losses, due to the cost of coastal cleanup and lost tourism revenue (ten Brink, Schweitzer, Watkins, & Howe, 2016). Costs of beach clean-up costs were estimated at EUR 10.4m annually in both the Netherlands and Belgium, countries with relatively short coastlines (Mouat, Lopez Lozano, & Bateson, 2010; OSPAR 2009). Globally, the cost required to keep all coastlines (34 million km) clean have been estimated as high as €50 billion per year (Wurpel, Van den Akker, Pors, & Ten Wolde, 2011). No estimates exist on the cost of cleaning up the oceans. Similarly, Gold et al. (2014) report that tourism is reduced in the Skagerrak coast of Bohuslan in Sweden of approximately €16-17 million but further studies are necessary to quantify the cost of environment degradation associated with plastic marine litter.

In addition, the plastics industry is very important for the European economy because plastics are key materials in many sectors of economy and daily life. They are used in a great number of applications such as building and construction materials, transportation, renewable energy, packaging, medical devices, clothing, household and personal goods or even sports. Every year, Europeans generate 25 million tons of plastic waste, but less than 30% is collected for recycling.

The problem of plastic marine litter has obvious international dimensions and environment instruments and institutions designed at international to local level to address marine pollution are necessary. Such instruments may be classified in two categories according to Gold et al. (2014) that are soft law and hard law, as follow:

“Soft law describes nonbinding arrangements between parties (e.g., the Global Programme of Action, GPA). Soft law agreements include regional strategic action plans, declarations, and resolutions adopted by conferences, intergovernmental organizations, and international institutions. In contrast, hard law describes legally binding contracts, often called conventions, with compulsory requirements or legal

operations (e.g., United Nations Convention on the Law of the Sea, UNCLOS). Hard law agreements generally apply to a specific land area and jurisdictional area of the marine environment, as determined by parties.

Hard law agreements often refer to a protocol that provides detailed information on legal standards the parties must meet. Where marine litter falls under an existing protocol, the existing protocol can serve as a legally binding foundation for the development of new action plans to address issues such as strategic monitoring and assessment of marine litter. Existing protocols can also support multiple annexes that provide additional details about factors such as permitting, criteria to establish and address priority pollutants, and how to apply the protocol to a specific pollution source.”

An overview of the current legal and policy framework with relevance to the management of the lifecycle of plastics is presented in Figure 1 (UNEP, 2017). The instruments are grouped thematically based on their primary objective of the management of 1) pollution, 2) biodiversity and species, or 3) chemicals and waste. In addition, representing its range of coverage on land or oceans indicates the general geographic scope of each instrument.

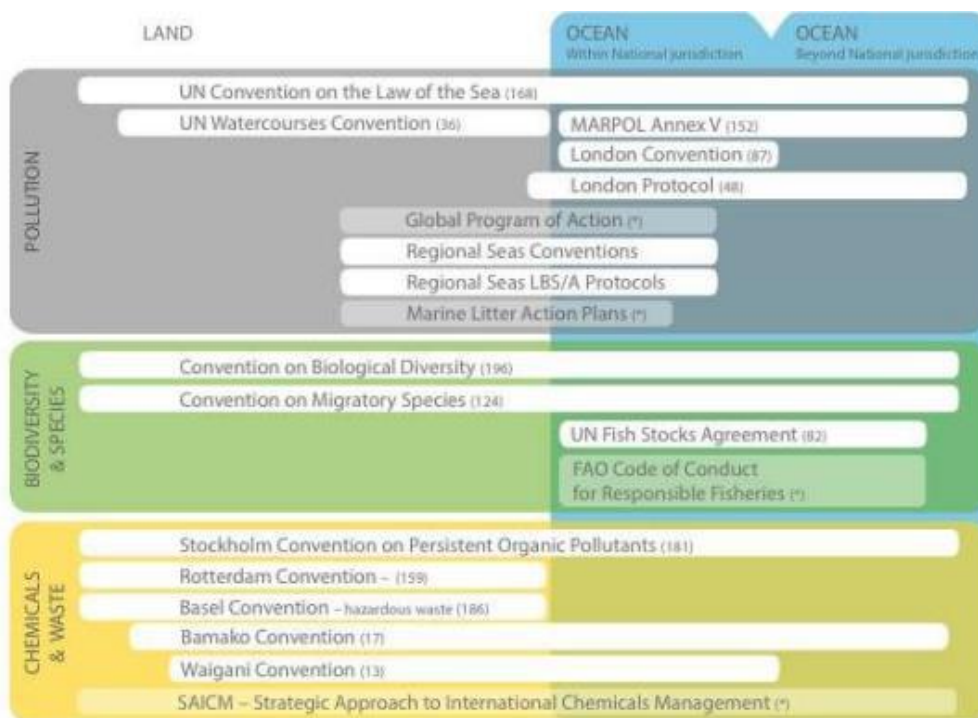


Figure 1: Diagrammatic overview of relevant global and regional instruments (Numbers in parentheses indicate ratifications/accessions as of September 2017). In https://papersmart.unon.org/resolution/uploads/unea-3_mpl_assessment-2017oct05_unedited_adjusted.pdf

2 INTERNATIONAL STRATEGIES

As a consequence, actions, policies and laws need to address the removal of the litter and to govern the production, use and disposal of products. Recently, it has been highlighted that a circular economy approach can reduce the quantity of waste by stopping it at its source. It should be noted, however, that there is no specific international legislation regarding microplastics but (Löhr et al., 2017) report that there are several global efforts aiming at action for reducing and preventing marine litter and for mitigating its impacts that are:

- **Global Partnership on Marine Litter (GPML)**

It was launched in June 2012 at Rio +20 in Brazil in the framework of the Global Programme of Action for the Protection of the marine Environment from Land-based Activities (GPA). It is a multi-stakeholder partnership that provides a unique mechanism to bring together all actors working to prevent marine litter and microplastics, with the aim of sharing knowledge and experience and advancing solutions to this pressing global issue. Its mission is to protect the global marine environment, human wellbeing and animal welfare by addressing the global problem of marine litter, in line with Target 14.1 of the Sustainable Development Goals: *“by 2025, prevent and significantly reduce marine pollution of all kinds (...)”*. (Global Partnership on Marine Litter, <http://marinelitternetwork.com/the-partnership/>).

Specific Objectives of the GPML:

- To reduce the impacts of marine litter worldwide on economies, ecosystem, animal welfare and human health.
- To enhance international cooperation and coordination through the promotion and implementation of the Honolulu Strategy – a global framework for the prevention and management of marine debris, as well as the Honolulu Commitment – a multi-stakeholder pledge.
- To promote knowledge management, information sharing and monitoring of progress on the implementation of the Honolulu Strategy.
- To promote resource efficiency and economic development through waste prevention e.g. 4Rs (reduce, re-use, recycle and re-design) and by recovering valuable material and/or energy from waste.
- To increase awareness on sources of marine litter, their fate and impacts.
- To assess emerging issues related to the fate and potential influence of marine litter, including (micro) plastics uptake in the food web and associated transfer of pollutants and impacts on the conservation and welfare of marine fauna

It must be noted that the Division for Sustainable Development Goals (DSDG) in the United Nations Department of Economic and Social Affairs (UNDESA) acts as the Secretariat for the SDGs, providing substantive support and capacity-building for the goals and their related thematic issues, and plays a key role in the evaluation of UN system wide implementation of the 2030 Agenda and on advocacy and outreach activities relating to the SDGs. The target 14.1 is defined as:

“By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution”

And its indicator is: “Index of coastal eutrophication and floating plastic debris density”.

- **The Honolulu Strategy**

A Global Framework for the Prevention and Management of Marine Debris (Honolulu Strategy) was developed to support and strengthen these efforts and catalyze new efforts around the world. The Honolulu Strategy serves as a template for global efforts addressing the problem of marine debris. (United Nations Environment Programme (UNEP) & National Oceanic and Atmospheric Administration (NOAA), 2011)

The Honolulu Strategy is a framework for a comprehensive and global collaborative effort to reduce the ecological, human health, and economic impacts of marine debris worldwide. This framework is organized by a set of goals and strategies applicable all over the world, regardless of specific conditions or challenges. The Honolulu Strategy specifies three overarching goals focused on reducing threats of marine debris:

- **Goal A:** Reduced amount and impact of land-based litter and solid waste introduced into the marine environment
- **Goal B:** Reduced amount and impact of sea-based sources of marine debris including solid waste, lost cargo, and abandoned vessels introduced into the sea
- **Goal C:** Reduced amount and impact of accumulated marine debris on shorelines, in benthic habitats, and in pelagic waters

- **G7 – Action Plan to Combat Marine litter**

Acknowledging that marine litter, in particular plastic litter, poses a global challenge, directly affecting marine and coastal life, ecosystems and potentially also human health, the leaders of the G7 at the annual Summit in Elmau, Germany in June 2015 committed to priority actions and solutions to combat marine litter, stressing the need to address land- and sea-based sources, removal actions, as well as education, research and outreach. (G7 Germany, 2015; UNEP, G7 France, & Italian Ministry of Environment Land and Sea, 2019)

- **Other initiatives**

And we may also indicate some initiative for cleaning the oceans and the beaches like Ocean Conservancy, Clean Up the World, the 5 gyres Institutes and the Waste Free Oceans. In particular, the **Waste Free Oceans (WFO)** is a European-wide industry-led initiative with the aim of reducing the amount of marine debris by 2020. Using existing fishing trawlers and new technologies, WFO will engage the fishing community in cleaning up floating marine debris and bringing it back to land for recycling and sorting. The time has come for industry to act together in tackling this growing problem and ensuring the health and purity of Europe’s coastal waters.

3 INTERNATIONAL AND REGIONAL LEGAL FRAMEWORK

The development and implementation of the policies dealing on marine plastics and microplastics are needed and should be supported by **international** and **regional treaties and conventions**. Indeed, as highlighted by different authors (Löhr et al. 2017; Vince and Hardesty 2018; Pettipas, Bernier, and Walker 2016; UNEP 2005; UNEP 2016; Löhr et al. 2017; Jeftic et al., 2009; Arroyo Schnell et al., 2017; Lam et al. 2018; Pettipas, Bernier, and Walker 2016; Vince and Hardesty 2018, Vince and Hardesty 2017) different international conventions that directly address various aspects of the marine litter. The relevant international conventions and agreement are:

SEA-BASED SOURCES:

- MARPOL 73/78 Convention for the Prevention of Pollution from Ships (Annex V)
- London Convention for the Prevention of Marine Pollution from Dumping of Wastes
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal
- Stockholm Convention

LAND-BASED SOURCES:

- Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
- United Nations General Assembly and the United Nations Convention on the Law of the Sea - UNCLOS
- Convention on Biological Diversity, with the Jakarta Mandate
- Convention on Migratory Species
- FAO Code of Conduct for Responsible Fisheries

3.1 MARPOL 73/78 Convention for the Prevention of Pollution from Ships

The International Maritime Organization (IMO) is one of the specialized agencies of the United Nations, who "provides machinery for cooperation among Governments in the field of governmental regulation and practices relating to technical matters of all kinds affecting shipping engaged in international trade; to encourage and facilitate the general adoption of the highest practicable standards in matters concerning maritime safety, efficiency of navigation and prevention and control of marine pollution from ships" (Convention on the International Maritime Organization (as amended in 1982), Article 1(a)). IMO has allowed the adoption and revision of regulations, standards and procedures to prevent accidental discharge or escape from ships of potentially polluting substances, mainly in MARPOL 73/78.

The International Convention for the Prevention of Pollution from Ships (MARPOL) is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. The MARPOL Convention was adopted on 2 November 1973 at IMO. The Protocol of 1978 was adopted in response to a spate of tanker accidents in 1976-1977. As the 1973

MARPOL Convention had not yet entered into force, the 1978 MARPOL Protocol absorbed the parent Convention.

The Convention includes regulations aimed at preventing and minimizing pollution from ships - both accidental pollution and that from routine operations - and currently includes six technical Annexes. Special Areas with strict controls on operational discharges are included in most Annexes. It includes 6 annexes, and annex V deals on “pollution by garbage from ships” entered into force 31 December 1988.

MARPOL Annex V seeks to eliminate and reduce the amount of garbage being discharged into the sea from ships. Unless expressly provided otherwise, Annex V applies to all ships, which means all ships of any type whatsoever operating in the marine environment, from merchant ships to fixed or floating platforms to non-commercial ships like pleasure crafts and yachts.

It V requires that all ships of 400 gross tons and above, or ships certified to carry more than 15 persons, develop and follow a written garbage management plan. Such plans should have been developed by 1 July 1997 (1 July 1998 for existing ships) and include the following:

- Description of the collection, processing, storage and disposal of each type of waste generated by the ship (as listed in Annex V of MARPOL 73/78), and waste that may be further categorized by local requirements, e.g., hazardous and medical waste;
- A list of waste management techniques/equipment available and to be employed by the ship;
- Provisions for the discharge of garbage in compliance with Annex V; and
- Designation of a person to be responsible for carrying out the plan

A revised version of Annex V entered into force on 1 January 2013 (Table 1), following a review by an intersessional correspondence group of the Marine Environment Protection Committee (MEPC).

To assist Governments, ships and port operators in implementing relevant requirements under MAPROL Annex V, MEPC has developed and adopted the Guidelines for the implementation of MARPOL Annex V, known as a living document, the latest of which is resolution MEPC.295(71) adopted on 7 July 2017 (MARINE ENVIRONMENT PROTECTION COMMITTEE, 2017).

More recently, in 2018, IMO’s Marine Environment Protection Committee (MEPC) adopted (on 26 October) the action plan, to contribute to the global solution for preventing marine plastic litter entering the oceans through ship-based activities. It provides IMO with a mechanism to identify specific outcomes for addressing marine plastic litter from ships, and actions to achieve these outcomes, in a way that is meaningful and measurable. The plan builds on existing policy and regulatory frameworks, and identifies opportunities to enhance these frameworks and introduce new supporting measures to address the issue of marine plastic litter from ships. The concrete measures and details have been further considered by MEPC 74 (Marine Environment Protection Committee).

Table 1: Simplified overview of the discharge provisions of the revised MARPOL Annex V, which entered into force on July 2013 (www.imo.org)

Type of garbage	Ships outside special areas	Ships within special areas	Offshore platforms and all ships within 500 m of such platforms
Food waste comminuted or ground	Discharge permitted ≥3 nm from the nearest land and <i>en route</i>	Discharge permitted ≥12 nm from the nearest land and <i>en route</i>	Discharge permitted ≥12 nm from the nearest land
Food waste not comminuted or ground	Discharge permitted ≥12 nm from the nearest land and <i>en route</i>	Discharge prohibited	Discharge prohibited
Cargo residues ¹ not contained in wash water	Discharge permitted ≥12 nm from the nearest land and <i>en route</i>	Discharge prohibited	Discharge prohibited
Cargo residues ¹ contained in wash water		Discharge only permitted in specific circumstances ² and ≥12 nm from the nearest land and <i>en route</i>	Discharge prohibited
Cleaning agents and additives ¹ contained in cargo hold wash water	Discharge permitted	Discharge only permitted in specific circumstances ² and ≥12 nm from the nearest land and <i>en route</i>	Discharge prohibited
Cleaning agents and additives ¹ contained in deck and external surfaces wash water		Discharge permitted	Discharge prohibited
Carcasses of animals carried on board as cargo and which died during the voyage	Discharge permitted as far from the nearest land as possible and <i>en route</i>	Discharge prohibited	Discharge prohibited
All other garbage including plastics, domestic wastes, cooking oil, incinerator ashes, operational wastes and fishing gear	Discharge prohibited	Discharge prohibited	Discharge prohibited
Mixed garbage	When garbage is mixed with or contaminated by other substances prohibited from discharge or having different discharge requirements, the more stringent requirements shall apply		

1 These substances must not be harmful to the marine environment.

2 According to regulation 6.1.2 of MARPOL Annex V, the discharge shall only be allowed if: (a) both the port of departure and the next port of destination are within the special area and the ship will not transit outside the special area between these ports (regulation 6.1.2.2); and (b) if no adequate reception facilities are available at those ports (regulation 6.1.2.3).

3.2 London Convention for the Prevention of Marine Pollution from Dumping of Wastes

The London Convention, one of the first international conventions for the protection of the marine environment from human activities, came into force on 30 August 1975 and since 1977, it's administrated by IMO. It contributes to the international control and prevention of marine pollution by prohibiting the dumping of certain hazardous materials. In addition, a special permit is required prior to dumping of a number of other identified materials and a general permit for other wastes or matter. **Annex I** of the Convention lists wastes and other matters which must not be dumped.

It must be outlined that the London Convention is a global agreement mainly to regulate marine pollution by dumping persistent plastic and other synthetic materials at sea, which will be ultimately replaced by the London Protocol (LP 1996; Louka, 2006; Mouat, Lopez Lozano, and Bateson 2010; Wang, Zheng, and Li 2018).

A key difference between the Convention and the amended Protocol is that where the Convention allows dumping unless specifically prohibited (a so-called "black list" approach), under the 96 Protocol, at-sea dumping is prohibited unless the material has been specifically included on an approved list (a "reverse list" or "white list" approach).

The Protocol also incorporates the "precautionary approach", which requires that "appropriate preventative measures are taken when there is reason to believe that wastes or other matter introduced into the marine environment are likely to cause harm even when there is no conclusive evidence to prove a causal relation between inputs and their effects, and recognizes that plastic materials, and other materials that may cause problems of entanglement and ingestion by marine organisms, constitute an environmental hazard. The use of the sea as a habitat for living resources should be considered a 'legitimate use' under this provision, and therefore the destruction of living resources resulting from the dumping of plastics is covered (Lentz, 1987). As a consequence, the dumping of such materials is prohibited. The Convention is applicable to wastes from land-based sources that are loaded onto ships for the deliberate purpose of dumping them at sea and to dredged spoils. It should be emphasized that the Convention does not address wastes that have been generated during the normal operation of ships. It must also be noted that operational wastes generated by vessels were exempt until Annex V of the International Convention for the Prevention of Pollution from Ships (MARPOL, promulgated in 1973) came into force at the end of 1988 (www.imo.org).

It also states that "the polluter should, in principle, bear the cost of pollution".

3.3 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal

The text of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was adopted on 22 March 1989 and entered into force 5 May 1992. 657 (Basel Convention 1992, UNEP 2018).

The Basel Convention covers many issues which are at the heart of preventing and minimizing the generation of wastes including those ending up in the ocean. Much of the marine litter and microplastics found in the sea may be determined as 'waste' as defined under the Convention, although not all will necessarily fall within the definition.

It defines the wastes as: ""Wastes" are substances or objects which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law"

The Basel Convention addresses the problems and challenges posed by the transboundary movements, and the environmentally sound management of hazardous wastes and other wastes. Indeed, parties are to take measures to ensure that the generation of hazardous wastes and other wastes is reduced to a minimum; and to ensure the availability of adequate disposal facilities for the environmentally sound management of hazardous wastes and other wastes. However plastic items are generally not covered by the Convention unless they exhibit any hazardous characteristics as identified in the convention (Annex III) and is listed under Annex IX, List B of the Convention,

The scope of this convention is defined in article 1 as follow:

1. The following wastes that are subject to transboundary movement shall be "hazardous wastes" for the purposes of this Convention:
 - (a) Wastes that belong to any category contained in Annex I, unless they do not possess any of the characteristics contained in Annex III; and
 - (b) Wastes that are not covered under paragraph (a) but are defined as, or are considered to be, hazardous wastes by the domestic legislation of the Party of export, import or transit.
2. Wastes that belong to any category contained in Annex II that are subject to transboundary movement shall be "other wastes" for the purposes of this Convention.
3. Wastes which, as a result of being radioactive, are subject to other international control systems, including international instruments, applying specifically to radioactive materials, are excluded from the scope of this Convention.
4. Wastes which derive from the normal operations of a ship, the discharge of which is covered by another international instrument, are excluded from the scope of this Convention.

More recently, during the Basel Conference of the Parties from 29 April to 10 May 2019, Governments amended the Basel Convention to include plastic waste in a legally-binding framework which will make global trade in plastic waste more transparent and better regulated, whilst also ensuring that its management is safer for human health and the environment. At the same time, a new Partnership on

Plastic Waste was established to mobilize business, government, academic and civil society resources, interests and expertise to assist in implementing the new measures, to provide a set of practical supports including tools, best practices, technical and financial assistance.

The Partnership activities include to:

- Collect information and undertake analysis on environmental, health, economic and social impacts of global, regional and national policy frameworks and strategies relevant to prevention, minimization, collection and environmentally sound management of plastic waste;
- Identify the gaps and barriers to the prevention, minimization, collection and environmentally sound management of plastic waste and identify best practices, lessons learnt and possible solutions to the same;
- Promote the development of policy, regulation and strategies on the prevention and minimization of plastic waste, in particular in relation to single-use plastics, inter alia, via better design and innovation to improve durability, reusability, reparability and recyclability of plastics and to avoid hazardous substances in plastics and on environmentally sound management of plastic waste, taking into account the entire life cycle of plastics;
- Advance prevention, minimization, collection and environmentally sound management of plastic waste;
- Undertake pilot projects which support the delivery of the other overall tasks;
- Collect, analyse and consider possibilities to improve information on transboundary movements of plastic waste;
- Facilitate knowledge sharing, capacity building, technical advice, and technology transfer to strengthen and implement policies, strategies, public-private initiatives for the prevention, minimization, collection and environmentally sound management of plastic waste;
- Undertake and contribute to outreach, education and awareness raising activities to widely disseminate the information and knowledge gathered and generated through the activities of the Partnership;
- Encourage and promote relevant innovation, research and development.

It should be noted that a number of Technical Guidelines for the Environmentally Sound Management of hazardous and other wastes would be relevant to the marine litter problem, such as:

- the Technical Guidelines on Wastes Collected from Households;
- the Technical Guidelines on Specially Engineered Landfill (D5);
- Guidance to assist Parties in developing efficient strategies for achieving the prevention and minimization of the generation of hazardous and other wastes and their disposal (UNEP, 2013/CHW.13/INF/11)
- Guidance manual on how to improve the sea-land interface (UNEP, 2017a/CHW.13/INF/37)
- and the Technical Guidelines for the Identification and Environmentally Sound Management of Plastic Waste and for Their Disposal. (UNEP, 2002/CHW.6/21)

3.4 The Stockholm Convention on Persistent Organic Pollutants

It was adopted by the Conference of Plenipotentiaries on 22 May 2001 in Stockholm, Sweden. The Convention entered into force on 17 May 2004 (UNEP, 2018b). The Stockholm Convention (UNEP) is a global treaty that aims to protect human health and the environment from POPs (Persistent Organic Pollutants - organic chemicals that persist in the environment, bioaccumulate in humans and wildlife, have harmful effects and have the potential for long-range environmental transport). Exposure to POPs can lead to serious health effects including certain cancers, birth defects, dysfunctional immune and reproductive systems, greater susceptibility to disease and damages to the central and peripheral nervous systems. As of 2018, the Convention controls 28 POPs, including those which have been used as additives, flame retardants or plasticizers in plastics. Plastics can adsorb POPs such as PCB, DDT and dioxins and these are frequently detected in marine plastic litter. Raubenheimer and McIlgorm (2018) report that the Convention promotes the role that manufacturers of POPs can play in 1) reducing the effects of their products at all stages of their lifecycle and 2) providing information to everyone on the hazardous properties of the chemicals they produce (Preamble). Thus, the hazard potential of plastic products is reduced by influencing the design phase through restrictions on the use of certain POPs during manufacture.

They further underline that the Stockholm Convention and the Basel Convention can play a role in reducing the impacts of plastics globally, including marine litter, and in terms of both hazard potential and quantity of waste mismanaged. Gaps remain in the management of all lifecycle phases for the majority of plastics that are not classified as hazardous.

3.5 Global Programme of Action for the Protection of the Marine Environment from Land-based Activities - GPA

The United Nations Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (GPA), adopted in 1995 by over 100 countries participating at the Intergovernmental Conference, whose Secretariat is provided by UNEP, is the only global initiative that directly addresses the link between watersheds, coastal waters and the open ocean at three levels: national, regional and global. It follows a “soft law” approach. This program addresses the impacts of land-based sources and activities on coastal and marine environments and human well-being. The goal of the GPA is to prevent the degradation of the marine environment from land-based activities by facilitating the realization of the duty of States to preserve and protect the marine environment. It is designed to assist States in taking actions individually or jointly within their respective policies, priorities and resources, which will lead to the prevention, reduction, control and/or elimination of the degradation of the marine environment, as well as to its recovery from the impacts of land-based activities.

The objective/proposed target of GPA regarding marine litter is “to reduce significantly the amount of litter reaching the marine and coastal environment by the prevention or reduction of the generation of

solid waste and improvements in its management, including collection and recycling of litter” (Trouwborst, 2011). It proposes the following actions:

- Introductions of appropriate measures to encourage reduction in the generation of solid wastes;
- Installation of garbage containers for citizens in public areas for the purposes of appropriate collection and/or recycling.
- Establishment and ensuring the proper operation of solid-waste-management facilities on shore for wastes from all sources, including shipping and harbour wastes;
- Formulation and implementation of awareness and education campaigns for the general public, industry, and municipal authorities, as well as recreational and commercial vessels, on the need to reduce waste generation and the need for environmentally sound disposal and reuse;
- Increasing local planning and management capacity to avoid location of waste-dump sites near coastlines or waterways or to avoid litter escape to the marine and coastal environment;
- Formulation and implementation of improved management programmes in small rural communities to prevent litter escape into rivers and the marine and coastal environment;
- Establishment of campaigns and/or permanent services for collecting solid wastes that pollute coastal and marine areas.

In addition to help improve the knowledge base, UNEP has collaborated with the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (UNESCO-IOC) to develop Guidelines on the Survey and Monitoring of Marine Litter (Cheshire et al., 2009). In collaboration with the Food and Agriculture Organization of the United Nations (FAO), a comprehensive report on abandoned, lost or otherwise discarded fishing gear has been published (Macfadyen et al. 2009). These Guidelines include a comparative analysis of information from around the world on experience and methods for surveys, monitoring, reporting protocols and assessment of marine litter and includes four sets of guidelines:

- 1) Comprehensive assessments of beach cast litter;
- 2) Assessments of benthic litter;
- 3) Assessments of floating litter; and
- 4) Rapid assessments of beach cast litter.

3.6 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) is an international treaty which was adopted and signed in 1982 in Montego Bay (Jamaica) and came into effect in November 1994. It is the only global instrument that imposes a legally binding obligation upon States for the prevention, reduction and control of land-based sources of pollution (article 207):

“1. States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources, including rivers, estuaries, pipelines and outfall structures, taking into account internationally agreed rules, standards and recommended practices and procedures. (par. 1)”

UNCLOS has now 160 Parties including the European Union. It replaced the four Geneva Conventions of April, 1958, which respectively concerned the territorial sea and the contiguous zone, the continental shelf, the high seas, fishing and conservation of living resources on the high seas. It lays down a comprehensive regime of law and order in the world's oceans and seas establishing rules governing all uses of the oceans and their resources and at the same time introduces new legal concepts and regimes and addresses new concerns

Over time, the Convention has become the legal framework for marine and maritime activities and includes rivers, estuaries, pipelines and outfall structures. The appropriate political body to handle them is the General Assembly of the United Nations. This principle is recalled each year in the resolution on the law of the sea adopted by the UNGA.

The Convention has created three new institutions on the international scene:

- the International Tribunal for the Law of the Sea, headquartered in Hamburg (Germany),
- the International Seabed Authority, headquartered in Kingston (Jamaica),
- the Commission on the Limits of the Continental Shelf, based in the United Nations Headquarters in New York.

UNCLOS Part XII deals with 'Protection and preservation of the marine environment' and requires:

" States shall take, individually or jointly as appropriate, all measures consistent with this Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practicable means at their disposal and in accordance with their capabilities, and they shall endeavour to harmonize their policies in this connection.

States shall take all measures necessary to ensure that activities under their jurisdiction or control are so conducted as not to cause damage by pollution to other States and their environment, and that pollution arising from incidents or activities under their jurisdiction or control does not spread beyond the areas where they exercise sovereign rights in accordance with this Convention" (Part XII art. 194: Measures to prevent, reduce and control pollution of the marine environment.)

It also sets out the responsibilities of states and necessary measures they need to undertake to minimize pollution their own and other states' jurisdictions. These measures have to include, inter alia, those designed to minimize to the fullest possible extent the release of toxic, harmful or noxious substances. Part XII includes detailed provisions on land-based sources of pollution, pollution from vessels, seabed activities, dumping, and pollution from or through the atmosphere.

Furthermore, The UN General Assembly routinely has an agenda item on oceans and the law of the sea and on sustainable fisheries. The work of the General Assembly was informed of the topic 'marine debris' at the 6th meeting in 2005, with the introduction of provisions relating to marine debris into the annual resolution on oceans and the law of the sea. However, while UNCLOS recognizes the differences between sea based and land based pollution, it does not address the type of pollutants and technical rules in great detail (Vince and Hardesty 2018; Palassis, 2011). States are required to adopt their own laws and regulations that address marine pollution.

3.7 Convention on Biological Diversity, with the Jakarta Mandate

The Convention on Biological Diversity was agreed upon by the world community as part of its commitment to sustainable development. It represents a dramatic step forward in the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from the use of genetic resources.

The Convention is the first global, comprehensive agreement to address all aspects of biological diversity, and recognizes that the conservation of biological diversity is a common concern of humankind and an integral part of the development process.

The Jakarta Mandate on Marine and Coastal Biodiversity is part of the UN Convention on Biological Diversity (CBD). The work programme is focused on five key elements:

- Marine and coastal biodiversity resource management;
- Sustainable use of marine and coastal biodiversity;
- Marine and coastal protected areas;
- Mariculture; and
- Alien species.

The issue of marine litter is relevant for the thematic areas marine and coastal biodiversity (smothering of the seabed, and the effects of entanglement and ingestion of litter on fish, marine mammals and seabirds), and alien species (litter as a vector for transport of species).

Furthermore, as reported by Vince and Hardesty (2018), the Conference of the Parties to the Convention on Biological Diversity (COP CBD) Scientific and Technical Advisory Panel of the Global Environment Facility adopted Decision XI/18 at the 11th Meeting (2012) which addresses the impacts of marine debris on marine and coastal biodiversity. The Parties also agreed upon a Strategic Plan for Biodiversity (2011–2020) that includes Aichi Biodiversity Targets. **Target 8** states that a goal that “by 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.”

3.8 Convention on Migratory Species

As an environmental treaty under the aegis of the United Nations Environment Programme, the Convention on Migratory Species (CMS) provides a global platform for the conservation and sustainable use of migratory animals and their habitats. CMS brings together the States through which migratory animals pass, the Range States, and lays the legal foundation for internationally coordinated conservation measures throughout a migratory range.

Signed in 1979 in Bonn, Germany, the Convention entered into force in 1983. Today, there were 129 Member States to the Convention. The depositary is the government of the Federal Republic of Germany. The 10th Meeting of the Conference of the Parties (Bergen, Norway, November 2011) adopted Resolution 10.4 on **Marine Debris** which sets a clear mandate for the work of the Convention on the impact of marine debris on migratory species. Successively the Resolution 11.30 on Management of Marine Debris was

adopted by the 11th Meeting of the Conference of the Parties (Quito, Ecuador, November 2014). The resolution recognizes that entanglement and ingestion of marine debris are both conservation and welfare concerns. It recognizes also the knowledge gaps with regard to debris and its effects on wildlife, and makes recommendations for addressing this issue in collaboration with the other regional and global instruments working on this subject (UNEP, 2014).

3.9 FAO Code of Conduct for Responsible Fisheries

The major UN Food and Agriculture Organization (FAO) programme on fisheries is aimed at promoting sustainable development of responsible fisheries and contributing to food security. The FAO Code of Conduct for Responsible Fisheries was adopted in 1995. Technical guidelines for the implementation of the Code have also been prepared by the FAO.

According to the Code, the management objectives include that appropriate measures should be taken to provide, inter alia, that "pollution, waste, discards, catch by lost or abandoned gear, catch of non-target species, both fish and non-fish species, and impacts on associated or dependent species are minimized, through measures including, to the extent practicable, the development and use of selective, environmentally safe and cost-effective fishing gear and techniques". Management measures include that States should take appropriate measures to "minimize waste, discards, catch by lost or abandoned gear, catch of non-target species, both fish and non-fish species, and negative impacts on associated or dependent species, in particular endangered species".

To promote long-term conservation and sustainable use of fisheries resources, following a call from the International Conference on Responsible Fishing (1992) to strengthen the international legal framework for more effective conservation, management and sustainable exploitation and production of living aquatic resources, the 1995 FAO Conference adopted the FAO Code of Conduct for Responsible Fisheries. Furthermore, in February 2018 FAO adopted voluntary Guidelines on the Marking of Fishing Gear which were endorsed by the FAO Committee of Fisheries in July 2018. The Guidelines include indications to implement a gear marking system; to control and enforce it; to report on and encourage recovery of Abandoned, Lost or otherwise Discarded Fishing Gear (ALDFG); to improve commercial traceability of fishing gear marking; to encourage research, awareness raising and capacity development; and guidance on the special requirements of developing States and small scale fisheries.

In 2014, the Global Oceans Action Summit for Food Security and Blue Growth¹⁰⁴ requested FAO, IMO and UNEP to work together with GESAMP to improve the knowledge base on microplastics in the marine environment and provide policy advice on this topic. FAO was requested to contribute specifically on fisheries and aquaculture in particular to assess the potential impact of microplastics on consumer health and perception, and understand the potential consequences on fish productivity as physiological processes (because of their occurrence and of the presence of additives and contaminants contained in the plastic).

4 REGIONAL SEA CONVENTIONS

In 1974, the **United Nations Environment Programme (UNEP)** established its *Regional Seas Programme* to foster the development of environmental management plans for water bodies shared by two or more countries (UNEP, 1982). Today, more than 143 countries participate in one of eighteen regional seas and partner programs, making it one of the most globally comprehensive initiatives for the protection of marine and coastal environments (fig). Of these, 7 are administered by UN Environment (Wider Caribbean, Mediterranean, Eastern Africa, East Asian Seas, Northwest Pacific, Western Africa and Caspian Sea) and an additional 7 are administered by other organizations (Black Sea, North-East Pacific, Red Sea and Gulf of Aden, ROPME Sea Area, South Asian Seas, South-East Pacific and Pacific) and 4 are independent regional seas (Antarctic, Arctic, Baltic and North-East Atlantic).

For further details see Table 2.

Table 2: Regional Seas Programmes

UN Environment administered Regional Seas Programmes	Non-UN Environment administered Regional Seas Programmes established under the auspices of UN Environment	Non-UN Environment administered, independently established Regional Seas Programmes
Caspian Sea (http://www.tehranconvention.org/)	Black Sea Region (http://www.blacksea-commission.org/)	Arctic Region (https://www.pame.is/)
East Asian Seas (https://www.unenvironment.org/cob-sea/)	North-East Pacific Region (https://www.unenvironment.org/explore-topics/oceans-seas/what-we-do/working-regional-seas/regional-seas-programmes/north-east-0)	Antarctic Region (https://www.ccamlr.org/)
Eastern Africa Region (https://www.unenvironment.org/nairobi-convention/)	Pacific Region (https://www.unenvironment.org/explore-topics/oceans-seas/what-we-do/working-regional-seas/regional-seas-programmes/pacific)	Baltic Sea (https://clmeplus.org/un-environment-regional-seas-program/)
Mediterranean Region (http://web.unep.org/unepmap/)	Red Sea and Gulf of Aden (http://www.persga.org/)	North-East Atlantic Region (https://www.ospar.org/) Public database (https://odims.ospar.org/)
North-West Pacific Region (https://www.unenvironment.org/norwpap/)	ROPME Sea Area (http://ropme.org/home.clx)	
Western Africa Region (https://www.abidjanconvention.org/)	South Asian Seas (http://www.sacep.org/)	
Wider Caribbean Region (https://www.unenvironment.org/explore-topics/oceans-seas/what-we-do/working-regional-seas/regional-seas-programmes/wider)	South-East Pacific Region (http://www.cpps-int.org/)	



Figure 2: Map of the Regional Seas (UNEP, 2018)

Europe, there are four cooperation structures which aim to protect the marine environment and bring together Member States and neighboring countries that share marine waters under the Regional Sea Conventions (RSC):

- The Convention for the Protection of the Marine Environment in the North East Atlantic of 1992 (further to earlier versions of 1972 and 1974) – the OSPAR Convention (OSPAR)
- The Convention on the Protection of the Marine Environment in the Baltic Sea Area of 1992 (further to the earlier version of 1974) – the Helsinki Convention (HELCOM)
- The Convention for the Protection of the Black Sea of 1992 – the Bucharest Convention.
- The Convention for the Protection of Marine Environment and the Coastal Region of the Mediterranean of 1995 (further to the earlier version of 1976) – the Barcelona Convention (UNEP-MAP)

Table 3: Summary of Regional Seas instruments relevant to marine plastic litter and microplastics

Regional Seas Programme	Action Plans for Protection of the Marine Environment (voluntary)	Regional Convention (year entered into force)	LBS/A Protocol (year entered into force)	Action Plans/Strategies Specific to Marine Litter (voluntary, except Mediterranean Sea)
OSPAR	2002 Regional Plan of Action 2010-2020 Strategy of the OSPAR Commission for the Protection of the Marine Environment of the North-East Atlantic	1992 OSPAR Convention (1998)	1992 OSPAR - Annex I (1998)	2014 North East Atlantic Marine Litter Regional Action Plan
Baltic	2007 Baltic Sea Action Plan	1992 Helsinki Convention (2000)	Annex III	2015 HELCOM Regional Action Plan for Marine Litter in the Baltic Sea
Black Sea	2009 Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea	1992 Bucharest Convention (1994)	1992 LBA Protocol (1994) 2009 LBA Protocol (not in force)	Report: 2007 Marine Litter in the Black Sea Region (Ch 7: Proposals for Changes)* Marine Litter Action Plan – under development
Mediterranean	1995 Action Plan for the Protection of the Marine Environment and the Sustainable Development of the Coastal Areas of the Mediterranean	1976 Barcelona Convention (1978) – amended 1995 (2004)	1996 Amended LBA Protocol	2013 Regional Plan on Marine Litter Management in the Mediterranean (binding)

* Recommendations only, no action plan on marine litter

Table 4: Summary of principles in regional LBS/A Protocols and Annexes

Regional Sea	Name of LBS/A Protocol / Annex*	Precaution	Polluter Pays	Best Available Technique	Best Available Technology	Most Appropriate Technology	Clean Production Technologies	Best Environmental Practice	Environmental Impact Assessment	Integrated Coastal Management
OSPAR	1992 OSPAR Convention - Annex I	x	x	x			x	x	x	
Baltic Sea	1992 Helsinki Convention - Annex III	x			x			x	x	
Black Sea	1992 LBS Protocol for the Black Sea and the revised LBS Protocol for the Black Sea (Rev)	x	x	x	x			x	x	x
Mediterranean	LBS/A Protocol for the Mediterranean	x	x	x			x	x	x	x

4.1 The OSPAR Regional Action Plan

The OSPAR objective with regard to marine litter is “to substantially reduce marine litter in the OSPAR maritime area to levels where properties and quantities do not cause harm to the marine environment” by 2020. In order to achieve this objective, the North East Atlantic Environment Strategy also commits to “develop appropriate programmes and measures to reduce amounts of litter in the marine environment and to stop litter entering the marine environment, both from sea-based and land-based sources”.

The OSPAR Regional Action Plan for prevention and management of Marine Litter in the North-East Atlantic has been adopted by OSPAR Contracting Parties as an OSPAR Other Agreement. The Regional Action Plan is designed as a flexible tool providing a set of actions to address marine litter. It contains actions requiring collective activity within the framework of the OSPAR Commission through, where applicable, OSPAR measures (i.e. Decisions or Recommendations) and/or other agreements such as guidelines.

4.2 The Helsinki Convention

The 1992 Helsinki Convention requires the prevention and elimination of pollution in order to promote the ecological restoration of the Baltic Sea Area and the preservation of its ecological balance (article 3). Specifically, under article 6 of the Helsinki Convention, the Contracting Parties undertake to prevent and eliminate pollution of the Baltic Sea Area from land-based sources. Moreover, Annex III is dedicated to specific requirements of “Prevention of pollution from land-based sources.” The OSPAR Convention provides a short but broad obligation to prevent and eliminate pollution from land-based sources (article 3). Parties to the LBS/A Protocol for the Caspian Sea must prevent, control, reduce and to the maximum extent possible eliminate pollution and other adverse effects (article 4). However, the more recent LBS/A Protocol of Western, Central and Southern African Region does require elimination of land-based sources of pollution but to prevent, reduce, mitigate and control pollution from land based sources and activities (article 5).

4.3 The Black Sea Convention

The Convention on the Protection of the Black Sea against Pollution (also referred to as “Bucharest Convention”) was signed in Bucharest in April 1992, and ratified by all six legislative assemblies of the Black Sea countries in the beginning of 1994; it is the basic legal framework for regional cooperation to protect the coastal and marine environment.

Development and implementation of the Black Sea Integrated Monitoring and Assessment Program (BSIMAP) is stipulated in Article XV of the Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention) and its Protocols. BSIMAP is based on national monitoring programs financed by the Black Sea states

The main environmental challenges, as defined in the Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea (2009), for the Black Sea are: (a) the preservation of the commercial marine living resources, (b) the conservation of Black Sea biodiversity and habitats, (c) eutrophication reduction and ensuring good water quality for human health, (d) recreational use and aquatic biota. In particular, one of the policy questions to be answered under the Black Sea Integrated Monitoring and Assessment Program is related to: What are the levels of marine litter in the Black Sea and how to minimize its impact on marine organisms, especially on cetaceans?

4.4 The Barcelona Convention

In 1974, the United Nations Environment Programme (UN Environment) established its Regional Seas Programme with the scope of coordinating activities aimed at the protection of the marine environment through a regional approach. The Mediterranean Action Plan (MAP) was adopted in 1975 and was the first UN Environment initiative to be developed under the Programme. MAP gathers all the 21 countries bordering the Mediterranean Sea and the European Union.

The Convention for the Protection of the Marine Environment and Coastal Region of the Mediterranean (the Barcelona Convention) (initiated in 1976 and reviewed in 1995) addresses pollution from land and sea based sources.

The measures and timetables of 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 8 July 2014.

The main objectives of the Regional Plan are to:

- a) *“Prevent and reduce to the minimum marine litter pollution in the Mediterranean and its impact on ecosystem services, habitats, species in particular the endangered species public health and safety;*
- b) *Remove to the extent possible already existent marine litter;*
- c) *Enhance knowledge on marine litter; and (d) Achieve that the management of marine litter in the Mediterranean is performed in accordance with accepted international standards and approaches as well as those of relevant regional organizations and as appropriate in harmony with programmes and measures applied in other seas.”*

5 EUROPE LEGISLATION

In the European Union, the issue of marine litter is addressed through the context of the work on the circular economy, especially through the upcoming EU Strategy on Plastics; and on the other hand, through a broad range of EU policies and legislation relate to marine litter, addressing both its sources and impacts, including EU environmental legislation relating to waste management, urban wastewater or pollution from ships or the Marine Strategy Framework Directive, which includes marine litter as one of the criteria for achieving Good Environmental Status of the European marine environment. It must be noted that in the context of marine litter on the coastal and marine environment, the EU Integrated Maritime Policy (IMP) and the Marine Strategy Framework Directive as its environmental pillar address the development of sea-related activities in a sustainable manner.

These apply to all 28 Member States of the EU. An overview of European Commission (EC) policies, legislation and initiatives related to marine litter was published in 2012 (EC, 2012).

LAND BASED SOURCE

- **EU Waste Framework Directive**

The EU's Waste Framework Directive (2008/98/EC) of 19 November 2008 establishes the legislative framework for the handling of waste within the EU. It sets out essential conditions for waste management and concerns all waste. The Directive introduces a binding waste hierarchy, defining the order of priority for treating waste. Top of the list is waste prevention, followed by re-use, then recycling and then other recovery operations, with disposal such as landfill to be used only as the last resort. Indeed, art.4 (par. 1) reports:

“The following waste hierarchy shall apply as a priority order in waste prevention and management legislation and policy: (a) prevention; (b) preparing for re-use; (c) recycling; (d) other recovery, e.g. energy recovery; and (e) disposal. ...

Member States shall take into account the general environmental protection principles of precaution and sustainability, technical feasibility and economic viability, protection of resources as well as the overall environmental, human health, economic and social impacts, in accordance with Articles 1 and 13.”

The directive is designed to protect the environment and human health by emphasising the importance of proper waste management, recovery and recycling techniques to reduce pressure on resources and improve their use.

- **The Packaging and Packaging Waste Directive**

The Directive sets a range of requirements to reduce the impact of packaging and packaging waste on the environment. It contains provisions on the prevention of packaging waste, on the re-use of packaging and on the recovery and recycling of packaging waste. Prevention of the production of packaging waste is the first priority.

The directive as amended covers all packaging placed on the European market and all packaging waste, whether it is used or released at industrial, commercial, office, shop, service, household or any other level, regardless of the material used.

EU countries should encourage the increase in the share of reusable packaging put on the market and of systems to reuse packaging without compromising food safety.

EU countries must also take the necessary measures to meet certain recycling targets which vary depending on a packaging material and for this purpose apply the new calculation rules. The targets set for the 31 December 2025 is that at least 65% by weight of all packaging must be recycled. The recycling targets for each material are:

- 50% of plastic
- 25% of wood
- 70% of ferrous metals
- 50% of aluminium
- 70% of glass, and
- 75% of paper and cardboard

- **The Landfill Directive**

The Landfill Directive establishes technical requirements for the operation of landfills, with the goal of reducing their impact on the environment, including the pollution of surface water. This Directive, for example, requires that the location of landfill sites takes into account factors such as the proximity of water bodies and coastal waters and that wind-blown materials are minimised. Such measures should reduce potential dispersal of plastic packaging waste and other debris in the marine environment.

WATER SOURCE

- **Urban Wastewater Treatment**

The Urban Waste Water Treatment Directive requires that all sewerage discharges serving populations over 10,000 in coastal areas and 2,000 in estuarine areas, must receive secondary (biological) treatment prior to discharge. This Directive is relevant because discharge of urban waste water is one of the sources of marine litter. Sewage related marine debris includes, among other things, sanitary towels, tampons and plastic cotton wool bud sticks. In pre-treatment, stones, sand and other relatively large elements are removed; in this particular case, retained particles may range between 200 µm and even be above 100 mm of diameter. Micro-plastics and fibers from clothes washing might pass the waste water treatment plant. Also storm water overflows may be a significant source.

The directive aims to protect the environment in the European Union (EU) from the adverse effects (such as eutrophication) of urban wastewater and sets out EU-wide rules for collection, treatment and wastewater discharge. The law also covers wastewater generated by industries such as the agro-food industries (like food-processing and brewing).

- **Pollution from ships**

The EU has adopted a set of rules to reinforce maritime safety and help prevent pollution from ships:

- the **Ship-source Pollution Directive** (2009/123/EC):

it creates rules that are applicable EU-wide on the imposition of penalties in the event of discharges of oil or other polluting substances from ships sailing in its waters.

- the **Port Reception Facilities Directive** (2000/59/EC).

it aims to protect the marine environment from the negative effects of waste from ships using EU ports, by improving port reception facilities for waste from ships.

These Directives also aim to incorporate international ship-source pollution standards into EU law that are MARPOL73/78 and the London Convention.

ADDRESSING IMPACTS

- **The Integrated Maritime Policy (IMP)**

The Integrated Maritime Policy seeks to provide a more coherent approach to maritime issues, with increased coordination between different policy areas. It focuses on issues that do not fall under a single sector-based policy e.g. "blue growth" (economic growth based on different maritime sectors) and on issues that require the coordination of different sectors and actors e.g. marine knowledge.

Specifically, it covers these cross-cutting policies:

- Blue growth
- Marine data and knowledge
- Maritime spatial planning
- Integrated maritime surveillance
- Sea basin strategies.

- **The Marine Strategy Framework Directive**

The EU's Marine Strategy Framework Directive (MSFD) is a key element in Europe's actions to address marine litter. It is also the environmental pillar of the IMP. The Directive aims to ensure that the EU's marine waters achieve 'good environmental status' by 2020, while protecting the resource base upon which marine-related economic and social activities depend. The GES is defined by means of eleven qualitative 'descriptors. Descriptor 10 relates directly to marine litter: "Properties and quantities of marine litter do not cause harm to the coastal and marine environment". It is the first EU law for the protection of marine biodiversity.

The 'Good environmental status' is achieved (Article 3.8) when marine waters "provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations ...

Marine litter is any persistent, manufactured or processed solid material that is discarded, disposed of, or abandoned in the marine and coastal environment. The provisions of MSFD D10 aim to protect the marine environment against harm caused by litter and has the following **criteria**:

- D10C1 –The composition, amount and spatial distribution of litter on the coastline, in the surface layer of the water column, and on the seabed, are at levels that do not cause harm to the coastal and marine environment. Member States shall establish threshold values for these levels through cooperation at Union level, taking into account regional or subregional specificities
- D10C2 –The composition, amount and spatial distribution of micro-litter on the coastline, in the surface layer of the water column, and in seabed sediment, are at levels that do not cause harm to the coastal and marine environment Member States shall establish threshold values for these levels through cooperation at Union level, taking into account regional or subregional specificities

- D10C3 – Secondary: The amount of litter and micro-litter ingested by marine animals is at a level that does not adversely affect the health of the species concerned. Member States shall establish threshold values for these levels through regional or subregional cooperation
- D10C4 – Secondary: The number of individuals of each species which are adversely affected due to litter, such as by entanglement, other types of injury or mortality, or health effects. Member States shall establish threshold values for the adverse effects of litter, through regional or subregional cooperation

5.1 A EUROPEAN STRATEGY FOR PLASTICS IN A CIRCULAR ECONOMY

Marine litter cannot be traced back to a single source. Rather, it is the result of many types of inputs and actions (or inactions). Policies and laws need to address not only the removal of litter but more importantly govern the production, use, and disposal of products. A circular economy approach can reduce the quantity of waste by stopping it at its source.

In December 2015, the Commission adopted an EU Action Plan for a circular economy. There, it identified plastics as a key priority and committed itself to ‘prepare a strategy addressing the challenges posed by plastics throughout the value chain and taking into account their entire life-cycle’. In 2017, the Commission confirmed it would focus on plastics production and use and work towards the goal of ensuring that all plastic packaging is recyclable by 2030. The EU is best placed to lead the transition to the plastics of the future. This strategy lays the foundations to a new plastics economy, where the design and production of plastics and plastic products fully respect reuse, repair and recycling needs and more sustainable materials are developed and promoted. This will deliver greater added value and prosperity in Europe and boost innovation. It will curb plastic pollution and its adverse impact on our lives and the environment. By pursuing these aims, the strategy will also help achieve the priority set by this Commission for an Energy Union with a modern, low-carbon, resource and energy-efficient economy and will make a tangible contribution to reaching the 2030 Sustainable Development Goals and the Paris Agreement. The strategy presents key commitments for action at EU level. Yet the private sector, together with national and regional authorities, cities and citizens, will also need to mobilise. Similarly, international engagement will be necessary to drive change outside Europe’s borders. With decisive and concerted efforts, Europe can turn challenges into opportunities and set the example for resolute action at global level.

We must also cite the **Single-use plastics ban** which aims to

- prevent and reduce the impact on the environment of certain plastic products and to promote a transition to a circular economy by introducing a mix of measures tailored to the products covered by the directive, including an EU-wide ban on single-use plastic products whenever alternatives are available.
- The directive delivers on the EU's plastic strategy, an important element in the EU's move towards a circular economy.



Figure 3: Map shows where are plastic bags banned or taxed around the world

6 POLICIES IN ITALY AND CROATIA

Although the issue of marine litter has been present for a long time, the knowledge about this issue is still very scarce. The main disadvantages in understanding are the absence of a sufficient database on the quantities, composition and trends of marine litter, low understanding of oceanographic and climate processes that affect its distribution and retention in the marine environment as well as insufficient knowledge of distribution of marine litter after entering the sea. Activities related to the monitoring and prevention of marine litter are implemented through the application of existing legal framework and strategic documents related to waste management. Marine litter collection activities are mainly carried out on beaches before and during the tourist season, on the initiative of local self-government units, counties or concessions, and individual actions of NGO's (<http://www.ml-repair.eu/en/sea-waste>).

6.1 Croatian Legislations

The problem of marine litter is included in Croatian legal framework, which is derived from the documents mentioned above. The legal framework containing or problematizing marine litter and/or micro plastics in Croatia includes:

- Environmental Protection Act (Croatian Parliament),
- Maritime Code (Croatian Parliament),
- Sustainable Waste Management Act (Croatian Parliament),
- Maritime Law (Croatian Parliament),
- The Decree on the Conditions to Meet by the Ports (Croatian Parliament),
- Decree on Arrangement and Protection of the Protected Coastal Sea (Croatian Parliament),
- Decree on the Development and Implementation of Marine Strategy and Coastal Area Strategy Documents (Croatian Parliament),
- Plan of Intervention in Case of Sudden Sea Pollution (Croatian Parliament),
- Action Programme of the Strategy of Management of Marine Environment and Coastal Area: Monitoring: System for Continuous Assessment of Condition of the Adriatic Sea (Croatian Parliament) and
- Waste Management Plan for 2017-2023 (Croatian Parliament).

Not all documents within the Croatian legal framework address all aspect of marine litter. Moreover, the only document that holistically problematizes marine litter as one specific problem is *Action Programme of the Strategy of Management of Marine Environment and Coastal Area: Monitoring: System for Continuous Assessment of Condition of the Adriatic Sea*.

Other documents address marine litter in regards to just being a different waste category, some address the need to monitor marine litter, or broader - the quality of water, and some address marine litter in term of waste management.

Table 5: Overview of Croatian legal acts addressing marine litter directly and indirectly

	Addressing marine litter in regards to:			
	general	waste management	pollution of the sea	monitoring
Environmental Protection Act			x	x
Maritime Code	x	x		
Sustainable Waste Management Act	x		x	x
Maritime Law		x		
The Decree on the Conditions to Meet by the Ports		x		
Decree on Arrangement and Protection of the Protected Coastal Sea		x		
Decree on the Development and Implementation of Marine Strategy and Coastal Area Strategy Documents				x
Plan of Intervention in Case of Sudden Sea Pollution	x	x	x	x
System for Continuous Assessment of Condition of the Adriatic Sea - Action Programme of the Strategy	x	x		x
Waste Management Plan for 2017-2023	x	x	x	x

In summary, **Maritime Code**, **Marine Law**, **Decree on Arrangement and Protection of the Protected Coastal Sea** and **The Decree on the Conditions to meet by the Ports** do not explicitly define marine litter, but rather focus on waste on ships and near the sea and/or the coast, especially in terms of waste management for ports and ships.

Sustainable Waste Management Act defines marine litter and categorizes it as a special category of waste, but does not provide any other information that could be seen as a basis for further action in regards to either monitoring or management of marine litter specifically. It does, however, address the need to monitor environment conditions in regards to pollution and waste in general.

Plan of Intervention in Case of Sudden Sea Pollution addresses the problem of environmental pollution and provides guidelines for the mentioned, but does not define marine litter in full sense. On the other hand, the Plan does provide a legal framework in terms of placing procedures for regular data collection and reporting the conditions of the sea. It also includes parts dealing with waste management near shore and coast.

Environmental Protection Act does not define marine litter in any way, but does address the need for setting a system for monitoring environment conditions especially for sea and costal area in regards to pollution risk. Within the Environmental Protection Act, monitoring of marine litter was laid down in an indirect way. The Act provides legal guidelines addressing the need to monitor conditions of natural eco-systems, including (and explicitly addressing) the sea and water. In addition, it provides a legal frame for setting the Information System for Environment Protection. In this part of the Act waste is explicitly mentioned in a way that waste monitoring data is an integral part of the **Information System for Environment protection**. In the same way, waste is mention as a key element to be monitored (in regards to quantity, sources of waste, type and other) in the proscribed Register of Pollution of Environment.

Decree on the Development and Implementation of Marine Strategy and Coastal Area Strategy Documents is a starting document that provides basic legal framework for concretization of marine litter problem in terms of waste and pollution risk management, monitoring, providing data for Good Environment Conditions and setting the Monitoring System within specific Action Programme within the Strategy). **Action Programme of the Strategy of Management of Marine Environment and Costal Area: Monitoring System for Continuous Assessment of Condition of the Adriatic Sea** is the most relevant legal document on the national level regarding monitoring and marine litter concretely. It properly defines and problematize marine litter and provides a legal framework that sets and standardize monitoring processes in regards to locations, frequencies, reporting, methodology and other. It also mentions waste management by referring to other legal acts.

Waste management Plan 2017-2022 again define marine litter as a special waste category. It also, for the first time clearly states the need to set a system for management of marine litter with a strong emphasis on data collection and monitoring procedures, both in specific goals and measures (M2.4) in the Plan.

Document relevant to Croatian legal framework in regards to monitoring marine litter that are still in procedures (consolidation with the public phase):

- Strategy of Management of Marine Environment and Costal Area and
- Action Programme for Measures for Protection and Management of Marine Environment and Costal Area (within the Strategy).

At the national level, implementation of actions to carry out legal obligations is defined through specific Monitoring System for marine litter and environment conditions of the Adriatic Sea, which is stated in the National Waste Management Plan. It considers development of the Waste Management Information System and the Registry for specific waste categories (including marine litter). However, these documents are still nonexistent and the most concrete actions, measures and methodologies for marine litter monitoring are analyzed in the System for Continuous Assessment of Condition of the Adriatic Sea - Action Programme of the Strategy of Management of Marine Environment and Coastal Area. This System is harmonized with Marine Strategy Framework Directive considering required actions to achieve Good Environmental Status of EU marine waters. Within this System a specific list of actions is defined that relates to specific monitoring activities related to the marine litter components to be analyzed, parameters which are to be monitored, sampling sites and areas, and frequency of sampling.

At the local level, an obligation for implementing waste management system in ports for collecting and processing waste from ships is stated within Croatian legislation (Maritime Code, Sustainable Waste Management Act, Plan for Intervention in Case of Sudden Sea Pollution, Maritime Law, and Decree on Conditions to be met by Ports). In addition, specific legal decisions, plans and programs for particular sites and areas should be developed at some point, but they are still missing. However, Croatian ports are obliged to have a system for waste collection, as well as required infrastructure. Still, there is a lack of particular measures, other than just legal obligations for the ports.

An overview of the national marine plastic litter policies in EU Member States (Schnell et al., 2017) indicate that in Croatia the Ordinance on packaging and waste packaging (OG 88/15) sets general requirements for the production of packaging. The packaging company is obliged to produce packaging that can be reused, recovered and / or recycled in accordance with the best available technologies to minimize the adverse environmental impact of packaging and waste packaging. The packaging company and the manufacturer may only place on the market packaging which meets the essential requirements for the production and composition of the packaging and its reuse and recovery characteristics, including recycling.

Furthermore, the Act on Sustainable Waste Management (OG 94/13) defines marine litter as a special waste stream category and sets the obligation to prepare a Rule book of marine litter management. Other relevant legislation is the Act on Maritime Domain and Sea Ports under jurisdiction of the Ministry of Sea, Transport and Infrastructure (Article 88, 89 and 90) and Maritime Code (Article 48, 49b, 49c and 49f) regarding dumping within the specially protected areas.

The waste management plan of the Republic of Croatia for the period 2017-2022 sets the establishment of a marine waste management system as one of the goals that need to be met by 2022.

Finally, legislation that indirectly deals with marine litter management and influence on marine litter prevention, collection and disposal is covered by these sectors: waste management, maritime transport, maritime domain management, fisheries, etc.

6.2 Italian Legislations

In **Italy**, a law demanding a complete ban on the use of microplastics in cosmetic products by 2019 has been discussed and approved by the Italian Parliament. It is expected to be approved by the Senate as well. Moreover, Italy banned the distribution of lightweight plastic bags that are not from biodegradable sources with the law 116/2014. This law is mentioned the Italian MSFD Programmes of Measures as an existing measure addressing the regulation of single-use bags.

The Legislative Decree n. 205/2010 regulates the waste disposal in marine waters. The Decree is the national transposition of the Waste Framework Directive (WFD), Directive 2008/98/EC.

The Directive 2000/59/EC regarding port reception facilities for ship-generated waste and cargo residues has been implemented by Legislative Decree n. 182 of 24 June 2003.

The Directive 2008/99/CE (on the protection of the environment through criminal law) and Directive 2009/123/CE (amending Directive 2005/35/EC on ship-source pollution and on the introduction of penalties for infringements) have been implemented by Legislative Decree 121/2011 and Legislative Decree n. 68/2015.

The Italian MSFD Programme of Measures proposes a new measure under Descriptor 10: Marine litter related to waste disposal and waste management:

- Design and implementation of measures to improve the management of waste generated by fishing and aquaculture, including dismantled equipment, favoring, where possible, re-use, recycling and recovery.

The Italian MSFD Programme of Measures also has three existing measures that are related to waste disposal and waste management:

- Measure to regularize the waste disposal permit in marine waters.
- Measures to reduce discharges into the sea, particularly the illegal ones, of waste and cargo residues produced by ships using ports in the state territory, and to improve the availability and use of port collection facilities for such waste and residues.
- Measure that defines marine waste as urban solid waste even if not completely in line with the MSFD.

The Italian MSFD Programme of Measures proposes a new measure under Descriptor 10: Marine litter related to waste disposal and waste management which is the Study, design and creation of a collection and disposal chain of accidentally harvest - ed litter from fishermen.

Finally, Italy is preparing a new law for the promotion of the removal of marine debris in the sea and the circular economy. The following paragraphs report the draft of this law.

6.2.1 Draft bill for the promotion of waste recovery at sea and for the circular economy ("sea safe law")

The problem of the presence of waste in the marine environment has become a global challenge in recent decades and, therefore, the Ministry of the Environment and Protection of Land and Sea, with the aim of contributing to the restoration of marine ecosystems, is committed to defining a regulatory solution that provides effective solutions to the problem of waste abandoned at sea.

The draft law in question aims to:

- promote the recovery of accidentally caught waste and encourage voluntary sea cleaning campaigns;
- promote the circular economy by means of provisions to allow the cessation of waste status with regard to waste accidentally caught or collected as part of sea cleaning campaigns;
- promote awareness-raising campaigns.

In preparing this legislation, account has been taken of the framework of existing national and European regulatory sources and the "Proposal for a Directive of the European Parliament and of the Council on port reception facilities for ship-generated waste", repealing Directive 2000/59/EC and amending Directive 2009/16/EC and Directive 2010/65/EU, which introduces a specific framework for accidentally fished waste.

It is therefore considered particularly useful to have a specific legislative proposal to facilitate the delivery of waste collected at sea during fishing operations, which is fully in line with the provisions of the proposal for a directive, cited above.

Given the key role that fishermen play in the activity of waste collection during fishing operations, the Ministry considers it strategic to act in two directions: to clarify the reference regulatory framework avoiding sanctioning profiles for fishermen who carry out "accidental" waste collection during fishing operations and to encourage them to deliver the waste caught at port reception facilities; to increase awareness among these operators (but also in the community) of the need for a clean marine environment.

To this end, it is necessary to stimulate the participation of fishermen in voluntary collection during their daily activities and, at the same time, to promote the launch of awareness campaigns to encourage the cleanliness of the sea.

The bill consists of 8 articles that are commented below.

Article 1 (Purpose, object and scope of application)

Article 1 defines the purpose, object and scope of application of the provision, identifying as a goal the restoring of marine ecosystems, the promotion of circular economy, and the sensibilisation of the community towards good practice models focused on preventing the drop of waste in marine ecosystems and the correct management of it.

The object of the legislative proposal, therefore, is the management and reuse of accidentally caught waste and voluntarily collected waste, as well as the incentive to the fishing sector for the use of materials with reduced environmental impact.

Article 2 (Definitions)

Article 2 identifies the definitions, recalling the definitions described in the legislative decree 24 June 2003, n. 182 and in the Legislative Decree 3 April 2006, n. 152. In the same article, specific definitions are also set out.

Article 3 (Procedures for managing accidentally caught waste)

Article 3 identifies the methods of managing accidentally caught waste. This waste is equivalent to ship waste regarding the landing and disposal in the port collection facilities. The disposal of accidentally caught waste in the port collection facility is equivalent as a temporary deposit in accordance and under the conditions of Article 183, paragraph 1, lett. bb) of the Legislative Decree 3 April 2006, n. 152.

To avoid that the costs of accidentally caught waste burden only on fishermen and port users, the management costs of such waste are covered by a component of the integrated waste service management fee. In this way, the provisions contained in the aforementioned proposal for a directive amending directive 2000/59/EC are anticipated, with particular reference to alternative financing systems, envisaged by article 8, paragraph 2, letter e-bis) of the aforementioned proposal directive that provides for the possibility for Member States to cover these costs with the revenues generated by alternative financing systems.

These methods of financial coverage are established by the regulatory authority for energy and environment networks (ARERA), which is also responsible for identifying the subjects and Authorities required to provide the data and information necessary for determining that tariff, as well as the terms within which that data and information must be supplied. In this way the components of the costs and the tariff method will be defined for the determination of the fees for the management service of the waste accidentally caught, including the modalities of reassignment of the amounts collected on the national territory towards the Port Authorities that actually support these costs.

Paragraph 6 foresees a reward system for the fishing vessel subject to the obligations for the disposal of accidentally caught waste. This reward system will be identified by decree of the Minister of Agricultural, Food, Forestry and Tourism Policies, in consultation with the Minister of the Environment and the Protection of the Territory and the Sea, who will also establish the methods, terms and procedures for the application of the mentioned reward system and for serious infractions as per art. 14 of the Legislative Decree 9 January 2012, n. 4.

Article 4 (Cleaning Campaign)

Article 4 illustrates how to organize voluntary sea cleaning campaigns for waste collection. These campaigns can be organized on the initiative of the Competent Authority, or following a request to the Competent Authority by the promoter of the campaign, according to the methods identified with a decree of the Minister for the Environment and the Protection of the Territory and the Sea in conjunction with the Minister of Agricultural, Food and Forestry Policies.

Pending the adoption of this decree, cleaning campaigns can be started only after sixty days have elapsed from the presentation of the request to the Competent Authority. It is in any case reserved for the aforementioned Competent Authority the possibility of adopting motivated measures prohibiting the commencement or continuation of the activity itself or adopting provisions concerning the subjects authorized to participate in the cleaning campaigns, the marine areas affected by the activities themselves and waste collection methods.

Voluntary sea cleaning campaigns can be attended by the Managing Authorities of protected areas, environmental associations, fishermen's associations and other subjects identified by the Competent Authority.

To the waste voluntarily collected during the sea cleaning campaigns are applied the provisions of the art 3 of this law.

Article 5 (Promotion of the circular economy)

Article 5, in order to promote the recycling of plastics, in accordance with the waste hierarchy described in the Legislative Decree n. 152 of 2006, attributes to the Minister for the Environment and the Protection of the Territory and the Sea the power to establish, in compliance with article 184-ter of the same Legislative Decree n. 152 of 2006, the criteria and methods on the basis of which the waste accidentally caught and the waste voluntarily collected cease to be qualified as waste.

Article 6 (Awareness Campaign)

Article 6 provides for the possibility of organizing public awareness campaigns in line with the objectives of this law. The methods of the aforementioned campaigns are established by a subsequent decree of the Ministry of the Environment and the Protection of the Territory and the Sea, in agreement with the Ministry of Agricultural, Food, Forestry and Infrastructure and Transport Policies.

Article 7 (Materials with reduced environmental impact. Environmental certification)

Due to the purpose contemplated by article 1 of this draft, and to disseminate good practice models focused on preventing the drop of waste in marine ecosystems and the correct management of it, it was deemed appropriate to extend the scope of application to the fishing sector by providing the adoption of measures aimed at encouraging the fishing industry towards behaviors that increasingly respect the needs of the marine and coastal environment. These measures provide for the attribution of an environmental certification to fish entrepreneurs who engage in using equipment of reduced environmental impact, in participating in sea cleaning campaigns or in disposing accidentally caught waste. Paragraph 2 establishes

that by decree, adopted pursuant to art. 17, paragraph 3, of the law of 23 August 1988, n. 400, to be issued within six months from the date of entry into force of this law, the Minister of Agricultural Food and Forestry Policies and Tourism, in consultation with the Minister of the Environment and the Protection of the Territory and the Sea, regulates the procedures, the methods and conditions for the recognition of this certification. Paragraph 3 also provides that by decree adopted pursuant to art. 17, paragraph 3, of the law of 23 August 1988, n. 400, the Minister of Agricultural, Food, Forestry and Tourism Policies identifies the procedures, methods and conditions for the recognition of the environmental certification referred to in paragraph 1 also for the purposes of the eco-labeling program pursuant to art. 18, paragraph 2, letter d), of Legislative Decree 9 January 2012, n. 4.

Article 8 (Financial invariance clause)

Article 8 provides for the clause of financial invariance: it establishes that from the application of the law there must not derive new or greater charges for the public finance, specifying that the involved administrations provide the human, instrumental and financial resources envisaged under current legislation.

Table 6: Link of the main legal framework

INTERNATIONAL AND REGIONAL LEGAL FRAMEWORK		
SEA BASED SOURCES	MARPOL 73/78 Convention for the Prevention of Pollution from Ships (Annex V) MEPC.295(71)	www.imo.org/en/OurWork/Environment/PollutionPrevention/Garbage/Documents/MEPC.295(71).pdf www.imo.org/en/OurWork/Environment/PollutionPrevention/Garbage/Pages/Default.aspx https://madden-maritime.com/pollution/ www.imo.org/en/OurWork/Environment/PollutionPrevention/Garbage/Documents/MEPC.295%2871%29.pdf www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx www.imo.org/en/MediaCentre/PressBriefings/Pages/20-marinelitteractionmecp73.aspx
	London Convention for the Prevention of Marine Pollution from Dumping of Wastes	www.imo.org/en/OurWork/Environment/LCLP/Documents/PROTOCOLAmended2006.pdf
	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	www.basel.int/TheConvention/Overview/TextoftheConvention/tabid/1275/Default.aspx www.basel.int/Home/tabid/2202/Default.aspx www.ifrc.org/docs/idrl/1294EN.pdf
	The Stockholm Convention on Persistent Organic Pollutants	www.pops.int/TheConvention/Overview/tabid/3351/Default.aspx
LAND BASED SOURCES	Global Programme of Action	www.unenvironment.org/resources/toolkits-manuals-and-guides/global-programme-action-protection-marine-environment-land
	United Nations General Assembly and the United Nations Convention on the Law of the Sea - UNCLOS	www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf
	Convention on Biological Diversity, with the Jakarta Mandate	www.cbd.int/doc/legal/cbd-en.pdf www.cbd.int/ www.cbd.int/doc/business/jakarta-charter-busissness-en.pdf
	Convention on Migratory Species	www.cms.int/sites/default/files/instrument/CMS-text.en_.PDF www.un.org/depts/los/general_assembly/contributions_2016/CMS_Contribution_to_ICP_on_marine_debris.pdf
	FAO Code of Conduct for Responsible Fisheries	www.fao.org/3/a-v9878e.pdf
	AGENDA 21	https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf

REGIONAL SEA CONVENTIONS		
	UNEP - Regional Seas Programme	See dedicated tables and: www.un.org/Depts/los/biodiversityworkinggroup/Regional_seas_programmes_ABN_J.pdf www.unep.ch/iuc/info/seas/RSbooklet-E.pdf
	The Oskar Regional Action Plan	www.ospar.org/work-areas/eiha/marine-litter/regional-action-plan www.ospar.org/documents?v=34422 https://odims.ospar.org/
	The Helsinki Convention	http://www.helcom.fi/about-us/convention
	The Black Sea Convention	http://www.blacksea-commission.org/convention-fulltext.asp
	The Barcelona Convention - Regional Plan Marine Litter Mediterranean	https://www.cbd.int/doc/meetings/mar/mcbem-2014-03/other/mcbem-2014-03-120-en.pdf
EUROPE		
LAND BASED SOURCES	EU Waste Framework Directive	https://ec.europa.eu/environment/waste/framework/ https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0098
	EU Packaging and Packaging Waste Directive	www.ec.europa.eu/environment/waste/packaging/legis.htm https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:01994L0062-20150526
	EU Landfill Directive	https://ec.europa.eu/environment/waste/landfill_index.htm https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:31999L0031
WATER SOURCE	EU Urban Waste Water Treatment Directive	https://ec.europa.eu/environment/water/water-urbanwaste/index_en.html https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31991L0271
	EU Ship-source Pollution Directive	http://www.emsa.europa.eu/main/enforcement-eu-legislation/topics-a-instruments/item/673-ship-source-pollution.html https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM%3A124123
	EU Port Reception Facilities Directive	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32019L0883
ADDRESSING IMPACTS	EU Integrated Maritime Policy IMP	https://ec.europa.eu/maritimeaffairs/policy_en https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.149.01.0001.01.ENG
	EU Marine Strategy Framework Directive	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32008L0056 https://mcc.jrc.ec.europa.eu/main/dev.py?N=28&O=223&titre_chap=D10%20Marine%20litter
	EU Strategy for Plastics in a Circular Economy	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0028&from=EN www.ec.europa.eu/environment/circular-economy/index_en.htm https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1516265440535&uri=COM:2018:28:FIN

7 Legal aspects regarding the use of drones

This paragraph provides useful information for the execution of the project being used:

- by the Task Manager (TM) and Project Team (PT) to consider the possibilities and limitations of the use of drones in Italy and Croatia as foreseen in the project
- by the Activity 3.1 Technical Task Coordinator (TC) to complete the D 3.1.2. document
- by the Activity 3.3 Technical Task Coordinator (TC) which deals with the study and design of the EWS - Early Warning System including Integrated Marine Drone for collection of microplastic and geo-localized water indicators on the route
- in the Activity 4.1 Monitoring plastic and microplastic wastes on coastal and marine environments for “on-field” test procedure for all remote sources of data (maritime drone, instrumented package on board of ships, etc.)
- in the Activity 5.2 “Development of the UAV/marine drone for real-time data acquisition” and Activity 5.4 “Pilot implementation, business simulation and assessment”

The most common **terms and abbreviations** used in this paragraph have the following meaning:

Airspace restriction: means a defined volume of airspace within which, variously, activities dangerous to the flight of aircraft may be conducted at specified times (a ‘danger area’); or such airspace situated above the land areas or territorial waters of a State, within which the flight of aircraft is restricted in accordance with certain specified conditions (a ‘restricted area’); or airspace situated above the land areas or territorial waters of a State, within which the flight of aircraft is prohibited (a ‘prohibited area’);

AMC: Airspace Management Cell

Buffer Area: the area surrounding the area of intended operations, established to guarantee the safety levels applicable to the type of operations. The buffer area has characteristics equivalent to the area of intended operations, its dimensions are evaluated as adequate with respect to RPA possible behavior in case of malfunctions.

CCAA: Croatian Civil Aviation Agency

Detect and Avoid (D&A) or Sense and Avoid (S&A): the ability of the pilot, through technical systems, to avoid collisions on ground with vehicles and aircraft and collision in air with other airspace users, to comply with the rules of the air, to avoid terrain impacts, to avoid adverse Weather conditions, to comply with visual signs and to maintain the applicable visibility and distance from clouds distances in a manner equivalent to the “see and avoid” ability expected for aircraft with a pilot on board.

EASA: European Union Aviation Safety Agency

ENAC: National Civil Aviation Authority (Ente Nazionale Aviazione Civile in Italian language)

Flight Operations: performing flight by unmanned aircraft system for the needs of air works (air recording, air traffic, air surveillance, scientific exploration flight, etc.)

NN: Official Gazette (“Narodne novine” in Croatian language)

Operational mass of unmanned aircraft: total mass of unmanned aircraft at take-off moment

Remote pilot: the natural person responsible for the safe management of an unmanned aircraft’s flight who handle his flight commands, either manually or while an unmanned aircraft is flying in an automated manner, by monitoring its direction of flight with the possibility of intervention and changes the direction at all times. In terms of the provisions of the Air Traffic Act, the remote pilot is considered to be the commander of the aircraft.

The unmanned aircraft system (UAS): a system that consists of unmanned aircraft and other equipment, software or plugins needed for its management at a distance

Unmanned Aircraft (UA) or Unmanned aircraft vehicle (UAV): a plane intended for the operation of a non-pilot airplane, remote-controlled or programmed and autonomous

Unmanned Aircraft System Operator: a natural or legal person conducting or intending to conduct flight operate UAS

Visual Line of Sight (VLOS): operations at distances, both horizontal and vertical, in which the remot pilot maintains continuous visual contact with the aerial vehicle, without the aid of tools to enhance the view, so to be able to directly control it with the aim to conduct the flight and to meet separation and collision avoidance responsibilities.

In terms of the provisions of the Air Traffic Act, the remote pilot is considered to be the commander of the aircraft.

7.1 EU Rules on civilian drones – current status

Till now there is no harmonized rules that regulate the operations of unmanned aircraft systems (UAS) of operational mass below 150 kg in EU but with the latest developments on relevant regulations, Europe is one step closer to harmonized rules for safe drone operation.

On 28 February 2019, as the [EASA \(European Union Aviation Safety Agency\)](#) Committee voted unanimously to approve the European Commission's proposal for an [Implementing Act on the rules and procedures for the operation of unmanned aircraft](#) to regulate the operations of Unmanned Aircraft Systems (UAS) in Europe and the registration of drone operators and of certified drones. The Implementing Act is accompanied by a [Delegated Act on unmanned aircraft systems and on third-country operators of unmanned aircraft systems](#), which defines the technical requirements for drones. It was adopted by the European Commission on 12 March 2019 and sent to the EU Parliament and to the EU Council for the mandatory 2 months scrutiny period.

The common EU-wide rules on technical requirements for drones will set features and capabilities that drones must have in order to be flown safely and, at the same time, help foster investment and innovation in this sector. The EU rules build on national rules that were in place and now provide a harmonized framework across the European Union.

The operations of UAS in Europe will be classified in 3 main categories:

- **the 'open' category** is a category of UAS operation that, considering the risks involved, does not require a prior authorization by the competent authority nor a declaration by the UAS operator before the operation takes place;
- **the 'specific' category** is a category of UAS operation that, considering the risks involved, requires an authorisation by the competent authority before the operation takes place, taking into account the mitigation measures identified in an operational risk assessment, except for certain standard scenarios where a declaration by the operator is sufficient or when the operator holds a light UAS operator certificate (LUC) with the appropriate privileges;
- **the 'certified' category** is a category of UA operation that, considering the risks involved, requires the certification of the UAS, a licensed remote pilot and an operator approved by the competent authority, in order to ensure an appropriate level of safety.

The proposed regulation is focusing on the open and specific categories.

The further step in to replacement of national drone rules with EU law is achieved on 24 May 2019 when European Commission adopted European Union rules and procedures for the operation of unmanned aircraft so, the entire regulation concerning unmanned aircrafts will become gradually applicable within a year of publication. By 2022 the transitional period will be completed and the regulation will be fully applicable in all EU countries.

7.2 Legal aspects of the use of drones in Italy

Unmanned Aircraft Systems, known as drones, are considered aircraft for all intents and purposes as required by art. 743 of the Navigation Code and regulated by EU regulation and by the national ENAC regulation (Remote Aircraft Means Regulation - Edition 3, 11 November 2019) for activities that take place within the Italian airspace.

The Regulation lays down the conditions for the safe operation of unmanned aircrafts up to 150 kilograms and for those designed or modified for research, experimentation or scientific purposes as well as the conditions to be met by persons engaged in the flight operation of such aircraft.

This chapter provides an overview of the main legal information and requirements for UAS and for performing UAS operations in Italy relevant to the Net4mPlastic project.

7.2.1 Legal sources for the use of drones in Italy

The use of air drones (unmanned aircrafts) in Italy is regulated by following Acts and Regulatory Acts:

- Italian Navigation Code
- Remote Aircraft Regulation - Edition 2, Amendment 4 of 21 May 2018
- Remote Aircraft Regulation - Edition 3, of 11 November 2019
- ENAC ATM-09 Circular - of 24 May 2019
- Information Note NI-2017-007 of 17 May 2017 - Implementation of standard scenarios for critical specialized operations of remotely piloted aircraft
- Information Note 2016-007 - "Aircraft Remote Control Pilot" Regulation APR driver certificates
- ENAC Regulation "Italian Air Rules";
- ENAC Technical Regulation
- ENAC Regulation "Air Traffic Services"- Ed. 2;
- ENAC Regulation "Health organization and medical certifications of suitability for obtaining licenses and aeronautical certificates".;

The principal source of navigation law is the Italian Navigation Code ("INC"), a comprehensive body of rules that regulates all aspects of maritime and aerial navigation. Although it is very detailed, the INC does not cover all legal issues and must be supplemented by specific national regulations.

The first specific regulation on unmanned aircraft systems is the Remote Aircraft Regulation- Edition 1 of 16 December 2013 issued by the National Civil Aviation Authority. Today, this document has been updated to Edition 2, Amendment 4 that is in effect in Italy until the adoption of a European Regulations.

This Regulation will be harmonized in the next months with "Implementing Regulation on the rules and procedures for the operation of Unmanned Aircraft Systems (UAS)" in Europe adopted on 24 May 2019 and "Delegated Regulation on unmanned aircraft systems and on third-country operators of unmanned aircraft systems" adopted by the European Commission on 12 March 2019.

The implementation on rules and regulation on use of civilian drones in Italian territory is under the competence of the National Civil Aviation Authority (Ente Nazionale Aviazione Civile, ENAC). Activities of

ENAC include air traffic safety related tasks, especially certification, oversight and supervision with the objective of ensuring continuing compliance with the requirements of the air transportation and other air. The air traffic in Italy is managed by the private holding ENAV.

7.2.2 Labeling UA

The UA involved in flight operations is marked with identification plate (QR-Code) or identification label of appropriate size which allows a clear identification of the vehicle (ENAC reference) and of the operator. An identical plate shall be installed also on the remote ground pilot station. In addition, a plate reporting a QR-Code released by ENAV shall be installed on the vehicle.

As of the 1st of July 2016, in addition to plates, any RPAS shall be equipped with an Electronic Identification Device, that allows the transmission of RPA real time data, its owner/operator and basic flight parameters, as well as the recording of these data. Electronic Identification Device performances and characteristics are defined by ENAC.

7.2.3 Conducting flight operations

Drone flight operations can be managed by operators that are obliged to submit the Registration of UAS operator (List of UA Operators) to the National Civil Aviation Authority. The list includes the operators authorized to carry out specialized critical operations, as well as the operators who, pursuant to the ENAC Regulation, have made the declaration for non-critical specialized operations and for critical operations in standard scenarios.

Operators intending to conduct flight operations in ATZ or CTR are obliged to obtain the permission from the National Civil Aviation Agency prior to flight operations.

Remote pilot intending to conduct critical flight operations with drones weighting more than 300 g is obliged to pass the theoretical and practical examination at training centers approved by ENAC.

In order to pilot RPAS with UA having operating take-off mass less than 25 kg, in VLOS operations, it is necessary to hold the UA *pilot certificate*. In order to pilot UA having operating take-off mass more than or equal to 25 kg, it is necessary to hold the RPA *pilot license*. In the first case, the pilot has to show a medical record released by a AME (aero medical examiner) according to the standards of the license LAPL. In the second case, pilots shall have a valid medical certificate of third class. The pilot is at least 18 years old.

In uncontrolled airspace, VLOS operation are performed in daylight, up to maximum height of 120 m AGL, within maximum horizontal distance of 500 m, and shall be carried out safely, without causing damages to third parties. Higher distances and heights may be evaluated and authorized by ENAC as appropriate, following submission of an appropriate risk assessment by the RPAS operator

RPAS operations shall not be conducted:

- a) within ATZ-CTR and beneath take-off and landing paths or at a distance less than 6 km from the airport (from published geographical coordinates) longitudinally in both directions of track;
- b) within active restricted areas and prohibited areas.

When it is required to operate within airspaces listed above, operations shall be subject to specific authorization according to procedures published by ENAC in the [ENAC ATM-05A Circular](#). Further details are available in the [ENAC ATM-09 Circular](#).

The permits can be requested at least 30 working days before the planned date of activity to the competent [airport departments](#). Prior to the start of approved activities in controlled airspace, ENAC publishes the details by NOTAM (NOTice To AirMen).

The boundaries of CTRs and ATZs can be checked on [ENAV official website](#) and on [D-Flight website](#).

7.2.4 UA and Flight Operations Categorization and Requirements

Two distinct classes of drones are identified: the class of drones weighting less than 25kg and the class of drones with take-off mass equal to or greater than 25kg and less than 150kg.

The substantial difference between the two classes lies in the fact that while the drones belonging to the former can be used both for "non-critical operations" and for "critical operations", those with a take-off mass greater than 25kg instead cannot be used in operational scenarios critical.

"Non-critical" specialized operations are VLOS operations which do not overfly, even in case of malfunctions and/or failures:

- Congested area, gathering of persons, urban areas;
- Critical infrastructures

Critical operations are operations that do not respect the "non-critical" requirements.

In the case critical specialized operation does not fall into standard scenario, before commencing critical operations, the operator shall apply for and obtain the authorization by ENAC. For non critical operation and for operations in standard scenarios, the operator shall submit the declaration to ENAC with the dedicated module.

The LIC-15 circular issued by ENAC on 6 June 2016 defines the Classes and Categories of the various UA typology.

The classes are divided according to the OM (Operative take-off mass) which is the total weight of the APR including every type of accessory at the time of its use (gimbal, chamber, terminator, etc. ...).

- Class VL (Very Light) contains the APR with OM between 300 grams and 4 Kg.
- The L-Class (Light) includes the APR with a $4 \text{ kg} < \text{OM} < 25 \text{ kg}$.
- The H-Class (Heavy) includes APRs with $\text{OM} > 25 \text{ KG}$.

The Categories are divided according to the type of flight mechanics.

- The MC category represents multicopters
- The AP Category represents the Fixed Wing UA.
- Category HC represents the helicopters.
- Category AS represents the airships.

The piloting license or certificate is specific for a specific class and category.

Depending on the operative scenario and on type of drone used, the operator may perform air operations in accordance with the specific conditions and limitations defined by ENAC informative note [NI-2017-007](#) of 17 May 2017.

Model aircraft operator is responsible for obtaining any permissions concerning the electromagnetic spectrum for the frequency used by the radio-control and for the respect of any relevant obligations.

7.2.5 Duties and responsibilities of UA operator

The SAPR operator is the one who assumes the risk and the responsibility that derive from the regulations.

Before commencing “non-critical” operations, RPAS operator shall provide ENAC with the *declaration of compliance* to the applicable sections of this Regulation, where limitations and conditions for the intended flights are defined, including the necessary segregations of airspace when applicable. The above declaration is made by the operator by using the ENAC web site compulsorily (www.enac.gov.it), providing all information and data required by the procedure, including data of the RPAS identification plates.

The operator is responsible for the assessment of the risk posed by the operations and of the continued validity of the “non-critical” conditions.

The operator shall hold all the documents pursuant to Art. 11.8 of ENAC [Remote Aircraft Regulation](#) as applicable and shall keep them updated.

Before commencing critical operations, the operator shall apply for and obtain the *authorization* by ENAC unless the critical specialized operation does not fall into standard scenarios published by ENAC. In the latter case shall submit the *declaration*.

The occurrence reporting is responsibility of operator.

7.2.6 Duties and responsibilities of a UA remote pilot

The pilot puts his skills and competences at the operator's service. The pilot shall ensure the correct management of the RPA flight and the correct execution of the maintenance tasks. The pilot Certificate or License have a validity period of 5 years, unless otherwise specified by ENAC, and they can be renewed according to ENAC Regulation.

The pilot shall record his/her flight activity and he/she is not authorized to carry out specialized operations when he/she has not carried out at least three different flights with the UA during the preceding 90 days.

A remote pilot shall:

- (a) operate an Unmanned Aircraft in a safe manner, without jeopardizing life, health or property on the ground or in the air, and without disturbing the public order and peace,
- (b) operate an Unmanned Aircraft in accordance with applicable regulations, Flight Manual, Operations Manual and Maintenance Manual when applicable,
- (c) check the integrity of the Unmanned Aircraft System before flight,
- (d) check if the Unmanned Aircraft is marked in accordance with [Remote Aircraft Regulation](#),
- (e) secure the perimeter of the take-off and landing area,
- (f) collect all necessary information for the planned flight and make sure that weather and other conditions in the flight area ensure a safe flight conduct,
- (g) ensure that all equipment or cargo is properly attached to Unmanned Aircraft in a way to prevent unintentional drop off,
- (h) operate an Unmanned Aircraft in a manner to clear all obstacles during take-off or landing,
- (i) to constantly scan the airspace in which the flying of Unmanned Aircraft is conducted so as not to endanger other aircraft, and
- (j) give way to manned aircraft.

Remote pilot should not operate:

- (a) with more than one Unmanned Aircraft at once, and/or
- (b) within the area in which emergency response effort is being conducted.

7.3 The Italian legislation for navigation

The Italian central authority for the transport by sea is the Ministry of Infrastructures and Transports ("Ministry of Transports"). The Controlling Body of the Harbor Masters (Comando Generale del Corpo delle capitanerie di porto) is part of the Ministry of Transport and represents the competent authority for the vessels administrative regime. Local administration is distributed in a capillary structure related to the division of the coast into maritime zones (zone marittime), maritime districts (compartimenti) and administrative districts (circondari). The structure of Harbour Masters Corps, diffused on the 8000 km of Italian coast, consists in 11'000 internal staff.

The exercise of nautical activity in Italy is currently regulated by the "yachting code" Legislative decree n. 229 of 3/11/2017. This Decree review and integrate the previous legislation documents: the Law 172 of 8/7/2003, the "Recreational Boating Code" Decree 171 of 18/07/2005 (the transposition of the European Directive 2003/44/EC amending Directive 94/25/EC on the approximation of the laws, regulations and administrative provisions of the Member States relating to recreational craft) and the Legislative decree n. 5 of 11/01/2016 (the transposition of the European Directive 2013/53/EU on recreational craft and personal watercraft and repealing Directive 94/25/EC).

The "yachting code" Legislative decree n. 229 of 3/11/2017 can be rectified until the 13 august 2020. To facilitate the legislative work of the Member of Parliament and Senate, the Study Service – Infrastructure and Transport Research Office - of the Senate of the Republic has drawn up a text with suggestions to improve the Decree. The text is entitled "Supplementary and corrective provisions to the legislative decree revising the yachting code" and proposes for the first time the discipline of drones, qualified as "remote controlled yachting craft" and described as a yachting craft without on board command and at remote control. By now, this is the only mention of drones in the marine legislation (Dossier n 157 del Senato della Repubblica e della Camera dei Deputati, 2019).

The legislation assumes that a floating device that has a hull length of up to 10 meters is classified as a "natant" and therefore:

- it is not subject to registration, there is no "plate" (it is considered "movable property" as a bicycle)
- if the engine has a power lower than 40 hp, a boat license is not required to drive it. But if it is sailed beyond 6 miles from the coast, the license is mandatory.

7.4 Legal aspects of the use of drones in Croatia

The use of air drones in Croatia is regulated by the Ordinance on Unmanned Aircraft Systems (NN 104/2018).

The Ordinance lays down the conditions for the safe operation of unmanned aircrafts up to and including 150 kilograms and the conditions to be met by persons engaged in the flight operation of such aircraft.

This chapter provides an overview of the main legal information and requirements for UAS and for performing UAS operations in Croatia relevant to the Net4mPlastic project.

7.4.1 Legal sources for the use of drones in Croatia

The use of air drones (unmanned aircrafts) in Croatia is regulated by following Acts and Regulatory Acts:

- The Air Traffic Act (Official Gazette [NN 69/2009](#))
- The Act on Amendments to The Air Traffic Act ([NN 84/2011](#), [NN 127/2013](#), [NN 92/2014](#))
- The Ordinance on Unmanned Aircraft Systems ([NN 104/2018](#))
- and The Ordinance on Airspace Management (

The term unmanned aircraft (UA) is mentioned for the first time in the Croatian air traffic legislation in Act on Amendments to The Air Traffic Act (NN 84/2011) defining unmanned aircraft as a plane intended for the operation without pilot on the plane (Amendment to Article 2, Paragraph 2a) and unmanned aircraft systems as an unmanned aircraft with related devices (Amendment to Article 2, Paragraph 76a).

In the same Act the Title 8 named “*Unmanned Aircrafts, Unmanned Aircraft Systems and Aircraft Models*” and Subtitle “*General Conditions*” are added to Air Traffic Act (Article 93a) stating that the conditions for the safe use of unmanned aircrafts, unmanned aircraft systems and aircraft models and the conditions to be met by persons involved in the management of such aircrafts and systems shall be laid down by a regulation adopted pursuant to this Act.

The first regulations on unmanned aircraft systems are issued Act by the Minister of Sea, Transport and Infrastructure pursuant to Article 142, item 5 of the Air Traffic on 2015 (Ordinance on Unmanned Aviation Systems (Official Gazette 49/15 and 77/15).

Today, the new Ordinance on Unmanned Aircraft Systems (NN 104/2018) is in effect in Croatia and will be until the adoption of a European Regulations on this area. The Ordinance is highly harmonized with Implementing Regulation on the rules and procedures for the operation of Unmanned Aircraft Systems (UAS) in Europe adopted on 24 May 2019 and Delegated Regulation on unmanned aircraft systems and on third-country operators of unmanned aircraft systems adopted by the European Commission on 12 March 2019.

The implementation on rules and regulation on use of civilian drones in Croatian territory is under the competence of the Croatian Civil Aviation Agency (CCAA). Activities of CCAA include air traffic safety related tasks, especially certification, oversight and supervision with the objective of ensuring continuing compliance with the requirements of the air transportation and other air traffic related activities, keeping of all relevant registers and records, and any other task as defined under the Air Traffic Act.

7.4.2 Labeling UA

The operator must ensure that the UA involved in flight operations is marked with unflamable identification plate or identification label, for unmanned aircraft with operating weight up to 5 kg.

Identification plate or label of appropriate size which allows a clear identification of the data containing following information:

- a) for the UA with weight under 5 kg - the name, address and contact details of the operator or for the UA with weight => 5 kg - the name, address and contact details of the owner, and
- b) for the UA to perform flight operation categories C2 - a unique UA identification tag.

7.4.3 Conducting flight operations¹

Drone flight operations can be conducted by natural or legal persons according to Article 6 of Ordinance on unmanned aircraft systems (“Official Gazette”, number 104/18).

Operators intending to conduct flight operations categories B2 or C1 are obliged to submit the Registration of UAS operator ([FOD-FRM-005](#)) to the Croatian Civil Aviation Agency.

Operators intending to conduct flight operations category C2 are obliged to obtain the permission from the Croatian Civil Aviation Agency prior to flight operations ([FOD-FRM-003](#)).

Remote pilot intending to conduct flight operations categories C1 or C2 is obliged to pass the theoretical examination at the Croatian Civil Aviation Agency.

Ordinance on Airspace Management prescribes the obligation to establish an ad hoc structure in a controlled and uncontrolled airspace for drones operating mass greater than 900g, so flights of unmanned aircraft of all categories except A and B1 in uncontrolled airspace can be performed only with a prior The Airspace Management Cell (AMC) Croatia approval for establishment of ad hoc structure.²

If flights are performed:

- in uncontrolled airspace up to 120 meters above ground level or
- in controlled airspace outside circle of radius 5 km centered at aerodrome reference point up to 50 m above ground level

[automated procedure for establishment of an ad-hoc structure](#) - 5 minutes prior start of activities applies.

If flights are performed:

- in uncontrolled airspace above 120 meters above ground level or
- in controlled airspace within circle of radius 5 km centered at aerodrome reference point or
- in controlled airspace above 50 m above ground level

[regular procedure for establishment of an ad-hoc structure](#) - 7 working days prior start of activities applies.

¹ http://www.ccaa.hr/english/conducting-flight-operations_415/

² <http://www.crocontrol.hr/default.aspx?ID=3505>

The boundaries of controlled zones (CTRs) and responsible air traffic control units (ATC) for the Croatian Adriatic Area are as follows:

ATC Unit	Area of Responsibility
Brač TWR	Brač CTR
Dubrovnik TWR	Dubrovnik CTR
Lošinj TWR	Lošinj CTR
Pula TWR	Pula CTR
Rijeka TWR	Rijeka CTR
Split TWR	Split CTR
Zadar TWR	Zadar CTR

Information on aerodromes are available in [eAIP and VFR Manual](#).

7.4.4 UA and Flight Operations Categorization and Requirements

Depending on the needs and type of drone used the operator may perform air operations in accordance with the conditions shown in the following table.

Flight operation category	UNMANNED AIRCRAFT		PERFORMING FLIGHT OPERATIONS		REQUIREMENTS FOR REMOTE PILOT		REQUIREMENTS FOR OPERATOR	
	UA operative mass	The highest speed of an UA according to the manufacturer's technical specifications	Part of the day	Area of operation	Minimum age	Necessity of taking theoretical/practical exam	Obligation to record/ approve the operator	Operator documentation
A	OM < 250 g	< 19 m/s	By day or/and by night	Populated and/or unpopulated area	Not applicable	Not applicable	Not applicable	Not applicable
B1	250 g ≤ OM ≤ 900 g	< 19 m/s	By day	Unpopulated area	14 years or less but under adult supervision	Not applicable	Not applicable	Not applicable
B2	OM < 5 kg	Not applicable	By day or/and by night	Populated and/or unpopulated area	16 years	Not applicable	Records	Not applicable
C1	5 kg ≤ OM < 25 kg	Not applicable	By day	Unpopulated area	18 years	Passed theoretical knowledge examinations provided by the Agency	Records	Not applicable
C2	5 kg ≤ OM ≤ 150kg	Not applicable	By day or/and by night	Populated and/or unpopulated area	18 years	a) Passed theoretical knowledge examinations provided by the Agency b) Demonstration of flight preparation and flying	Approval	a) Operations Manual b) Flight records c) Safety risk assesment

7.4.5 Operator's duties and responsibilities

Operator's duties and responsibilities are specified in Article 9 of the Ordinance on UAS. An overview of the [Summarized requirements for flying UAS in Croatia](#) for all categories that is published on CCAA web site is shown on following pages.

Operator's requirements for the conduct of flight operations with unmanned aircraft systems

Category A

Unmanned Aircraft operating mass	The highest speed of an Unmanned Aircraft according to the manufacturer's technical specifications	Part of the day for conducting flight operations	Area of flight operations
OM < 250 g	< 19 m/s	Day and/or night	Unpopulated and/or populated area

<i>This list of requirements is of an informative character and does not release an unmanned aircraft operator from compliance with all applicable requirements defined in the Ordinance on Unmanned Aviation Systems and other applicable regulations</i>	Provisions of regulation imposing an obligation
Contract an insurance policy	Article 7. Regulation (EZ) 785/2004
Mark the unmanned aircraft with an identification label (Applicable to UAS weighting less than 5 kg) or Non-flammable identification plate containing the name, address and other operator's contact information	Ordinance on Unmanned Aircraft systems, Article 3
Equip the Unmanned Aircraft with lights that ensure the determination of orientation of the Unmanned Aircraft in airspace	Ordinance on Unmanned Aircraft systems, Article 8 (1)
Conduct all flights in accordance with the applicable regulations, flight manual or instructions for use	Ordinance on Unmanned Aircraft systems, Article 9 (1) a)
Conduct flight operations in a safe manner, without jeopardizing life, health or property on the ground or in the air, and without disturbing the public order and peace	Ordinance on Unmanned Aircraft systems, Article 9 (1) b)
Properly instruct the remote pilot for the conduct of light operations	Ordinance on Unmanned Aircraft systems, Article 9 (1) c)
Ensure the remote pilot's ability to conduct flight operations	Ordinance on Unmanned Aircraft systems, Article 9 (1) c)
Establish a reporting system on events related to safety in air transport	Article 4. Regulation (EZ) 376/2014
Mandatory documentation while conducting flight operations: <ul style="list-style-type: none"> - Flight Manual or instructions for use, - an insurance policy in accordance with the provisions of the Regulation (EC) No 785/2004 	Ordinance on Unmanned Aircraft systems, Article 15

Operator's requirements for the conduct of flight operations with unmanned aircraft systems

Category B1

Unmanned Aircraft operating mass	The highest speed of an Unmanned Aircraft according to the manufacturer's technical specifications	Part of the day for conducting flight operations	Area of flight operations
$250g \leq OM \leq 900g$	$< 19 \text{ m/s}$	Day	Unpopulated area

<i>This list of requirements is of an informative character and does not release an unmanned aircraft operator from compliance with all applicable requirements defined in the Ordinance on Unmanned Aviation Systems and other applicable regulations</i>	Provisions of regulation imposing an obligation
Contract an insurance policy	Article 7. Regulation (EZ) 785/2004
Mark the unmanned aircraft with an identification label (Applicable to UAS weighting less than 5 kg) or Non-flammable identification plate containing the name, address and other operator's contact information	Ordinance on Unmanned Aircraft systems, Article 3
Conduct all flights in accordance with the applicable regulations, flight manual or instructions for use	Ordinance on Unmanned Aircraft systems, Article 9 (1) a)
Conduct flight operations in a safe manner, without jeopardizing life, health or property on the ground or in the air, and without disturbing the public order and peace	Ordinance on Unmanned Aircraft systems, Article 9 (1) b)
Properly instruct the remote pilot for the conduct of light operations	Ordinance on Unmanned Aircraft systems, Article 9 (1) c)
Ensure the remote pilot's ability to conduct flight operations	Ordinance on Unmanned Aircraft systems, Article 9 (1) c)
Establish a reporting system on events related to safety in air transport	Article 4. Regulation (EZ) 376/2014
Mandatory documentation while conducting flight operations: <ul style="list-style-type: none"> - Flight Manual or instructions for use, - an insurance policy in accordance with the provisions of the Regulation (EC) No 785/2004 	Ordinance on Unmanned Aircraft systems, Article 15
Minimum age of the remote pilot: 14 years, or less than 14 years but under adult supervision	Ordinance on Unmanned Aircraft systems, Article 6

Operator's requirements for the conduct of flight operations with unmanned aircraft systems

Category B2

Unmanned Aircraft operating mass	The highest speed of an Unmanned Aircraft according to the manufacturer's technical specifications	Part of the day for conducting flight operations	Area of flight operations
OM < 5kg	Not applicable	Day and/or night	Unpopulated and/or populated area

<i>This list of requirements is of an informative character and does not release an unmanned aircraft operator from compliance with all applicable requirements defined in the Ordinance on Unmanned Aviation Systems and other applicable regulations</i>	Provisions of regulation imposing an obligation
Contract an insurance policy	Article 7. Regulation (EZ) 785/2004
Mark the unmanned aircraft with an identification label (Applicable to UAS weighting less than 5 kg) or Non-flammable identification plate containing the name, address and other operator's contact information	Ordinance on Unmanned Aircraft systems, Article 3
Equip the Unmanned Aircraft with lights that ensure the determination of orientation of the Unmanned Aircraft in airspace	Ordinance on Unmanned Aircraft systems, Article 8 (1)
Conduct all flights in accordance with the applicable regulations, flight manual or instructions for use	Ordinance on Unmanned Aircraft systems, Article 9 (1) a)
Conduct flight operations in a safe manner, without jeopardizing life, health or property on the ground or in the air, and without disturbing the public order and peace	Ordinance on Unmanned Aircraft systems, Article 9 (1) b)
Properly instruct the remote pilot for the conduct of light operations	Ordinance on Unmanned Aircraft systems, Article 9 (1) c)
Ensure the remote pilot's ability to conduct flight operations	Ordinance on Unmanned Aircraft systems, Article 9 (1) c)
Establish a reporting system on events related to safety in air transport	Article 4. Regulation (EZ) 376/2014
Mandatory documentation while conducting flight operations: <ul style="list-style-type: none"> - Flight Manual or instructions for use, - an insurance policy in accordance with the provisions of the Regulation (EC) No 785/2004 	Ordinance on Unmanned Aircraft systems, Article 15
Minimum age of the remote pilot is 16 years	Ordinance on Unmanned Aircraft systems, Article 6
Registration by the CCAA	Ordinance on Unmanned Aircraft systems, Article 13(2)

Operator's requirements for the conduct of flight operations with unmanned aircraft systems

Category C1

Unmanned Aircraft operating mass	The highest speed of an Unmanned Aircraft according to the manufacturer's technical specifications	Part of the day for conducting flight operations	Area of flight operations
$5 \text{ kg} \leq OM < 25 \text{ kg}$	Not applicable	Day	Unpopulated area

<i>This list of requirements is of an informative character and does not release an unmanned aircraft operator from compliance with all applicable requirements defined in the Ordinance on Unmanned Aviation Systems and other applicable regulations</i>	Provisions of regulation imposing an obligation
Contract an insurance policy	Article 7. Regulation (EZ) 785/2004
Mark the unmanned aircraft with a Non-flammable identification plate containing the name, address and other operator's contact information	Ordinance on Unmanned Aircraft systems, Article 3
Conduct all flights in accordance with the applicable regulations, flight manual or instructions for use	Ordinance on Unmanned Aircraft systems, Article 9 (1) a)
Conduct flight operations in a safe manner, without jeopardizing life, health or property on the ground or in the air, and without disturbing the public order and peace	Ordinance on Unmanned Aircraft systems, Article 9 (1) b)
Properly instruct the remote pilot for the conduct of flight operations	Ordinance on Unmanned Aircraft systems, Article 9 (1) c)
Ensure the remote pilot's ability to conduct flight operations	Ordinance on Unmanned Aircraft systems, Article 9 (1) c)
Establish a reporting system on events related to safety in air transport	Article 4. Regulation (EZ) 376/2014
Mandatory documentation while conducting flight operations: <ul style="list-style-type: none"> - Flight Manual or instructions for use, - an insurance policy in accordance with the provisions of the Regulation (EC) No 785/2004 	Ordinance on Unmanned Aircraft systems, Article 15
Minimum age of the remote pilot is 18 years	Ordinance on Unmanned Aircraft systems, Article 6
Passed theoretical knowledge examinations provided by Agency	Ordinance on Unmanned Aircraft systems, Article 6
Registration by the CCAA	Ordinance on Unmanned Aircraft systems, Article 13(2)

Operator's requirements for the conduct of flight operations with unmanned aircraft systems

Category C2

Unmanned Aircraft operating mass	The highest speed of an Unmanned Aircraft according to the manufacturer's technical specifications	Part of the day for conducting flight operations	Area of flight operations
5 kg ≤ OM ≤ 150kg	Not applicable	Day and/or night	Unpopulated and/or populated area

<i>This list of requirements is of an informative character and does not release an unmanned aircraft operator from compliance with all applicable requirements defined in the Ordinance on Unmanned Aviation Systems and other applicable regulations</i>	Provisions of regulation imposing an obligation
Contract an insurance policy	Article 7. Regulation (EZ) 785/2004
Mark the unmanned with a Non-flammable identification plate containing the name, address and other operator's contact information, and the unique identification mark for category C2 flight operations, which is assigned by the Croatian Civil Aviation Agency.	Ordinance on Unmanned Aircraft systems, Article 3
Equip the Unmanned Aircraft with lights that ensure the determination of orientation of the Unmanned Aircraft in airspace	Ordinance on Unmanned Aircraft systems, Article 8 (1)
Conduct all flights in accordance with the applicable regulations, flight manual or instructions for use	Ordinance on Unmanned Aircraft systems, Article 9 (1) a)
Conduct flight operations in a safe manner, without jeopardizing life, health or property on the ground or in the air, and without disturbing the public order and peace	Ordinance on Unmanned Aircraft systems, Article 9 (1) b)
Properly instruct the remote pilot for the conduct of light operations	Ordinance on Unmanned Aircraft systems, Article 9 (1) c)
Ensure the remote pilot's ability to conduct flight operations	Ordinance on Unmanned Aircraft systems, Article 9 (1) c)
Establish a reporting system on events related to safety in air transport	Article 4. Regulation (EZ) 376/2014
Mandatory documentation while conducting flight operations: <ul style="list-style-type: none"> - Flight Manual or instructions for use, - an insurance policy in accordance with the provisions of the Regulation (EC) No 785/2004 - Original or a certified true copy of the Agency Approval, if applicable, - Operations Manual 	Ordinance on Unmanned Aircraft systems, Article 15

<p><i>This list of requirements is of an informative character and does not release an unmanned aircraft operator from compliance with all applicable requirements defined in the Ordinance on Unmanned Aviation Systems and other applicable regulations</i></p>	<p>Provisions of regulation imposing an obligation</p>
<p>Minimum age of the remote pilot is 18 years</p>	<p>Ordinance on Unmanned Aircraft systems, Article 6</p>
<p>Passed theoretical knowledge examinations provided by Agency, and demonstration of flight preparation and flying</p>	<p>Ordinance on Unmanned Aircraft systems, Article 6</p>
<p>Develop and ensure that the operating manual is in compliance with applicable regulations, the flight manual or the instructions for use. Ensure availability of the operations manual for people involved in operator activities. Ensure familiarity of persons involved in operator activities with parts of the operating manual relating to their duties and responsibilities</p>	<p>Ordinance on Unmanned Aircraft systems, Article 12</p>
<p>Establish, implement and document the hazard detection and related risk management procedures</p>	<p>Ordinance on Unmanned Aircraft systems, Article 11</p>
<p>Establish a system of record-keeping</p>	<p>Ordinance on Unmanned Aircraft systems, Article 10</p>
<p>Obtain an approval for the conduct of category C2 flight operations from the CCAA</p>	<p>Ordinance on Unmanned Aircraft systems, Articles 6 and 14(4)</p>

7.4.6 Duties and responsibilities of a remote pilot

The duties and responsibilities of the remote pilot are regulated by Article 5 of Ordinance on UAS and In accordance with it

(1) A remote pilot shall:

- (a) operate an Unmanned Aircraft in a safe manner, without jeopardizing life, health or property on the ground or in the air, and without disturbing the public order and peace,
- (b) operate an Unmanned Aircraft in accordance with applicable regulations, Flight Manual or instructions for use and Operations Manual when applicable,
- (c) check the integrity of the Unmanned Aircraft System before flight,
- (d) check if the Unmanned Aircraft is marked in accordance with Article 3 of this Ordinance,
- (e) secure the perimeter of the take-off and landing area,
- (f) collect all necessary information for the planned flight and make sure that weather and other conditions in the flight area ensure a safe flight conduct,
- (g) ensure that all equipment or cargo is properly attached to Unmanned Aircraft in a way to prevent unintentional drop off,
- (h) operate an Unmanned Aircraft in a manner to clear all obstacles during take-off or landing,
- (i) to constantly scan the airspace in which the flying of Unmanned Aircraft is conducted so as not to endanger other aircraft, and
- (j) give way to manned aircraft.

(2) Remote pilot should not operate:

- (a) with more than one Unmanned Aircraft at once, and/or
- (b) within the area in which emergency response effort is being conducted.

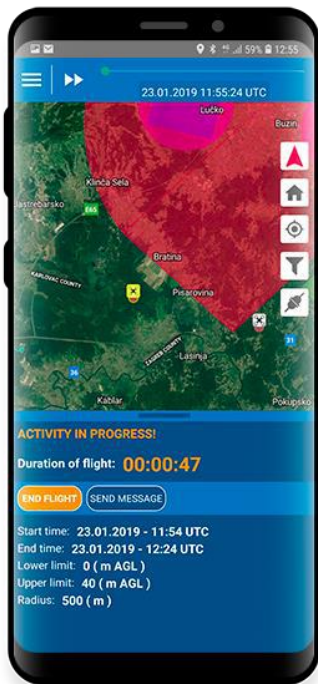
7.4.7 AMC Croatia approval for establishment of ad hoc structure

Automated procedure

[Automated procedure](#) of establishment of an ad-hoc structure and approval of activity real time on the day of activities is enabled through application AMC Portal Mobile.

Application AMC Portal Mobile is free of charge and you can start using it after following these 5 simple steps:

1. Register at CCAA as UAS operator. Contact is: uas@ccaa.hr,
2. Install application at your smart phone from [Google Play](#) or [APP Store](#),
3. Start Application,
4. Register or log in with your username and password. For the purpose of registration, you will have to send UAS operator's registration accepted by Croatian CAA to civaa@crocontrol.hr and
5. Read carefully and, if you agree, accept terms of use.



Detailed instructions and help desk contact are available within application.

Conditions and rules for automated procedure are published by aeronautical information circular.

For operations conducted at distance less than 3 km from runway edges/thresholds of uncontrolled aerodrome UAS operator must have aerodrome operator's approval.

Establishment and/or activation of ad hoc structure through automated procedure is promulgated on AMC portal only. Navigation warning by NOTAM is not published.

Regular procedure

In order to establish an ad hoc structure by regular procedure completed [request form](#), available only in Croatian language, shall be submitted to the Airspace Utilisation Department at least 7 working days before the planned date of activity. Request form shall be sent through [AMC portal](#) or if that is not possible by e-mail.

Tel: 01 6259 592, 01 6259 498

Fax: 01 6259 552

E-mail: civaa@crocontrol.hr

Working hours: From Monday to Friday 07:30 - 15:30 local time, except Croatian national holidays and CCL's vacation day between weekend and national holiday.

Prior to the start of activities in controlled airspace approved through regular procedure it is also necessary to obtain a tactical approval by phone from the competent ATC unit. Approval for establishment of an ad hoc structure will contain the telephone number of the [ATC unit](#) with which activity has to be coordinated. CCL publishes the details by NOTAM.

For operations within controlled aerodrome borders beside the request form it is necessary to send airport operator's consent in writing.

For operations conducted at distance less than 3 km from runway edges/thresholds of uncontrolled aerodrome UAS operator must have aerodrome operator's approval.

For operations conducted in uncontrolled airspace above 120 m AGL operator must have Croatian Civil Aviation Agency's approval.

In case the activity is cancelled, the organiser shall inform the Airspace Utilisation Department or [NOTAM Office](#) accordingly.

8 References

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