



Project co-financed by the EU

# LAYMAN'S REPORT

## DELIVERABLE DD1.3

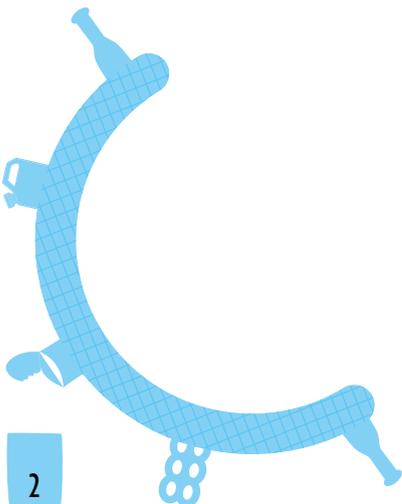
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October 2019, San Sebastian, Spain



[www.lifelema.eu](http://www.lifelema.eu)

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## THE LIFE LEMA PROJECT

### THE LIFE PROGRAMME AND THE LIFE LEMA PROJECT

The LIFE programme is the EU's funding instrument for climate and environmental protection created in 1992. The current Environment and Climate Action Programme (LIFE) corresponds to the period 2014-2020. Its objective is to contribute to sustainable development and to achieving the objectives and goals in the areas of environment and climate by promoting policies and new technologies in the search for solutions.

The LEMA Life project was approved in September 2016 with a total investment of 2.1 million Euros, of which 1.2 millions are co-financed by the European Union. Its strategic objective is to define a methodological guide and smart tools for local authorities, to support the efficient management of floating marine litter in the southeast waters of the Bay of Biscay during its duration (2016-2019).



### OBJECTIVES

Life LEMA aimed to provide local administrations with a methodological guide and prediction tools for the efficient management of floating marine litter through the pilot experiment in the southeast waters of the Bay of Biscay. The location of the Life LEMA project has helped to boost the search for solutions to marine litter in trans-boundary waters, promoting collaboration and dialogue through meetings of groups of experts.

#### The project objectives were to:

- ≈ Establish statistical models to predict the movement and accumulation points of floating marine litter.
- ≈ Develop a computer tool to integrate data on floating marine litter collection, detection and prediction methods.
- ≈ Design management plans to prevent and reduce floating marine litter.
- ≈ Show sustainable marine litter collection actions that will reduce the carbon footprint and provide fishers with an additional source of income.
- ≈ Use innovative technologies to detect floating marine litter.
- ≈ Establish a European network of entities that work with marine litter to ensure that the results can be useful in other areas.

## PROJECT LOCATION

The project takes place in two adjacent regions in the southeast of the Bay of Biscay, in Guipuzcoa (Spain) and the region of Pyrenées Atlantiques department (France).

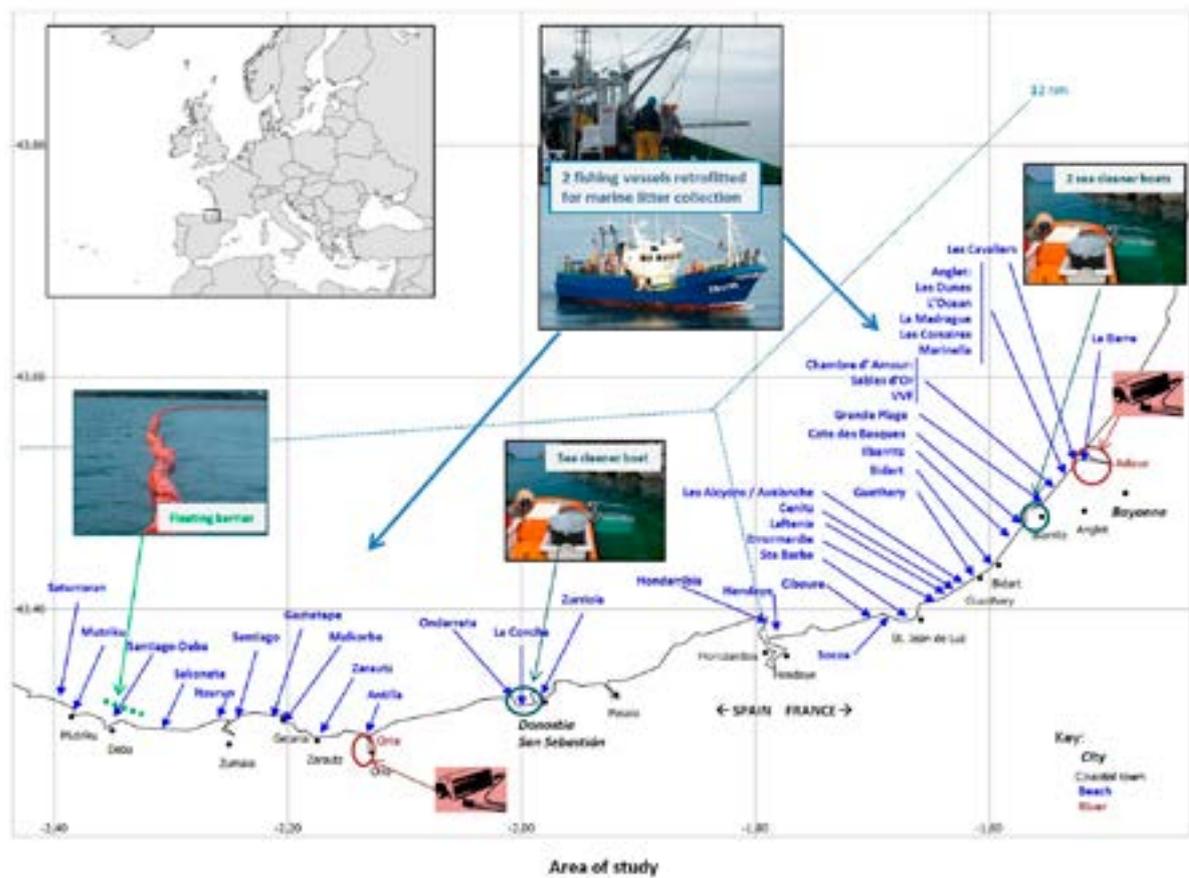


Illustration 1. Work Area of LIFE LEMA

### WHY HAS THE LIFE LEMA PROJECT BEEN CARRIED OUT?

#### MARINE LITTER: THE PROBLEM

The European Environmental Agency (EEA)<sup>1</sup> estimates that between 8 and 10 million tons of marine litter end up in the world's seas and oceans every year. However, sources show figures of up to 12 million<sup>2</sup> tons due to inadequate waste management<sup>3</sup>. Plastic items are the most common type of litter in the marine environment, accounting for 70% of marine waste.

The definition of marine litter is *any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment. Marine litter consists of items that have been made or used by people and deliberately discarded into the sea or rivers and beaches; brought indirectly to the sea with rivers, sewage, storm water or winds; or accidentally lost, including material lost at sea in bad weather (fishing arts, cargo), or deliberately left by people on the beaches and shores*<sup>4</sup>.

Marine litter can be found in all seas and oceans without distinction, producing different types of impacts on the environment, on marine species, on the local economy and the health of people. According to the UN Environment Programme (UNEP), 15% of the waste that flows into the sea ends up on the shore, another 15% floats on the surface, and the remaining 70% are trapped in the bottoms, sinking into the seabed. In other words, we just see the tip of the iceberg; society is not aware of the real dimension of the problems associated with marine litter<sup>5</sup>.

The Bay of Biscay, above all, is an area of great interest, as it concentrates numerous activities linked to small-scale, commercial fishing and tourism, where the impact of marine litter has numerous effects on local economies<sup>6</sup>. An average of 712 items of marine litter can be found on the Atlantic coast, along a one-hundred metre strip of beach<sup>7</sup>. Thus, it is essential to have a healthy environment for these activities to be carried out.

1 <https://www.eea.europa.eu/es/senales/senales-2018-el-agua-es-vida/infografias/recogida-de-datos-sobre-basura-marina/view>

2 Jambeck J, Perryman M, Geyer R, Wilcox C, Siegler TR, Andrady A, Narayan R, Lavender Law K. 2015. Plastic waste inputs from land into the ocean. *Science*. 347(6223):768–771. doi: 10.1126/science.1260352

3 *Towards a pollution-free planet, UNEP/EA.3/25, 2017*

4 *Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, Washington DC, 1995*

5 <https://www.eea.europa.eu/es/senales/senales-2014/en-detalle/basura-en-nuestros-mares>

6 Galgani F, Hanke G., Werner S., Vrees L., 2013. Review marine litter within the European marine strategy framework directive. *ICES J Mar Sci*. 70(6):1055–1064. doi: 10.1093/icesjms/fst122

7 <https://www.eea.europa.eu/es/senales/senales-2014/en-detalle/basura-en-nuestros-mares>

## MARINE LITTER: MANAGEMENT

The UN General Assembly acknowledged the problem of marine litter at an international level for the first time in 2005, in its Resolution on Oceans and the Law of the Sea, of November 2005, fostering decision-making to tackle the new challenge arising from the consumer system. The global action plan to tackle the new impact of marine litter took shape in 2011 with the Strategy of Honolulu<sup>8</sup>, a worldwide framework to reduce and manage marine litter.

At a European level, the Framework Directive on Marine Strategy<sup>9</sup> recognised the problem of marine litter, identifying it as one of the 11 necessary descriptors to attain Good Environmental Status of the marine environment in 2020. The member-states presented a programme of measures to tackle the problems<sup>10 11</sup>.

Insofar as the management of marine litter, and floating litter in particular, is concerned, no specific legislation exists. The legislations that must be referred to are the ones on the management of solid waste, which is not surprising considering that it is estimated that 80% of the waste comes from land<sup>12</sup>. European legislations request the identification of the sources of generation and accumulation<sup>13</sup> as well as the definition of a strategy to search for solutions in terms of prevention and management. In general, competences on waste management are decentralised, leaving the work of reaching an ad hoc and efficient prevention and management in the hands of local administrations. This entails considerable investment of the public expenditure resulting from the collection, transport and operating costs. With regards to marine litter, in 2016, an annual cost of 630 million Euros was estimated just to clean beaches on European coasts<sup>14</sup>. Considering that, precisely due to plastics, the production and their introduction into the environment continues to grow exponentially<sup>15</sup> the cost prediction for the management increases correspondingly.

This was the starting point for the creation of the LIFE LEMA coalition whose aim was to gather together a group of heterogeneous players to define a tool for local administrations, in order to support the efficient management of floating marine litter.

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8 [https://marinedebris.noaa.gov/sites/default/files/publications-files/Honolulu\\_Strategy.pdf](https://marinedebris.noaa.gov/sites/default/files/publications-files/Honolulu_Strategy.pdf)

9 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0056&from=EN>

10 <https://www.miteco.gob.es/es/costas/temas/proteccion-medio-marino/basuras-marinas/basura-programas.aspx>

11 <http://www.dirm.memn.developpement-durable.gouv.fr/IMG/pdf/MMN.pdf>

12 [https://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/pdf/Marine\\_litter\\_vital\\_graphics.pdf](https://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/pdf/Marine_litter_vital_graphics.pdf)

13 <https://eur-lex.europa.eu/legal-content/ES/TXT/PDF/?uri=CELEX:32018L0851&from=ES>

14 [https://www.un.org/depts/los/general\\_assembly/contributions\\_2016/European\\_Union\\_Contribution\\_to\\_ICP\\_on\\_marine\\_debris.pdf](https://www.un.org/depts/los/general_assembly/contributions_2016/European_Union_Contribution_to_ICP_on_marine_debris.pdf)

15 <https://www.ellenmacarthurfoundation.org/news/the-new-plastics-economy-rethinking-the-future-of-plastics-infographics>

### HOW HAS THE WORK BEEN DIVIDED UP?

#### LEADERSHIP (REGIONAL COUNCIL OF GUIPUZCOA)

The Regional Council of Guipuzcoa, project leaders, is responsible for developing the Integrated Urban Waste Plan, for coordinating with the municipalities and for promoting waste treatment infrastructures. Within the framework of Life LEMA, the Department of the Environment and Hydraulic Works is responsible for managing the project. The Council has supervised the development of actions, and acts as spokesperson for the LEMA working group with respect to the European Community.



#### TECHNOLOGY AND RESEARCH (RIVAGES PRO TECH AND AZTI)



AZTI is a specialised technology centre in the Basque Country (Spain), belonging to the Tecnalia corporation. Within Life LEMA, AZTI is responsible for the technical coordination of the project. Among other tasks, it is responsible for defining tools to anticipate the evolution of floating marine litter and to select the waste collection technology that will be installed in waste fishing vessels, monitoring the latter's energy consumption, and estimating the carbon footprint of eliminating floating marine litter. It was also responsible for installing a floating barrier in Deba.

The Rivages Pro Tech (RPT) research centre, located in Bidart (France) is a technical-scientific centre that forms part of the SUEZ Eau France group, specialised in the aquatic environment, bathing waters and port areas. Within the framework of Life LEMA, RPT has collaborated with AZTI in modelling and statistics systems to understand the accumulation of marine litter in the Bay of Biscay. It has also implemented a floating marine litter alert and detection system to cope with extreme events and monitor them using drones.

#### FIELD EXPERIENCE (VILLE DE BIARRITZ AND KOSTA GARBIA)

The Biarritz City Council (France) is a public administration that is actively involved in coastal protection. Within the Life LEMA framework, Biarritz City Council has been responsible for forming an advisory group that has permitted the validation of results, maximising the dissemination of the project achievements. Like the Regional Council of Guipuzcoa, it was responsible for defining the creation of the Life LEMA management tools.

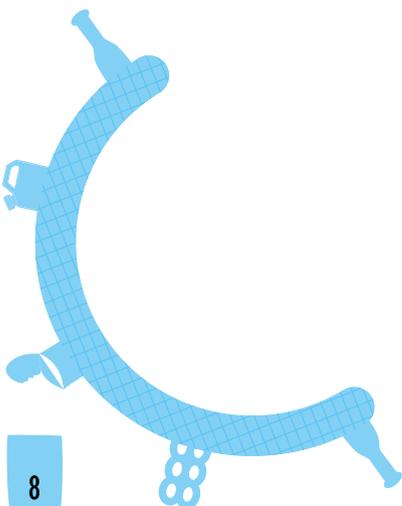




The Kosta Garbia Mixed Trade Union, located in Bayonne (France), is a centre of environmental and coastal resources of the Pyrenées Atlantiques department. Through Life LEMA, Kosta Garbia shares its experience in the use of fishing vessels to collect marine litter. It also collaborates in the project by selecting the marine litter collection technology that has been installed in the vessels.

### INTERNATIONAL EXPERTS AND DISSEMINATION (SURFRIDER EUROPE)

Surfrider Foundation Europe (SFE) is a non-profit organisation at European level, with headquarters in Biarritz (France), dedicated to the protection of the oceans, the sea, the waves and coasts. At project level, it has coordinated the communication of the project and the awareness-raising of the public in general, informing about the problems, promoting collaboration of citizens through volunteer activities and citizen science. Finally, it has coordinated the meetings of the groups of experts on marine litter, which have supported analysis to seek solutions to the problems, as well as international policies.



## RESULTS OF LIFE LEMA?

### THE LEMA AND LEMA TOOL TECHNOLOGY

The project has permitted the development of techniques and technologies to predict, detect, analyse and collect floating marine litter, as well as to test them together. One of the main results of the project has been the tool to predict and detect floating marine litter, defined as LEMA TOOL. This tool, which could be extremely useful for the administrations, has been associated with the application of collection methodologies to identify the best synergies in terms of applicability, cost efficiency and analysis, and benefits. The LEMA technology includes, more precisely:

1. **LEMA TOOL**, which permits storing and centralising the monitoring data on floating marine litter, meteorological parameters, video-detection system data, etc. The monitored data, stored in an ocean metadata modelling system, permit the prediction of potential areas that floating waste may reach as well as accumulation points. The LEMA TOOL reveals the elaboration of two components, monitoring and prediction, within a series of indicators that facilitate decision-making.



*Illustration 2. Location of the floating object detection system in Guipuzcoa, Spain (prepared using Google Maps)*



*Illustration 3. Infrared video-detection camera in the river Orio (Guipuzcoa, Spain)*

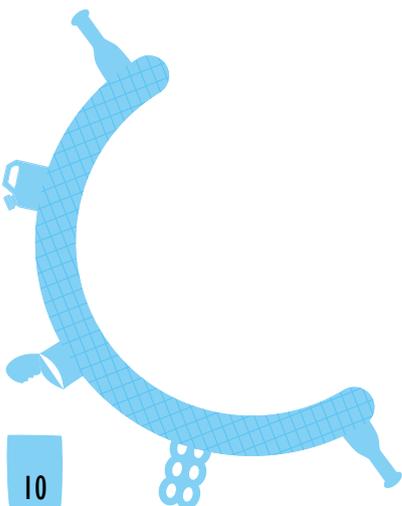
2. **VIDEO-DETECTION SYSTEMS** using cameras at the river mouths. Some infrared cameras were installed in the mouths of the rivers Oria (Guipuzcoa, Spain) and Adour (Aquitaine, France), to register, identify and monitor floating objects. The detection system, based on images and video-processing, has offered promising and operative results. In fact, it can provide real-time in-

formation about the abundance of floating marine litter carried to the sea from a river. However, some points regarding its operation, which must be improved, have led to three more common errors: the flashes or reflections that reduce the capacity of the camera to identify the object, and the presence of foam, due to waves or passage of vessels, so the camera may give a false positive, confusing the foam with floating waste. An improvement of the detection efficiency and precision is being considered for night vision. The cameras will continue to be active through the management of AZTI in order to recover highly important data to study the flows from the rivers to the sea.

3. Video-detection systems that use drones to identify floating waste at high sea. A **VECTOR ZENMUSE 23 MATRIX 100** system was used, in which diffe-

rent types of cameras were embedded, in particular, the multispectral sensor, and the RGB colour sensor, to verify the most efficient option. The system with the RGB colour sensor offered a good automatic response, identifying floating marine litter. However, its usefulness may be limited due to several technical and legislative factors. The Life LEMA pilot was carried out in France, at the mouth of the river Adour, where the legislation on the use of these instruments is very strict, especially around developed areas due to data protection issues. The application of drones for operations away from the coast has not been satisfactory due to the necessary energy requirements for longer flights. Therefore, drones are potentially interesting tools, but however, their application to detect floating marine litter requires further studies.

*Illustration 4. Vector Zenmuse 23 Matrix 100, on the beach of the river Adour (France)*



### MARINE LITTER COLLECTION

Floating marine litter and accumulated litter on beaches have been collected. Campaigns have been carried out involving 2 fishing vessels that were transformed to fish floating marine waste, and in which a monitoring system had been installed to reduce the CO2 footprint, and increase their energy efficiency. Together with other vessels: 2 coast cleanup boats normally used in the summer by the coastal town councils as a maintenance service. The litter was collected in waters in the province of Guipuzcoa (Spain) and the Pyrenées Atlantiques department (France) as indicated in the Table.

The 2 fishing vessels transformed are Itsas Belarra and Miren Argia. The 2 coast cleanup boats used are Uhaina and Subaquatique.

YEAR	IPARRALDE	HEGOALDE
2017	May/October	September/December
	Itsas Belarra, Uhaina y Subaquatique	Miren Argia
2018	May/October	May/December
	Itsas Belarra, Uhaina y Subaquatique	Miren Argia
2019	May/October	
	Itsas Belarra, Uhaina y Subaquatique	

*Table 1. Year and period of sampling of the two fishing vessels (Itsas Belarra and Miren Argia) and of the two boats (Uhaina and Subaquatique).*



A waste characterisation protocol has been applied to fish waste in a predetermined area, which has been divided into quadrants and stations, to perform two types of sampling: quantitative sampling on macro floating waste (diameter > 5 cm), and another quanti-qualitative or scientific sampling on macro, meso and micro waste (>5 cm, between 2.5 and 0.5 cm; < 0.5 cm, respectively).

*Illustration 5. Itsas Belarra, Iparralde boat involved in the sampling campaigns*



Illustration 6. Sampling area and quadrants



Illustration 7. Waste fishing

As an additional value to the participating fishing vessels, the energy impact has been assessed, offering the option of installing a control system to reduce the ecological footprint and gasoil consumption.

YEAR	Itsas Belarra*	Miren Argia	Uhaina*	BAB Subaquatique*
2017	15060	386	451**	3506
2018	25140	1109	3499	2779
2019	21293	-	3618	3088

Table 2. Kilos of waste found, \*Miren Argia without sampling for 2019

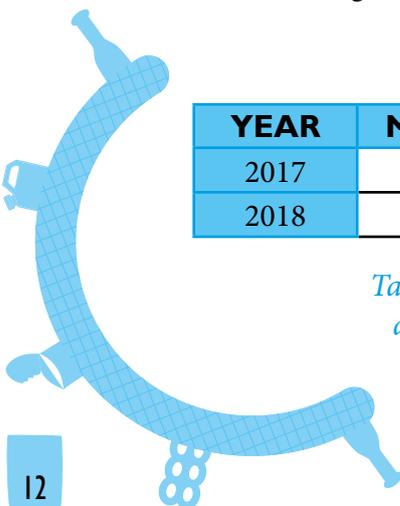
\*\*The weighing includes also wood

\*\*\*During the 2017 campaign the data was not yet “harmonized” and it was still quantified in volume instead of weight.

In addition to waste fishing, the waste on beaches has been collected manually and mechanically, characterising it by material, and quantifying the weight on a Biarritz beach in Aquitaine.

YEAR	MECHANICAL COLLECTION	MANUAL COLLECTION
2017	1135150	1186
2018	1789180	2482

Table 3. Kilos of marine litter collected mechanically and manually at a pilot site in Biarritz (France) from May 2018 to April 2019.



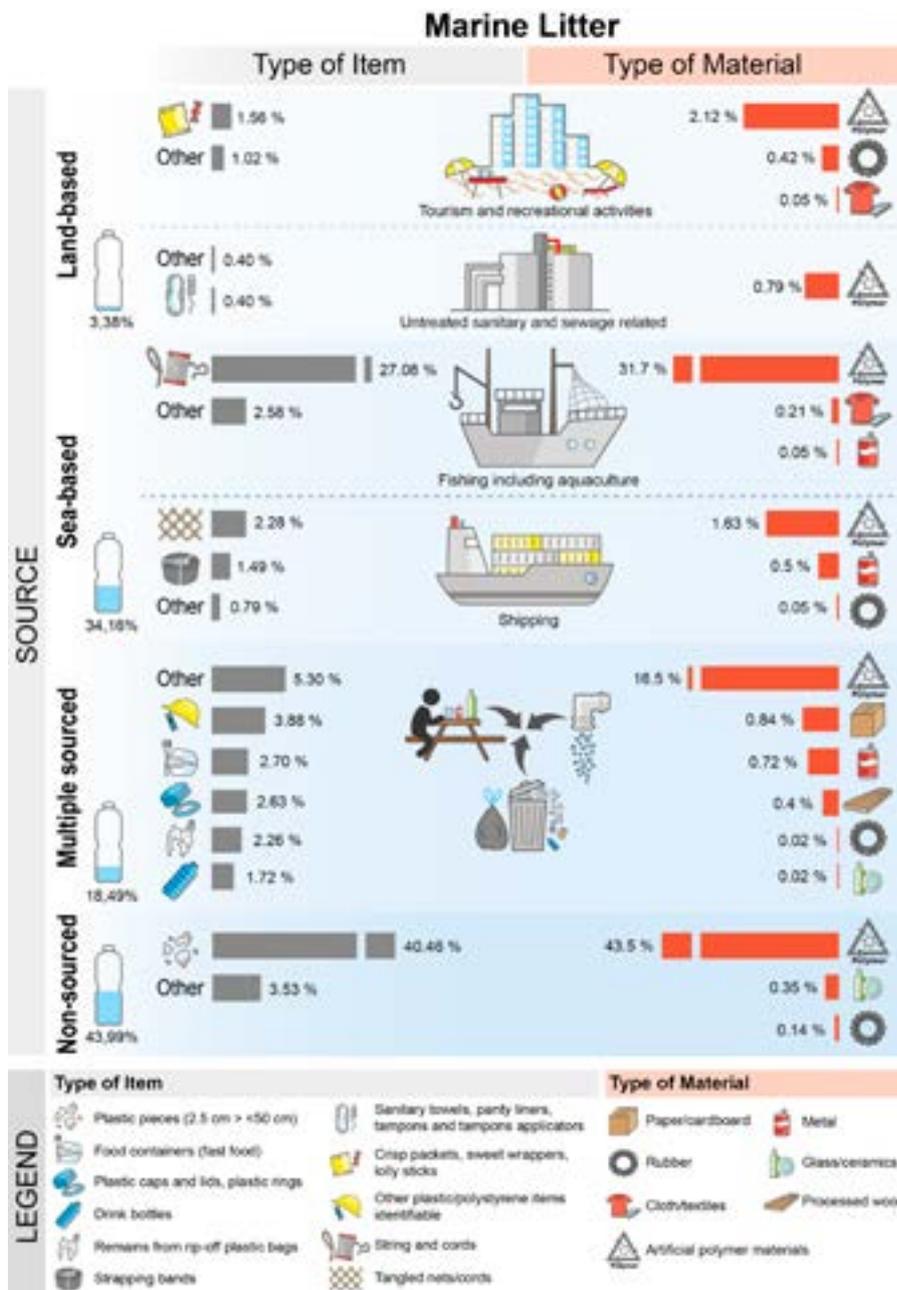
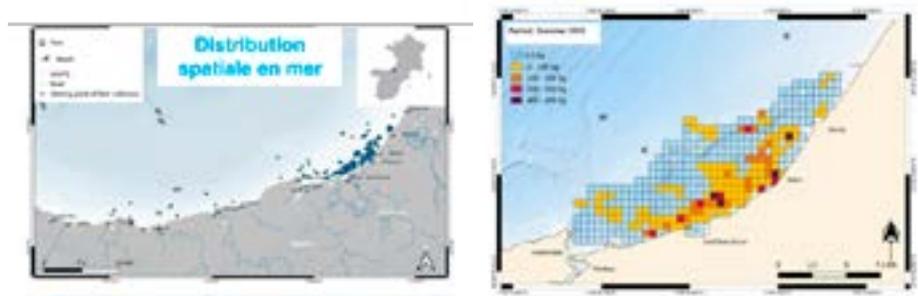


Illustration 8: Typology of the waste found

The Biarritz experiment involving the collection and characterisation of waste in different systems, has permitted the evaluation of the LEMA tool application.

Illustration 9. Example of applying the LEMA Tool in the samplings carried out.



Another waste collection methodology applied during the Life LEMA project experiment was a barrier in the mouth of the river Deba in the province of Guipuzcoa. A total of 72 kilos of waste were collected for a period from 16/3/2018 to 14/6/2018. The waste was characterised, showing a considerable prevalence of plastic, amounting to 90%. However, the characteristics of the river with variable flow during a period of floods that eliminated the barrier on several occasions, have led to less meaningful data, overwhelmingly increasing the maintenance costs of these barriers.

On the other hand, as an additional value, [some marine litter collection and characterisation campaigns have been carried out with volunteers on different beaches](#). In Guipuzcoa (Spain) on the beach of the Adour River, and on the beach of Biarritz (France). These have not been funded by the project, but however, they have permitted the accumulation of an important database to analyse the behaviour of marine litter.

For the citizen science campaigns with volunteers, the monitoring started on 3 beaches on the coast of Guipuzcoa (Murgita in San Sebastian, Burumendi in Mutriku, and Inpernupe in Zumaya), and 2 beaches in Iparralde, to obtain more representative data from the different situations. The OSPAR protocol<sup>16</sup> was followed to characterise the waste, using standardised methodology in which the participating volunteers had previously been trained. In Spain, the actions were carried out with local groups: In Zumaya (students and staff Zumaiena Ikastetxea), in Mutriku with the collaboration of the BHI Mitriku institute, and the Nagusilan group, an association that entails voluntary work with the elderly.



*Illustration 10. OSPAR campaign with students in Guipuzcoa (Spain).*

<sup>16</sup> [https://www.ospar.org/ospar-data/10-02e\\_beachlitter%20guideline\\_english%20only.pdf](https://www.ospar.org/ospar-data/10-02e_beachlitter%20guideline_english%20only.pdf)

The citizen science programmes permit greater involvement and increased interest of citizens in scientific projects, as well as in the problem of marine litter. On the other hand, we have aid to compile data, both in marine litter collection processes, and in the subsequent characterisation. The local fabric has been reinforced throughout the years of work, creating deeper roots in the population in terms of the preservation of the territory. A database on marine litter on the coasts of Guipuzcoa has also been created, within the framework of the OSPAR protocol, and awareness has been raised in the citizens regarding the problem of waste.

The monitoring campaigns have been successful, highlighting the importance of involving citizens in scientific projects. The campaigns will continue to be compatible, to obtain a complete set of data. Further to this, the increased number of monitored beaches will be an asset for coming years. Regarding the results, the most frequent elements found permit identifying where all the players must focus their efforts to reduce the impact of marine litter by means of rules, awareness-raising campaigns, or specific studies that understand the source of marine litter. The top items found over the 3 years' monitoring, are as follows (OSPAR protocol applied):

1. Pieces of plastic / polystyrene 2.5 – 50 cm.
2. Beverages (bottles, containers and drums)
3. Rope and cords
4. Pieces of plastic / polystyrene 0 – 2.5 cm.
5. Food containers
6. Glass items
7. Ceramic items
8. Construction material
9. Plastic bags
10. Container lids and stoppers



*Illustration 11. Training of volunteer groups in Guipuzcoa (Spain)*

## INTERNATIONAL NETWORK

Three meetings were held with experts within the project framework, to create working groups focused on different themes which, aligned with the themes of Life LEMA, could complement and open up debates on the theme of marine litter and its management. The objectives were to:

- ≈ Contribute to the objectives of the Framework Directive on Marine Strategy<sup>17</sup>.
- ≈ Respond to the requirements of the new policies of the European Maritime and Fisheries Fund<sup>18</sup>.
- ≈ Optimise the collection and management of marine litter pursuant to the territorial policies.

These working groups were organised in September 2017 in Biarritz (France), October 2018 in San Sebastian (Spain) and April 2019 in Seville (Spain) within the framework of the Forum Marlice<sup>19</sup>. The groups were able to count on 60 experts directly and indirectly related to marine litter as well as local agents, in order to open up a discussion space on marine litter at both a European and local level, to search for solutions.



*Illustration 12. Meeting in Biarritz September 2017*

The main conclusions of these working groups have underscored the need to specifically define competences in the specific management of marine litter at different scales. Bearing in mind the functions of the different institutions, the local administrations are the ones that directly tackle the problem of marine litter, both technically and with respect to the citizens, notwithstanding their reduced resources and, in some cases with overlapping competences or vague delimitations. Despite this, the local authorities are responsible for waste management, involving all the treatment phases, from collection through to the final treatment, and in terms of marine litter, the work starts with the beach clean-up services. One of the proposals of the working groups was the need for a common European management plan that would be the basis for the local instruments to combat marine litter. The definition of clearly established competences among the institutions, going from European level to a local level.

<sup>17</sup> [https://www.miteco.gob.es/es/costas/temas/proteccion-medio-marino/Directiva\\_2008-56-CE\\_tcm30-130841.pdf](https://www.miteco.gob.es/es/costas/temas/proteccion-medio-marino/Directiva_2008-56-CE_tcm30-130841.pdf)

<sup>18</sup> [https://ec.europa.eu/fisheries/cfp/emff\\_es](https://ec.europa.eu/fisheries/cfp/emff_es)

<sup>19</sup> [https://aebam.org/marlice2019/marlice2019.aebam.org/block-3-atlantic-region-session-ii\\_798751093\\_88427.html](https://aebam.org/marlice2019/marlice2019.aebam.org/block-3-atlantic-region-session-ii_798751093_88427.html)

Therefore, considering the urgency of the issue, alliances among administrations must be created, especially cross-border ones, for the work to combat pollution caused by marine litter to be undertaken among several actors from local administrations, including the fisheries sector. A European Alliance has been proposed, similar to the Covenant of Mayors for Energy and Climate Change, which may bear in mind the following **main objectives**:

- 1. Create a European space for local administrations engaged in exchanging experiences and knowledge on marine litter.**
- 2. Prepare a comprehensive catalogue on best practices and tools, such as the LEMA tool.**
- 3. Define an adequate common European management plan that can be used and adapted to local needs in local territories that will help to facilitate the understanding of competences, resources and replicability.**

### AWARENESS-RAISING AND DISSEMINATION ACTIONS

The consortium members have participated in more than 130 communication actions, holding more than 60 events that have informed about the project, creating discussion and knowledge exchange spaces to deal with the problems of marine litter with experts and the general public.



*Illustration 13. Life LEMA Marquee in Pasaia Itsas Festibala, May 2018.*

The activities carried out included: Environmental education workshops for children, talks and lectures within the framework of other projects, or participation in awareness-raising days, or festivals on sustainability. The main objective was to inform about the project in a different way to the traditional and formal ways, such as the social networks or online. It also permitted informing about the working of the LIFE and European Union projects, as well as the marine litter problem.

In collaboration with the Albaola Museum, a different citizen science action was carried out. To analyse the drifts, useful to define the modelling systems of the Life LEMA project, in addition to biodegradable buoys, some wooden boats, created with the collaboration of Albaola, were used. The wooden boats, which simulated marine litter in terms of weight and size, were used to hold children's workshops, decorating them and then launching them into the sea. The contact data were engraved on the boats to be returned to Life LEMA. This has enabled us to compile information about the drifts of potential macro-plastic items. The boats have helped to learn about the main marine litter transport currents on the coasts of the Bay of Biscay, thanks to citizen participation.



*Illustration 14. Activity with drift boats in collaboration with Albaola Itsas Kultur Faktoria*

## **GUIDELINES FOR REPLICABILITY**

The Life LEMA project, its technologies and procedures have been presented to motivated agents in terms of the implementation of a pilot trial in another area, in order to analyse the potential replicability of the methodology, in particular in the Bay of Marseilles (France). The implementation of the video-detection monitoring techniques began in 2018 and continues today. Two river mouths on the Mediterranean coast were equipped, and the system calibration is currently being analysed. The replication of the data modelling tools began in 2018, and the process is still ongoing (model development, calibration, adaptation, etc.) Likewise, the litter collection strategy will be considered later on in time, after applying different tools.

On transposing the project tools, the adaptability of the technology at territorial level must be considered, as well as the relevance of engaging the agents involved (administration, research centres, associations, etc.). In general, due to the pilot experiment, the majority of the project phases will be replicable in other environments. However, the cost-benefit ratio of the adaptation must be considered.

## **AFTER THE PROJECT (AFTER LIFE PLAN)**

LIFE LEMA has involved 3 years of work that do not end with the termination of the funding. The consortium will carry out several activities included in the plan that will begin with the termination of the project, and will continue over the coming years (2019-2022). The actions proposed have been grouped into 4 action groups: Dissemination activities, execution of the technological solutions developed in the project, marine litter elimination activities, and other current and future marine litter projects in the SE waters of the Bay of Biscay.

Some of the actions to be maintained are listed below:

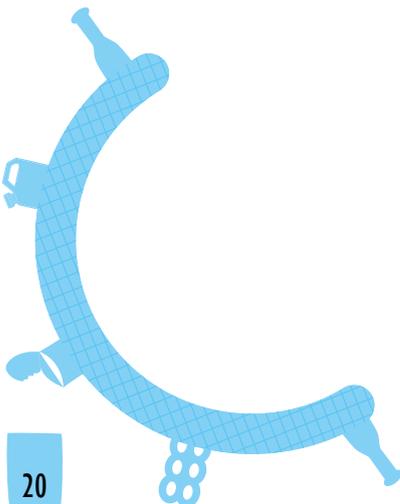
- ≈ **Video cameras installed in the mouths of the rivers Oria and Adour will continue to provide data to the LEMA tool in real time, regarding the amounts of floating marine litter that the rivers carry to the sea.**
- ≈ **Annual updating of the LEMA tool is foreseen. This will consist, among other operations, in updating the statistical models or adding new data collection techniques.**
- ≈ **During the period of this plan, work will be carried out with several agents from Marseilles to continue with analysis tasks regarding the introduction of the LEMA tool**
- ≈ **into their operating areas.**
- ≈ **The fuel consumption in Itsas Belhara and Uhaina will continue to be monitored to be able to take appropriate decisions that will enable them to reduce their carbon footprint.**
- ≈ **The collection of floating marine litter on the coast of Labourd (FR) will foreseeably continue over the coming years, the same as in the development phase of the LEMA project, with actions from May to October.**
- ≈ **The citizen science campaigns for the collection and characterisation of marine li-**

Work with volunteers will be carried out with the support of local volunteers, helping to engage citizens in the preservation of the local natural heritage. Over the coming three years, the idea is to continue with the campaigns that are already in progress on the Guipuzcoa coast. Work will specifically continue in the following coves: Murgita in San Sebastian, Internupe in Zumaia and Murumendi in Mutriku. These campaigns will be carried out at each site in 4 different periods: Winter, spring, summer and autumn to be able to assess the seasonal behaviour of the litter.

≈ The Regional Council of Guipuzcoa has begun to prepare a diagnosis of the hot spots where nonpoint litter comes from and where it accumulates on the mainland, and in, river and coastal environments of the province. This diagnosis

will be accompanied by an action plan to process nonpoint litter in Guipuzcoa, which will include a package of preventive and corrective measures for nonpoint litter in the three aforementioned environments. All of this will be accompanied by awareness-raising measures and awareness-raising among citizens.

≈ The Life LEMA project, mainly during its final stage, has helped to establish synergies to define new coalitions and projects on marine litter in the Bay of Biscay. Thus, the knowledge acquired during the development of the Life LEMA project will permit making progress in the implementation of these new projects and, reciprocally, the work carried out in these new projects will not just facilitate the consolidation of the results obtained, but the objectives will also provide feedback to the LEMA tool.



## CONTACT

To obtain further information about the project or the different processes, you can contact:

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