

# MICROPLASTOX - Microplastics in the marine environment: estimation and ecotoxicological assessment.



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## Introduction

Microplastics (MP, plastics < 5mm) [1] are present in many household items and are also formed due to the cracking and embrittlement of larger plastic particles. Owing to their inherent physical and chemical characteristics, MPs are persistent and ubiquitous aquatic contaminants that can be potentially ingested by benthic and planktonic organisms, thus entering food webs. Additionally, studies have shown that the microbial communities that colonize these materials differ enormously from the indigenous free-living marine communities. All these threats are further exacerbated by these materials' ability to adsorb other contaminants, namely, persistent organic pollutants. However, the exact prevalence of these materials in the environment remains a topic of debate. Therefore, a detailed quantitative and qualitative monitoring of microplastics and their effects in the marine environment is highly recommended by the Marine Strategy Framework Directive [2]. Furthermore, their ecotoxicological effects remain undetermined, as most studies resort to unrealistic concentrations of these materials, thus putting into question the environmental validity of such findings. Hence, sampling of MPs is now underway at the Galway Cabled Observatory (SmartBay, Ireland) and at the POSEIDON-HCB (HCMR, Greece) buoy, and sampling onboard the MS Fantasy (NIVA, Norway) resorting to the on-board water pumping system, is scheduled to begin soon. This approach will allow to ascertain the efficacies of the different methodologies and the geographical areas covered on these sampling sites will contribute to establish a wider understanding of the real prevalence of these materials in European waters.

## Sampling



Figure 1 – Sampling locations

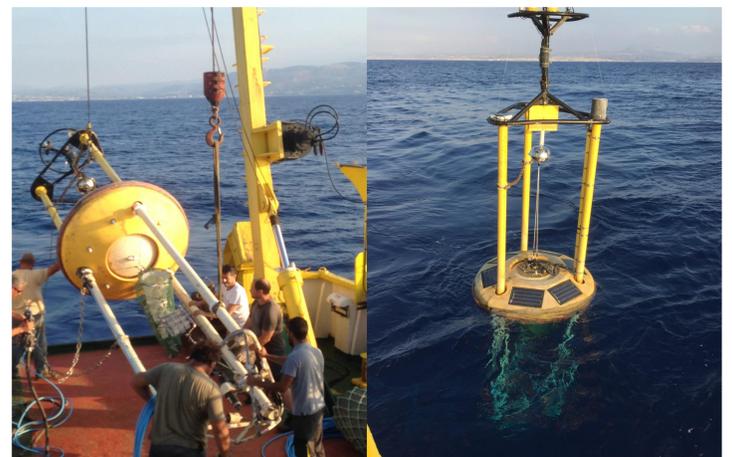


Figure 2 – Deployed net at the HCMR's Heraklion buoy



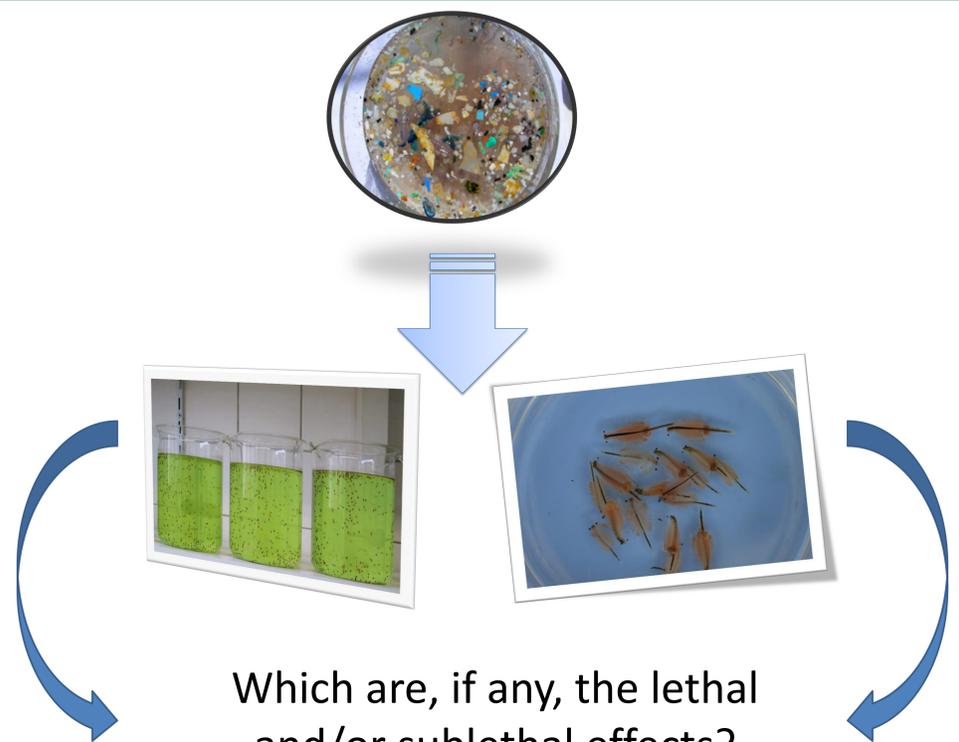
Figure 3 – The Galway sub-sea cabled observatory (SmartBay) (partial) and the MS Color Fantasy (NIVA)

## Prospective results

The *de facto* prevalence of microplastics in the environment is not well established, leading to inherent difficulties in the determination of their hydrodynamic behavior and transport pathways, as well as their fate and effects [3]. Hence, the MICROPLASTOX Project, as a trans-national endeavor, will, in combination with other available data, allow for a better assessment of these contaminants in the aquatic environment.

Additionally, the effects of these particles, cited in the literature and often alarmingly transmitted by the media, are frequently determined resorting to unrealistic concentrations [4], thus putting into question the environmental validity of such findings.

Therefore, the isolated microplastics will be used to accurately evaluate their ecotoxicological effects by resorting to well-established ecotoxicological tests, using, among others, *Artemia franciscana* and *Daphnia magna*.



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## References

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