



## Monitoring litter and microplastics in a highly polluted protected site of southern Spain: A research-based citizen science initiative

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Plastic pollution research and awareness activities have increased exponentially over the last decade, however not all citizen science activities are run with a degree of control assurance. Also, not many research projects include collaborations beyond academia or have set goals for the dissemination of results to specific non-academic stakeholders. Here, our project involves a range of collaborators from different disciplines, from the Irish academic sector to Spanish environmental NGOs and citizen scientists. Also, the project is funded by the US-based NGO Sustainable Ocean Alliance (SOA). We selected the natural area of Maro-Cerro Gordo Cliffs (southern Spain) as our sampling site due of its special status under Natura 2000. Despite this protection, previous monitoring work in 2019 identified heavily plastic polluted sites due to intensive agriculture activities in the area. Therefore, this project was designed as a citizen science initiative with a focus on (1) clean up and characterisation of litter from selected terrestrial and aquatic sites, both freshwater and coastal, and (2) an analysis of microplastics in stream and coastal waters. The main objectives of the project are to characterise the presence of litter and microplastics while working closely with citizen scientists, raising awareness and informing local authorities about the issue.

First sampling activities were carried out in December 2020. A second field trip is organised for February 2021. Citizen scientists were previously trained and always worked together under the supervision of a team member. Litter was collected following transects and using tracking apps (eLitter and MARNOPA). A total of 43 items were collected from stream transects whereas 59 items were collected in beach transects. Remarkably, 74% of litter collected in streams were plastic items, 12% were other materials, 9% was paper or cardboard and 5% was metal. Whereas in beach transects, 51% of the litter collected was paper or cardboard, 25% plastic, 10% metal and 14% other materials. Regarding microplastic sampling, 200 L of stream water and 50000 L of coastal water samples were collected using a filtration unit with a 45 µm pore size. The volume of filtered coastal water was significantly higher as it was collected from three kayaks for 30 minutes. Microfibres and fragments have been detected at both sites. Sample processing and polymer analysis is currently ongoing using FTIR. All protocols follow strict QA/QC guidelines including clean

conditions and airborne contamination procedures.

Results from this project will be submitted for peer-review and also shared in the form of mid-term and final reports among local stakeholders including local environmental managers and SOA. Also, citizen scientists will take part of a workshop aimed at informing the general public. Therefore, the findings from this project are directly used to raise awareness through citizen scientists and informing local and international non-profit stakeholders. More specifically, lessons learned will be presented at EGU in the form of successes and challenges for discussion. It is imperative that, when feasible, high quality environmental research is carried out between cross-disciplinary collaborators in order to gather sound data while raising awareness and discussing solutions.