



# Marine litter in the Mediterranean Sea: the knowledge gaps

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# **Marine Litter: an emerging issue**





Conserve and sustainably use the oceans, seas and marine resources for sustainable development

COLLECTION AND TRANSFER > WASTE REDUCTION

#### U.N. Ocean Conference Concludes with Call for Action on Marine Litter



#### G7 countries outline measures against marine litter



The G7 countries are developing an action plan to combat marine litter. Practical measures to reduce waste from land- and sea-based sources will be set out at a meeting in Berlin. This meeting will also focus on removing the existing waste in our oceans. During the G7 summit in Elmau at the start of June 2015, the G7 heads of state and

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government decided on a G7 action plan to combat marine litter and expressly committed themselves to concrete measures. Today in Berlin, State Secretary







G7 Workshop on Marine Litter (Rome, Italy - 20-21 April 2017)



### MARINE LITTER IN THE MEDITERRANEAN SEA

- An highly urbanized and developped coastline
- A closed basin
- 30% of the maritime traffic
- A touristic destination
- Large rivers (Rhône, Nile, Po)



### THE MOST AFFECTED AREA WORLWIDE FOR MARINE LITTER

- Some of the largest amounts of Municipal Solid Waste (MSW) are generated annually per person in the Mediterranean Sea (208 – 760 kg/Year)
- An estimated 731 tons of plastic is littered every day, with important differences depending on country
- Cigarette butts may reach 40% of stranded litter
- the highest densities of marine litter stranded on the sea floor, up to 100,000 items / km<sup>2</sup> (French Coast) are found in the Mediterranean Sea
- the highest densities of floating microplastics, up to 4680,000 items / km<sup>2</sup> (Southern Adriatic) are found in the Mediterranean Sea







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Mediterranean Sea

knowledge gaps

MEDITERRANEAN SEA ONE OF THE MOST AFFECTED AREAS FOR MARINE LITTER

Impact on Biodiversity? **Identification of Bioindicators? Identification of Hot Spots? Impact on MPAs ? Impact on Fisheries?** Impact on Human Health ?

## **Plastic Busters project**

How can we better assess the marine litter problem and impacts in the whole Mediterranean?



A crucial aspect of the marine litter issue, underlined by the **Barcelona Convention within the Regional Plan for Marine Litter** (Istanbul 2013) is that: "Marine pollution knows no border, pollution in one country affects all other 21 countries, hence there is a need for a regional approach".

Plastic Busters is the first project at basin scale that binds the Southern and Northern Mediterranean countries on the issue of Marine Litter under the umbrella of UNEP/MAP and UfM, with 10 countries already involved in the project and 12 countries endorsing the project.

Diagnosis of the problem to identified specific solutions

Impact on Biodiversity? Impact on Fisheries? Identification of Hot spot areas? Impact on Human?





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## WP2

### INFORMATION GAPS AND DATA COLLECTION



WP3

### DESIGN AND IMPLEMENTATION OF DEMONSTRATION PROJECTS

WP4

IMPLEMENTATION OF THE REGIONAL PLAN

## WP5

AWARENESS RAISING AND EDUCATION FOR SUSTAINABLE DEVELOPMENT

### WP1 COORDINATES AND MANAGES THE ACTIVITIES IN THE PROJECT

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK

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## **Plastic Busters project:** from the diagnosis to the solutions



STEP1 - Model-based prediction of plastic debris accumulation areas to design sampling activities, using information mapping



STEP 2 - Monitoring the presence and effects of plastic debris in marine ecosystems using bioindicators - GIS Mapping (Hot Spots)

STEP 3 - Detecting the effects of marine litter on marine trophic webs and fishery resources



Plastics presence and effects on indicators







**STEP 4** - Investigating the impacts of plastics on human health



# **Impact on Mediterranean Biodiversity ?**



145 plastic items in the stomach

**5 Kg** of plastic in the stomach

More than 91 studies have showed the interactions of marine fauna with plastic in the Mediterranean basin

# Impact on whales?

## Balaenoptera physalus

## Fin whale as indicator of the health status of sea basin



## Identification of Hot Spot Areas and risk prediction in a SPAMI







The multi-layer approach used to investigate the possible overlap between microplastics convergence areas and fin whale feeding ground allow us to suggest potential <u>risk areas for whales</u>

# Fin whale in Pelagos Sanctuary





# **MED - Interreg**



# Plastic Busters MPAs





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Priority axia-Investment Priority-Specific Objective 3-2-1 Priority Axia 3: Protecting and promoting Mediterranean natural and cultural resources PI 6d 3.2: To maintain biodiversity and natural ecosystems through strengthening the management and networking of protected area.

#### **PlasticBusters MPAs**

Plastic Bunters: preserving biodiversity from plastics in Mediterraneau Marine Protected Areas

#### Submitted version



## Microplastic impact in the food chain? Plastic and human impact?





This rainbow runner had consumed 17 plastic fragments. Marine plastic pollution plays an unknown role in human exposures to toxic chemicals. Regardless of what that role may turn out to be, sources for this story believe we have options for realizing the benefits of plastics without the hazards of marine pollution.  $\otimes$  5 Gyrus Institute



#### New Link in the Food Chain?

### Marine Plastic Pollution and Seafood Safety



...Whereas the overall human health risks posed by microplastics in seafood at present appear to be low, it is important to consider the unavoidable increase of micro- and nanoplastics in the future as a result of degradation of plastics already released in the environment as well as future inputs.



#### Table 1

Mean values and range of fish length and weight for each predator (SWO - swordfish; BFT - bluefin tuna; ALB - albacore). The number of stomach containing plastics is also reported.

Species	Number of stomachs examined	Mean fish length ± SD (cm)	Length range (cm)	Mean fish weight ± SD (kg)	W eight range (kg)	Number of stomachs with plastic
SWO	56	145.4 ± 25.4	63-206	41.2 ± 19.8	2.5-109	7
BFT	34	156.4 ± 22.1	123-201	58.7 ± 32.2	30-165	11
ALB	31	79.0 ± 13.7	64-110	2.8-16.2	2.8-16.2	4
Total	121					22



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(Linnaeus, 1758) exposed to microplastics: Preliminary results\*

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Intestinal alteration

Intestinal alteration

Intestinal alteration

## Marine Litter impact: two points of view...

# Detect the impact of marine litter on Mediterranean species



..and/or



## Bioindicators of impact of marine litter on Mediterranean sea

# Identification of marine litter bioindicators





Bioindicators for monitoring marine litter ingestion and its impacts on Mediterranean biodiversity\*

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BIOINDICATOR. SELECTION IN THE STRATEGIES FOR MONITORING MARINE LITTER IN THE MEDITERRANEAN SEA

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## **Plastic Busters project:**

Which are the most effective actions to put on place for removing/reducing marine litter from the Med and what about their impacts on jobs and economical growth in the Mediterranean sea basin?



circular economy It is essential to develop at **basin scale** specific **prevention and mitigation measures/actions** (outlined in the UNEP/MAP Regional Plan on Marine litter Management in the Mediterranean under article 9 and 10) aiming to reduce the input and impacts of marine litter in the Mediterranean coastal and marine environment (**Plastic Busters WP3**):

a) Single - use plastic bags reduction;
b) Deposit refund systems for beverage packaging;
c) Fishing for litter, targeted recovery of ghost nets and derelict fishing gear management;
d) Circular economy approach – turning plastic marine litter into products;
e) The no-special-fee system to reduce dumping at sea;

f) Bioremediation and biodegradation process on plastics; g) Sustainable aquaculture.













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LINKS

"Plastic Busters for a Mediterranean free from litter project" at the SOM meeting on 16th February 2016

http://plasticbusters.unisi.it/

# PLASTIC BUSTERS MEDITERRANEAN FREE FOR LITTER

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# Acknowledgements





## Mediterranean













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