

Surfing:

A unique opportunity for monitoring "blue health", improving ocean literacy and conducting coastal based citizen science

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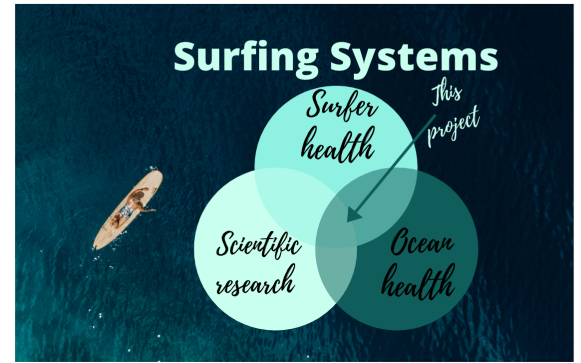


Introduction

With the UN's Ocean Conference in Lisbon in June focussing on "scaling up ocean action based on science and innovation" there is clearly a call for further research to be carried out on plastic pollution within the marine environment and for microplastics sampling to reach a standardised methodology. Surfing will also make its debut in the (now postponed) Tokyo Olympics in 2021, shifting it into the International spotlight which could instigate a surge in popularity, incentivising new users - who are less ocean literate - to take up the sport.

Surfers, who are a global community of 35 million (O'Brian and Eddie, 2013 in Ponting and O'Brian, 2014) are possible indicators/monitors for the health of our coastal waterways; similar to cetaceans, seabirds and turtles being indicator species for contamination/pollution in open oceans (Germinov et al., 2018). Surfers spend much of their time in littoral zones and along coastlines and what they know about the state of their local surf area could be vital to improving environmental management. Their enthusiasm to protect the habitats they use for surfing, could also be utilised and transferred towards citizen science and stewardship. Their physical and mental health could also be considered intrinsically linked to the accessibility of pollution free ocean waves.

Microplastics in coastal habitats are considered widespread and ubiquitous (Cole et al., 2011) yet research is currently unstandardised and infrequent (Green et al., 2018). Current research encourages more investigation into methods, sites and conditions to report on a wider range of findings (Camins et al., 2020). This study draws on surfing as a Social and Ecological System; and questions whether surf communities could be ideal candidates for monitoring and conducting citizen science programmes investigating microplastic contamination in coastal habitats.



Objectives

This multi-disciplinary research covers both qualitative social science research and quantitative marine ecology data in a mixed methods approach by exploring:

- Surfers health and well being, specifically "blue health": *in what way does the ocean affect their physical fitness, mental health and personal identity. Why is the ocean so important to them, how far would they go to protect it?*
- Surfers knowledge of surfing habitats and the ocean ecosystem: *what might influence surfers awareness of microplastic contamination and how would they describe their relationship to evidence of plastic pollution in surf breaks.*
- Microplastic contamination in surfbreaks: *Testing novel sampling methods, that have been proven to work in other ocean areas, but not extensively used to study microplastics in surf breaks or coastal regions. Interpreting what impacts levels of microplastic accumulation in surf breaks; considering variation of coastline and beaches during different conditions and sea temperatures. Using local surfers as research participants to understand the feasibility of them conducting citizen science in the future whilst assessing the process**

Methodology

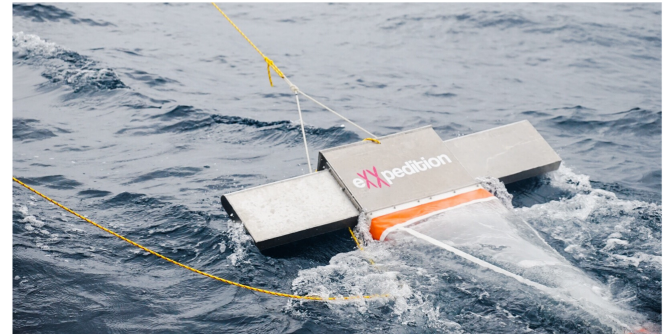
Social research:

- A) Online feedback: questionnaire for 200+ participants; aimed at +18 years surfers, all abilities, global spectrum. 10 multiple choice questions including: how often and where they surf, would they be interested in collecting citizen science data, how the ocean (and a surfing ban) impacts their health and wellbeing.
- B) *Sampling feedback: 20 participants volunteering to physically collect ocean samples (2 per location). Obtaining more insight into the feasibility of surfing citizen science. This open interview will aim to understand more about the experiential process, such as how easy/difficult/interesting it was for participants to conduct ocean data sampling.

Ecological research:

Collecting ocean samples at specific surfing sites; using manta trawl method. Manta method involves towing a surf specific manta net behind a surfboard during small wave conditions, transferring findings to a sieve, to filter then analyse. For each sample I will be determining:

- No. of microplastics
 - Size and colour of microplastics
 - Using an FTIR machine, the polymer of the microplastic samples.
- The number of samples will total 200:
- 10 surf spots
 - 5 samples taken on each surfing session
 - Samples taken over 4 months (on best surf conditions)



Timeframe



Locations



1. Agudela*
 2. Cova de Alfarroba*
 3. Ericeira
 4. Cresmina*
 5. Fonte da Telha*
 6. Arrifana
 7. Bordeira*
 8. Castelejo
 9. Zavial
 10. Porto de Mos
- * sites already studied by Martins and Sobral, 2011, "Plastic marine debris on the Portuguese coastline: A matter of size?"

Results and further research

This study is piloting strategies for microplastic monitoring and mitigation, specifically within surfing areas. It aims to add significant data and knowledge to the research behind conserving coastal habitats and encourage surfers to take on the role of citizen scientists and stewards of the ocean. In the long term, plans are to extend to ecological and social systems with surfing waves in the Atlantic, Pacific and Indian Ocean, and focus on climate change data with SMARTFIN, micro plastic accumulation data using the surf manta trawl, whilst broadening the study of citizen science to more diverse, global surf communities. For more information and references please visit: www.ecoyogasurf.com/research.

*COVID-19 risk mitigation:
The part of the study where surfers help collect microplastic data will depend on the Covid-19 situation and government guidelines at the time.