



# SCIENTIFIC DOSSIER

**Marine Litter, Our Challenge**

# THE PLASTIC AGE

40% of the global population (3 billion people) live within 100km of the sea, and our lifestyle, culture, and well-being depend on it. The ocean provides us with food, medicine, energy, oxygen, and connects communities. **The ocean is a fundamental part of life for all human beings.**

In just a few decades, our natural world has undergone profound changes, echoing the unprecedented acceleration of human economic activity. We have inherited a degenerative economic system that extracts Earth's resources to manufacture more and more goods, which are often used for only a short period before being discarded as waste.

**We live in the "Plastic Age," where we dump  
8 million tons of plastics into the ocean each year.**

That's equivalent to a garbage truck being dumped into the sea every minute, a weight equivalent to 40,000 blue whales.

# THE FIVE OCEAN GYRES

**There are 5 major plastic accumulation zones in the ocean, traditionally called “plastic islands.” To these, we can add two in the Portuguese Atlantic coast: north and south.**

Litter can cause entanglements, ingestion, and habitat damage. In nature, plastic items such as bottles, clothes, and bags break down into multiple fragments as they age, known as microplastics (< 5 mm). Microplastics are accidentally mistaken for plankton, the base of the marine food chain. Plastics contain chemical additives, some of which are persistent, bioaccumulative, and toxic substances that can transfer to organisms during digestion. Nanoplastics can even go directly into the bloodstream and embed into tissues. Once incorporated, they can move up the food web.

Today, **100% of the sea turtles we study have plastic in their digestive tract.**



## OUR CHALLENGE, MARINE LITTER

The issue of marine litter is a global challenge that requires different paths of action, from industries and regulations to consumers themselves. It is essential to understand the extent of this contamination by marine litter and microplastics to focus our actions.

For this, **the Portugal Azul Expedition will monitor the situation along the Spanish coasts, featuring its diversity of habitats and different realities, to raise awareness of the issue at all levels** (scientific, management, and general public) and advance towards a plastic-free ocean.



## MEDIA IMPACT

Currently, environmental scientific projects have a significant media impact and echo. The Portugal Azul team has extensive experience in this sector and has worked on projects with significant media impact:

**Forbes**

**The  
Guardian**

**THE  INDEPENDENT**

**nature**

**B B C**

**Science**



Transects will be performed along the entire coastline, where data on macro-litter will be recorded, and microplastic samples will be collected, along with other environmental variables.

**Scientific samplings will be accompanied by beach cleaning actions, where citizen science activities will also be carried out, and data will be collected and analyzed according to established protocols.** Additionally, each local marine reality will be considered, involving local stakeholders knowledgeable about their environment, both scientifically and culturally, thus **contributing to integrated research and knowledge transfer.**



## **SAMPLING ZONES**

Sampling locations can be adapted depending on weather conditions and port locations, covering the coasts of the peninsula as well as the Balearic coastline. Samplings will be conducted at locations near:

1. River mouths
2. Anthropogenic environments such as cities
3. Pristine or protected areas such as national parks

For each location, sampling points will be established perpendicular to the coast, creating a mapping in the form of radials (from shallow to deeper water) along the coast.



## **MICROPLASTICS IN SURFACE WATER (PROTOCOL)**

- Microplastic and mesoplastic in water will be sampled using manta trawls equipped with 200-micron mesh and flow meters.
- The net should be launched from the side, with a boom or similar, and placed parallel to the hull at a distance of about 3-4m. It should not be launched from the stern nor under the influence of the wake.
- Sampling time should be sufficient for plastic sampling, around 15 minutes per haul, sailing between 2 and 3 knots, or sampling about 50-70 m<sup>3</sup>.
- Coordinates and start-end time will be recorded, as well as the flow meter readings at the start and end. The count starts when the net is submerged and ends when it begins to emerge for collection.
- Transects will be performed parallel to the coast, at two different distances (for example, at the depth of the 10 and 100 m isobaths) and each one in triplicate.
- For each location, 6 hauls will be conducted. In each haul, samples will be taken from the collector with the aid of a sprayer and funnel, and stored in approximately 500 mL jars. Samples will be preserved in alcohol for better conservation.
- Another proposal: Macroplastic floating debris will [be sampled](#) through visual censuses from the deck, conducting fixed point and moving censuses between areas.
- Samples will be sent by courier to the Marine Litter [Laboratory](#) at the University of Cádiz.





## SCIENTIFIC PARTNERSHIPS

The expedition will feature local scientists throughout the journey, who will convey the reality, challenges, and advancements in the conservation of the natural environment.

For scientific advice, including sampling and processing of microplastics, the expedition will be supported by the Marine Litter Laboratory at the University of Cádiz.

**Marine Litter Research Lab (MALUCA) – University of Cádiz ([www.marinelitterlab.eu](http://www.marinelitterlab.eu))**

The Marine Litter Laboratory at the University of Cádiz aims to generate science-based knowledge to support decision-making against the environmental and social challenges posed by the accumulation of litter in the oceans. The laboratory has extensive high-level scientific experience both domestically and internationally. Recently, the laboratory has created the Global Litter Observatory (GLO), which has been endorsed by the United Nations Ocean Decade. GLO addresses the need to harmonize and collect information generated by numerous initiatives to characterize macro-litter worldwide.



**2021  
2030** Decenio de las Naciones Unidas  
de las Ciencias Oceánicas  
para el Desarrollo Sostenible

**Some of the most relevant publications of the group are as follows:**

- C. Morales-Caselles et al. 2021. [An inshore-offshore sorting system revealed from global classification of ocean litter. Nature Sustainability,](#)
- C. Morales-Caselles & A. Cózar. 2021. [A mayor force for global litter monitoring. ECO Magazine,](#)

# MEDIA IMPACT

Environmental science projects currently have significant media resonance and impact. The Portugal Azul team has extensive experience in this sector and has worked on projects with a substantial media impact:



- [\*\*BEHIND THE PAPER: GLOBAL CLASSIFICATION OF OCEAN LITTER CIVIL\*\*](#)
- [\*\*SOCIETY: A MAJOR FORCE FOR GLOBAL LITTER MONITORING MIGRATING\*\*](#)
- [\*\*PLASTICS: EVEN THE ARCTIC IS NOT IMMUNE\*\*](#)
- [\*\*MEDITERRANEAN, MEDIO PLASTICAE: ANALYSIS OF PLASTIC POLLUTION IN THE MEDITERRANEAN DURING THE CORONAVIRUS OUTBREAK\*\*](#)
- [\*\*EL FRACASO DEL CÍRCULO VIRTUOSO DEL PLÁSTICO\*\*](#)
- [\*\*PLÁSTICO DEPENDIENTES CRÓNICOS\*\*](#)
- [\*\*VIDA MARINA INTOXICADA A ESCALA PLANETARIA\*\*](#)

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**IEMed.**  
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**eco**  
environment coastal & offshore

**SPRINGER**  
**NATURE**





# Portugal Azul

Explore, learn, protect



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