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Evaluating the impact of microplastics on coastal environments using citizen science

David Jones

University of Portsmouth, Science, School of Earth and Environmental Sciences, Southsea, United Kingdom (david.jones1@port.ac.uk)

The threat of anthropogenic activities to the health of marine ecosystems continues to grow at an alarming rate and present the world with a range of existing and new management challenges. Amongst those challenges is plastic pollution. Although the impact of plastic pollution is now significant news, there are still many gaps in scientific knowledge particularly regarding the impacts of microplastics in oceans and coastal environments. In 2015 the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) published their global assessment of the sources, fate and effects of microplastics in the marine environment. They highlighted three action orientated recommendations that supported the need for more scientific data and changes in public perception and behaviour. However, the lack of sufficient scientific resources and the relative 'invisibility' of microplastics in the environment means that success in addressing the issues has arguably been restricted to piecemeal and reactionary activities.

The popularity of coastal clean-ups has provided opportunities for NGOs to gather useful scientific data about macro and mega plastic pollution along coastlines around the world. However, microplastic data collection has often remained beyond the scope of citizen science projects due to the complexity of the task, accuracy of results and consistency of methodologies.

In 2018 researchers at the University of Portsmouth developed a simple and cost effective methodology for gathering microplastic data along rivers, lakes and coastlines. This process was successfully trialled in a highly designated area on the South coast of the UK using over 100 volunteers from the local community and stakeholder organisations on four dates between March and June 2018. Since then the University of Portsmouth has forged a collaborative partnership with marine conservation charity, Just One Ocean and in July 2018, launched a global research programme based on the trial.

Since that date, hundreds of registrations to participate in the 'Big Microplastic Survey' programme have already been received from over forty countries. These participants not only include environmentally concerned individuals, but government departments, charitable conservation organisations and academic institutions. Data from this research is being uploaded onto an open source multiple layered GIS database providing an analysis of scale, distribution and characteristics of microplastic pollution on the coastal environment. Additional research from this data is planned for the future including, potentially, the measurement of toxins and correlation with other coastal processes. The programme has no end date and will continually add to the scientific knowledge base of microplastics over time.

This presentation will evaluate the contribution of citizen science to understanding the impact of microplastcs specifically on coastal environments. It will highlight the main issues and challenges and provide a recommended process for the successful implementation of projects of this kind. It will also describe how the use of citizen science meets the GESAMP recommendations by adding to scientific knowledge as well as changing the perceptions and behaviours of participants.