

2014 - 2020 Interreg V-A
Italy - Croatia CBC Programme
Call for proposal 2019 Strategic

MARLESS (MARine Litter cross-border awareN ESS and innovation actions)

Priority Axis: Environment and cultural heritage; Specific objective: 3.3 - Improve the environmental quality conditions of the sea and coastal area by use of sustainable and innovative technologies and approaches

5.1.4 Analysis of the Management of Waste on rivers and water basins from a Legislative perspective both in Italy and Croatia

Activity Number 5.1

WP Number 5

Version: FINAL

Distribution: PUBLIC

Date: 25/06/2023

PROJECT MARLESS

Work Package:	WP5 Cross-boundary Management Plan
Activity:	5.1 Analysis of the legislation and the related constraints
WP Leader:	PP1
Deliverable:	5.1.4 Analysis of the Management of Waste on rivers and water basins from a Legislative perspective both in Italy and Croatia

Version:	Final 1.0	Date:	25/06/2023
Type:	Report		
Availability:	Public		
Responsible Partner:	LP -ARPAV		
Involved Partner	PP1 - Ministry of Economy and Sustainable Development, MESD		
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If needed:

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European directives

1.1. Implementation of EU Directive 2019/904 (SUP – Single Use Plastic)

Approved on 21 May 2019, published in the Official Journal of the European Union on 12 June and entered into force on 3 July, with a deadline for transposition into national law within two years (July 2021).

The directive aims to combat marine litter pollution through 7 measures which include:

- Production ban in the EU as of 2021 of the following single-use plastic products and packaging (Article 5):

- cotton swabs (except those used for medical purposes);
- cutlery (forks, knives, spoons, chopsticks);
- dishes;
- straws, except those used for medical purposes;
- drink stirrers;
- poles for supporting balls, excluding balls for industrial or professional use;
- expanded polystyrene food containers, i.e. containers such as boxes with or without lids, used for foods ready for immediate consumption (including containers for fast food-type foods or for other meals ready for immediate consumption, with the exception of containers for drinks, crockery, packages and wrappers containing food);
- expanded polystyrene beverage containers and related caps and lids;

- cups for beverages in expanded polystyrene and related caps and lids.
- New design requirements for beverage containers up to 3 litres, with cap glued to the body of the bottle and minimum recycled material content (from 20% to 30%) (article 6);
- Marking obligations for plastic cups, tobacco (filters), wet wipes, sanitary towels and internal sanitary napkins, to inform consumers about the negative impacts in case of abandonment in the environment and to provide indications on correct disposal (within two years of entry in force of the directive);
- General reduction in the consumption of food containers and glasses (mugs) by 2026;
- Extended producer responsibility for non-prohibited products;
- Dedicated separate collection for plastic bottles (77% by 2025 and 90% by 2029);
- Awareness-raising measures to inform consumers and encourage them to adopt responsible behaviour in order to reduce waste dispersion and use alternative products to disposable solutions for: food containers, packages and wrappings in flexible material, beverage containers up to 3 litres, tobacco products, wet wipes, balloons, light shoppers and sanitary towels) (article 10).

It should also be noted that the decree, in art. 6 paragraph 5, provides that the collection and recycling system must guarantee that the post-consumer material relating to beverage bottles returns to the availability of the producers in order to allow the implementation of virtuous company policies in this sector aimed at achieving the related objectives to the recycled material content set at 25% by 2025 and 30% by 2030.

2. Italian national legislation

2.1 Legislative Decree n. 152/2006 laying down "Environmental standards" (better known as the Consolidated Environmental Text)

As far as waste is concerned, it should be noted that Legislative Decree no. 152/2006 establishes in the classification contained in article 184, paragraph 2, letter d), that urban waste is, among others, "waste of any nature or origin lying on roads and public areas or on roads and in any case subject to public or on the beaches of the sea and the lake and on the banks of the watercourses". From the combined provisions of the first two paragraphs referred to in art. 198 of the same Consolidated Law also shows that "The Municipalities contribute, within the sphere of the activities carried out at the level of the optimal areas referred to in article 200 and with the methods envisaged therein, to the management of urban and similar waste [...] and which provide for it with specific rules which establish in particular a) the measures to ensure hygienic-sanitary protection in all phases of urban waste management; b) the modalities of the urban waste collection and transport service [...]". In turn, the Regional Law n. 3/2000 as a result of the art. 7, paragraph 1, attributes to the Municipalities, through the Area Authorities, the competence relating to the management of urban and similar waste considering urban waste "all waste from street sweeping, or of any nature and

origin, lying on the streets and in its roads and private areas in any case of public utility or on coasts and lakes and on the banks of watercourses”.

2.2 Law 17 May 2022, n.60 - "Save the sea" law

On June 10, 2022, Law No. 60 of May 17, 2022 was published containing "Provisions for the recovery of waste at sea and in inland waters and for the promotion of the circular economy", which entered into force on June 25, 2022. Presented on 2018 by the then Minister of the Environment, Sergio Costa, and after a troubled process, it was definitively approved by the Senate.

The purpose of the law is to contribute to the recovery of the marine ecosystem and the promotion of the circular economy, as well as to raise awareness of the community for the dissemination of virtuous behavioural models aimed at preventing the abandonment of waste in the sea, lakes, rivers and in the lagoons and the correct management of the waste itself.

The law reiterates some definitions that also include inland waters:

- a) «accidental waste» means waste collected at sea, lakes, rivers and lagoons by nets during fishing operations and waste collected occasionally at sea, lakes, rivers and lagoons by any means;
- b) "voluntarily collected waste": waste collected through waste capture systems, provided they do not interfere with the ecosystemic functions of water bodies, and during the cleaning campaigns of the sea, lakes, rivers and lagoons of referred to in letter c);

- c) "clean-up campaign": the initiative aimed at carrying out cleaning operations of the sea, lakes, rivers and lagoons in compliance with the conditions set out in article 3;
- d) «awareness campaign»: the activity aimed at promoting and disseminating virtuous behavioural models for the prevention of littering in the sea, lakes, rivers and lagoons;
- e) "competent authority": the territorially competent municipality;
- f) "subject promoter of the cleaning campaign": the subject, among those authorized to participate in the cleaning campaigns of the sea, lakes, rivers and lagoons pursuant to article 3, paragraph 3, who submits to the competent authority the request referred to in the aforementioned article 3, paragraph 1;

Art. 6 Measures for the collection of floating waste in rivers

- 1 In order to reduce the impact of marine pollution deriving from watercourses, the Basin District Authorities introduce, in their planning documents, experimental measures in watercourses aimed at capturing floating waste, compatible with the plumbing and the protection of ecosystems, the implementation of which is also envisaged by the program referred to in paragraph 2.
2. In relation to the measures referred to in paragraph 1, by 31 March 2022 the Ministry of ecological transition will launch a three-year experimental program for the recovery of plastic in the rivers most affected by this form of pollution, also through the installation of floating instruments .

3. For the activities referred to in paragraph 2, the expenditure of 2 million euro is authorized for each of the years 2022, 2023 and 2024. The charges referred to in this paragraph are met by means of a corresponding reduction in the endowment of the current special fund, for the purposes of the three-year Budget Law 2021-2023, as part of the "Reserves and special funds" program of the "Funds to be disbursed" mission of the estimates of the Ministry of Economy and Finance for the year 2021, for the purposes partially making use of the relative provision to the Ministry of the Environment and the Protection of the Territory and the Sea.

According to what is reported in the Law Dossier, the abandonment of large quantities of waste in the marine environment "has recently taken on the dimensions of a complex and global challenge, the object of attention and a cause for widespread concern at all levels. are the main components of marine litter, which is estimated to account for up to 85% of marine litter found along coasts (beach), sea surface and ocean floor (marine litter). An estimated 300 million tonnes of plastic is produced every year around the world, of which at least 8 million tons are lost to the sea each year.

The Salva-Mare Law introduces two important definitions:

- "Waste caught incidentally" defined as "waste collected from sea, lakes, rivers and lagoons by nets during fishing operations and waste occasionally collected from sea, lakes, rivers and lagoons by any means";
- "Voluntarily collected waste" or waste collected through catchment systems, provided they do not interfere with the ecosystem functions of water bodies, and during the cleaning campaigns of the sea, lakes, rivers and lagoons.

Both wastes are classified as urban, in fact in the definition of art. 183, c.1 letter b-ter (definition of urban waste) now also includes "waste accidentally captured or voluntarily collected, also through cleaning campaigns, in the sea, lakes, rivers and lagoons".

In article 2, paragraph 1, the Law equates waste caught accidentally with waste from ships (from Directive (EU) 2019/883 of 17 April 2019).

Such waste can be delivered separately to the port reception facility. Pursuant to the same art. 2 for this activity it is not necessary to register in the National Register of Environmental Managers.

Accidentally captured waste is then returned to the vessel at an established physical location on land. In this regard, the law provides for two possibilities for disembarkation:

- Unloading in a commercial port, in this case the master of the ship or the driver of the unloading vessel recommends the waste accidentally caught at sea to the port facility for collection. In the case of mooring of a boat in areas not included in the territorial jurisdiction of a port system Authority, the territorially competent Municipalities, in the context of urban waste management, have, pursuant to art. that such waste is delivered to special collection facilities, even temporary, set up near the moorings.
- I disembark in a small non-commercial port, that is characterized only by a sporadic or low traffic of pleasure boats. In this case, the master or driver of the vessel shall send the incidentally captured waste to port reception facilities integrated into the municipal waste management system.

In the first case, the conferral of accidentally captured waste is free of charge for the conferrer, subject to weighing at the time of conferment. However, this gratuity for the supplier has costs that will be borne by the community, through a specific component that is added to the waste tax (TARI). This provision also takes the form of temporary storage of waste in compliance with the conditions set out in art. 185-bis of Legislative Decree 152/2006.

From a circular economy perspective, the art. 4 of the Law indicate that in order to encourage the recycling of plastic and other materials that are not compatible with the marine ecosystem and inland waters, within 6 months from 25 June, MITE with its own Decree will establish the criteria and methods by which waste caught accidentally and the waste collected voluntarily ceases to be classified as waste, pursuant to art. 184-ter of the aforementioned legislative decree no. 152/2006.

Management of collected voluntary waste

Such waste can also be collected through cleaning systems provided they do not interfere with the ecosystem functions of water bodies, and as part of specific cleaning campaigns organized on the initiative of the competent authority or upon request presented to the competent authority by the promoter of the campaign, according to the methods identified with a future MITE decree.

Pending the adoption of the decree, the activity covered by the application can be started after 30 days from the date of presentation of the same. These cleaning campaigns can be promoted by entities such as: entities managing protected areas, environmental associations, fishermen's associations, cooperatives and fishing companies, as well as their consortia, sport and recreational fishermen's associations, diving and boating sports associations, category, etc. .

Authorized promoters are also third sector entities as well as non-profit organizations of social utility, social promotion associations, foundations and associations whose purpose is to promote, protect and safeguard natural and environmental assets and other identified subjects by the institution.

Additional Provisions

Finally, the following additional provisions on:

collection of waste floating in rivers

- Establishment of reward measures to encourage the collection of waste in the water by the captains of fishing vessels
- Promotion of awareness campaigns
- Promotion of environmental education plans in schools
- Creation of a permanent inter-ministerial consultation table.

As regards the collection of floating waste in rivers, the sea-saving law establishes that, in order to reduce the impact of marine pollution deriving from watercourses, the district authorities introduce, in the planning acts, experimental measures in the rivers 'water aimed at the collection of floating waste in watercourses. spoil. MITE is entrusted with the launch of a three-year experimental program for the recovery of plastic in rivers, authorizing the expenditure of 2 million euros for each of the years 2022, 2023 and 2024.

2.3 Legislative Decree 8 November 2021, n. 196

Implementation of Directive (EU) 2019/904, of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment. (21G00210)

While not directly related to the management of plastics present in water bodies, this legislation can have an important effect on the generation of waste that could end up in surface water bodies.

Legislative Decree n.196/2021 came into force on 14 January 2022 and implements EU Directive 2019/904 on the reduction of the impact of certain plastic products on the environment.

The decree contains measures aimed at promoting the use of recycled plastic suitable for direct food contact in beverage bottles and applies:

- disposable plastic products
- oxo-degradable plastic products,
- fishing gear containing plastic.

The main provisions of the provision with reference to the immediate deadlines are shown below:

- Starting from 14 January 2022, the date of entry into force, the decree provides for a ban on the placing on the market of disposable plastic products listed in part B of the annex (cotton buds, cutlery, plates, straws, drink stirrers, for balloons, etc.) and oxo-degradable plastic products (art. 5, paragraph 1).

For these products, making them available on the national market will be permitted until stocks run out, provided that they were placed on the market prior to the effective date of the prohibition (Article 5, paragraph 2).

They do not fall within the prohibition referred to in paragraph 1 of the art. 5 products made of biodegradable and compostable material certified in compliance with the UNI EN 13432 standard and with the UNI EN 14995 standard in certain cases where it is not possible to use reusable alternatives to disposable plastic products.

- For products such as sanitary towels, tampons, wet wipes and tobacco products with filters (see annex part D) a marking requirement is established, again starting from 14 January 2022. Each product must bear a marking informing the consumer on the appropriate waste management methods in line with existing collection systems, as well as the forms of disposal and the presence of plastic in the product and the consequent negative impact on the environment of dispersion or improper forms of disposal (Article 7).

The making available on the national market of products that do not comply with the marking requirements is permitted until stocks run out, provided that it is demonstrated that they were placed on the market before the effective date of the obligation (Article 7, paragraph 4) .

3. Regional legislation

3.1 RESOLUTION OF THE REGIONAL COUNCIL n. 793 of 31 March 2009

The regional law concerns guidelines and clarifications regarding the identification of the Administration institutionally competent for the management of waste abandoned along the banks of watercourses and floating on surface waters.

Taking up the contents and purposes of the DGR n. 3309 of 12/23/2007, following requests for clarifications represented by some structures involved, the provision provides some indications regarding the administrative responsibilities of the Regional Offices of Civil Engineers, of the Reclamation Consortia, as well as of other subjects to which a competence in terms of control over the regular functioning of hydraulic works, with particular reference to the management of waste found in the respective areas of pertinence.

More than once, in fact, the succession over time of primary and secondary regulations and administrative acts, the not always unequivocal interpretation and application of the procedures, as well as the establishment, in some cases, of a practice accepted and shared between the various entities but not always compliant with the provisions of the law, they have generated a situation of uncertainty in the administrative action.

The objective of the regional regulation is to provide information and guidelines, including operational ones, aimed at homogenizing, simplifying, clarifying, as far as possible, behaviours and procedures, in the context of a correct division between the Region and the Municipalities of the respective competences.

From the results of the regulatory survey referred to in the DGR and mentioned above, the specific responsibilities of the various bodies emerge which are required to guarantee the correct management of waste abandoned along the banks of watercourses and floating on surface waters, as represented in the attached provision table (Annex A).

In consideration of the complexity and onerousness of the interventions under the responsibility of the Municipalities concerning the operations of collection, transport and disposal/recovery of waste floating on surface waters, where these do not impede the hydraulic regime of the watercourse concerned, the standard deems regional appropriate to guarantee, as anticipated in the aforementioned DGR 3309/2007, adequate forms of economic support for the expenses incurred by the Municipalities themselves, in analogy to what is already usually provided for in support of "urgent interventions to protect bathing conditions" or "beached ", drawing the necessary resources from the funds deriving from the so-called "Ecotax" (Law n. 549 of 12/28/1995 and Regional Law n. 3 of 01/21/20009).

In this regard, with reference to the interventions that have taken place since 01/01/2008, the Municipalities concerned will be able to submit a suitable request for funding to the competent offices of the Regional Environmental Protection Directorate, attaching the descriptive documentation, including photographs, of the circumstances that made necessary the collection and disposal of floating waste, as well as the accounting documentation certifying the expenses actually incurred.

3.2 ANNEX A to the Dgr n. 793 of 31 March 2009

Descriptive statement of the responsibilities of the various Bodies required to ensure the correct management of waste abandoned along the banks of watercourses and floating on surface waters

1. In the case of abandonment of urban and similar waste on the banks of watercourses, the subject institutionally competent for management, understood as the collection, transport, recovery and/or disposal of abandoned waste, and the Municipality in whose territory the discovery of the material. This without prejudice to the identification of the person responsible for the abandonment, on whose head, in this case, the obligation to remove the material and restore the state of the places will bear weight;
2. On the other hand, in the case of waste floating on surface waters, or transported in them, which is recognized by the competent hydraulic Authority as harmful to the hydraulic regime of the waters themselves or which, in any case, may jeopardize the functioning of the hydraulic works, it will be up to these Authorities (Offices of Civil Engineering, Forestry Services or Reclamation Consortia), or to the person responsible for managing the watercourse, building or hydraulic work, in the exercise of its supervisory, management and hydraulic maintenance functions, , assuming the relative expenses, to the waste management operations found, understood as collection, transport, recovery and/or disposal of the same.
3. The collection, transport and disposal/recovery intervention by the Municipalities is to be considered extended to the cases of waste floating on the surfaces, or in the waters transported

therein, which are not an impediment to the hydraulic regime of the watercourse concerned. So much, in consideration of the fact that the body of water is, to all intents and purposes, a public area that insists on the municipal territory and, therefore, the same regulation valid in the case of waste abandoned on the banks applies to the case in question.

4. For waste consisting of carrion and/or carcasses of dead animals while recalling that pursuant to art. 185, paragraph 2, of Legislative Decree No. 152/2006, the special discipline referred to in EC regulation no. 1774/2002 of 3 October 2002 for the purpose of correct elimination of the same in specially authorized plants, the subject institutionally competent for the relative removal and the subsequent phases aimed at correct elimination and the Municipality in whose territory the discovery of the material took place.

3.3 ANNEX A Regional Decree no. 988 of 09 August 2022 - Update of the Veneto Region Waste Plan

Article 20 - Provisions regarding waste lying on seashores, lakes and on the banks of watercourses

1. The Regional Council may identify appropriate funding to cover the costs of waste management activities lying on seashores, lakes and on the banks of watercourses.
2. The Regional Council defines with a specific resolution the criteria for access to regional funding by the Municipalities taking into account the main factors that influence costs, such as, by way of example, for sea and lake beaches, the length of the coast, the presence of river mouths in the municipal area and the extension of the hydrographic basin pertaining to them, the occurrence of extraordinary events of bad weather and possibly also the best results in waste collection and management.
3. The costs deriving from the collection and sending for recovery or disposal of urban waste lying on the banks of watercourses or floating impediments to the hydraulic regime must be divided among the Municipalities belonging to the same hydrographic network, according to elements agreed between them in the scope of a specific agreement/convention, considering the criteria identified by the resolution referred to in the previous paragraph.
4. They are excluded from the calculation of the separate waste collection percentage pursuant to article 205 of Legislative Decree no. 152/2006 and subsequent amendments and art. 39 of the Regional Law No. 3/2000 and subsequent amendments "waste of any nature or origin lying on

public roads and areas or on private roads and areas in any case subject to public use or on seashores and lakes and on the banks of watercourses" (Article 183 b-ter), point 4, of Legislative Decree no. 152/2006 and subsequent amendments).

5. In the face of an emergency situation caused by exceptionally large atmospheric events, the Regional Council can establish the priorities and the sums to be allocated to the municipalities referred to in paragraph 1 for the prompt overcoming of the environmental emergency that has occurred.

Article 27 – Fight against littering and measures to contain the dispersion of plastic waste

1. To encourage the fight against the littering of waste, in particular plastic, deposited on the banks of rivers and canals that potentially feed the shares of beached waste and the quantity of plastic that reaches the sea, the Region promotes the stipulation of agreements between the Councils Basin for waste management and reclamation consortia and other subjects competent in the field of surface water bodies with the aim of coordinating the various activities carried out, including cleaning and grass mowing activities, in order to avoid phenomena disintegration of abandoned waste by the mechanical means used for green maintenance.
2. The Basin Councils and/or the public service management bodies must envisage specific awareness-raising activities to combat the abandonment of waste.

3. The Region defines the operational procedures for implementing the provisions of Law no. 60 of 05.17.2022 and any access criteria to the Plan incentive fund identified in art. 10.

Plan objectives par. 3 1st Action Objective 1.4 "Reducing waste dispersion (pag.87.88.89 Annex A)

3.4. Containment of the production and dispersion of plastic waste

Action to be implemented on the basis of the rules contained in the programs of measures envisaged by Directive 2008/56/EC (framework directive for the strategy on the marine environment) and Directive 2000/60/EC (framework directive on water) it is essential to act on the reduction of waste dispersed at sea. In particular, the European Commission identified plastic as one of the priority areas for intervention within the Circular Economy Action Plan, proposing new reuse and recycling objectives for bottling waste as well as the intention to adopt "also measures to achieve the goal of significantly reducing marine litter". On 5 December 2017, the United Nations Environment Assembly then presented the "Resolution on marine litter and microplastics", in line with the Sustainable Development Goal 14.1, which aims, by 2025, to "prevent and significantly reduce marine pollution of all kinds, especially from land-based activities, including marine debris and nutrient pollution."

The European strategy for plastics in the circular economy, adopted by the European Commission on 16 January 2018, stems from the fact that "every year 5 to 13 million tons of plastic ends up in the oceans (representing 1.5% to 4 % of world production of this material", while in the EU the amount varies between 150,000 and 500,000 tonnes, a small percentage of global marine litter, but which ends up in particularly vulnerable marine areas, such as the Mediterranean Sea or the Arctic Ocean The phenomenon, continues the Commission, "is accentuated by the growing amount of plastic waste generated every year, also attributable to the growing diffusion of single-use plastic

products, for example packaging or other consumer products thrown away after a single short use, rarely recycled and liable to be released into the environment. These products include small packs, bags, disposable cups, lids, straws and cutlery, in which case plastic is widely used due to its light weight, low cost and practicality ". Disposable products, which tend to be used away from home and thrown into the environment, are the most common items found on beaches and are estimated to account for 50% of marine litter.

Plastics, especially disposable ones, and microplastics therefore represent a problem that has emerged in recent years on which particular attention is required and on which the PRGR must also adopt targeted control and containment actions, in particular to promote initiatives linked to the reduction of the use of in plastic, in particular disposable or in any case replaceable with reusable goods. In the 2010-2020 planning cycle, the Region has already provided incentives for the use of reusable tableware in events such as village festivals and festivals. This initiative could be extended to other ambitions also in relation to the possibility, offered by Law 141/19, the so-called Climate Decree, to allow purchases in reusable packaging brought from home by customers at large and small distribution. Also in this sense, actions coordinated with the regional health could be implemented.

The PRGR envisages support for initiatives, also coordinated between the various competent subjects, for the fight against littering and for the interception of waste abandoned in the area. Sensitive areas are the banks of canals and rivers, where large quantities of floating and abandoned

waste are often concentrated. In this sense, it is important to plan periodic cleaning campaigns, with costs divided among the municipalities crossed by the watercourse through special agreements.

It is also important to establish specific agreements between the various subjects in charge of waste collection and embankment mowing activities in order to avoid the shredding of any waste present by the mechanical means used.

In this context of contrast to marine littering and in general in surface waters, law n. 60 of 17 May 2022, called Salvamare.

The aforementioned law integrates the definition of urban waste provided for in article 183, paragraph 1, lett. b-ter) of Legislative Decree no. 152/2006 and subsequent amendments with: " 6-bis. "waste accidentally caught or voluntarily collected also through cleaning campaigns, in the sea, lakes, rivers and lagoons". Fishermen will be able to confer free of charge, after weighing, the waste caught at the port facility or, in the case of moorings outside the competence of a port system Authority, in special collection structures identified near the mooring by the territorially competent Municipalities. The costs for the management of these "new" wastes will be distributed among all citizens, with a specific component added to the tax or tariff on waste and regulated by ARERA.

A further element concerns the identification of the administrative procedures for the management and treatment of plant biomass deposited on the seashore and on the beach, of anthropic accumulations consisting of mineralized algae, sand, inert material or material of anthropic origin and plant products of agricultural or forest origin, deposited on the shores of lakes and rivers and sea shores.

The law also provides that the Basin District Authorities include in planning experimental measures for the capture of floating waste in rivers.

The update of the PRGR is in line with the principles of the Salvamare Law, it provides for the implementation of the operating methods through a specific provision in art. 27 of the Technical Implementation Standards and, moreover, provides for a specific line (Line 2) in the incentive fund of the Plan to support the fight against the abandonment and dispersion of waste.

Equally fundamental is the support for virtuous initiatives in the field of beverage containers with incentives for the provisions contained in Legislative Decree 196/2021, such as the obligation to ensure that beverage containers made of disposable plastic are designed and manufactured according to the requirements required and repossession of the post-consumer material to the manufacturer in order to achieve the goals of the minimum recycled content. In particular, special experiments may be envisaged to identify the most appropriate methods that can be implemented to ensure the return of the post-consumer material to the producers of beverage bottles.

Authorization procedure for river interventions

Like all the works to be carried out along a water course, the works for monitoring and collecting plastic waste along rivers or canals are subject to an authorization procedure which they may require (the list is representative and must be assessed on a case-by-case basis according to the constraints and managing subjects:

- Landscape authorization;
- Evaluation of impact or environmental incidence;
- Hydraulic authorization;
- State concessions;
- Permission to build;

4. Legislation in force in Croatia

Croatia is a member and signatory of a number of global and regional conventions, from UNCLOS and MARPOL to the Barcelona and London Conventions. On a European Union (EU) level, it has an obligation to implement EU directives on marine protection. Unfortunately, the existing international and national legislation regarding marine litter is not applied in practice at a satisfactory level. Activities related to the prevention of marine litter are carried out through the existing legal framework and strategic documents related to land-based waste management, as well as legal framework dealing with waste from ships. As is the situation on the Italian side, Croatia also implements measures related to riverine floating waste issue as well as measures related to river banks waste management issue. The legal acts regulating marine litter and or issues related to waste/litter disposal on the marine area in Croatia are the Waste Management Act (O.G., 2021) and Maritime Act (O.G., [181/04](#), [76/07](#), [146/08](#), [61/11](#), [56/13](#), [26/15](#), [17/19](#)) while notable contribution to said legislative provides also recently renewed Maritime Domain and Sea Harbours Act (O.G., 2023).

As is prescribed by the Croatian Waste Management Act, same as on the Italian side, urban waste management is given in charge to the municipalities leaving little room for the regional level responsibility in urban waste management procedures.

The more relevant EU directives on these issues are the Marine Strategy Framework Directive (MSFD)(2008/56/EC), Waste Framework Directive (WFD)(2008/98/EC) the new Port

Reception Facilities Directive (EU) 2019/883). The former being the one that establishes a framework for community action in the field of marine environmental policy. MSFD is transposed in Croatian legislative through Environment Act (O.G. 80/13, 153/13, 78/15, 12/18, 118/18), and through Regulation on the preparation and implementation of Marine protection and. Member states were obligated to take appropriate measures to achieve or maintain good marine environmental status (GES) by 2020, including those related to qualitative GES descriptor D10 (marine litter), as one of the important pressures on the marine environment. Croatia transposed obligations from the Marine Strategy Framework Directive into national legislation. Furthermore, during 2017, it adopted the Program of measures for protection and management of the marine environment and coastal area, which determines the measures necessary to achieve and/or maintain good environmental status as well as measures to achieve the objectives arising from the Protocol on Integrated Coastal Zone Management in the Mediterranean of the Convention for the Protection of Marine Environment and Coastal Region of the Mediterranean (O.G., 8/2012). The Program of measures includes inter alia key measures connected to the implementation of pilot actions for cleaning and disposing of marine litter, i.e., the collection of litter both from the coastal region and from the sea both through clean-up campaigns and/or trawling. Water Framework Directive (WFD)(2000/60/EC), being relevant for water quality of surface waters which, among others, include coastal marine waters, unfortunately doesn't meddle with waste/litter problem. The latter Directive was transposed in Croatian legislative through Water Act(O.G. 66/19, 84/21, 47/23)

The Convention on the Protection of the Marine Environment and the Coastal Area of the Mediterranean (Barcelona Convention) and accompanying protocols are the legal basis for broad multilateral cooperation between the contracting parties (21 Mediterranean countries and the EU) in protection and management of the marine and coastal area of the Mediterranean through the Mediterranean Action Plan of the United Nations Environment Program (UNEP/MAP). Article 8 of the Barcelona Convention is referred to the pollution from land-based sources and it states that the Contracting Parties shall take all appropriate measures to prevent, abate, combat and to the fullest possible extent eliminate pollution of the Mediterranean Sea Area and to draw up and implement plans for the reduction and phasing out of substances that are toxic, persistent and liable to bioaccumulate arising from land based sources. These measures shall apply to pollution from land-based sources originating within the territories of the Parties, and reaching the sea directly from outfalls discharging into the sea or through coastal disposal or indirectly through rivers, canals or other watercourses, including underground watercourses, or through run-off; and also to pollution from land-based sources transported by the atmosphere.

In the framework of Protocol on the Protection of the Mediterranean Sea from Pollution from Land-Based Sources and Activities the so-called LBS Protocol (O.G. [12/93](#)), the Regional Plan on Marine Litter Management in the Mediterranean was adopted defining in detail the goals and measures that need to be taken in order to prevent and reduce pollution of the sea from land. According to its Article 9 - Prevention of marine litter of the Part II – Measures and operational targets, the Contracting Parties shall, beside others, take necessary measures to establish as appropriate adequate urban sewer, wastewater treatment plants, and waste management systems

to prevent run-off and riverine inputs of litter by the year 2020 and related to Land-based sources. Also, related to Sea-based sources, the Contracting Parties shall take enforcement measures to combat dumping in accordance with national and regional legislation including littering on the beach, illegal sewage disposal in the sea, the coastal zone and rivers in the area of the application of the Regional Plan. Croatia also transposed the Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft (by succession O.G. [12/1993](#)) as well as its Amendments (O.G. [17/1998](#)). Some of the provisions of the former are transposed by aforementioned Maritime Act and Maritime Domain and Sea Harbours Act.

The Water Area Management Plan's (WAMP) production and its execution are established by Water Act. WAMP is a planning document that is adopted for a period of six years, and it prescribes, among others, the methodology for analyzing the features of the water area, the program of measures including basic and supplementary measures, the competent authorities for the implementation of the Water Act and the competent authorities of all international bodies (river basin commissions) in which the Republic of Croatia participates. On the basis of Article 39, paragraph 1 of the Water Act the Government of the Republic of Croatia passed a decision in June 2023 on the adoption of the Water Area Management Plan for period until 2027. As an integral part of that Plan, and for the purpose of improving monitoring to the level necessary for efficient and credible water management, a new Monitoring Plan as well as a Program of measures were published. In addition to the basic measures, supplementary measures were also added, including

5.4.1. Supplementary measure for harmonizing the monitoring of water conditions, where the

Establishment of monitoring of floating litter on terrestrial surface waters in the period 2022 - 2024 is listed, and the competent authority for implementation is Croatian Waters. Croatian Waters would be a State level public legal entity in charge of water management. Aformentioned measures contain activities such as floating riverine litter collection by means of maintenance of protective surface grids placed upstream of water power stations dams. These protective grids are mainly under the domain of Croatian electric power authority (HEP) that accordingly to the WAMP contributes plan and even more carries out subsequent waste sorting activities. Where no protective surface grids are in place, Croatian Waters envisaged and implements instalations of surface barriers for the purpose of floating waste collection. In these cases, maintenance and subsequent treatments of collected waste is organised by Croatian Waters. Croatian Waters are also, accordingly to the Waste management plan as well as WAMP, in charge of riverine litter collection on any and all river embankment on the Croatian territory.

That being said, same as on the Italian side, microplastics present a significant water and marine environment problem that has been largely pronounced in recent years. Although MSFD requires marine water monitoring of microplastic as well as GES achieved regarding to marine litter quantities in the marine waters, being aware of riverine input of microplastics in marine environment, water protection policy conducted through both Water Framework Directive and through Council Directive 91/271/EEC concerning urban waste-water treatment is starting to tackle the microplastics problem and discuss its solution.

Without taking in the account the microplastics input by riverine waters issue, objectively, the major threat that riverine litter poses on marine environment on the Croatian part of the

Adriatic are the neighbouring rivers, meaning rivers that are being shared by neighbouring countries. Notably River Neretva being the mayor riverine litter threat to the litter input in the eastern Adriatic. Such issues are usually approached by cumbersome and protracted intergovernmental negotiations and understandings and gave poor results so far.

The Ministry of the Sea, Transport and Infrastructure actively implements environmental protection measures related to the reduction of harmful impacts when it comes to navigation in inland waters, as well as navigation safety measures, which actively protects and preserves the environment, and environmental protection and water quality of inland waters is carried out through appropriate application the goals of water and river protection determined by the regulations governing the management of water, the environment and the coastal area and environmental protection. In order to establish general and regional rules, measures, recommended practices and procedures with the purpose of suppressing, reducing and monitoring pollution of internal waters and the environment by pollutants from sources on land, from ships, by submersion, from the air or by air and pollution caused by activities on the bottom, the Republic of Croatia cooperates with countries in the region, and participates in the work of regional and world international organizations. Also, the Republic of Croatia encourages regional cooperation, in order to adopt joint emergency action plans in cases of accidents that cause environmental pollution, and with special measures protects sensitive ecosystems, habitats of species and other forms of life on inland waters.

Navigation safety and environmental protection from pollution from inland navigation facilities are performed by port authorities on inland waters under the competent unit of the Ministry of Sea, Transport and Infrastructure, as prescribed by the Act on port authorities NN 2018/118, part two, article 4. Fundamentals of organization.

In the basic act related to the pollution of inland waters caused by navigation (from a navigable object), the Act on Navigation and Ports on Inland Waters, NN no. 144/21 in Chapter III Protection against pollution from inland navigation facilities, the procedure in case of water pollution from navigable facilities is regulated.

When it comes to water pollution from vessels on inland waters, in addition to the above-mentioned legal acts, there are also internationally binding documents that contain provisions which facilitate issues related to this topic. Such are treaties and acts of the Danube and Sava Commissions, bilateral agreements and other supporting by-laws and the EU acquis, as well as international instruments in the field of inland navigation, safety of inland navigation and protection against pollution from facilities, and finally also navigational customs that are applied on some parts of the waterways prescribed by local rules within the framework of by-laws.

Depending on the situation, in addition to the port authorities, the environmental protection inspection and other services are included in the rescue procedure in case of imminent danger for environmental pollution, which depends on the situation, the source of pollution, and other elements.

5. Planned activities

Further to the previously stated legal provisions related to pollution of inland waters caused by navigation (from vessels) and taking into account the adopted goals as part of the defined measures and activities arising from the Strategy for the Development of River Transport in the Republic of Croatia from 2022 to 2032 and the Mid-Term Plan for the Development of Water of roads, ports and piers of the Republic of Croatia for the period from 2022 to 2031 with the corresponding Action Plan, the plan is to implement project activities for the improvement of the waste disposal system that are implemented in port administrations of inland waters as part of measure C1.4. R3-I4 "Equipping ports and piers with infrastructure for waste disposal" through the National Recovery and Resilience Plan (NRRP) 2021-2026, as follows:

1. Equipping ports and piers in the jurisdiction of the Slavonski Brod Port Authority with waste disposal infrastructure.

Location: Brod-Posavina County, Davor Municipality. Project implementation period: June 2021- June 2026.

Project description: The project envisages the construction of infrastructure for the reception and disposal of waste at the Davor pier. The project activities include the creation of project-technical documentation, the arrangement of the coast and the city-type embankment on the left bank of the Sava River, the construction of an access road and accompanying infrastructure facilities, the construction of a covered area of approx. and shafts for sanitary-fecal water on the coast with

pumps with a capacity of approx. 5 m³/h, arrangement of access traffic areas and locations for vehicles that will accept waste and carry out maintenance. A pontoon with an access bridge will be placed parallel to the new coastal fort for the purpose of docking vessels. The execution of the works is accompanied by the creation of a Waste Management Plan and the holding of a workshop to inform users.

2. Equipping the port and wharves in the port area of the port of Osijek with waste disposal infrastructure

Location: Osijek-Baranja County. Project implementation period: June 2021-June 2026.

Project description: It is planned to create project documentation and the necessary studies, as well as the construction of the infrastructure and the procurement of the necessary equipment for the reception and disposal of waste from vessels in the port of Osijek. A waste management plan in the port of Osijek will also be created. The works and the procurement of equipment include the arrangement of the existing coast, the arrangement of approx. 300 m² of access traffic areas and locations for vehicles that will accept sanitary-fecal water and maintain the separator, the construction of a covered area of 50 m² for containers for selected waste and the acquisition of tanks, the acquisition of equipment for functioning of the waste reception terminal, horticultural arrangement and creation of a waste management plan.

3. Construction of a protective pier for the purpose of collecting waste from vessels in the port of Vukovar

Location: Vukovar-Srijem County. Project implementation period: June 2021-June 2026.

Project description: The project plans to build a terminal for the reception of waste in the port of Vukovar, on the part of the port area where the coast is not regulated. The basic elements of the project are: arrangement of the coast of approx. 185 m, equipping the embankment/coast with construction and mooring elements for safe and unhindered docking of vessels, installation of a pontoon and an access bridge along the embankment/coast if the conceptual solution with a floating object is selected, arrangement of a covered area of 50 m² in which containers for selected waste will be placed and acquisition of tanks, construction of an impermeable shaft on the coast with an installed pump with a capacity of 5 m³/h for oily water and shafts for sanitary-fecal water with associated equipment, and arrangement of traffic areas and locations with a surface area of cc 300 m² where waste collection vehicles are located.

The Port Authority of Slavonski Brod, through the CEF project "Development of studies and project documentation for the needs of the construction of a terminal for dangerous goods in the port of Slavonski Brod", is preparing study and project documentation for the construction of the Terminal for dangerous goods in the port of Slavonski Brod, which will include the infrastructure for waste collection. The planned intervention includes the upgrading of the existing infrastructure in the port of Slavonski Brod with adequate facilities to ensure the reception and temporary storage of waste from ships and oily and sanitary wastewater.

6. Conclusions

As part of a wider waste management system on land, including marine litter as link of that chain, inland water litter accumulation is being one of the global environmental threats causes not only social and environmental problems but also serious economic effects to the countries concerned. It is detrimental to countries economies whose tourism, fisheries, aquaculture and shipping are their strategic development resources. The economic impacts of inland water debris should be approached far more seriously and strategic guidelines for future sustainable management of the inland waters and seas are indispensable.

Republic Croatia, with its Adriatic coastline and the rivers that flow into it, being a Mediterranean country as well as a member state of the European Union still lacks adequate integral strategic framework for both inland water and marine debris management. The European Union documents regulating the issue should serve as starting guidelines to shape an efficient strategy. Taking into consideration the importance of the inland waters and marine litter transboundary nature, it is clear that a successful strategy, apart from the efforts of a particular country also requires a transboundary cooperation of all countries in the region.

The results of the analysis of the state of the art in Croatia in the field of strategic tackling of the inland waters and marine litter management issue are applicable to the countries with similar problem. Thus, in order to prevent economic losses caused by the lack of a strategic framework the following measures are necessary: the establishment of a continuous and reliable inland waters and

marine litter monitoring; the establishment of credible regional databases; harmonization of data within all coastal regions, well established multi-sectoral cooperation (including joint action by several relevant ministries); coordinated horizontal cooperation tackling inland waters and marine litter from all sources; systematic planning of investments in waste management infrastructure based on circular economy principles; intensive awareness raising activities.

The measures in Croatia undertaken so far should achieve favourable results so that it will manage to provide the envisaged strategic framework in compliance with the European Union marine policy in joint efforts to contribute to preservation of the Adriatic Sea and the economic value it has as development resource for Croatia and all the countries of the region.