MARLICE 2019

International Forum on Marine Litter and Circular Economy

SUMMARY OF SESSIONS

Coordinated by the **Spanish Marine Litter Association**, the International Forum on Marine Litter and Circular Economy was held in Seville from 10th to 12th of April, 2019

AEBAM
ASOCIACIÓN ESPAÑOLA DE BASURAS MARINAS

The Forum was conceived as a cross-sectoral and multi-stakeholder event to advance in the management of marine litter, gathering public authorities, research institutes, private sector and environmental organizations.

Marine Litter is considered as a proper global environmental challenge and one of the greatest threats to marine biodiversity by the Marine Strategy Framework Directive (MSFD) and the Convention of Biological Diversity of United Nations. Connectivity through ocean currents makes this a transboundary problem which needs cooperation between countries.

The Forum served as a platform for projects in the Mediterranean and Atlantic area to hold meetings as part of their actions, thus contributing with content to the sessions and promoting synergies between different sectors, countries and regions.

MARLICE 2019

International Forum on Marine Litter and Circular Economy

All this information can be found at
http://marlice2019.aebam.org

With the support of

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Collaborating Projects

Promoted by

International Forum on Marine Litter and Circular Economy

Wednesday 10th April

Opening Ceremony

What did we aim at?

The goal of the session was:

- Give an overview of marine litter issues taking into account the circular economy as one of the solutions to this problem. In this session different institutions, such as the Regional Seas Conventions, EU Member States, regional and municipal governments and the AEBAM, intervened.

Chairperson:

- Pilar Zorzo, President of the AEBAM (Spanish Marine Litter Association)

Speakers:

- Pilar Zorzo – President of the Spanish Marine Litter Association
- Juan Antonio Romero - Director of Seville Aquarium
- Begoña de Benito - Director of External Relations and Corporate Social Responsibility - ECOEMBES
- Mohamad Kayyal - Programme management officer at MEDPOL, UN Environment/MAP

- Mª Carmen Clarisa Castreño – First Deputy Mayor and delegate for the economy, commerce and institutional relations of Seville city council

Pilar Zorzo introduced the Spanish Marine Litter Association (AEBAM). She explained that the aim of the creation of MARLICE 2019 was to provide a place for all those concerned about marine litter pollution and who wants to move towards a circular economy, as well as to build synergies between projects and entities from both Mediterranean and Atlantic regions.

She introduced MARLICE 2019 and gave information about the 3-day schedule.

Firstly, Juan Antonio Romero talked about the environmental problems of the seas and the important role that aquariums play in this, due to their active work on marine litter issues and public awareness. He explained that during the "Our Ocean conference" in Malta in 2017 an agreement between aquariums worldwide was signed to work together against marine litter playing a relevant role in the dissemination of events and raising awareness. Up today there are 182 aquariums participating in this programme from 41 countries.

Begoña de Benito mentioned the United Nations, when in 2015 they first talked about Sustainable Development Goals and how to achieve them by 2030. She highlighted the role of the Circular Economy in the fight against marine litter and how Ecoembes has been working for 20 years so that the packaging has the lowest impact on the environment, generating less waste.

She mentioned the three axes on which the Circular Economy is based: collaboration, innovation and education; and gave some initiatives from Ecoembes, such as field activities with scholars. To end, she remarked that Ecoembes was strongly committed to being part of the development of the answer to the problems discussed in the forum.

Mohamad Kayyal highlighted that the forum was a good opportunity to bring together private and public companies from different regions and countries, since marine litter is a cross-border problem (owning to ocean currents) that needs cooperation between different locations. He mentioned that plastics account for 95% of floating marine litter and more than 40% of benthic litter.

He also mentioned the UNEP/MAP meeting that took place two days before the Forum, in which the situation of marine litter in the Mediterranean and the need for measures in the Regional Action Plan were discussed. Following the same idea, he talked about the last United Nations meeting held in Nairobi, where the issue of marine litter (mostly single-use plastics) and the need for an Action Plan played an important role.

Mari Carmen Clarisa Castreño mentioned that sustainable development must start with the administration, regulating and managing the use of single-use products. She also stressed the important role of the city council in the protection of the oceans from the origin of the plastics, then she mentioned the Seville City Council initiatives to move towards the Circular Economy. This is further supported by the promotion of the Declaration of Seville and the commitment to form part of the Pact of Amsterdam (document setting out the Urban Agenda of the European Union). She finished by recalling that this year is the commemoration of the 500 years of the first circumnavigation of Elcano and Magallanes, which began in the Guadalquivir River in Seville.


MARLICE 2019

Block 1. Governance.

What did we aim at?

The goal of the session was:

- This session aimed at sharing progress made in the Mediterranean region by Contracting Parties of the Barcelona Convention supported by UN Environment – Mediterranean Action Plan (UNEP/MAP) and its Regional Activity Centres in the implementation of the Regional Plan on Marine Litter Management.

- In a second stage of the meeting, other stakeholders active on the topic and region had the chance to exchange and explain their activities, also contributing to the implementation of the Plan.

Chairperson:

- Mohamad Kayyal - Programme management officer at MEDPOL, UN Environment/MAP

Speakers:

- Christos Ioakeimidis - MED POL. Monitoring and assessment of marine litter through the UN Environment/MAP System. Activities related to the implementation of adopt-a-beach and fishing-for-litter measures.

- Magali Outters - SCP/RAC. Regional activities related to the prevention of land-based plastic pollution

- Pedro Fernández - SCP/RAC. Activities related to the reduction single-use plastic bags and the promotion of extended producers responsibility in the plastic sector

- Franck Lauwers – REMPEC. Activities related to the provision of Reception Facilities in Ports and the Delivery of Ship-Generated Wastes, as well as Application of Charges at Reasonable Costs for the Use of Port Reception Facilities or, when Applicable, Application of No-Special-Fee System

- Countries delegates (Albania, Algeria, Cyprus, Croatia, Bosnia & Herzegovina, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Morocco, Montenegro, Monaco, Slovenia, Spain, Syria, Tunisia and Turkey). Countries will share experience on national implementation measures in line with the Regional Plan on Marine Litter Management in the Mediterranean and other initiatives.

Work by UNEP/MAP and Regional Activity Centres

The session was opened by Mohammad Kayyal, MED POL Programme Management Officer and representing UNEP/MAP. He highlighted that marine litter is a priority for MAP and is being addressed by all MAP components under different angles:

- MEDPOL: monitoring and assessment
- SCP/RAC: prevention of land-based sources
- REMPEC: management of sea-based sources
- SPA/RAC: effects of marine litter on biota
- Plan Bleu: socio economic analysis

From left to right: Franck Lauwers (REMPEC), Christos Ioakeimidis anb Mohammad Kayyal (MEDPOL), and Magali Outters and Pedro Fernández (SCP/RAC)

Thus, he gave the floor to representatives from the different Regional Activity Centre to explain activities in detail.

- Magali Outters and Pedro Fernández presented SCP/RAC activities from a regional and national perspective. For example, they showcased work at the regional level on how green and circular businesses are boosting solutions to marine litter through the SwitchMed programme, as well as how the Centre has supported governments in their efforts to reduce single-use plastic bags (Marine Litter Med project). Other activities in the Balkans are ongoing to prevent plastic packaging in the food and beverage sector.

- Christos Ioakeimidis presented MED POL activities and those related to monitoring and assessment of marine litter in the region. Many countries have been supported in putting in place a national monitoring system that would allow for national and regional evaluations. In addition, MED POL provided guidance and on the ground support for the implementation of the "Adopt-a-beach" and "Fishing-for-Litter" pilots envisaged in the framework of the EU-funded Marine Litter Med Project.

- Franck Lauwers presented the mandate and activities of REMPEC, particularly in relation to marine litter. The Centre has been working on regional guidelines and pilot projects on two crucial measures: provision of reception facilities in ports and application charges at reasonable costs for their use.

- Christos Ioakeimidis, on behalf of SPA/RAC, provided a comprehensive overview of the work that is being carried out with regards to the effect of marine litter (i.e. ingestion and entanglement) on biodiversity, with a particular focus on endangered species (e.g. marine turtle). The Centre organized specific capacity building, training sessions on the methods applied to monitor the amount of marine litter ingested by or entangling the marine turtles and fostered collaboration across the region.

- Magali Outters, on behalf of Plan Bleu, presented the Centre and its marine litter related activities, notably the socioeconomic analysis on marine litter key best practices to prevent/reduce single use of plastic bags and bottles which aims at developing sound economic arguments on the reduction and prevention of single use plastic bags and bottles.

All the Regional Activity Centre acknowledged the financial report received through different donors, including UN Environment, the European Union (Marine Litter Med, SwitchMed and SWIM-H2020 SM projects), the Italian Ministry of Environment, Land and Sea Protection and the European Bank for Reconstruction and Development (EBRD) (marine litter activities in the Balkans).

After the overview provided by the Centres, there was a short discussion on different topics:

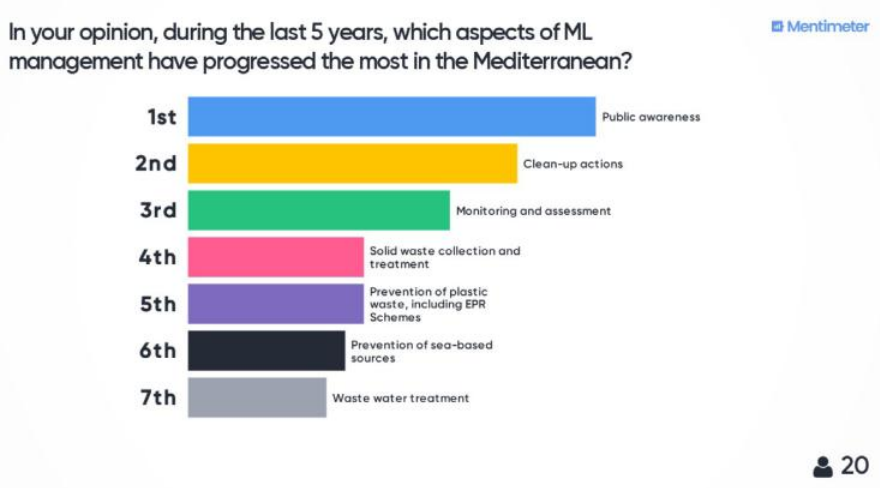
- Riverine inputs of marine litter draw particular attention from the audience, with a particular focus on the contribution of the major rivers in the Mediterranean. An attendant expressed concerned on the Nile River as a major contributor of marine litter in the region, based on scientific estimates. A participant from Egypt explained that several studies are being conducted at the Nile Delta for data cross-check. In addition, ongoing infrastructures works are expected to reduce the amount of waste reaching the riverine waters. Furthermore, it should be considered that the contribution from small rivers reaching the sea, even if less loaded, is very important due to their wide extension in the region.

- Another issue of discussion was toxic chemicals in relation to plastics. One industry representative expressed that not all plastic contains toxic additives, and informed on a recent publication by the industry related to additives in the top 10 Marine Litter items.
- A participant of Algeria expressed the need to better address links with climate change policies and the Basel-Rotterdam-Stockholm Conventions, in order to better support Southern Mediterranean countries in their efforts to combat marine litter.

Countries' delegates in the session

Panel topics

A participatory exercise using the Mentimeter tool introduced the panel topics to have a collective impression on specific topics. Three questions were made to participants who answered as it follows.


In your opinion, during the last 5 years, which aspects of ML management have progressed the most in the Mediterranean?
Mentimeter
1st
Public awareness
2nd
Clean-up actions
3rd
Monitoring and assessment
4th
Solid waste collection and treatment
5th
Prevention of plastic waste, including EPR Schemes
6th
Prevention of sea-based sources
7th
Waste water treatment
20


In your opinion, what are the priority actions that should be urgently implemented in your country?
Mentimeter
190927
recycling
Deposit refund scheme
Drastically reduce plastic packaging and single use plastics
Strict implementation of the regulatory requirements
Reclycing
Single-use plastic regulation
Prevention measures
Improve waste management
Preventing waste from ships and facilities
REducing of plastics use
public behavior
Land based Prevention measures Waste water treatment Extended producer responsability
Better waste management to prevent at source
Monitoring, prevention at sources,
Monitoring & assesment. Increase of recycling.
Improving and extended of ML monitoring and assesment
Reducir of plastics use


How do you fight against Marine Litter in your daily life?
Mentimeter
Sorting at source.Public awareness.
Responsible consumption
Minimizing plastic usage, behavioral change, informing others, purchasing responsibly, doing clean-ups
I collect thrown up wastes from shore and I inform children
Educating the future generation!
Reduce, reuse, think and return to sustainable alternatives
Responsible consumption
Avoiding or decreasing of use of plastic
Pick my waste when I come to the beach and try to avoid single use dishes
reducing the use of plastic products
Responsible consumption
I dont use plastics
I drink tap water
Recycling
Avoid littering
Reduction of single use plastic
i go to work
Doing research and spreading the word

Then, a series of 3 panels took place around specific marine litter topics. Different countries and stakeholders intervened focusing in one topic (some explained additional activities).

Firstly, Spain as host country provided a comprehensive overview of marine litter related actions in the country. Marta Martínez-Gil from the Ministry for Ecological Transition explained programs on prevention of sea and land-based pollution, removal, partnerships and public awareness, including the Citizens' Decalogue on Marine Litter. The presentation raised some questions from the public. How is the database generated by "fishing for litter" being used? These data complement the official monitoring system of the Ministry. Is there available national funding for volunteer clean-up initiatives? Yes, particularly through the calls of Fundación Biodiversidad and the National Parks organisation.

Panel 1: Prevention of land-based sources

- Ronit Avrahami from the Ministry of Environment of Israel presented the implementation and impact of the plastic bag levy in the country. It managed to reduce by 80% the consumption in large supermarkets. However, it is being considered to impose a compulsory charge on all bags since a certain law by-pass is observed.

- Khaoula Lagrini from the State Secretary for Sustainable Development in Morocco explained the national ban on single-use plastic bags as well as implementations measure taken by the government, along with other national initiatives.

- Sameh Ayoub from the Egyptian Environmental Affairs Agency (EEAA) presented activities related to the prevention of plastic bags, for example, a voluntary initiatives with supermarkets by which they would provide discounts to costumers coming with marked reusable bags.

- The French representatives also intervened from the floor explaining that the country managed to reduce by 80% the consumption of single-use plastic bags, which have been replaced by thicker and reusable bags.

Panel 1 with speakers from Morocco and Egypt

Panel 2: Prevention of sea-based sources

- Pero Tutman from the Institute of Oceanography and Fisheries of Croatia presented Fishing for Litter in the country within the Interreg ML-REPAIR project.

- Özlem Özer from the Ministry of Environment and Urbanization in Turkey presented the "Blue Card" programme in marinas by which recreational boats deliver the waste at no extra cost.

- REMPEC's consultant Peter van den Dries provided an overview of the study on best practice for the application of cost recovery systems for ship-generated waste in ports and marinas.

Panel 3: Monitoring and assessment

- Konstantinos Antoniadis from the Department of Fisheries and Marine Research in Cyprus.

- Marjeta Mima from ECAT Tirana (Albania) presented the Interreg MELMETI project which is conducting monitoring activities in Vlora, among others

- Attendants acknowledged the wealth of information provided at this meeting and the exchange north-south and south-south was particularly interesting and welcome.

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- By organizing this session within MARLICE 2019, the UNEP/MAP system has strengthen efforts in communicating activities to a large audience, as well as in acting as a facilitator for exchanges among participants.efforts in communicating activities to a large audience, as well as in acting as a facilitator for exchanges among participants.

MED POL team (from right to left): Mohammad Kayal, Nathalie Gomez, Christos Ioakeimidis and Georgios Petridis

From left to right: Marta Martínez-Gil (Spanish Ministry for the Ecological Transition), Pilar Zorzo (president of the Spanish Association of Marine Litter - AEBAM) and Nathalie Gomez (MED POL)

Special Session: Presentation of Projects

Coordinated by AEBAM

The goal of the session was:

- Present 13 pioneering projects in 5-minute talks about "Conservation and Awareness" and "Circular Economy and Innovation".

Chairperson:

- Estíbaliz López Samaniego, founding member and Research Commission member of the Spanish Marine Litter Association (AEBAM).

Speakers:

Conservation and Awareness projects

1. A Pesca por um Mar sem Lixo - (Fishing for Litter) - Paula Sobral - APLM - Portuguese Marine Litter Association
2. SOS Redes Alborán – David León – Hombre y Territorio Association
3. Effects of marine litter presence on beaches on the reproduction of *Caretta Caretta* turtle (Sal Island, Cape Verde). - Laura Corredor - Vertidos Cero Association
4. Marine Debris: the threat at San Juan Bay Estuary Watershed - Cristina I. Ramírez Colón - Programa del Estuario de la Bahía de San Juan
5. Reset Your Habits - Diane BEAUMENAY-JOANNET - Surfrider Foundation Europe
6. Red de Vigilantes Marinos - Antonio Márquez – Oceánidas
7. Marine Litter Hub – Marina González – Vertidos Cero Association

Round of questions

Circular Economy and Innovation projects

8. OCEANWiSE Project. Wise Reduction of EPS Marine Litter in the North-East Atlantic Ocean – Carlos León – SUSTAINN

9. International Quebec-France Forum. Plastics solutions: recycling innovations on both sides of the Atlantic - Maryse Vermette - Éco Entreprises Québec

10. MARCET Project - Tania Montoto – Universidad de Las Palmas de Gran Canaria

11. ROMULO (Robotics and Modelling for Underwater Litter Observation) – Francisco López-Castejón – Technical University of Cartagena

12. OCT - COMPETITIVE MULTITASK MARINE TECHNOLOGY - Santiago Miranda Palomino - Ocean Cleaner Technology

13. Intelligent technology for the recovery of the environment- Moisès Cruañas Cardona - ONA Safe and Clean

Second round of questions

Conservation and Awareness projects

1. A Pesca por um Mar sem Lixo - (Fishing for Litter) - Paula Sobral - APLM - Portuguese Marine Litter Association

Paula said that the project started in 2015, when a student went on board a ship and captured and quantified the marine litter (that captured by trawling nets, sorting out the litter produced on board and all the litter was disposed of in the garbage bins in ports) of the coast of Portugal with the aim of contributing to the implementation of the port reception facilities for litter from fisheries. The marine litter was also georeferenced and showed that the major presence was in the mouth of the main rivers. The pilot experiment had good results and they now plan to cover 16 out of the 24 continental Portugal fishing ports.

Paula Sobral - APLM - Portuguese Marine Litter Association

2. SOS Redes Alborán – David León – Hombre y Territorio Association

David explained that the project started in 2017, and its goal is to inform, assess and act on the minimization of damage caused by lost and abandoned fishing gears to species and marine protected areas (MPAs) in the Alboran Sea. To attain the objectives, they work on three axes: dissemination, citizen science and the most innovative and important part, the technical part, where specialized staff evaluates whether or not litter should be removed from the environment due to its integration in it. He highlighted that they have also participated in the elaboration of a tool for fishing gears detection..

3. Effects of marine litter presence on beaches on the reproduction of Caretta Caretta turtle (Sal Island, Cape Verde). - Laura Corredor - Vertidos Cero Association

Laura talked about an experiment carried out on Sal Island, Cape Verde. The aim of the project was to study the effects of the presence of marine litter on the beach from the hatching of *Caretta caretta* turtle until it manages to go into the sea. It intends to demonstrate that high amounts of marine litter on land reduce the chances of survival of this endangered species. She also highlighted the importance of investing in studies focused on the early stages of turtle life.

Laura Corredor – Vertidos Cero Association

4. Marine Debris: the threat at San Juan Bay Estuary Watershed - Cristina I. Ramírez Colón - The San Juan Bay Estuary Programme

Cristina explained that The San Juan Bay Estuary Programme was aimed at protecting the environment and managing aquatic waste, protecting water quality. She highlighted that mostly all the litter found on the sea bottom comes from land; therefore, the programme has a project with rainwater filters for the sewage system, not allowing waste generated on land to pass to the water of the bay. They also have a tool able to pass through different water bodies to collect microplastics. She mentioned an oil recycling campaign to avoid its incorrect handling.

Cristina I. Ramírez Colón - The San Juan Bay Estuary Programme

5. Reset Your Habits - Diane Beaumenay-Joannet - Surfrider Foundation Europe

Diane explained the objectives of the foundation, which are to protect oceans, coasts and the people who enjoy them. Their focus is to work in three main areas: quality and health, coast management and marine litter. Surfrider developed a volunteer programme called Ocean Initiatives, through which they noticed that plastic bottles were the third most commonly found item on beaches. She indicated that the idea is not to clean up the beach, but to collect data on marine litter to know the issue better in order to find solutions, and that is why they write a report yearly with the results. She said that they also design pedagogical tools and perform citizen science activities. They believe that it is necessary to change the policy and the economic framework in order to provide a solution. They develop advocacy related to reducing plastic bottles throughout the life cycle of the products. They propose measures at national and European levels.

Diane Beaumenay-Joannet - Surfrider Foundation Europe

6. Red de Vigilantes Marinos - Antonio Márquez – Oceánidas

Antonio explained that the project of the Network of Marine Guards started in 2015, and its aim was to involve divers in conservation actions, awareness about marine sea life and data collection to support scientific research. He said that the network started in the south of Spain and now up to 40 spots around the country collaborate with it, and this year it is going to be an international event. All the litter collected is sorted, weighed and georeferenced and the data are uploaded onto the App MARNOBA. Nowadays, a diving clean-up and a beach clean-up are developed simultaneously. Furthermore, they develop activities about the marine environment in schools with the results obtained from the beach clean-up. They are developing a new project focus on repairing the nets taken out of the sea to transform them into the new "bags" used for the beach clean-up.

Antonio Márquez – Oceánidas

7. Marine Litter Hub – Marina González – Vertidos Cero Association

Marina explained that the goal of the Marine Litter Hub was to become a connection point between all sectors affected by plastic pollution. They offer a platform with many pedagogical materials to raise awareness about marine pollution. She said that the project works in 3 sectors: educational, material for dissemination and citizen science. She highlighted that all the material is available to download.

Marina González – Vertidos Cero Association

Round of questions

To **Laura Corredor**: Was the experiment carried out with a single turtle nest? Has the experiment been continued over time?
Laura: Yes, it was carried out with a single turtle nest due to limited resources of the nursery which provided them; therefore, once they had 50 hatchlings they performed the experiment.

- **Same person**: Have the results of the experiment been published?

Laura: Not yet; the publication is awaiting revision to be published in the Cape Verdean magazine.

- To **Paula Sobral**: Are fishermen involved in the sorting of marine litter?

Paula: No; the results are not as good as expected since the sorting must be carried out by qualified staff and not by fishermen, and currently they don't have funding to perform it properly. They just have the data provided by the waste management company, which are focused on weight and volume. Therefore, apart from those sorting data collected by the student on board, they have no data about the sorting of the litter in the port.

- To **David León**: Due to the possibility of finding sea life on marine litter, is it going to be evaluated whether or not this litter should be removed?

David: Yes; to remove marine litter a previous evaluation must be undertaken due to the problems that can occur to the species and ecosystems. Currently, we are working with experts on the development of methodologies and protocols to evaluate whether or not to remove the item. It is complicated because it is necessary to know how, where the item is, what kind of item it is, what kind of sea life is living associated with it and whether it is safe for the staff to remove it.

- Same person: On the evaluation of the removal or manipulation of marine litter, is just the presence of native species being considered or are non-native species also considered on making decisions?

David: The evaluation is focused on Marine Protected Areas (MPAs) in the Alborán Sea, thus on the habitats and species listed there (invertebrates, sea grass meadows, coralligenous communities, etc.). The work is performed in the diving safety area, at a depth of 20-30 metres.

8. OCEANWiSE Project. Wise Reduction of EPS Marine Litter in the North-East Atlantic Ocean – Carlos León – SUSTAINN

Carlos explained that the aim of the project is the reduction of expanded and extruded polystyrene (EPS/XPS) products in marine litter in the Northeast Atlantic Ocean. He highlighted that the activities they are currently performing now are addressing the entire life cycle of the EPS/XPS, integrating the circular economy principles into design and developing alternatives from scratch, building a stakeholders' platform to collect all the information and performing a life cycle cost assessment of the current applications and the new ones that will be found. The target industries on which they are focused are the fishing industry, food goods industry and single-use items..

9. International Quebec-France Forum. Plastics solutions: recycling innovations on both sides of the Atlantic - Maryse Vermette - Éco Entreprises Québec

Maryse explained that they finance all the municipal recycling programmes carried out in Quebec-France and they are developing a great deal of projects to optimize the value change of recycling. She talked about their participation in a Forum where they presented molecular recycling technology and the important role they have played connecting start-ups with investors. She highlighted their interest in finding solutions to recycle their packaging and printed matter.

Maryse Vermette - Éco Entreprises Québec

10. MARCET Project - Tania Montoto – Universidad de Las Palmas de Gran Canaria

Tania talked about the project carried out in Macaronesia. The goal of the project was to observe how marine water quality affects the health of the cetacean population located in the project area, with the support of Whale Watching companies for the water sampling. She explained the innovative microplastic device for sampling microplastics through a pumping system.

Tania Montoto – Universidad de Las Palmas de Gran Canaria

11. ROMULO (Robotics and Modelling for Underwater Litter Observation) – Francisco López-Castejón – Technical University of Cartagena

He explained that their aim is to map the marine litter located at the bottom of the sea with underwater vehicles. They use mathematical models to find the initial mapping area. They are able to know the location data (latitude, longitude and depth) of the marine litter, allowing a map to be generated that shows the areas with higher amounts of waste. He explained that it is possible to classify the items through Software they have developed.

12. OCT - COMPETITIVE MULTITASK MARINE TECHNOLOGY - Santiago Miranda Palomino - Ocean Cleaner Technology:

Santiago explained the functions and advantages of a multitask catamaran able to collect marine litter and carry out port works. He mentioned the functions of this vessel that can be carried out, such as first response, fast acting on arrival and identification, collection system, storage of spill to the point of management, etc.

Santiago Miranda Palomino - Ocean Cleaner Technology

13. Intelligent technology for the recovery of the environment - Moisés Cruañas Cardona - ONA Safe and Clean

Moisés said that the project started in 2014 and is focused on cleaning up the surface, before waste sinks to the bottom. He explained that they placed special emphasis on littoral conservation, tourism and marine litter. The vessels they build are environmental friendly. He stressed that they are currently working on unmanned vessels which will be able to work in an autonomous way.

Second Round of questions

- To Francisco López-Castejón How useful was the information provided by the Lagrangian model in the detection of Hot Spots?

Francisco: The Lagrangian model seems to be useful in the detection of Hot Spots. However, one of the study areas was eutrophicated, so underwater vehicles were not able to work there and it was impossible to test whether the model runs well. The second study area was in a port, where even by adding the parameter that the litter found there must come from the open sea it is really difficult to verify the model. The aim of the project was not to

test the model, and therefore more study areas are necessary to validate whether it works.

Block 2. Circular Economy.

Coordinated by PlasticsEurope

The goal of the session was:

- Discuss the Legal framework, Private Sector Initiatives and R&D Projects.
- Focus on projects to mitigate the arrival of waste in the environment, with special attention on collection, treatment and recovery of waste.

Chairperson:

- Ignacio Marco, General Manager of the Iberian Region of PlasticsEurope.

Speakers:

Legislative framework

- Margarita Ruiz - "Spanish roadmap towards a circular economy" - General Subdirector on Waste. Ministry for the Ecological Transition. Government of Spain.
- Joachim Quoden - "Circular Economy Package and Single Use Plastic Directive Challenges and Solutions" - Responsibility Alliance EXPRA - Extended Producer

Round of questions

Industry initiatives

- Tony Kingsbury - Alliance to End Plastic Waste – Dow Chemical
Ana Gascón - Eco-innovation initiatives in Coca-Cola - Coca-Cola Iberia

Round of questions

I&R Projects

- Sonia Albein - Repesca-Plas and Oceanets projects. – AIMPLAS
- Begoña de Benito - Innovative projects – ECOEMBES
- Isabel Goyena - Life Eps-Sure project – CICLOPLAST

Round of questions

Legislative framework

- Margarita Ruiz - "Spanish roadmap towards a circular economy" - General Subdirector on Waste. Ministry for the Ecological Transition. Government of Spain.

Margarita talked about the need to move towards a circular economy model which has several advantages from different points of view, such as environmental, economic, and social. Due to all these benefits, the European Commission created an Action Plan for the European Union in 2015, with 54 measures, including a set of basic waste regulations. This action plan was based on production, consumption, waste management and reintroduction of secondary raw materials into production processes. She highlighted the fact that the action plan has almost ended, since these measures are currently ongoing and others have finished.

Then, she talked about the national framework, in which the Spanish Strategy on Circular Economy was established in 2017 in a High-Level Conference adapted to our society and our environment. It was the result of inputs by different sectors, such as local administrations, research sector, autonomous producers' sector, waste management sector, etc.

She stressed that, in February 2018, a draft with the Circular Economy Strategy (2018-30) was developed, which involved short and long-term actions to reach the circular economy goals. She explained that the aim of the proposed short-term actions (2018-20) was to achieve results by 2020, to verify the efficiency of those actions and to obtain results and corrections. With regard to the 2030 objective, a new strategic goal was included, which is to raise material productivity by 30% by 2030.

Simultaneously, it is intended to involve all sectors, from companies to social and economic agents, to sign a pact towards the circular economy. Those who sign it must show evidence of their progress towards the circular economy plan through the indicators they use to measure it.

The strategy goal has 12 general objectives linked to the 12 commitments of the circular economy pact, among which is to protect the terrestrial and marine environment and its biodiversity, improving people's health by reducing the consumption of non-renewable materials, improvements in marine litter management, guidelines to improve production efficiency, innovation on sustainable consumption, etc.

She explained that the Spanish action plan is based on the same axes as the action plan of the European Commission, but has also incorporated three additional measures: water reuse, horizontal thrust on participation and awareness and another one on over-employment and education.

She mentioned that the Spanish Action Plan contains 74 action lines with 111 measures and the budget for its implementation is €632 million.

She finished the speech talking about the *interministerial* group and its aim, which is to quantify whether the 74 measures in the action plan contribute to the reduction of greenhouse gases through the information given by the Climate Change Office. She highlighted that many of the strategies overlap in the methodology, providing overstated data on greenhouse gas reduction; therefore, strategy corrections are required.

- Ministry for the Ecological Transition. Government of Spain.

- Joachim Quoden - "Circular Economy Package and Single Use Plastic Directive Challenges and Solutions" - Responsibility Alliance EXPRA - Extended Producer

Joachim talked about the origins of EXPRA, which was founded 6 years ago from the non-profit alliance of 26 members and entities in charge of packaging and its subsequent collection and recycling in 24 different countries.

He stressed that EXPRA acts as the authoritative voice and common political platform representing the interests of all of its packaging recovery and recycling organizations, such as Ecovidrio and Ecoembres from Spain.

He said that its goal is that all the containers that are on the market are kept in the circle and find a second life, on the one hand promoting the circular economy and, on the other hand, defending their common interests as packaging companies, solving the problem of plastic in a coherent way, working together with the governments and political forces of the different countries.

With the support of the governments, they are committed to doing their job, which is to keep this circular economy circle going and to ensure that there is a balance between governments and waste management companies. He said that there is a problem, which is that there is no control by the European Commission to control what the European members are reporting.

He then discussed the technical challenges of EXPRA, such as Promote Extended Producer Responsibility (EPR) for packaging waste, promote a sustainable and efficient EPR scheme, non-profit, boosted by the industry and which should offer a service of public or collective interest, and promote Best Practices for the separate collection, sorting and recovery of used containers.

He talked about the policy of banning single-use plastic products and what it will mean from an economic viewpoint, but also how EXPRA assume that costs are not going to be a problem since their policy states that "what can be done for the environment, must be done". He highlighted that it is obvious that the fees will increase. He mentioned that nowadays an input of money of 5 billion is injected into the European system for EPR and deposit and it will rise to 20 billion per year, if it is done in the best way.

He claimed that industries are working together to change the composition of their plastics and be able to solve the problem. He mentioned that a tool has been developed to see whether or not packaging is recyclable; this tool will be online soon, so citizens can buy those packages that they know can then be recycled.

He emphasizes and defends the need to educate the population.

Joachim Quoden - Responsibility Alliance EXPRA

Round of questions

- To Margarita Ruiz: Related to the circular economy strategy: 1. What are the obstacles to public and private cooperation? 2. When you showed the value of costs, they seem insufficient to turn waste into new resources.

Margarita: Concerning the first question, public-private partnerships have been present from the beginning. In order to progress with these partnerships, a circular economy council has been created where all the suggestions from stakeholders will be heard.
Concerning the second question, within the section on water, the state has part of the authority while waste is delegated to local and autonomous communities. Therefore, the waste budget is lower, because it only considers the state budget and not the budget allocated by autonomous communities or local entities.

- To Joaquim Quodem: When do you think there will be a methodology for the unified measurement of globally accepted recycling?

Joaquim: It is currently complicated to measure the effect of these objectives but he thinks ways will be found to do it. He highlights the responsibility of the European Commission to monitor and unify the protocols, so that they can be comparable.

- To Joaquim Quodem: Looking at the EPR system, can we find some preventive measures where the directive says how members can develop these preventive measures?

Joachim: All members have programmes to help companies to improve packaging or eliminate unnecessary packaging and they try to help them to do the right things.
We cannot force them; we can only try to help them. If we consider how much plastic packaging is bought per person and why, it is difficult or impossible for us to answer, because this is a social discussion. We can consider that to buy more packaging in small portions is a problem in today's society; however, food waste is being reduced, which is good. To know where is desirable, and not to put plastic packaging represents a daily discussion because there will always be arguments for and against, although many of them are going to be withdrawn due to public pressure.

- To Margarita Ruiz: How do you see the reduction of so much plastic ending up in the dump?

Margarita: She thinks that different measures need to be taken in different areas of legislation. Landfill cost, at least in Spain, is very low; therefore, the Royal Decree on Landfills is being revised (possibly new information on landfill legislation will come out in May). This new legislation has endeavoured to ensure that the cost of discharge includes all those costs that were not internalized.
There will also be an attempt to achieve more and better separate garbage collection. The aim of these measures is to reduce discharges in Spain.

Industry initiatives

- Tony Kingsbury - Alliance to End Plastic Waste – Dow Chemical

Tony talked about the creation of the Alliance to End Plastic Waste and its aim, which is to find a solution to the plastic problem. They think that the biggest problems concern those countries where there is a high population and there are no waste treatment plants, such as Asia, Vietnam and Indonesia. Therefore, the Alliance is focused on these countries to invest money and effort to resolve the problem.

He mentioned some organizations that try to deal with the problem but in a fragmented way. This means focusing on developed countries where there is not the real challenge because there is not as much need for investment in infrastructure as in underdeveloped countries. In these countries there is no infrastructure to manage, collect or treat waste.

The solution that they are working on is a combination of expert knowledge, from producers, brand owners, management companies, NGO's with experience in these places, etc. He remarked the importance of the cooperation of industry, government and NGO's to solve this problem.

This is the biggest alliance of this kind, non-profit and with specific assignments and large-scale solutions to prevent plastics from arriving or remaining in the environment. These solutions include reuse, recovery, redesign and anything that can be done to prevent this material from ending up in the environment.

He said that all the companies involved in the Alliance have committed to donating money up to $1.5 billion to create infrastructure to recycle waste, withdraw plastic waste, waste collection systems as well as raising awareness and support for material innovation, more efficient packaging designs, waste disposal technologies, all based on science and economics.

He stressed that education is especially important, particularly where people are not used to managing waste, and this has to be supported by local and federal governments. Also, he stated that clean-up projects play an important role in raising awareness.

Much of the work of the alliance is focused on whether they are effective in the actions they are carrying out. He ended by saying that The Alliance was formed recently; there is still a lot of organization needed, but it is possible to see how many projects have appeared in a short space of time.

- Ana Gascón - Eco-innovation initiatives in Coca-Cola - Coca-Cola Iberia

Ana talked about the eco-innovation measures in Coca-Cola, and their work

preventing plastic pollution in those countries where they work. Coca-Cola believes that the cooperation of industry, the administration, citizens, customers, NGO's, could resolve the problem of plastic as a whole.

She talked about some initiatives that Coca-Cola launched, such as the international strategy "A World Without Waste" by 2030, the European Strategy "This is Forward" by 2025, where all Coca-Cola's packaging must be part of the circular economy, Coca-Cola also undertakes to collect the equivalent of all the packaging that they sell to prevent them from becoming marine litter in Spain and Portugal by 2025. In addition, they commit to 50% of plastic packaging being made from recycled PET, 100% of the portfolio being 100% recyclable and to collecting and preventing all Coca-Cola packaging from being litter and specially reaching the sea. Thus, they are committed to informing their customers and consumers in order to raise public awareness about recycling.

She talked about the actual data of the Coca-Cola portfolio and their aim to increase the percentage of recycled PET, recycled glass bottles and recycled glass cans in their products. They are also going to introduce transparent plastic in all the products that they manufacture to allow them to move towards a circular economy. They also try to lighten materials, including plastics, glass and cans. She stressed that they also want to include material of renewable source in the packaging.

She explained that Coca-Cola is working closely with start-ups and companies that contribute to the innovation process. They also work on plastic reduction in secondary packaging.

To achieve all the goals, they collaborate with recycling plants by adapting their packaging to the identifiers of the different plants. They are starting to collaborate with chemical recycling from Brussels.

She presented the "Circular Seas" project ("*Mares Circulares*"), which has three main axes: remove waste by coastal clean-ups and a *fishing for litter* programme, education and population awareness-raising and fostering solutions for the future, which has the aim of investing in three university degrees and supporting start-ups linked to marine litter from a circular economy viewpoint.

She ended by saying that the first promotion of the project has been very successful, due to the participation of more than 170 organizations, public administrations and companies that have been involved.

Round of questions

- To **Tony Kingsbury**: The Alliance is a new organization. Do you have any guidelines for decision-making when selecting the countries in which actions should be taken and the projects you will support?

Tony Kingsbury: Yes, a decision-making brief has recently been published, which indicates the priority order to carry out a project or to clarify what are the things that they will support in case someone wants to make a proposal. This does not mean that they are looking for solutions only for Indonesia and India; they are focusing on places where there are big amounts of waste.

- To **Ana Gascón**: Coca-Cola's approach focuses mainly on recycling, but have you investigated the deposit system with the idea of reusing glass bottles?

Ana Gascón: 92% of Coca-Cola glass is returnable glass, so they already have a very efficient glass deposit system. Concerning plastics and cans, solutions are being sought to reach 100%, but more time and research are needed.

General question: There are companies that cannot invest in innovation. How can we support them?

Answer: **Tony Kingsbury** says that SMEs have to be more creative to have a successful business. Innovation is focused on solving this huge problem. **Ana** says that Coca-Cola has an initiative called "hostelry for the climate", in which guidelines are given to the sector to try to mitigate its impact on climate change. Coca Cola asserts that large companies have to be responsible for transferring these commitments to medium or small companies because, in this way, everyone will be more competitive.

- To **Ana Gascón** from **Xavi Delgado** (Waste Agency of Catalonia): With regard to the deposit-refund system and in accordance with the single-use plastic directive and the target of 90% collection for the recycling of beverage bottles, is the Coca-Cola team thinking of other alternatives to be able to reach 90%?

Ana: The legislation sets 90%; however, Coca-Cola's strategy is 100% return of all its packaging. They are open to new solutions but want the solutions taken to be as efficient as possible.

- **General question** from **Olga Villacañas** (Ocean52): What are the measures that companies are taking with regard to the arrival of

plastic pellets, from industry, which appear on the coasts of Catalonia, the Atlantic part of France or the United Kingdom?

Answer: Tony Kingsbury says that the plastics industry is taking this very seriously. Dow has clean-up systems in order to make sure that in the case of a spill in the plastics industry it can be cleaned, avoiding an impact and preventing these pellets from reaching the sea. They also have a collection device in the sewage systems. New challenges are, on one hand, to go beyond the facilities, and control transport companies to prevent the input of pellets into the sea and, on the other hand, to take action at recycling plants where many infiltrations occur.

They work with local authorities to analyze pellets and find their origin, to eliminate whatever is behind these discharges. Ignacio Marco says that, at that Spanish level, the programme from the United States has also been implemented and has been promoted as Plastic Europe (in Europe). In the Iberian Peninsula all members and some transport companies have signed it. Measures to prevent the release of pellets into the environment will be implemented, such as filters in the sewerage system or nets to prevent them from falling to the ground, and, in case this happens, they must have a quick pick-up.

- To Tony Kingsbury from Ignacio Marco: Wants to know about the projects budget and whether there are any to be carried out in North Africa, as it would have an impact on the Mediterranean due to its proximity.

Tony Kingsbury: He says that Africa is in its crosshairs and they are exploring opportunities with partners and awaiting their proposals for intervention in Morocco and even Egypt. They have already begun to invest in awareness programmes.

- To Ana Gascón from Ignacio Marco: Asks about innovation and eco-design and the main obstacles that have been found.

Ana Gascón With regard to caps attached to bottles, it is not yet being implemented as it is not mandatory yet, but innovation processes are being invested in. The challenge is to improve on eco-innovation when we think we are pretty innovative, so a constant improvement becomes more and more difficult. The next improvements that we want to introduce in the market are the material coming from other recycled material, and to increase the percentage of recycled PET in some packaging. To achieve 100%

recycled PET in all products, it is required to supply recycled PET in the market. All the eco-innovation processes are linked to the whole packaging management chain. So it doesn't just depend on what Coca-Cola wants, but also on the materials they have available in the market.

Left to right: Ignacio Marco (PlasticsEurope), Ana Gascón(Coca-Cola Iberia) and Tony Kingsbury (Dow Chemical)

- Sonia Albein - Repesca-Plas and Oceanets projects. – AIMPLAS

Sonia talked about two projects, Repesca-plas and Oceanets.

She explained that marine litter has been identified as a global problem, and has 3 main impacts on biodiversity: ingestion or tangling of species with marine debris, economic damage (fishing, tourism or aquaculture), and there is also a problem with waste loss. If this waste does not reach the sea, it can be managed to generate a product that is then recoverable.

Repesca-plas is a national project to be developed in 4 years. The first stage involved mainly the characterization of waste collected.

The second step is more focused onto make a sampling protocol for national standardization, also, a range of detailed ecotoxicological analyses (in both polymers and additives) and a technical-economic feasibility to treat marine debris on treatment plants.

The primary general aim is to reduce the waste found in the sea. There are also specific goals which are to increase knowledge about marine debris composition as well as evaluate the possibilities of recoverable waste and transfer replicability spreading the project.

She explained that the project methodology is similar in both phases. It involves the passive removal of marine litter by volunteer fishermen during their working day and its disposal in containers located in the ports, where the waste is characterized by the MARNOBA platform. Moreover, the plastic fraction is sent to AIMPLAS, where it is characterized according to its nature, to check what is the most common and how it arrives. They also do research on processability and recovery of waste.

She mentioned that they have focused on two polymers, PET and LDPE (low density polyethylene). PET has not been mechanically recycled due to its state of degradation and impurity level. However, as regards LDPE, transformed plates have been successfully made.

Ecotoxicity was analyzed on 3 species in different substrates: domestic packaging, industrial packaging, octopus pots and fishing nets. Toxicity was only observed in a sea urchin larva with the fishing net as substrate. She highlighted that the concentration levels in trials did not represent the concentrations found in the marine environment

In the second year, a more exhaustive cleaning or manual selection treatment is carrying out on those bottles that present a lower degradation level, and part of LDPE wastes mixed with other polyolefins will be was used

to produce urban furniture as well as marine useful products to fishers in terms of be grateful for developing these tasks.

Regarding ecotoxicity tests, during the second phase of this project it will be check if toxicity is due to the polymer, additive or pollutants that bioaccumulate on the net in the environment.

Oceanets is a European project under Blue Economy call.

It has a total duration oflasts two years and aims to prove the technical and economic viability of recovery fishing nets to produce a valuable final product as well as to prevent marine debris.

An ICT tool will be developed to geolocate Hot Spots of lost nets and their collection. The aim is to prevent their loss and to recover this waste, promoting their removal from the sea.

The main steps of the project with the extracted fishing nets will be pre-treat it (fine crushed) and then, if necessary, add different additives to improve the quality of the product. Afterwards, it is sent to Sintex to spin and make textile fibre for the manufacture of sportswear, thus giving a new life to fishing nets.

She ended by saying that they obtained better results than expected in the first part of the project.

- Begoña de Benito - Innovative projects – ECOEMBES

Begoña de Benito summarizes the Ecoembes framework, after 20 years helping to integrate the circular economy based on the 17 points of the sustainable economy.

She talked about the Circular lab, which is a circular economy laboratory, located in La Rioja. It is a collaborative area on a real scale with people specialized in different subjects. She explained that the Circular lab works in 4 action areas: smartwaste, future packaging, citizen science and entrepreneurship.

She introduced the three projects they are working on. The first one is about a Bio-Bio Container, where they are researching the creation of a container with a polymer of vegetable origin. The second project is LIBERA Makers, aimed at generating courses for professional training focused on the construction of instruments and ways to capture marine litter. The third one was the Plastic Leak Project, focused on the plastic life cycle, from the moment it is produced, until it becomes or does not become waste. The objective is to find the weak points of the production-consumption-management chain to act in the right place.

- Isabel Goyena - Life Eps-Sure project – CICLOPLAST

She introduced Cicloplast, a non-profit entity which represents manufacturers of raw materials and converters of plastic containers. The entity promotes projects to prevent and recycle plastic waste, carries out awareness-raising campaigns and green volunteering. She explained that it is a three-year project and its goal is to recycle and implement a series of procedures with EPS (expanded polystyrene) fish boxes, and to transform them into another type of polystyrene packaging (dairy packaging or extruded polystyrene trays).

She mentioned that despite its bad reputation, polystyrene is one of the plastics that are best recycled, because it can be recycled in several ways; the most common system is mechanical recycling, with very little loss of recycling, only with crushing and pressure. She said that the product obtained is mainly used as an insulating material in construction.

The project deals with physical-chemical recycling to provide polystyrene with enough purity, allowing this material to be in contact with food; she said that to date this is not possible. She highlighted the fact that fish boxes are not considered as domestic waste; therefore, they do not have an organized collection system and depend on the producer looking for this system, which is expensive due to the air that is transported.

She stressed the fact that disposal landfill costs in Spain are very low; therefore, in many cases the option is landfill instead of recycling.

She explained all the steps of a project that they are carrying out with El Corte Inglés, which involves the entire process from the collection, production of the recycled final product and its return to El Corte Inglés.

She explained that this project contributes to European policies in the circular economy package, in directives (since it reduces the amount going to

landfill), plastics strategies due to the saving of raw material and the prevention of marine waste production.

Isabel ended by saying that they are expecting to build a semi-industrial-sized plant to reduce the use of landfills and reduce the use of virgin polymers, energy and water, as well as to increase jobs.

Round of questions

- From **Francisco López** (Technical University of Cartagena) **to Sonia Albein**: Do you know which boat has picked up the marine litter, where and if there is a mapping of the areas covered?

Sonia Albein: Yes; it depends on each fisherman's guild but the boats are monitored and their fishing areas are known. In the III phase of Repesca-plas, an analysis of density and location of the marine litter found will be performed.

- Same person to **Begoña de Benito**: Are there any previous designs before collecting trash from the bottom?

Begoña de Benito: She says that they are starting with the Project now; therefore, she cannot say anything until they obtain the results, but surely there will be.

- **Ana Cabezas** asks **Sonia Albein**: How do you know where the fishermen pick up the debris, because it's not the same to know where the boat has made a track as where exactly it was caught or with which casts.

Sonia Albein: We work with the fishermen before starting the project, seeing the areas and coordinates where they usually fish. Rubén from Vertidos Cero Association says that they follow them through specific software and that it is intended to continue with a better one. Because of the speeds at which they sail, they know more or less when they are casting. It is true that it is not known, except in very specific cases, exactly when this rubbish gets into the boat because there are vessels that operate for a week and make many sets during that period. However, with those boats that make great fishing efforts and bring marine litter ashore daily, it could be known where they have been fishing.

- From **Ignacio Marco** to **Isabel Goyena**: Polystyrene is specifically mentioned in the single-use plastics regulation. What impact can it have on the project?

Isabel Goyena: The project will not be affected because fish boxes are not within the single-use directive. It is true that by citing polystyrene as a banned product, although it is not the most common marine waste material,

it has revolutionized the market. It is important at the project level because it is in the spotlight of the directive. One of the solutions for commercial fish trays is to revalue the waste produced and to reduce the management of this waste at a lower cost.

- From **Juan Pablo Pérez** (AEBAM) to **Isabel Goyena**: What is the logistics cost of the EPS and at what point in the chain is compaction recommended to lower the costs of the process?

Isabel Goyena: Right now they are investigating several options where there are compactors and the possibilities of having required staff, such as big supermarkets or large ports. A compacting machine would cost around €4,000 plus the staff. She mentions as an example the port of Vigo, which has a compactor with good waste management.

A Plastic Ocean documentary presentation session + Round table

The goal of the session was:

- Introduce the problem of the marine litter through the documentary A Plastic Ocean.
- Create a discussion among speakers of the round table; this involved representatives from the plastics industry, associations interested in the regulation of this material and associations working to end its presence in the environment, and the Forum audience.
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- The session was open to the general public

Chairperson:

- Juan Antonio Romero - AQUARIUM OF SEVILLE
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  Speaker:

  Jo Ruxton, Plastic Oceans (UK) - Conference & Documentary presentation.
- The round table was made up of:
- - Jo Ruxton (PLASTIC OCEANS UK)
  - Pilar Zorzo Gallego (SPANISH MARINE LITTER ASSOCIATION)
  - Vanessa Salvo (SURFRIDER)
  - Tony Kingsbury (DOW - ALLIANCE TO END PLASTIC WASTE)
  - Ignacio Marco (PLASTICSEUROPE)
  - Cristina Fossi (UNIVERSITY OF SIENA)
  - François Galgani (IFREMER)
  - Isabel Goyena (CICLOPLAST)

Jo Ruxton presented the documentary A Plastic Ocean. During the conference she showed the increase in the production of plastics from their creation in 1950 to the present. They spent four years exploring the issue of plastics in our oceans and their effect on marine ecosystems and human health, including endocrine disruption. She emphasized that, although this material brings us many advantages, its regulation is essential, especially in countries where they have no facilities for its management. In the presentation, she showed some images and videos from the shooting of the documentary. During the shooting they were looking for a big mass of plastic which forms the plastic island; instead of that, they found small pieces of plastic under the surface in the North Pacific Gyre.

At the end of the session a round of questions took place in which the public received feedback from the round table speakers.

Participants in the round table. From left to right: Ignacio Marco (PlasticsEurope), Jo Ruxton (Plastic Ocean UK), Isabel Goyena (Cicloplast), Juan Antonio Romero (Aquarium of Seville), Pilar Zorzo (AEBAM), François Galgani (IFREMER), Cristina Fossi (University of Siena), Vanessa Sarah Salvo (SurfRider Spain), Tony Kingsbury (Dow – Alliance to end Plastic Waste)

Thursday 11th April

Review of day 1 conclusions, introduction to the programme of the day and Awareness block

KEY-NOTE SPEECHES

The goal of the session was:

- Current research on marine litter, focus on the Marine Strategy Framework Directive, chemical impact of plastics on marine biota, new tools for monitoring marine litter and its impact on biodiversity and related indicators.

Chairperson:

- Pilar Zorzo, President of the AEBAM

Speakers:

- "Marine litter research in support of the Marine Strategy Framework Directive (MSFD)" by François Galgani, IFREMER.
- "Chemical impact of plastics on marine biota" by Ethel Eljarrat, Institute of Environmental Assessment and Water Research (IDAEA) - Spanish National Research Council (CSIC).
- "Marine litter: new tools for monitoring" by Jesús Gago, Spanish Oceanographic Institute.
- "Marine litter impact on biodiversity and related indicators" by Cristina Fossi, University of Siena.

Round of questions

Key-note speeches

- Marine litter research in support of the Marine Strategy Framework Directive (MSFD). By François Galgani, IFREMER.

François Galgani talked about the role of Marine litter research in support of the Marine Strategy Framework Directive (MSFD), which undertakes different issues, such as monitoring, port reception facilities, SUP Directive, Plastic Stateg and regional cooperation. He remarked that IFREMER operates the French oceanographic fleet for the benefit of the entire scientific community.

IFREMER designs and builds maritime monitoring and research infrastructures, as well as tools for scientific observation, research and for database management. He said they are currently working on new challenges to solve many problems about marine debris and its effect on sea life.

He talked about the Technical Group on Marine Litter (The TG Litter) and the current work they are undertaking as baselines on Marine Litter, updating monitoring guidance 2019, revision of the marine litter master list 2019, research project list, following the development of Impact Criteria D10C3 (sea turtles) plus the D10C4, etc.

He mentioned some marine litter databases and websites, such as EMODNET which has a chemistry module and gives information about beach litter, sea floor litter and micro litter. He remarked the importance of compatible data structure, data exchange and metadata.

He ended by talking about the research projects in support of both MSFD and the new SUP Directive. He talked about the European BLUEMED initiative, where IFREMER participated in the work coordinated by the European Commission to formulate a new strategic research and innovation agenda for the Mediterranean Sea. The objective is to meet the various challenges in marine and maritime research in the Mediterranean Sea to develop growth and promote the creation of new jobs.

- Chemical impact of plastics in marine biota. By Ethel Eljarrat, Institute of Environmental Assessment and Water Research (IDAEA) - Spanish National Research Council (CSIC).

Ethel talked about the effects of chemical compounds associated with plastics in marine biota. She said that there are more than 3,000 chemical substances associated with plastics and at least 60 of them produce harmful effects for the environment and human health. She highlighted the fact that the others have simply not yet been studied.

The research group is focused on flame retardants, plasticizers and those that in view of their quantity are more important to evaluate. The importance of studying them is because they are persistent organic pollutants, being very stable against degradation, bioaccumulation and biomagnification throughout the food chain. They also have the potential to be transported over large distances and reach remote areas, such as Antarctica.

She mentioned that there are some alternatives to these compounds, but structural composition is similar and they behave in an analogous way to those already banned.

She highlighted that these compounds reach the marine environment through microplastics from cosmetics, toothpaste, etc.

She mentioned some studies where the presence of flame retardants, their effects and different evaluations such as biomagnification, temporal trends, maternal transfer or long-range transport, have been studied in biopsy samples or in samples of stranded animals. She mentioned that chemical compounds that were banned 10 years ago are still being found in the tissues of stranded marine mammals.

She ended by saying that organophosphate plasticizers in marine biota tissues could be an indicator of contamination of plastic pollution in the world's oceans, although more information about plastic transfer additives to organisms after ingestion, the origin of these additives accumulated in tissues of organisms and more data in different seas and comparison with plastic debris distribution studies are needed.

- Marine litter: new tools for monitoring. By Jesús Gago, Spanish Oceanographic Institute.

He talked about new tools for monitoring marine litter. He stressed that it is not simply due to the different categories and the huge amount of items of marine waste, up to 200, from gloves to batteries, etc.

Their aim is to straightforward the protocol of marine litter characterization as much as possible to allow the adaptation of the sampling protocol to make data comparison with other sampling methods in an easy way.

They study different ways of analyzing marine litter in a non-invasive way, although heavy marine litter is not included, so the data are not accurate. By using ROVs and Photogrammetric sleds, they obtain non-invasive images of the marine debris.

He explained that floating marine litter in coastal areas and on the sea surface is analyzed by satellites (open source and commercial). The analysis consists of testing spectral signatures of different cover types - comparing

them to the spectral signatures of plastic litter. He also talked about the advantages of using drones in this kind of studies; however, he said that many are lost due to the electromagnetic source of the ships and also good weather conditions are required to use them.

He stressed the necessity to involve groups of students to use these technologies; therefore, they count on raising awareness and citizen science activities, such as fishing for litter actions, activities with local students to classify the litter fished, reports with a video to cover the whole process, etc.

- Marine litter impact on biodiversity and related indicators. By Cristina Fossi, University of Siena.

Cristina Fossi during her speech

Cristina Fossi started by saying that there is a gap on identifying the impact of marine debris since the quantification of microplastics in the marine environment can depend on different environmental factors and change according to multiple oceanographic features. Therefore, they support the necessity to study the marine litter impact on biodiversity through bioindicators, for example large filter-feeding species, such as the fin whale (*Balaenoptera physalus)*.

She stressed that some species are more exposed to plastics than others due to the huge amount of water they ingest during their filtering activity for feeding. She talked about some studies they carried out in which, depending of the contamination of the feeding areas, the tissues of the bioindicators presented higher or lower levels of microplastics.

She talked about the Hydrodynamic Model which allowed them to predict the dispersion of plastic particles and therefore to identify areas of accumulation and non-accumulation of microplastic. Thus, the multi-layer approach used to investigate the possible overlap between microplastic

convergence areas and fin whale feeding grounds allowed them to suggest potential risk areas for whale feeding.

She talked about the bioaccumulation of microplastics and the problems it has on rising in the food chain. This means that top predators show a higher concentration of contaminants, which includes many edible species. Therefore, the content of plastics in fish varies with the position of the species in the food chain and the contamination of the habitat of the individual fish.

Following their aim to study the impact of marine litter on Mediterranean marine life and to develop a monitoring protocol based on bioindicator organisms, she explained the importance of carrying out the projects from a threefold monitoring approach, which includes analysis of the stomach contents to evaluate the marine litter ingested, analysis of plastic additives and PBT compounds used as plastic tracers, and finally the analysis of the effects by biomarker responses at different levels of organization.

She ended by stressing the raising of the awareness of the population. She also referred to the importance of disseminating all the scientific evidence and of involving the new generations on this.

Attendants to Key Notes Speech Session

Round of questions

- From Pilar Zorzo to Ethel Eljarrat: What are the effects on human health and the difficulty in studying them?

Ethel Eljarrat: The impact on human health would be given in the same way as for marine species. These substances have been found in human food, and all fat foods may have these elements; also, transfer from the mother to the foetus can occur. These substances appeared in breast milk.

- From **François Galgani** to **Cristina Fossi**: Due to the current knowledge about microplastics and political concern, is there a switch of interest in citizenship about plastics in food?

Cristina Fossi: Because we remove the digestive tract in the food we consume there should be no transfer of these substances to our organism, but scientific studies are needed to prove this.

- From **Pilar Zorzo** to **Cristina Fossi**: Can microplastics be transferred between tissues?

Cristina Fossi: They could be.

- From **Sara** (Mater Museoa) to **Ethel Eljarrat**: Why are additives not regulated or is this information not disclosed in food contact plastics?

Ethel: Investigation comes after application; some are already banned, but their properties make them very persistent. Many years of research are necessary to prove this effect, how it accumulates, and there are no alternatives because they are chemically very similar.

Jesús Gago adds that additives should be regulated because food is as important as the substances that it is in contact with.

Block 3. MEDITERRANEAN REGION SESSION I

Coordinated by SPC/RAC

The goal of the session was:

- To give information on PlasticBusters MPAs, is an Interreg Med funded project, aiming to contribute to maintaining biodiversity and preserving natural ecosystems in pelagic and coastal protected areas.

- The project covers the whole management cycle of marine litter, from monitoring and assessment, to prevention and mitigation.

The session particularly focuses on activities in Spain conducted by SCP/RAC, the Spanish Oceanographic Institute and the Government of the Balearic Islands.

Chairperson:

- Magali Outters - SCP/RAC

Speakers:

- The Plastic Busters MPAs in a nutshell and first outcomes - Cristina Fossi - University of Siena

- Novel approach on marine litter impacts on biota through Plastic Busters MPAs.- Cristina Panti – University of Siena

- Prevention of land-based marine litter affecting MPAs - Ignasi Mateo - SCP/RAC

- Enhancing knowledge on marine litter distribution, patterns, trends and implications for biota in Mediterranean MPAs.- Salud Deudero - Spanish Oceanographic Institute

- Marine litter management: Focus on National Park of Cabrera. Maria Francesca López Cortès - Director of the National Park of Cabrera, Government of the Balearic islands

Objective

The Spanish Plastic Busters MPAs Info Day took place back to back with MARLICE 2019 (International Forum on Marine Litter and Circular Economy), a larger marine litter event that brought different marine litter related projects together and major European and Mediterranean stakeholders. More than 200 participants attended this three-days event (from 10 to 12 April).

The session focused on Plastic Busters MPAs project, was chaired by Magali Outters from ARC-SCP/RAC and introduced the project to later on focus on activities in Spain conducted by Plastic Busters MPAs partners.

The objectives of the Spanish Plastic Busters MPAs Info Day were:

- To inform about the project activities
- Engage marine litter community within the project
- Create synergies with other related projects
- To showcase specific marine litter activities in the country by project partners

Session content

Several presentations were delivered by different member of the project team:

· Cristina Fossi from the University of Siena in her presentation 'The Plastic Busters MPAs in a nutshell and first outcomes' introduced the

background, the partners, the main lines of action of the different WP and the main project features including whole management cycle of marine litter, structure of the consortium, harmonized diagnosis, risk assessment, biodiversity monitoring in multiple species, step to step methodological guidelines to implement specific measures in MPAs and the transferring to the South Med coast.

· Cristina Panti from the University of Siena in her presentation 'Novel approach on marine litter impacts on biota through Plastic Busters MPAs' introduced the novelty of the project in the scientific phase in relation of the selection of species as bioindicators for monitoring marine litter ingestion and impacts on Mediterranean Biodiversity, the effects of microplastic ingestion in fish and invertebrate species and the monitoring marine litter ingestion and impacts in endangered species (stranded organisms).

· Salud Deudero from the Spanish Oceanographic Institute (IEO) introduced the work done by one of the Spanish partner of the project. Her presentation 'Enhancing knowledge on marine litter distribution, patterns, trends and implications for biota in Mediterranean MPAs' explained the experience of the IEO in relation with the ML, specifically on the impacts in the biota.

· **Ignasi Mateo** from ARC-SCP/RAC introduced the work done by the Interreg Med Project ACT4LITTER, which provides a suitable ground for Plastic Busters MPAs. His presentation 'Prevention of land-based marine

litter affecting MPAs' focused on concrete solutions to prevent and mitigate the impacts of marine litter.

· **Maria Francesca López**, director of the National Park of Cabrera explained the situation of this MPA in relation to ML. Her presentation 'Marine litter management: Focus on National Park of Cabrera' detailed the rich marine ecosystem of the archipelago, its history, natural values and the waste management in the MPA and the ML impacts.

Exchange with the audience

The audience of the event was wide in terms of geographical scope and background (the list of participants can be found in Annex IV). After the project team presentations

Magali Outters gave the floor to the audience for questions and comments.

Gloria Garcia from the Cabo de Gata regional Park explained her very positive experience with ACT4LITTER project and expressed the interest of the park to beneficiate from the Plastic BustersMPAs projectin order to give continuity to the work initiated with ACT4LITTER.

Pilar Fernández from the UNED (Spanish online University), explained her concern about the toxics components or additives in micro and nano plastic, the difficulty of collecting and analyzingthis material and the problem her organization face in relation with tracers / samples. The project team offered support and showed willingness to collaborate in collecting and analyzing samples

Pedro Fernández from SCP/RAC asked about the origin of latex ML waste found in the south of Cabrera Island. IEO provided a comprehensive explanation on the origins and evolution of marine litter in the archipelago. Indeed the amounts and composition greatly vary according the sea conditions and seasonal pressures

In addition, after lunch break, the Mediterranean session II-block 3 'Marine litter knowledge and tools in Mediterranean Marine Protected Areas (MPAs)', coordinated by the horizontal PANACeA Project, introduced the modular Interreg Med project initiatives tackling Marine Litter in the Mediterranean through three round tables. Participation of Plastic BustersMPAs partners (Magali Outters and Ignasi Mateo from ARC-SCP RAC, François Galgani from IFREMER, Cristina Fossi from University of Siennaand Mª Francesca López

from National Park of Cabrera (Govern Illes Balears), allowed attendants of the session to have a wide insight on the main lines of action of Plastic Busters MPAs project and also exchange experiences with other related project

Block 3. ATLANTIC REGION SESSION I

Coordinated by CETMAR

The goal of the session was:

- Portray the status of marine litter in the Atlantic Area.
- Highlight latest progress achieved on the monitoring and modelling of litter in marine, coastal, estuarine and river environments in this region.
- Pay special attention to assessing the potential links between the Marine Strategy Directive and the Water Framework Directive.

Chairperson:

- Marisa Fernández – CETMAR

Cochairperson:

- Vanessa Sarah Salvo – Surfrider Foundation Europe

Project Session

Led by the CleanAtlantic project, this session will showcase latest advances on marine litter monitoring, modelling, and detection of hotspots. In connection with Session II, it will provide technical context to further discuss how to link the Water Framework Directive (WFD) to the Marine Strategies, and to identify gaps and needs for further research. The session will include presentations of different projects working on these issues, such as Life LEMA, LitterDrone and CleanAtlantic.

Introductory part

- "Welcome and presentation of the objectives of the Session" - Marisa Fernández – CETMAR.
- "CleanAtlantic at a glance" - Marisa Fernández – CETMAR.
- "Life LEMA at a glance" - Vanessa Sarah Salvo - Surfrider Foundation Europe.

Technical developments

- "Tools for monitoring marine litter" - Jesús Gago - Spanish Oceanographic Institute.

- "Enhancing Marine Litter detection and monitoring: applications of UAVs and object based imagery analysis" – Jesús Jiménez – ARDITI.
- "Marine litter modelling & hotspot mapping: Fate of plastic debris in the marine environment" - Ramiro Neves - University of Lisbon, MARETEC.
- "Applicability of Drones for beach litter monitoring inside LitterDrone project" - Juan Pablo Pérez - Spanish Marine Litter Association, AEBAM.
"Floating marine litter in the SE Bay of Biscay and Life LEMA project" - Oihane Cabezas-Basurko - AZTI Research Centre.
- "An operational Life LEMA tool for monitoring and management support of marine litter on near-shore" - Irene Ruiz - AZTI Research Centre.

Open questions

Introductory part

Marisa Fernández presented the framework and objectives of the Atlantic Region Sessions, co-organized by CleanAtlantic and Life LEMA project, and the dynamics of Session I. After this introduction, she presented the CleanAtlantic project.

The aim of CleanAtlantic is to protect biodiversity and ecosystem services in the Atlantic Area by improving capabilities to prevent, monitor, locate and remove marine litter. Key outcomes will include user friendly online maps and databases showing marine litter data, knowledge and best practices, improved data management systems and monitoring tools, transport models and maps of hotspots and new insights on risks and impact of marine litter. Capitalization and awareness-raising actions planned in the scope of the project were highlighted as a way to facilitate the final transference of the results to end users and to change attitudes of stakeholders and civil society.

http://www.cleanatlantic.eu/

Project Life LEMA was presented by Vanessa Salvo. The main objective of the project is to demonstrate the feasibility of a sustainable management strategy to address floating marine litter by local authorities. Special emphasis is being placed on the diversification of the activities of the fishing sector, which could be directly involved in marine litter collection. To accomplish these project goals, the project has been organized in 5 different axes (awareness raising/network of experts, detection, prediction, marine litter collection and intelligent management). It is also intended to transfer the positive outcomes to end users and replicate the project methodology in other geographic areas (Marseille - Mediterranean Sea)
.
https://www.lifelema.eu/en/

Technical developments

In the second part of this session, representatives from CleanAtlantic, Life LEMA and LitterDrone projects shared their latest advances on marine litter monitoring, modelling, and detection of hotspots.

Firstly, **Jesús Gago** presented different tools for at-sea litter monitoring being improved and/or tested in the CleanAtlantic project. Regarding seabed litter, he pointed out that the list of categories and subcategories for the items monitored must be user-friendly and as synthetic as possible to facilitate data comparison with other sampling methods. He also emphasized the need to continue developing other complementary non-invasive technologies, such as ROV or Photogrammetric SLED. Floating meso and micro plastic litter is being monitored during the surveys of fisheries that different institutions carry out periodically (e.g. IEO, IFREMER, etc.). In the case of macro litter, other aerial and spatial techniques are used for its assessment. In the framework of the CleanAtlantic project, satellite calibration experiments are being carried out, but available data have low definition (10x10m pixel size). Drone field tests and protocols have also been implemented and some preliminary findings (requirements and constraints) will be taken into account for further experiences

The following gaps and challenges were highlighted:

-Need for harmonization by international organizations (OSPAR, ICES, etc.) of all the monitoring methodologies (seabed, floating or beach litter). There is still room for improvement, particularly in the monitoring of beaches.

-Development of simpler, faster and cheaper tools for marine litter monitoring.

Jesús López Jiménez presented the different technologies that ARDITI is using in the framework of CleanAtlantic to detect and monitor marine litter (floating, beach and seabed litter).

To monitor beach litter, they are using the OSPAR methodology (100 m transects), that will likely need to be modified to adapt it to the use of drones that will focus only on a qualitative characterization of litter. Besides, collaboration with stakeholders and clean-ups are foreseen to improve marine litter detection.

Automated counting technologies are also explored (fluorescence and imagery analysis) for mesoplastics sand samples, in order to reduce the processing time, and to increase sampling size and geographical range.

At sea, they are facing difficulties with the deployment of drones from large fishing boats due the interferences with the metallic hulk and antennas of these vessels. However, from small vessels drones can land and take off from the sea surface without problem.

Regarding the seabed, citizen engagement is foreseen (e.g. diving clubs) to tag marine litter items or report their concentration. Collaboration with M-ITI was already established to develop apps for citizen's science-based data collection.

Ramiro Neves talked about marine litter modelling and hotspot mapping. The basic inputs to study hotspots are hydrodynamic models at different scales (global, local and estuarine), wind models (for floating debris) and finally Lagrangian models to perform the particles tracking modelling. Data are available from NOAA and these models are being implemented in the CleanAtlantic project. Wave modelling is also being considered in these studies to simulate the beaching of litter.

On a large scale, a model for the Atlantic area has been running for two years, allowing the identification of an accumulation zone (North Atlantic anticyclone) and the discrimination of clean areas. The African and Iberian coasts were identified as clean zones due the upwelling effect and the removal of floating debris towards the continental shelf.

On a smaller scale, inlet and outlet currents in an estuary cause part of the particles modelled to be finally beached and found on the coast. This is mainly due to the effect of the wind and waves.

Historical data, principally long data series, are necessary to validate models' accuracy. Those that have been used in the scope of the project for different areas (Galicia, Ireland, etc.) show a good match between models and drifters' trajectories.

Main gaps and challenges identified in the scope of modelling are:

- Capacity to forecast the evolution of plastic density

- Size matters only if it modifies the dry volume.

- Plastic that becomes denser than water will sink on the way to the floating accumulation hotspots.

Juan Pablo Pérez (AEBAM), Ohiane Cabezas (AZTI) e Irene Ruiz (AZTI)

Juan Pablo Pérez Gómez presented the main developments achieved in the framework of the Litterdrone project, which already ended in January 2019.

The main objective of the project was the development of an innovative tool for marine litter control and management in coastal areas. For this, new technologies were applied to traditional beach litter sampling methodologies. Two different drones were used, multirotors (low altitude and short distances) and fixed wing (high altitude and long distances) equipped with three types of camera: RGB, multispectral and thermal.

Sampling was performed on two beaches of the Cíes Islands, located in the National Park of Atlantic Islands of Galicia (NorthWest Spain). In one of them, periodic campaigns were performed, following the official Beach Litter Monitoring Programme of the Spanish Ministry for the Ecological Transition (100 m sampling, all litter items and 1000 m sampling only large items (>50 cm)). This allowed Litterdrone results to be contrasted with official monitoring results. During a first phase of this project the software developed was trained and calibrated. In a second stage, the campaigns carried out by the Ministry were also coupled. Data obtained by the cameras were exported as CSV files or to a GIS program

It was concluded that results were satisfactory and similar to those obtained using traditional methodologies with large items, but less precise when smaller objects were sampled. Consequently, it could be an interesting tool to work on large scales or to access remote areas. Also, information gathered from drones could be useful in studies performed together with litter monitoring (dunes, vegetation and beach dynamics).

It is expected that climatologic and oceanographic models can be used in complementary fashion to detect litter items. In addition, it was pointed out that in the near future detection technologies improvement and production of new sensors will allow litter hotspots to be identified. http://litterdrone.eu/

Oihane Cabezas shared what is being done in terms of monitoring and collection of floating marine litter in the framework of the LifeLEMA project (SE Bay of Biscay). The project's main goal is to demonstrate the feasibility of a sustainable management strategy to address floating marine litter by local authorities.

Collection of floating marine litter was carried out using a 5-vessel fleet that includes 2 fishing vessels. All of them were equipped with a fuel consumption monitoring device and a geo-positioning system. All the data collected by these vessels are included in the LEMA tool that is used by local authorities and the vessel crews (online dashboard for FML operations management). Collection of floating litter is focused on litter windrows floating hotspots (frontal areas). During 2018 (68 days) 151 litter windrows were found and 14 Tn of litter were collected (each windrow represented 1km in length and 88 kg of litter on average). After each haul the information is reported, including the total weight brought on board. This information is used to map the situation and identify the number of litter windrows. A seasonal pattern was found; more accumulation was detected in the spring months.

Litter windrow characterization was carried out both in number and in weight. 4,302 items were found and were categorized by type of material in 7 categories and 63 sub-categories. More than 40% of what is found is of

unknown origin. Sea-based source represents 34% in number of items and 54% in weight of the total floating marine litter.

Monitoring of riverine litter was carried out with a videometry system, using near-infrared cameras, which were installed in four estuaries. The algorithm used provides information on all the items that pass through a river section, its size and speed.

Finally, Irene Ruiz Muñoz focused her presentation on the operational tool for monitoring and management support of marine litter on the near-shore, also developed in the scope of LifeLEMA project. One of the project milestones is to implement this user-friendly tool that provides detailed information to both the authorities and the fishermen in charge of collecting floating marine litter. It is structured in two parts, one focused on monitoring (data gathered from vessels, camera, etc.) and the other on prediction.

Prediction was addressed with two different approaches: the first one is based on statistical and artificial intelligence models; information from different sources is gathered in order to obtain a prediction index of marine litter accumulation on beaches. This information is used by local authorities responsible for beach clean-up. On the other hand, Lagrangian particle tracking models are used to simulate litter transport at sea, to produce floating marine litter density maps in the coastal area that include information about trends, litter abundance and hotspot location. After a 5-year simulation, which includes the river inputs, a seasonal pattern was identified, and it is shown that in the summer there is a higher marine coastal retention. On the basis of the Copernicus model, the Lagrangian modelling of surface ocean transport was validated with HF Radar surface currents and drifting buoys, also developed in the framework of the project. Satellite-tracked low-cost drifters were released both at sea and in the river mouths. In the same way, small wooden boats were launched into the sea from the boats of the project with the aim of knowing more about the dynamics of the currents on the coast of the Bay of Biscay. The field data seem to show that the buoys released principally remained in the southeast of the Bay of Biscay and finally reached the coast.

The final output of this transport model is an operational tool that provides abundant risk maps showing abundant probability indexes. For this purpose, the coast was divided into ten areas and daily forecasts inform the cleaning vessels about the litter accumulation zones.

Open questions

After the presentations, a time for open questions and answers began.

The first question from the floor was posed by **Pilar Zorzo** (President of the Spanish Marine Litter Association) about the work that is being done in the framework of LifeLEMA regarding the monitoring of microplastics in rivers. **Oihane Cabezas (AZTI Research Centre)** replied that currently microplastics are only being monitored in coastal areas, from 300 m to 6 miles.

Garbiñe Ayensa (INTECMAR) asked if regional authorities are interested in the tool developed in the LifeLEMA project and if it will be useful to carry out clean-ups. **Vanessa Salvo** (Surfrider Foundation Europe SFE, Life LEMA) recalled that local public administrations form part of the consortium; thus, the tool was built as a collaborative task with local authorities. **Oihane Cabezas** added that local authorities had been tackling marine litter in the area long before the project, but taking advantage of the project they have gained scientific knowledge and are more efficient. Litter collection has been improved and also, on a regional level, authorities have realized that it is necessary to tackle this problem.

Fuensanta Salas (European Commission Joint Research Centre, JRC) asked if member states are implementing these project results, in order to include them in the maritime strategies, to characterize the type, source and distribution of marine litter they find along the coast. **Jesus Gago** (Spanish Oceanographic Institute (IEO)) replied that with the CleanAtlantic project and the IEO, there is a direct link with Member States' representatives, not only in Spain, but also in other countries of the project through institutions such as IFREMER (FR) or CEFAS (UK).

Marisa Fernández (CETMAR, CleanAtlantic project) added that Member State authorities with responsibility for marine litter are included on the CleanAtlantic advisory board, as well as the OSPAR Secretariat. There is a constant flow of information between the consortium and the advisory board and work is being developed in alignment with existing initiatives, trying to foster synergies and to avoid duplicating efforts. Vanessa Salvo also mentioned that LifeLEMA results have been shared with the European Commission. Pilar Zorzo pointed out that CEDEX (Ministry for the Ecological Transition) was in contact with LifeLEMA from the early beginning of the project to know the kind of results that will be generated.

Santiago Miranda (OceanCleaner Technology Company) asked about the technical issues related to the operation of drones and their interaction with the hull of boats. Jesús López Jiménez (ARDITI) replied that this is due to the presence of magnetic sensors and antennas in the ships, which must be deactivated to ensure the proper performance of drones.

Mateusz Benko (TEHRAN CONVENTION SECRETARIAT, UNEP ROE) posed a question about video monitoring technologies used in the LifeLEMA project and how precise these technologies are, whether results are available and the costs associated with their installation and maintenance. LifeLEMA representatives answered that it is a new development, so many challenges had to be faced. This tool can provide information about the item size but not about the type. To provide more technical and economic details they will contact other colleagues in charge of these tasks.

Regarding models' performance, Marisa Férnandez asked Ramiro Neves how to use them to clearly guide intervention actions or clean-ups, and what additional knowledge we would require to use models in a reliable way. He noted that this is a matter of resolution; with a refined grid it is possible to get a good hydrodynamic resolution to forecast marine litter drift. In terms of collecting litter, this must be done near the coast so it is also necessary to simulate the fronts. Models represent a good contribution to identify marine litter hotspots, but results must be validated with a statistically representative number of drifters.

Regarding the future of drone technologies in the scope of marine litter, their applicability and use by competent authorities, Juan Pablo Pérez Gómez (Spanish Marine Litter Association, AEBAM) noted that drones are a platform to gather information and their use still presents some challenges and constraints. Data processing takes time and limits the capacity to obtain information quickly. Also, procedures to obtain legal permission are a complicated and time-consuming task.

Group at the end of Atlantic sessions

Block 3. MEDITERRANEAN REGION SESSION II

Coordinated by PANACeA

The goal of the session was:

- To showcase the joint achievements on marine litter assessment and management tools by the Interreg Med Biodiversity Protection Community, opening a wider discussion on existing gaps and challenges, and the needed actionsand integrated solutionsat Mediterranean scale.

Coordinators:

- Emanuele Bigagli - PANACeA Expert
- Carolina Pérez – MedCities
- Sonsoles San Román – ETC UMA – PANACeA

Opening speech

The Interreg Med Biodiversity Protection Community in the Mediterranean and evidence-based frameworks to support policy development". Dania Abdul Malak - Director ETC-UMA, PANACeA

Tackling Marine Litter in the Mediterranean: Setting the play and identifying the challenges ahead through questions and answers

Moderator:

- Emanuele Bigagli - PANACeA Expert

Round table 1: Our Action – Joint achievements on marine litter assessment and management

- Morgana Vighi , University of Barcelona, MEDSEALITTER
- Ignasi Mateo ,SCP RAC – Catalan Waste Agency, Act4Litter/PlasticBustersMPAs
- Gloria García, Natural Park Cabo de Gata - Nijar, Act4Litter

Round table 2:
Linking to other Mediterranean initiatives

- Celia Le Ravallec, ACCOBAMS Survey Initiative - Collecting floating marine litter sightings
- George Triantafyllou, HCMR, AMAre and CLAIM – Innovation for a cleaner Mediterranean
- Gloria de Paoli, ACTeon for Plan Bleu - A socio-economic dimension
- Marie Aude Sevin, IUCN-Med, Local solutions from source to sea

Round table 3: What's Next? Challenges and the way ahead

- Magali Outters,, UNEP MAP SCP/RAC
- François Galgani, IFREMER
- Cristina Fossi, University of Sienna
- Francesca López Cortés, Director of National Park of Cabrera, PlasticBustersMPAs

Participatory exercise to draw conclusions Wrap up and closing
Dania Abdul Malak - Director ETC-UMA, PANACeA

A Med Biodiversity Protection Community open session was held as part of MARLICE on 11 April from 14:30 to 17:30 hrs to present the common work and results of Interreg Med Marine litter initiatives. The session was organised by MedCities, ETC-UMA, Plan Bleu, and the Biodiversity Protection Community featured by PANACeA

Led by ETC-UMA, the session stressed the relevance of an ecosystem-based approach to policy development and summarised the main findings and achievements of the Interreg MED Biodiversity Protection Community, featured by PANACeA, regarding marine litter monitoring and management, with a focus on impacts on biodiversity and Marine Protected Areas (MPAs) and in a wider context. The gathering highlighted remaining gaps and joint recommendations for the forward-looking actions that are needed. The tools developed and/or enhanced by the Community were tested through a hands-on exercise to share their potential, obtain feedback on improvements and expand their use.

Round table 2: George Triantafyllou (HCMR), Gloria de Paoli (PlanBleu) and Marie Aude Seuin, IUCN-Med

Round table 3: Emanuele Bigagli (PANACeA Expert), Magali Outters(UNEP MAP SPC/RAC), Cristina Fossi (University of Siena), Francesca López Cortés (National Park of Cabrera) and

François Galgani (IFREMER)

Plastic Busters MPAs, one of the Modular Projects belonging to the Interreg MED Biodiversity Protection Community, held an Info session in the morning. Plastic Busters MPAs aims to contribute to maintaining biodiversity and preserving natural ecosystems in pelagic and coastal protected areas by consolidating Mediterranean efforts to address marine litter.

The open workshop was followed by an internal meeting of Interreg Med Biodiversity Protection Community partners on 12 April to build on the workshop conclusions and discuss gaps and needs for future priority actions.

Download the Capitalization Workshop Agenda on "*Marine Litter knowledge and tools in Mediterranean protected areas*" with links to the presentations of the event.

The draft version of the meeting report can be download here. Final version to be available in September.

The session was based on the following Biodiversity Protection Community Marine litter related products:

- Report: Ecosystem-based approaches to managing transboundary and cumulative impacts in the Mediterranean
- Database, MedBioLitter: Mediterranean marine litter and biodiversity interactions database (Feb 2019)
- Policy report: Tackling Marine Litter in the Mediterranean – Knowledge and Tools
- Factsheet: Tackling Marine Litter in the Mediterranean – Knowledge and Tools
- Factsheet: Marine Litter and Biodiversity interactions in the Mediterranean Sea

Block 3. ATLANTIC REGION SESSION II

What did we aim at?

The goal of the session was:

- To lead the dialogue between the WFD and the MSFD facing the problem of Marine Litter enhancing its inclusion as descriptor for both the environments rivers and seas toward a Good Environmental State.
- To showcase about best practices on technologies and innovative methodologies related with tracking and monitoring in rivers and estuarine ecosystems for gathering data on marine litter issue.

Moderator:

Vanessa Sarah Salvo, Spanish Offices Coordinator at Surfrider Foundation Europe Spanish Delegation.

Co -moderation:

Marisa Fernandez, Head of the Department of Control and Management of Marine Environment & Resources in CETMAR.

Speakers:

▪Andrés Cózar, Head of the Marine Litter Research Group at the University of Cádiz, Spain.

▪Fuensanta Salas, Coordinator of the Intercalibration of biological metrics in coastal waters at the Joint Research Centre (JRC) - European Commission.

▪Marta Martinez Gil, General Subdirectorate for the Protection of the Sea at the Spanish Ministry for Ecological Transition.

▪Ramiro Neves, Environmental Modeler and at the Instituto Superior Técnico (IST), University of Lisbon, Portugal.

▪Cristina Barreau, Marine Litter Project Manager at Surfrider Foundation Europe, France

▪Maria Cabrera, Responsible for Communication in Paisaje Limpio.

Garbiñe Ayensa, Head of Documentation and Scientific Support Unit of INTECMAR, Xunta de Galicia, Spain.

▪Carmen Morales, Research Scientist at the Marine Litter Research Group at the Faculty of Marine and Environmental Sciences in the University of Cádiz, Spain.

▪Filipa Bessa, Researcher at Marine and Environmental Research Centre from the University of Coimbra, Portugal.

How can we face the problem of ML in the aquatic environment?

To better achieve the goals proposed the session has been split two sections. The first part was dedicated about the Marine Litter impact in river and marine ecosystems, particularly in Atlantic area, the European legislations and the OSPAR Convention as prevention and monitoring tools. The last section was a showcase of projects located in the Atlantic coast to knowledges and best practices exchange focusing on monitoring and modelling.

Background section: State of art about Marine Litter distribution with particular attention to Atlantic area. European legislation and OSPAR CONVENTION

Andrés Cózar explained the current state of the Iberian coasts and aquatic environments concerning the marine litter impact and how a marine litter indicator could support the understandings about quantitative and qualitative trends. The elevated number of existing

indicators available at now is contraposing to their limitations due to low level of specificity and stability therefore an accurate indicator selection is crucial to get exhaustive dataset. Furthermore, estuarine and marine ecosystems due to their intrinsic characteristics are sometimes barely comparable enhancing limits for the indicators definition. In the framework of the **Marine Litter** (ML) spatial patterns study developed by the University of Cadiz in the Atlantic region 3 quantitative indicators has been considered: 1. amount of microplastics in the water column, 2. marine litter in the seabed and 3. marine litter in beaches. The study showed higher amounts of ML in beaches close to urbanized area with elevated human population density. While the seabed distribution displayed a decreasing pattern from the Cantabrian Sea to the Portuguese Atlantic Ocean, but an increasing trend in density for the Mediterranean Sea. Microplastic in water column showed lower densities in the North, rising up through the Portugal coast achieving highest densities in the Mediterranean Sea. Scientific data has to be the basis from which build up governance therefore a stronger linkage between **decision makers and researchers** have to established to facing the global issue ML in which interdisciplinarity is crucial to identify solutions.

"*linkage between science and decision making is important supportin networks to bring together institutions to fight ML*" – Andrés Cózar, UCA

Fuensanta Salas described the steps realized for the Water Framework Directive (FWD) definition and the bioindicators related with. The European Community is aware about **requirement to bond directives, such as MSFD and WFD, to achieve GES for which scientific data and policy making are the basis.** The JRC carried out reviews about directives in Members States in particularly for the FWD the evaluation underlined weakness related with monitoring in terms of harmonization, best practices and knowledges exchange of the monitoring techniques between countries. ML should be included in the FWD as part of descriptors but its hardly recognizable spatial distribution and heterogeneous tendencies depending of the systems analyzed, riverbeds and water column, make it a challenge. Although data about sources and characteristics are still lacking the dissimilar monitoring techniques applied hinder the ML analysis. Therefore, the **harmonization of the monitoring techniques** is basic to compare data as well as exploring methodologies suitable for marine and riverine waters systems. Actually, data and techniques still now are not properly exchanged between Members States, this issue could affect rivers ecosystems monitoring considering that several catchment areas are shared between countries.

" There is an urgent demand for harmonization concerning monitoring techniques that could be used in both marine and riverine ecosystems" – Fuensanta Salas, JRC - European Commission

Marta Martinez Gil as representative of Spain, OSPAR Contracting Party, introduce the audience in the OSPAR Convention regarding ML and its monitoring concerns. The convention is a clear case in which scientific data aligned with action plans allowing the identification of solutions to fight marine litter as well as detecting innovative projects capable to bring inputs for management that could be included in action plans.

OSPAR Convention includes several working groups and committees to the better understand of the Atlantic governance. The ML working group MLWG is one of them, since 2010 the MLWG settled a standardized monitoring system with regular evaluations to progressive improvement of the measures. It was starting from 2014 a common protocol to trackle ML has been approved within OSPAR: for beaches with a guideline for seasonal samplings, for seabed debris deposit in collaboration with International Council for the Exploration of the Sea (ICES) and identifying as indicators the fulmars seabirds in which huge amount of ML, mainly plastic, has been detected in their stomach. However, by means studies and research at now the Convention is going to approve other indicator to the ML accumulation detection such as turtles, in Mediterranean the *Careta careta* has been approved in the UNEP/MAP convention as well as researches have been carried out to harmonize methodologies for microplastics in sediments. The action plan of OSPAR Convention identify 4 lines in which working in: 1) maritime sources of ML, 2) terrestrial sources of ML, 3) awareness actions and 4) ML removal actions.

"Scientific data and action plans have to be aligned in order to fight marine litter" – Marta Martinez-Gil, Spanish Ministry for Ecological Transition

Showcase section: Experiences exchange monitoring in river and estuarine ecosystems

Ramiro Neves, shared the lessons learned from projects of modelling of Instituto Superior Técnico (IST), University of Lisbon highlighting the importance of rivers as flow discharging debris on the seas. In particular plastics is transported by the rivers as sediments the quantity of plastics moved by waters flows depends on several factors such as: the size of the catchment, density of population affecting the area or mismanagement of waste managing or treatments. The models are able to simulate flow but are weak to predict the exact amounts of ML transported by a potential flood considering that this depends by several external factor one of which the littering. Therefore, models could be auxiliary tools for the legislative regulations to stop the littering into the environment we the efforts should be focus on ensuring an efficient management of waste in the cities. Concerning type of models to examine ML hydrodynamic or sediments transportation models or ecological models related with filter feeders and fishes are focusing more on microplastics then macroplastics.

"*a huge effort in regulations to stop the littering into environment is needed*" – Ramiro Neves, University of Lisbon.

Cristina Barreau, presented the monitoring project of Surfrider Foundation Europe in the Adour River: The River Input Project. The aim was by means of monitoring build up a clear understanding to reduce plastic pollution inflows in the ocean through local solutions. To achieve definition of pathways, composition and distribution of ML micro and microplastic. For this purpose, monitoring 8 sampling sites in the basin and the beach of the river mouth has been studied during 4 years. The top 10 has been identified such as the different ML categories also including a comparison riverine litter and ML of the beach found. The findings allowed identify solutions to reduce the ML inflows, these measures have been sorted on the basis of costs analysis an efficiency to address the local authorities. The riverine litter amount should be an indicator of the good state of the European waters in the framework of WFD for that a standardized methodology to compare riverine dataset is required.

Furthermore, microplastic binding regulations supporting preventive actions to avoid ML entrance into the sea are the more efficient managing tools.

" The riverine litter amount should be an indicator of the good state of the European waters in the framework of WFD" – Cristina Barreau, Surfrider Foundation Europe

Maria Cabrera, from Paisaje Limpio shared limitations identified before to carry out monitoring projects in rivers due to suitable methodology selection related with the riverine ecosystem for ML detection. During the first 3 years of work the RIMMEL methodology has been applied in several rivers of Spain next step of the research will be data analysis comparing all rivers.

Garbiñe Ayensa, explained the work done at INTECMAR about effectiveness of models to identification of hotspot or accumulation zones of macrolitter when comprehensive meteo-oceanographic conditions are taken into account. An interested project in the Aurosa estuary with a specific item of ML which is commonly accumulating in this area, the plastic floating sticks from the "bateas". There are more than 3.000 farming places of mussels, or bateas, with several plastic structures each that break or are lost in the management. Estimations of lost of sticks per year are higher than 3 millions, 83 tonnes of plastic. One of the main lessons learned was that working with models helps but that drifting buoys and supervised citizen science are key elements to validate these models.

Carmen Morales, presented the RIMMEL Project done by the University of Cadiz and the JRC to gather data on floating litter in rivers and its entrance to the sea. She points out that it is an **easy methodology everyone can made with a previous little training**. It consists on the observations of macro litter through bridges and the extrapolations of the amount of it to the wide of the river. For this purpose there is an app to monitor the different categories which works with a researched and validated methodology and they will have it for citizens soon.

Applying this methodology they learned how at European level, in an accumulative way, Spain highly contributes to the ML amount on the seas. She points out that **methodologies have to be harmonized** and that the observation network has to be extended in order to have a better framework of the ML accumulation processes. Finally she mentioned that **more information about what is happening in the rivers regarding macro and micro plastics is needed**. For that we also need information on the proportion per citizens of litter that it is being mismanaged, to better calibrate the models and the interpretations of the inputs to the sea.

> *"Methodologies have to be harmonized and more information about what is happening in the rivers regarding macro and micro plastics is needed"* – Carmen Morales, UCA

Finally, **Filipa Bessa** presented the big challenges they face while trying to implement a monitoring program on microplastics in rivers of Portugal. They had to choose the definition they were going to use to talk about microplastic regarding size, origins, solubility…and also what where they going to monitor in the project and with which technique. 2 years of research later they decided to use a widely used method of nets and digestion of plastics.

They learned that **estuarine areas play a key role in the dynamics of microplastics**, as they found microplastics in all the sampling places. They also identify the discharge points and the gradients between river and sea. She points out that in the 1st year of the project they already recognized the influence of the rivers to the sea, and that **ML in rivers should be considered on the directives**. Finally, she agrees that harmonized monitoring and characterization methods are needed, as well as working together to fight sources and impacts of ML on aquatic ecosystems.

Break for questions

Rivers with higher loads is the poor river in Italy, and Mediterranean rivers the stimation for the loads are higher in the models shown. Why in the model, the loads of the Mediterranean rivers are higher?

This is the result of the calibration of all the data across Europe. We can find high concentration in the northern part due to the high populations in this part of Europe. There is no different approach for northern and Mediterranean rivers but it is a good question because climate and hydrological regimes are different. With this approach we cannot measure these inputs driven by storms, is more a seasonal calibration (seasonal loads) what we can see in these models. – Andrés Cózar

We have seen projects centered in macroplastics, other in microplastics… So if we want this conexion between directives, should we restrict to one of them or should we focus on both indicators for the 10th Descriptor?

We should take into account both types of plastics due to the fact that macroplastics degrade into microplastics and by doing so they release contaminants to the water. – Fuensanta Salas

Both fractions had a link between them and we could find them in both rivers and seas, so we should investigate its pathway to the sea and also how much of it is reaching the rivers. All of it along with researching on the capacity of the water treatment plants to contain microplastics. – Marta Martinez Gil

You talked about fishing for litter and you say that you hope that in some years all the ports apply this methodology, is there any strategy for this purpose? Have you been in touch with the fishing sector not only in Galicia but in other autonomous communities? What have you take into account?

We have the intention of creating a National Scheme of Fishing for Litter taking into account the National Secretary for Fishing. This measure is already inside the Spanish Strategy for Circular Economy. It is a project based on the existing experiences in Spain, where we have lots of initiatives working on Fishing for Litter, all of them different due to its different working places and fishing sector. We have started with the exchange of experiences and participation of the fishers as well as with some workshops to know about the problems and the needs of these projects. The idea is to support these projects and start to develop an scheme for working in Fishing for Litter. We are gathering the maximum information to develop common rules inside Intermares framework taking into account to adapt to the reality of the sector. To implement it correctly we need to know how the new waste directive is going to take place in the ports. – Marta Martinez Gil

I think it is very interesting what professor Cózar has address regarding the accumulation points of some types of ML. It will be nice to know these points, pick-up the litter and then at the harbours have some kind of disposals for it and to be able to reutilize this waste.

It is the idea of the project we talked about before, the problem with ML is that lots of times it is very degraded and that it is not possible to reutilize. Along with this, only very specific types of plastics can be reutilized, like the PET type. There are projects working on revalorizing this waste but there is still a lot to develop regarding this issue. - Marta Martinez Gil

It is difficult to price this kind of waste that usually is very degraded and even having PET or nets to price, you ustill have a big amount of waste that it is hard to manage. Nonetheless we are more and more associations working on it every day. – Marisa Fernández Cañamero

Is there in rivers any faunistic indicator, as there is already in seas with the turtles for example?

There are in estuarine areas in Portugal some fishes living there but estuaries are mostly transitional areas for fauna, so it will be better to look at rivers. From our experience we learn that pelagic fish from the bottom of the rivers are good indicators for microplastic quantities on the water. – Filipa Bessa

Many of us talked about the issue of harmonization of the data in monitoring but then we found that each working group has its Master List of indicators and when we try to harmonize them we create another Master List. How do we really harmonize the data and make the two directives work together?

Regarding monitoring in beaches this issue has been widely discussed and I think the idea is to have a long Master List with plenty of items or indicators with the examples we can found. What EU recommends is that in a regional level we should choose a more representative list from the previous one and thus make both compatible. – Marta Martinez Gil

The role of the agreements in this case has a huge importance for the harmonization – Fuensanta Salas

From our experience we learn that it is really difficult to impose any Master List and I agree that the bigger organizations have an important role on guiding but it is not the same to talk about basin scales or continental scales.In our laboratory we had been working on gathering information from a global scale using the main data sources and in different environments. We get different classifications and we cross these data. Obviously to harmonize the data we lost information, but the

final classification we arrive to its common or transversal one that can be used to harmonize Master Lists. - Andrés Cózar and Carmen Morales

Which one will be the way to follow in order to bring together in a coherent way these directives?

The proposal should be to include both, micro and macro plastics in the monitorings. For this purpose this aspect has to be included in the revision of the directive, which is happening right now. It is also important for this issue to be mandatory, for all the member states to have the duty of implementing the same monitoring for ML. – Fuensanta Salas

Block 4: Conservation, awareness and citizen science.

Coordinated by AEBAM with the support of the Biodiversity Foundation

In these pages, you can find the summaries of the **April 13th sessions** and links to download the presentations.

The session included a participatory action and a subsequent plenary session:

- Participatory action: the goal was to show and compare different citizen science methodologies used in the characterization of marine litter through the applications MARNOBA, Marine Litter Watch and the Ministry for the Ecological Transition Data Card. The activity took place on a beach in the SPA Marine Area of the Tinto and the Odiel and "Odiel Marshes" Biosphere Reserve and Natural Park in Huelva.

- Plenary Session: it was held in the auditorium of the Aquarium of Seville. The results obtained in the field activity were shown and compared graphically. This was followed by the presentation of projects related to this block, which were divided into actions aimed at civil society and actions related to the fishing sector.

Results of the participatory action

The activity took place within the SPA Marine Area of the Tinto and the Odiel and "Odiel Marshes" Biosphere Reserve and Natural Park in Huelva. The action, coordinated by **AEBAM**, was carried out with the collaboration of

Surfrider Foundation Spain, Hombre y Territorio Association (HyT), Vertidos Cero Association and the Aquarium of Seville. This block was developed thanks to the support of the Biodiversity Foundation of the Ministry for the Ecological Transition.

During the activity, in which more than 100 people participated, the characterization of more than 650 objects on 400 m of beach, mostly plastic items, was carried out. For the characterization, 3 monitoring methodologies were used simultaneously, through Citizen Science, applied at national and international level: Data card on marine litter on beaches from the Citizen Science Programme on Marine Litter of the Ministry for the Ecological Transition, produced within the framework of the Spanish Marine Strategies, MARNOBA App, from Vertidos Cero Association, that applies a methodology adapted to this Data Card, and the adapted protocol of SurfriderEurope (Ocean Initiatives) of Marine Litter Watch from the European Environment Agency.

Even though the municipal cleaning services had cleaned the beach that day, removing most of the large objects whased ashore by the currents or coming from the direct abandonment of waste by beach users, many small objects were found, mostly originating from fishing activity. The most representative fraction was plastic items (78%), followed by the other fraction (8%), where textile items, hygienic-sanitary waste (5%), processed wood (4%), metal (2.5%), paper and cardboard (1.5%) and glass (1%) stood out. The most frequent items were ropes, cords and strings, unidentifiable plastic fragments, plastic bags and fragments, packaging tapes, bottle containers, nets and pots, clothing and other textile materials and single-use plastic objects, such as glasses and straws.

A comparison of the results obtained using the three methodologies showed the existing harmonization between them. Although the percentages related to the categories detected (plastic, others, hygienic-sanitary...) are very similar, there are some differences regarding the most frequent objects or Top 10: the MITECO data card divides the fishing objects (tangles and nets) into two, meaning that they do not appear among the three most frequent, which is what happens with the other two methodologies.

Plenary session

The session included a participatory action and a subsequent plenary session:

Plenary Session: it was held in the auditorium of the Aquarium of Seville. The results obtained in the field activity were shown and compared graphically. This was followed by the presentation of projects related to this block, which were divided into actions aimed at civil society and actions related to the fishing sector.

Chairperson

- Estíbaliz López Samaniego- AEBAM Coordination Group Member of MARLICE.

Opening Speech

• Marta Martínez-Gil General Subdirectorate for the Protection of the Sea. Ministry for Ecological Transition - "Citizen Science and its integration in the Monitoring programmes in Marine Strategies".

• Silvia Revenga - General Secretariat Protection of Fishery Resources. General Fisheries Secretariat, Ministry of Agriculture, Fisheries and Food - "Marine reserves for Small-Scale Fisheries network: actions to fight marine litter".

Key Project Presentations. Citizen science and collaborative projects in the management of natural spaces.

- César Aliaga - ITENE - Packaging, Transport and Logistics Research Centre – "PlastiCircle. Improving plastics management through innovative collection, transport, sorting and recycling. Tools to involve citizens in the circular economy of plastics".

- Sara Güemes - Ecoembes and Miguel Muñoz - SEO/Bird Life - "LIBERA Project, an example of citizen participation in nature".

- Arabelle Bentley - KIMO International - "Societal solutions to marine litter: Fishing for Litter and the Green Deal approach"

- Marinha Guizán and Rubén Rodríguez- Vertidos Cero Association- "CIRCULAR SEAS": Fishermen face the challenge of marine litter"

- Irene Diez – Ecoalf Foundation- "Upcycling the Oceans"


MARLICE 2019

Opening speech

• Marta Martínez-Gil - General Subdirectorate for the Protection of the Sea. Ministry for Ecological Transition - "Citizen Science and its integration in the Monitoring programmes in Marine Strategies".

Marta referred to the importance of citizen participation in marine litter monitoring programmes. She talked about the Marine Strategy Framework Directive, which establishes 11 qualitative descriptors to determine the good environmental status of the marine environment; she placed special emphasis on descriptor 10 on marine litter.

On the 2nd of November, 2018, the Council of Ministers approved the first cycle of marine strategies, which is reviewed every 6 years with the aim of guaranteeing a continuous assessment of the environmental status of the marine environment, and to determine whether the proposed environmental objectives are being reached, as well as to analyze the effectiveness of the programme of measures in achieving the good environmental status of the marine environment.

She also spoke about the characteristics of marine litter, classifying it according to its location or origin: marine debris on the coastline, in the water column and microplastics in sediments, on the water surface or beaches. She mentioned the BM-7 monitoring programme related to citizen science and the activities that are carried out, such as beach cleaning with volunteers, where marine litter is characterized. Concerning this, a Field Card has been developed for data collection following a single harmonized protocol. This card is in the MARNOBA App for marine litter on beaches.

At the end of the speech, she presented the video produced by MITECO to promote the Citizen's decalogue against marine litter and explained the objectives and contents of this initiative undertaken within the framework of CONAMA's Marine Litter Working Group.

• Silvia Revenga - General Secretariat Protection of Fishery Resources. General Fisheries Secretariat, Ministry of Agriculture, Fisheries and Food - "Marine reserves for Small-Scale Fisheries network: actions to fight marine litter".

Silvia talked about the distribution of the Spanish Network of Marine Reserves and the total area that they cover, as well as the main objectives of these reserves, such as: improving fishing resources, encouraging small-scale fishing (artisanal fishing) (SSF) and protecting essential fishing habitats, etc. She also mentioned the work of these reserves in public awareness and sensitization activities, as they act as an observation window to show the impacts that litter has on the marine environment, its role in the conservation of archaeological heritage, etc.

She explained the work of the Marine Reserve Network in the removal and monitoring, by coastguards and diving centres, of abandoned fishing gears, avoiding possible ghost fishing. She also commented that they have a photographic database of observed data called BIRM.

She talked about the Citizen's decalogue against marine litter, which is a didactic manual of good practices as well as its awareness-raising campaigns in schools and field activities, in which coastal marine clean-ups are included. Within this framework, she spoke of the participation of the General Secretariat of Fisheries in two projects, ACT4LITTER and Circular Seas.

Key Project Presentations. Citizen science and collaborative projects in the management of natural spaces

- César Aliaga - ITENE - Packaging, Transport and Logistics Research Centre - "PlastiCircle. Improving plastics management through innovative collection, transport, sorting and recycling. Tools to involve citizens in the circular economy of plastics".

César introduced the huge amount of plastic waste produced annually and the economic and environmental impacts that this entails. Also, he mentioned the small percentage of this waste that is recycled.

He presented the PlastiCircle project, which is implementing innovation actions in waste collection, transportation, classification and recycling, seeking as a final step the recovery of plastic waste through the generation of new products.

As a first step in innovation, "Smart containers" has been designed in order to increase the collection rates of plastic waste. It also improves the transport cost, including sensors that indicate the amount of waste collected in each container, allowing collection routes to be more efficient. Furthermore, the

collecting vehicles include a waste compactor, which maximizes the amount of waste transported per route

As an innovation for the citizen, the containers have a device that allows the identification of each person and their recycling bag with a code. When the waste that contains the bags is classified and evaluated, a score is generated for the recycling that each user has carried out. This score allows the citizen to obtain bonuses such as electric scooters, backpacks or tickets for the subway. This pilot project is being developed in several provinces of Spain, such as Valencia.

Learn more about the project: http://plasticircle.eu/

- Sara Güemes - Ecoembes and Miguel Muñoz - SEO/Bird Life - "LIBERA Project, an example of citizen participation in nature".

Sara and Miguel presented the Libera Project, a Seo / Bird Life project in partnership with Ecoembes, which aims to eliminate waste from natural environments. It is developed through 3 main axes: knowledge, prevention and participation. Several alliances have been created with different entities throughout the Spanish territory in order to achieve the objectives of the project.

The knowledge objective is based on the collection of data in the field and is developed through two main blocks: science and citizen science. The data obtained from both branches makes it possible to improve the knowledge of the location, quantity, composition, origin and accumulation areas of "basuraleza", the litter that is found in nature areas

Libera Ciencia works together with NGOs and research centres to develop innovative tools that provide knowledge about the different terrestrial, marine and fluvial ecosystems. A collaboration has been established with the Spanish National Research Council (CSIC), which is collaborating with the identification and quantification of the presence of contaminants and litter in Important Bird Areas (IBA). 140 IBAs representing the main habitats present in Spain have been selected: wetland, agricultural, Atlantic forest, Mediterranean forest, riparian forest, coastal and mountain. The sampling is currently being developed.

Regarding citizen science activities, they are linked to the objectives of participation, knowledge and prevention through awareness. Different actions are carried out, highlighting "1m2 for nature", an initiative in which volunteers from all over the country are mobilized in different environments (beaches, mountains, rivers, etc.). They also characterize the garbage found through the App eLitter. These data serve both for science and for awareness and sensitization of the population.

Learn more about the project: https://proyectolibera.org/

- Arabelle Bentley - KIMO International: "Societal solutions to marine litter: Fishing for Litter and the Green Deal approach"

Arabelle spoke about Fishing for Litter and the Green Deal approach. The objectives of the KIMO project are to reduce the amount of marine litter in the oceans by removing it, to increase the awareness of fishermen and the fishing sector, to monitor fishing, as well as the promotion and recycling of waste. The project wants the fishermen, while fishing, to separate their catches and keep on board the garbage collected from the sea and store it in bags that are then deposited in the appropriate points in the ports, for its subsequent classification and recycling. This project does not imply any cost for the fishermen and represents an awareness activity for the fishing sector while reducing the amount of marine litter.

She mentioned that, on developing the project, she faced several problems, such as limited space on fishing boats, lack of facilities in ports and limited resources.

The project developed by KIMO has motivated the rest of the marine garbage collection initiatives of the fishing sector. She highlighted the exponential growth of participation in this sector from the beginning of the project in 2014 to 2017.

She also mentioned the centralization of all the information of the projects focused on the reduction of marine debris in the Fishing for Litter Hub platform.

She ended her speech talking about the Focus of the Green Agreement, in which the environmental policy involves those responsible for environmental pressure and those who can help prevent or solve the problem. This Green Agreement connects all activities in order to carry out beach clean-ups, recycling or reuse of materials.

Learn more about the project:

http://www.kimointernational.org/dk/news/green-deal-fisheries-an-extra-dimension-to-the-fishing-for-litter-project/

- Marinha Guizán and Rubén Rodriguez - Asociación Vertidos Cero project coordinators-"CIRCULAR SEAS": Fishermen face the challenge of marine litter".

Rubén presented the Circular Seas project, which focuses on three areas of action: cleaning and awareness actions in marine reserves, garbage collection campaigns on beaches and aquatic environments and garbage collection campaigns supported by fishing boats. The project, co-financed by The Coca-Cola Foundation, is developed through three partners: Asociación Vertidos Cero, Asociación Chelonia and Ecomar Foundation. The project has already involved more than 170 public and private organizations.

Rubén focused mainly on the actions developed by Vertidos Cero within the project. This entity is responsible for promoting passive marine garbage collection campaigns carried out by fishing vessels. The fishermen pick up the garbage that is entangled in the fishing gear and store it on board. Once in the port, the garbage collected is weighed, and part of it is periodically characterized by the project technicians through the MARNOBA App. The stored garbage is periodically removed by a specialized waste manager.

During the first year of the project, participating fishing vessels (more than 70 vessels in 12 Spanish ports) removed more than 6 tons of waste, among which were mainly plastic, metal objects, glass and others (clothing, footwear, tyres, etc.).
Marinha mentioned the case of the Azores, where due to its location and the low industrialization of the islands there should be little marine litter; however, due to its proximity to the North Atlantic Subtropical Gyre, large amounts of marine litter are accumulating on their shores.

She also explained the Marine Litter Action Plan carried out by the Azores, in which scientific research and monitoring projects are developed to provide data on the abundance and distribution of this waste, as well as its impact on the marine ecosystem. They are also monitoring marine litter in coastal bathing areas and in the water column (information collected by fishery observers). Within the action plan, annual campaigns are also carried out to raise awareness among the regional population. She concluded the presentation by commenting on different programmes and methodologies for sampling macro and micro litter.

Learn more about the project: https://www.cocacolaespana.es/mares-circulares

- Irene Diez – Ecoalf Foundation- “Upcycling the Oceans”

Irene presented Ecoalf, a Spanish brand that 10 years ago began to manufacture top-quality clothes with marine waste from fishing (nets). This idea is based on the circular economy, giving a second chance to the products derived from fishing, generating garments that have an added

value and demonstrating that it is not necessary to abuse the natural resources of the planet indiscriminately. In this context, she presented Upcycling the Oceans, a project that promotes the collection of waste by the fishing sector, mainly trawling. Upcycling the Oceans Spain was created in September 2015 by the Ecoalf Foundation as a pilot project involving 9 fishing ports. A year later it joined the ECOEMBES project to expand it all along the Spanish coast and ensure the correct management of all waste recovered. Currently, it has managed to involve more than 500 boats in 37 ports. More than 400 tons of waste have been recovered since the beginning of the project, of which 10% corresponds to PET.

Learn more about the project: https://ecoalf.com/es/p/upcycling-the-oceans-espana-16