LEMA
Intelligent marine Litter removal and Management for local Authorities

LIFE15 ENV/ES/000252

DELIVERABLE DE.3

After-LIFE plan

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1) INTRODUCTION.

This document aims to present the activities that the consortium intends to carry out over the next 3 years, once the Project is over, in order to ensure that the results of the project and the aims established in this plan are properly implemented.

The plan consists of a detailed list of measures that have been defined to achieve the aims being pursued, the deadlines for carrying these out, the identification of the people responsible for implementing them, the budget allocated for these and the foreseeable funding sources for their development.

2) AFTER-LIFE PLAN

The activities included in the plan will start with the completion of the project and will be extended over the following three years (2019-2022). They are grouped in 4 courses of action: dissemination activities, performance of the technological solutions developed in the project, marine litter removal activities and other current and future marine litter projects in the SE of the Bay of Biscay.

The list of proposed activities is included in appendix 1 with the identification of the deadlines, people responsible, budgets and funding sources. In the following sections each of the planned activities will be described.

2.1. Dissemination activities.

The planned dissemination activities vary depending on the target public. On the one hand, there will be activities aimed at the general public, and on the other hand, more technical activities that are aimed at a specialized public.

2.1.1. Dissemination activities aimed at the general public.

The following table includes the dissemination activities that are planned for after the completion of the project. The possibility of adding new activities over time is envisaged depending on whether good opportunities emerge to disseminate them.

Table 1: Dissemination activities aimed at the general public.

Activity	Leading Beneficiary	2019	2020				2021				2022				Budget			Source of Finance
		4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	2020	2021	2022	
2,1) Dissemination activities																		
2.1,1 Dissemination activities aimed at the general public.																		
- Maintenance of the project web page and social networks.	*SFE*														2.000 €	2.000 €	2.000 €	SFE´s own buget
- Layman´s report dissemination.	*SFE*														- €	- €	- €	
- Dissemination of the LEMA photography exhibition.	*SFE*														500 €	300 €	300 €	SFE´s own budget
- Dissemination of the LEMA videos.	*SFE*														- €	- €	- €	

Source: Compiled by the authors

- Maintenance of the Project web page and social networks.

  The web page, and the social networks (Facebook, Twitter, Instagram), will be the main dissemination tools that will be used to publicise the activities that are carried out throughout the After-Life plan. In both cases only the activities envisaged in this plan will be disseminated, and the results obtained, events organised, and information on the Ospar campaigns that are carried out in the SE of the Bay of Bizcay will also be made known, as will any other relevant information about floating marine litter in the Bay of Biscay. Detailed information about the results achieved in the project and any other informative documentation prepared within the framework of the project will also be available on the web page.

  SFE will be in charge of maintaining and updating the aforementioned communication channels, and will compile, process and publish the material to be disseminated. The web page and the social networks will be updated, at the very least, twice a month. The allocated budget meets the costs related with the maintenance of social networks and website. In detail these include: web hosting and fees, google advertisings for social networks and website and support for design. In addition the potential economical effort to avoid cyber-attacks has been considered taking into account that during last 2 years the LIFE LEMA's website has been hacked twice. Surfrider Foundation Europe will be in charge of human resources involved in, also if this specific item hasn't been estimated in the table above. These costs will be financed with funds from SFE's own budget, people regularly working in the communication department of Surfrider Foundation Europe will perform the maintenance tasks.

- Dissemination of the Layman´s report.

  The Layman´s report published in the 4 official languages of the project (EUS, ES, FR and EN) and which includes the achievements of the project in summarized and accessible form, will be a valuable tool for expanding the impact of the project beyond its implementation area. The report will be available on the web page and will be distributed at any events on marine litter that SFE, and/or of the LIFE LEMA's members of consortium, takes part in. No costs are envisaged to disseminate the report, considering that to boost the most environmentally friendly version no paper and printed form of the report will be offered, instead an agile e-book will send to partners, collaborators and stakeholders interested in the LIFE LEMA.

- Dissemination of the LEMA photography exhibition.

  The LEMA photography exhibition was launched to make use of art to disseminate the Life LEMA project and to raise public awareness about the problems involving marine litter. Throughout the Project the photography exhibition has been on display at various events linked to the marine environment, either directly promoted by the consortium, or at the request of the organizers of events. During the next three years, the photography exhibition will be made available to members of the consortium for them to use at any events that they take part in, and to use at educational and awareness-raising activities and projects. The Budget allocated to this activity will be defrayed by funds from SFE's own Budget and meets any logistical needs and possible upkeep costs. The expo has been printed on cardboard environmentally friendly material entailing more maintenance requirements.

- Dissemination of the LEMA videos.

  As well as the aforementioned resources, throughout the project 6 monographic videos have been made that sum up the Life LEMA project. After the completion of the project, these videos are still valid to show the work carried out during the Project, and as a result, will form part of the pool of resources available for dissemination activities. There are no costs associated with the tasks linked to disseminating the videos. All members of consortium will share the videos in appropriate occasion to spread information about the project.

2.1.2.Dissemination activities aimed at a specialized public.

The following table includes the technical dissemination activities addressed at a specialized public. The possibility is being considered of adding new activities over time as good opportunities emerge to disseminate them.

Table 2: Dissemination activities aimed at a specialised public.

Activity	Leading Beneficiary	2019	2020				2021				2022				Budget			Source of Finance
		4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	2020	2021	2022	
2,1) Dissemination activities																		
2.1,2 Dissemination activities aimed at a specialised public.																		
- Publication of scientific articles.	*AZTI*														1.000 €	1.000 €	1.000 €	AZTI´s own budget
- Attending conferences on the marine environment.	*AZTI*														1.500 €	1.500 €	1.500 €	AZTI´s own budget

Source: Compiled by the authors

- Publication of scientific articles.

  At least 3 scientific articles are expected to be published that make it possible to show the scientific community the results of the research activities associated with the project, as well as the data obtained during the project that are being used for research currently underway. The articles to be published will deal with: litter trails in the SE of the Bay of Biscay, presence of macro- and micro-plastics in the SE of the

Bay of Biscay, monitoring floating plastic in rivers and numerical modelling of floating marine litter in rivers and coastal ocean.

(1) Oihane C. Basurko, A. Rubio, T. Destang, I. Ruiz, B. Beldarrain, D. Kukul, J. Larreta (2020), The coastal south eastern Bay of Biscay a dead-end for microplastics. Abundance and distribution of microplastics in coastal waters of the south east Bay of Biscay. Draft for Environmental pollution journal.

(2) Irene Ruiz, O.C. Basurko, A. Rubio, J. Mader, I. Granado, M. Delpey, A. Declerck, A. Cózar, S. Capo (2020). Litter windrows in the south-east coast of the Bay of Biscay: an ocean process enabling effective active fishing for litter. Draft for Frontiers Marine Science.
(3) Amaia Mendoza, J.L. Osa, O.C. Basurko, A. Rubio, M. Santos, J. Gago, F. Galgani, C. Peña-Rodríguez (2020). Microplastics in teh Bay of Biscay: an overview. Marine Pollution Bulletin.

The scientific articles written by AZTI and RPT research staff will be published in the magazine like "*Frontiers in Marine Science*",. The budget for these publications is covered by the contributions that must be paid to publish them. These costs will be financed by funds from AZTI's and RPT's own budget.

- Attending conferences on the marine environment.

Another of the technical dissemination channels that will be used will be the international conferences that are held on the subject in the next 3 years. At the time of writing this document, it has been confirmed that representatives from AZTI will be attending the ISWA World Congress 2019 that will take place in Bilbao on the 7th-9th of October 2019. Taking into account the interest that the Project has aroused, it is also planned to take part in two other conferences that are still to be confirmed. The costs associated with these activities correspond to the costs of attending (registration, travel…) that will be defrayed by funds from AZTI's own budget.

2.2. Performance of the technological solutions developed in the project.

The LEMA project has made it possible to make significant progress in technologies for the detection and remote monitoring of marine litter. Promising specific progress has been achieved in using video to monitor, in real time, the discharge of floating litter from rivers and in predicting the marine areas in which floating marine litter is most likely to build up. Over the next few years, both solutions will be improved and used by the consortium in order to optimize floating marine litter collection operations and to improve knowledge of local coastal dynamics.

The energy efficiency technologies installed on French boats during the project will also be monitored.

2.2.1. *Performance of the video camera technology for the remote detection of floating litter in the mouths of rivers.*

Table 3:Performance of the video camera technology for the remote detection of floating litter in the mouths of rivers.

Activity	Leading Beneficiary	2019	2020				2021				2022				Budget			Source of Finance
		4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	2020	2021	2022	
2.2) Performance of the technological solutions developed in the project.																		
2.2.1 Performance of the video camera technology for the remote detection of floating litter in the mouths of rivers.																		
The cameras of Orio and Adour will be kept working at least for the next 1,5 years. AZTI will take care of the maintenance and the expenses derived from renting the land the camera is installed in.	*AZTI*														10.000 €	10.000 €	10.000 €	Funded in the framework of FML-TRACK project (Copernicus Marine Service User Uptake project) with RPT-SUEZ and AZTI as partners. Respective administration in Gipuzkoa and Labour will follow the results and benefits of these innovative monitoring stations to evaluate the opportunity to maintain the network.

Source: Compiled by the authors

- *Use of video cameras in the Rivers Orio and Adour.*

  The video cameras installed in the mouths of the River Oria and Adour will continue to provide the LEMA tool with data in real time about the amounts of floating marine litter that rivers carry to marine waters at least for the next 1.5 years. In order to ensure that the cameras are always working, the required maintenance operations will be carried out. These operations will focus on checking that the cameras are in good working order, the correct supplying of data and correcting any incidents that may occur. These operations will be funded in the framework of FML-TRACK project (Copernicus Marine Service User Uptake project) with RPT-SUEZ and AZTI as partners. Respective administration in Gipuzkoa and Labour will follow the results and benefits of these innovative monitoring stations to evaluate the opportunity to maintain the network.

  Apart from these maintenance operations, AZTI will also pay, for the next 1.5 years, the fees charged for occupying the land that the cameras are installed on.

2.2.2. Performance of the LEMA tool.

Table 4: Performance of the LEMA tool.

Activity	Leading Beneficiary	2019	2020				2021				2022				Budget			Source of Finance
		4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	2020	2021	2022	
2.2) Performance of the technological solutions developed in the project.																		
2.2.2 performance of the LEMA tool.																		
- Use of the tool.	*RPT Biarritz KGARBIA DFG*														- €	- €	- €	
Operational maintenance of the tool (per site or collection area)	*RPT*														-	11.000 €	11.000 €	The costs for the 2020 financial year will be co-financed by the MERCATOR DEM5 project and the costs for later financial years will be funded among the partners who make use of the tool. The financing of the maintenance operations of the tool in later financial years will be charged to the partners who require updates of the tool.
Updating of the tool (per site or collection area)	*RPT*														5.000 €	2.000 €	2.000 €	The costs for the 2020 financial year will be co-financed by the MERCATOR DEM5 project and the costs of later financial years will be financed among the partners who require updates of the tool.
- Implementation of the tool in Marseille.	*RPT*														54.000 €	31.500 €	31.500 €	Contract with Marseille Provence Metropole and Marseille City + SUEZ group own investment
Extension of the tool to the rest of the Basque coast	*AZTI*														- €	- €	- €	

Source: Compiled by the authors

- *Use of the tool.*

  As they have been doing throughout the project, during the period that covers this plan, the local authorities in Biarritz, KGARBIA and the DFG, and the operators of the boats that are working all the time will continue to use the LEMA tool during the campaigns to collect floating marine litter.

  Biarritz specifically plans to use the tool as a means of optimising the floating marine litter collection operations in the 300m-strip in the bathing areas (from the lighthouse to the Milady beach) using the Uhaina boat (owned and operated by RPT for BIARRITZ) and the BAB Subaquatique boat (subcontracted), and the daily cleaning operations on the sandy beaches. The tool will also be used as a data

base for these operations, monitoring their results and efficiency, as well as their relation to the local dynamics and overall floating marine litter abundance.
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KGARBIA for its part, plans to use the tool in order to optimize the operations to collect floating marine litter in the 300m to 3 mile strip between the mouths of the river Adour and the Bidasoa. The tool will also be used to monitor the cleaning operations and the dynamics of the area that the boat will be working in.

As for DFG, the LEMA tool in its original version was used during the second half of the 2018 campaign to collect floating marine litter on the coast of Guipuzcoa. As a floating marine litter collection campaign for 2019 was not envisaged in the project, the final version of the LEMA tool in the waters on the coast of Guipuzcoa still needs to be validated. This is why, as part of After-Life, in 2020 the DFG plans to hire the services of a boat to validate the LEMA tool in the strip that runs from 300m to 3 miles, between the mouths of the River Bidasoa and the Mijoa (western boundary of Gipuzkoa). During the 2020 campaign the boat that has been hired will operate by following the predictions provided by the LEMA tool. During each working day the operator of the boat, while collecting floating marine litter in the water, will also record any information that makes it possible to contrast how the predictions match the real situation. This information will be passed on to the managers of the tool so that as far as possible, where appropriate, they can then adjust the models and variables considered in the predictions. When the campaign is over, a report will be prepared that will assess the predictions made by the LEMA tool compared to real situations in order to analyze its level of correlation.
Finally, based on the validation provided and the action plan to deal with scattered litter defined by the DFG (described in section 2.3), the ways of using the LEMA tool during the next few years will be established.

There are no costs associated with the use by itself of the LEMA tool by local authorities.

- *Operational Maintenance of the tool.*

RPT will responsible for the operational maintenance of the LEMA tool. These maintenance operations will be based on continuously monitoring the correct working order of the tool and intervening to deal with computing problems. The costs envisaged for these operations correspond, on the one hand, to the personnel costs of the people responsible for monitoring the tool and intervening to deal with problems, and on the other hand, to the costs of maintaining the server that the tool is housed in. The costs for the 2020 financial year will be co-financed by the MERCATOR DM5 Project and the costs of the years after this will be funded among the partners who make use of the tool.

- *Updating of the tool.*

It is planned to update the tool annually. This will consist, among other operations, of updating the models with improved parameterization, adding new monitoring

techniques (for example, incorporating the new video cameras that can be installed in the mouths of rivers as a data source), comply to possible modifications in collection activities and reporting, adjust to modifications in external data sources that provide inputs to the tool, etc. RPT will be in charge of updating the tool.

The costs for the 2020 financial year will also be co-financed by the MERCATOR DEM5 Project and the costs of the years after this will be funded among the partners that require updates of the tool.

- *Implementation of the tool in Marseille.*

Throughout the period of this plan we will be working with the city of Marseille and the Marseille Provence Metropole on introducing the LEMA tool in its operational area. Implanting this will require an ad-hoc initial set-up that makes it possible to adapt predictions about areas where litter may pile up to meet the characteristics and variables of the Mediterranean.
These activities will cover gathering of available historical marine litter observations (from city services, local associations, etc.), implementation of reporting strategies to centralize daily information about FML collection, real time management of the two video stations installed in Marseille, calibration and validation of models against the marine litter observation, and finally the overall operational maintenance of the LEMA tool.

The corresponding costs will be co-supported by Marseille city and Marseille Provence Metropole as part of the global contract for the management of water networks (public service delegation contract), and by the SUEZ company (own innovation investment). It should be noticed here that Marseille marine litter model will benefit from the ocean circulation model already developed for the management of coastal water quality and bathing areas. The corresponding costs are not considered here, what contributes to reduce the replication budget significantly.

- *Extension of the tool to the rest of the Basque coast.*

Just as work will be carried out with the city of Marseille to replicate the tool in the Mediterranean, the extension of the LEMA tool to the *rest of the Basque Coast (SP)* will also be encouraged. *In order to achieve this, based on the guidelines initiated in the Advisory Group and Experts' Group that Bizkaia Provincial Council, the Basque Water Agency (URA) and the Basque Government have taken part in, attempts will be made to define an ad-hoc plan to extend the tool and floating marine litter collection to the entire Basque coast.*

2.2.3. Energy monitoring of the boats.

The boats used during the Project to collect floating marine litter were monitored to assess their fuel consumption and to provide them with guidelines to reduce their consumption and associated carbon footprint.

Table 5: Energy monitoring of the boats

Activity	Leading Beneficiary	2019	2020				2021				2022				Budget			Source of Finance
		4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	2020	2021	2022	
2.2) Performance of the technological solutions developed in the project.																		
2.2.3 Energy monitoring of the boats.																		
- Energy monitoring of the Itsas Belhara and the Uhainak.	*AZTI*														1.000 €	1.000 €	1.000 €	AZTI´s own budget

Source: Compiled by the authors

After the completion of the project, the consumption monitoring device (SIMUL) on two of the vessels has not been removed. As a result, during the period covered by this plan, fuel consumption on the Itsas Belhara and the Uhaina will continue to be monitored and they will continue to power the computing tool in order to be able to monitor this, and where appropriate, to take timely decisions that enable them to reduce their carbon footprint.

The costs associated with this activity will be those involving the maintenance of the devices (server and software) and the human resources intended to monitor the correct working order of the device and to intervene to deal with any possible problems.

2.3. Marine litter removal activities.

Marine litter collection activities are grouped together into those that are carried out at sea and those that are performed on land.

In this section the action plan is also included to deal with scattered litter that the DFG is preparing and in which the preventive and corrective measures that will be carried out in the future in Gipuzkoa will be defined.

2.3.1. Floating marine litter collection at sea.

Table 6: Floating marine litter collection at sea.

Activity	Leading Beneficiary	2019	2020				2021				2022				Budget			Source of Finance
		4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	2020	2021	2022	
2.3) Marine litter removal activities.																		
2.3.1 Collection of floating marine litter at sea.																		
A) *Coast of Labourd (FR).*																		
-Biarritz -bathing areas and the rocky shores	*Biarritz*														35.000 €	34.000 €	33.000 €	Biarritz Municipality´s own budget
-Biarritz - 300m strip off the bathing areas	*Biarritz*														35.000 €	34.000 €	33.000 €	Biarritz Municipality´s own budget
-From the river Adour to the Bidasoa (300 m - 3 miles)	*KGARBIA*														80.000 €	85.000 €	85.000 €	KGARBIA´s own funding
B) Coast of Guipuzcoa (SP).	*DFG*														62.000 €	- €	- €	DFG´s own budget

Source: Compiled by the authors

- *Coast of Labourd (FR).*

  Floating marine litter collection on the coast of Labourd (FR) will continue to be carried out, foreseeably, during the next few years just as has been done during the development phase of the LEMA project.

  On the one hand, in waters close to Biarritz, work will continue with two clean-up vessels. One of them will be working in the bathing areas and rocky sections located between the fishing port and the "BELZA" Villa (the area in which the BaB Subaquatic vessel has been working in throughout the project). The second vessel will operate in the 300-metre strip of the bathing areas, from the lighthouse to Milady beach, an area which the Uhainik vessel has been working on.
  The costs associated with both vessels will be financed through the Budget of the town of Biarritz.

  On the other hand, KGARBIA plans to continue with the floating marine litter collection operations in the 300m to 3-mile strip between the mouths of the River Adour and the Bidasoa, an area which the Itsas Belharra boat has been working on. The costs of these operations will be financed through funds from KGARBIA's own budget.

- *Coast of Guipuzcoa (SP).*

  As shown in section 2.2.2 the DFG will be hiring the services of a boat to validate the LEMA tool and to collect floating marine litter in the strip that runs for 300m to 3 miles between the mouths of the River Bidasoa and the Mijoa, an area which the Miren Argia boat worked on in the 2018 campaign. It will initially be hired by a campaign that will foreseeably take place from May to September 2020. The costs associated with this campaign will be financed through the resources of the DFG.

  At the same time as the campaign, contact will be maintained with the Basque Government Environment and Fishing departments in order to jointly define the institution(s) taking part in future floating marine litter collection operations on the coast of Guipuzcoa (SP).

  Based on the agreements that may be reached between the DFG and the Basque Government, the results of the 2020 campaign and the validation of the LEMA tool, the activities, people in charge and funding sources of future marine litter collection operations at sea will be defined.

2.3.2. *Floating marine litter collection on land.*

Table 7: Floating marine litter collection on land.

Activity	Leading Beneficiary	2019	2020				2021				2022				Budget			Source of Finance
		4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	2020	2021	2022	
2.3) Marine litter removal activities.																		
2.3.2 Collection of floating marine litter on land.																		
Mechanical FML collection on Biarritz beaches (mechanical)	*Biarritz*														74.000 €	74.000 €	74.000 €	Biarritz Municipality´s own budget
-Manual (by walking)FML collection on Biarritz beaches	*Biarritz*														19.500 €	19.500 €	19.500 €	Biarritz Municipality´s own budget
- OSPAR campaigns.	*SFE*														12.000 €	12.000 €	12.000 €	SFE´s own budget

Source: Compiled by the authors

- *Cleaning of the beaches in Biarritz.*

  As mentioned in section 2.2.2, Biarritz will use the LEMA tool as a means to optimise and monitor mechanical and manual cleaning operations on the beaches in the town.
  The forecast aspect of the tool will help technical services to define the best mechanical and human means on each intervention. Today, without forecasts, the activity is always the same, during the same times (according to the tidal coefficients and its impact on accessibility).
  Indeed, the tool will anticipate beaching of Floating Marine Litter (time window, location). Thus, technical services will be able to adapt the mechanical machine (typology, number) and direct them on the impacted beaches, at the right moment. Because mechanical machines can only work early in the morning in the summer season, when beach users are not yet present, human resources will be organized throughout the day to meet forecasts. If large FML are expected on the beaches at these times, the human resources will be adapted in number and the appropriate transport machines will be mobilized on site. The forecasts will be even more important outside the summer period and during the storm seasons, to limit fuel consumption and carbon impact when there is no need to intervene.

- *OSPAR Sampling Campaigns.*

  The OSPAR campaigns are campaigns to collect, characterise and quantify marine litter (following the standardized methodology established by the protocol of the same name in the framework of the OSPAR Convention) which aims to assess the presence and seasonal behaviour of the marine litter in coves and/or on beaches with determined characteristics and without cleaning services.

  These survey will be managed by SFE and will be carried out with support local volunteers, which will make it possible to get citizens involved in the preservation

local natural heritage as well as took part in the awareness to reduce the marine litter impact acting by means of prevention.

Over the next three years, it is planned to continue with the campaigns that are already underway on the coast of Guipuzcoa, the methodology implied cyclic surveys of 4 years at least to get significative dataset although get to more than a period of 4 years will offer more descriptive basis for scientific analysis. 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 in order to be able to assess the seasonal behaviour of litter.

SFE is responsible for carrying out and financing the campaigns although the continuity of this project depends by the economical support of public calls.. The DFG may take part by co-financing any activities that are carried out on the coast of Guipuzcoa. Co-financing this will be contingent on the availability of funds in the DFG's annual budget.

2.3.3. Action plan to deal with scattered litter in Gipuzkoa.

In accordance with the General Law 3/1998, on Environmental Protection in the Basque Country, the DFG has the powers conferred upon it regarding urban solid waste in the province to develop the framework planning of urban waste management (through the relevant provincial plans), coordinate municipal activities to ensure the comprehensive provision of services in this field, and encourage supra-municipal waste management infrastructures.

In accordance with the aforementioned, and following the provisions laid down in the legislation currently in force, the DFG has prepared the Comprehensive Urban Waste Management Plan in Gipuzkoa 2019-2030 (PIGRUG 2019-2030). This plan approved by the General Assembly (Provincial Parliament) through the Provincial Law 6/2019, of the 20th of March, contains a course of action in its waste prevention programme that is focused on the prevention and reduction of scattered litter in the environment.

In this way, the DFG has begun to prepare a diagnosis of the hot spots where scattered litter originates and piles up in land, river, and coastal environments in the province. This diagnosis will be accompanied by an action plan to deal with scattered litter in Gipuzkoa which will include a package of preventive and corrective measures for scattered litter in the aforementioned three environments, and all of this will be accompanied by aware-raising and sensitization measures among citizens.

Table 8: Action plan to deal with scattered litter in Gipuzkoa.

Activity	Leading Beneficiary	2019	2020				2021				2022				Budget			Source of Finance
		4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	2020	2021	2022	
2.3) Marine litter removal activities.																		
2.3.3 Action plan to deal with scattered litter in Gipuzkoa.																		
- Defining the action plan to deal with scattered litter in Gipuzkoa.	*DFG*														54.800 €	- €	- €	DFG´s own budget
- Corrective measures in priority coastal areas	*DFG*														10.000 €	- €	- €	DFG´s own budget
- Corrective measures in priority river environments.	*DFG*														13.000 €	- €	- €	DFG´s own budget

Source: Compiled by the authors.

Although the action plan to deal with scattered litter was not complete at the time of writing this document (it is expected to be finished by the end of 2019), and as a result, specific activities cannot be included in this plan, two general activities have been added. On the one hand, it is planned to launch corrective measures in priority coastal areas, and on the other hand, corrective measures in priority river environments.

2.4. Other current and future marine litter projects in the SE of the Bay of Biscay.

Table 9: Other current and future marine litter projects in the SE of the Bay of Biscay.

Activity	Leading Beneficiary	2019	2020				2021				2022				Budget			Source of Finance
		4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	2020	2021	2022	
2.4. Other current and future projects linked to marine litter in the SE of the Bay of Biscay.																		
- BLUENET project	*AZTI*														28.000 €	- €	- €	BLUENET project is funded by the European Maritime & Fisheries Fund (80%). The 20% of the project is funded by AZTI's own contribution.
MERCATOR DEM5 project	*RPT*														95.000 €	- €	- €	The MERCATOR DEM5 project is funded by MERCATOR OCEAN company as part the Copernicus User Uptake program 110-UU-DEM5-CMEMS
1 PhD thesis on teh "Distribution, origin and sustainable management of floating marine litter in the SE of the Bay of Biscay"	*AZTI*														20.000 €	20.000 €	- €	AZTI's own budget

Source: Compiled by the authors

The Life LEMA project, mainly during its final stage, has led to defining, and in certain cases to even launching, new marine litter projects on the SE of the Bay of Biscay. In this way, the knowledge acquired during the development of the Life LEMA project will make it possible to make progress in the implementation of these new projects, and reciprocally, the work carried out in these new projects will not only facilitate the consolidation of the results obtained in the project but also the aims pursued with this plan.

2.4.1.BLUENET project.

The BLUENET project (www.bluenetproject.eu), coordinated by AZTI, aims to reduce the marine litter from sea-based sources from the SE Bay of Biscay by 20-40%. As a demonstration activity, 5 fishing vessels and 4 fishing ports will be equipped with fishing gear collection bins. Recovered gear will be upcycled by recycling and using it as raw recycled material for manufacturing new fishing and aquaculture gear, closing the loop on the circular economy.

Once the system is working, stakeholders from Aquitaine, Galicia and Mediterranean provinces will be contacted to showcase how Abandoned, Lost or Discarded Fishing Gear management can be implemented locally, within a circular economy context and to facilitate the replication elsewhere.

This project is Co-funded by the European Maritime and Fisheries Fund.

2.4.2.MERCATOR DEM5 project.

The MERCATOR DEM5 project is led by RPT with partners AZTI and the Telespazio France company. It is part the Copernicus User Uptake program 110-UU-DEM5-CMEMS. The will use data about the regional to coastal ocean dynamics provided by the Copernicus Marine Service, and combine it with technologies developed as part of Life LEMA, to further provide an operational support to reduce Floating Marine Litter (FML) in the coastal area. Building on top of technologies brought by the LEMA Tool, the project will especially investigate the capacities to detect floating marine litter accumulation from space, developing new procedures to identify marine litter signature in optical and radar images collected by satellites.

Once developed and validated, the new system gathering pre-existing Life LEMA technologies and new developments will be demonstrated during the summer 2020 season. The new tool prototype will then be used to support the onshore and offshore marine litter collect activities by KGARBIA, BIARRITZ and DFG. During the demonstration, an iterative validation process will be conducted in collaboration with these local authorities to assess the tool improvements.

The project will also include offline investigation capacities, which may contribute to improve the knowledge on FML dynamics and sources. For that purpose, the backtracking modelling approach initiated in Life LEMA will be further improved, and remarkable historical marine litter events will be studied to determine and classify main contributing sources.

The MERCATOR DEM5 project is funded by MERCATOR OCEAN company (https://www.mercator-ocean.fr/) as part the Copernicus User Uptake program 110-UU-DEM5-CMEMS (http://marine.copernicus.eu/more-about-the-cmems-user-uptake-programme/). The project started in May 2019 and its duration is 18 months.

2.4.3. *PhD thesis on* "Distribution, origin and sustainable management of floating marine litter in the SE of the Bay of Biscay".

Thanks to activities carried out in LIFE LEMA and the data produced AZTI offered a scholarship (AZTI scholarship) in 2017 to do a PhD thesis. Irene Ruiz took the job and she is currently doing the PhD. The PhD completion is expected for 2021. The PhD is funded by AZTI's own budget.

The thesis the general purpose of this thesis is to gain a holistic understanding of litter in the SE of Bay of Biscay by integrating new monitoring and modelling strategies. Long term data collected in rivers and ocean thanks to field work and new technologies and the application of numerical modelling techniques for evaluate trends and risk scenarios will help to provide scientific knowledge for decision makers. To answer this challenge, three general objectives are defined as the core of the PhD research.

1- Review of abundance, distribution and sources of floating litter in the SE of the Bay of Biscay
2- Assess the riverine litter in the SE of the Bay of Biscay. Quantities, pathways and trends in Adour and Gipuzkoa rivers by
    a. Monitoring floating riverine litter: two different and complementary approaches for riverine litter data acquisition
    b. Evaluating of pathways of floating riverine litter in the river mouths. GPS buoys for detecting hotspots and tracking potential floating riverine and marine litter.
3- Model the risk linked to floating marine litter in the SE of the Bay of Biscay: predictions for medium/long-term transport and distribution

APPENDIX I – Table of activities that make up the After-Life plan

Activity	Leading Beneficiary	2019	2020				2021				2022				Budget			Source of Finance
		4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	2020	2021	2022	
2,1) Dissemination activities																		
2.1,1 Dissemination activities aimed at the general public.																		
- Maintenance of the project web page and social networks.	*SFE*														2.000 €	2.000 €	2.000 €	SFE´s own buget
- Layman´s report dissemination.	*SFE*														- €	- €	- €	
- Dissemination of the LEMA photography exhibition.	*SFE*														500 €	300 €	300 €	SFE´s own budget
- Dissemination of the LEMA videos.	*SFE*														- €	- €	- €	
2.1,2 Dissemination activities aimed at a specialised public.																		
- Publication of scientific articles.	*AZTI*														1.000 €	1.000 €	1.000 €	AZTI´s own budget
- Attending conferences on the marine environment.	*AZTI*														1.500 €	1.500 €	1.500 €	AZTI´s own budget
2.2) Performance of the technological solutions developed in the project.																		
2.2.1 Performance of the video camera technology for the remote detection of floating litter in the mouths of rivers.																		
The cameras of Orio and Adour will be kept working at least for the next 1,5 years. AZTI will take care of the maintenance and the expenses derived from renting the land the camera is installed in.	*AZTI*														10.000 €	10.000 €	10.000 €	Funded in the framework of FML-TRACK project (Copernicus Marine Service User Uptake project) with RPT-SUEZ and AZTI as partners. Respective administration in Gipuzkoa and Labour will follow the results and benefits of these innovative monitoring stations to evaluate the opportunity to maintain the network.
2.2.2 performance of the LEMA tool.																		
- Use of the tool.	*RPT Biarritz KGARBIA DFG*														- €	- €	- €	
Operational maintenance of the tool (per site or collection area)	*RPT*														-	11.000 €	11.000 €	The costs for the 2020 financial year will be co-financed by the MERCATOR DEM5 project and the costs for later financial years will be funded among the partners who make use of the tool. The financing of the maintenance operations of the tool in later financial years will be charged to the partners who require updates of the tool.
Updating of the tool (per site or collection area)	*RPT*														5.000 €	2.000 €	2.000 €	The costs for the 2020 financial year will be co-financed by the MERCATOR DEM5 project and the costs of later financial years will be financed among the partners who require updates of the tool.

Activity	Leading Beneficiary	2019	2020				2021				2022				Budget			Source of Finance
		4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	2020	2021	2022	
2.3) Marine litter removal activities.																		
2.3.1 Collection of floating marine litter at sea.																		
A) *Coast of Labourd (FR).*																		
-Biarritz -bathing areas and the rocky shores	*Biarritz*														35.000 €	34.000 €	33.000 €	Biarritz Municipality´s own budget
-Biarritz - 300m strip off the bathing areas	*Biarritz*														35.000 €	34.000 €	33.000 €	Biarritz Municipality´s own budget
-From the river Adour to the Bidasoa (300 m - 3 miles)	*KGARBIA*														80.000 €	85.000 €	85.000 €	KGARBIA´s own funding
B) Coast of Guipuzcoa (SP).	*DFG*														62.000 €	- €	- €	DFG´s own budget
2.3.2 Collection of floating marine litter on land.																		
Mechanical FML collection on Biarritz beaches (mechanical)	*Biarritz*														74.000 €	74.000 €	74.000 €	Biarritz Municipality´s own budget
-Manual (by walking)FML collection on Biarritz beaches	*Biarritz*														19.500 €	19.500 €	19.500 €	Biarritz Municipality´s own budget
- OSPAR campaigns.	*SFE*														12.000 €	12.000 €	12.000 €	SFE´s own budget
2.3.3 Action plan to deal with scattered litter in Gipuzkoa.																		
- Defining the action plan to deal with scattered litter in Gipuzkoa.	*DFG*														54.800 €	- €	- €	DFG´s own budget
- Corrective measures in priority coastal areas	*DFG*														10.000 €	- €	- €	DFG´s own budget
- Corrective measures in priority river environments.	*DFG*														13.000 €	- €	- €	DFG´s own budget
2.4. Other current and future projects linked to marine litter in the SE of the Bay of Biscay.																		
- BLUENET project	*AZTI*														28.000 €	- €	- €	BLUENET project is funded by the European Maritime & Fisheries Fund (80%). The 20% of the project is funded by AZTI's own contribution.
MERCATOR DEM5 project	*RPT*														95.000 €	- €	- €	The MERCATOR DEM5 project is funded by MERCATOR OCEAN company as part the Copernicus User Uptake program 110-UU-DEM5-CMEMS
1 PhD thesis on teh "Distribution, origin and sustainable management of floating marine litter in the SE of the Bay of Biscay"	*AZTI*														20.000 €	20.000 €	- €	AZTI's own budget

APPENDIX II – Abbreviations and acronyms

Abbreviation / acronym	Meaning
Biarritz	Biarritz Town Hall
DFG	Gipuzkoa Provincial Council
FR	France
KGARBIA	Kosta Garbia
RPT	Rivages Pro Tech, SUEZ
SE	South East
SFE	Surfrider Foundation Europe
SP	Spain