Enhancing the harmonisation, QA/QC, and application of riverine macroplastic monitoring data

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Several guidelines have been developed that describe methods for analysing riverine macroplastic flows. No single method has emerged as the standard approach for sampling plastic waste in rivers. This reflects the difficulty in establishing a global ‘one size fits all’ approach for river systems: there is significant variability in river morphology, hydrology, and geomorphology across the world and these differences necessitate adaptations of existing methods or the development of new approaches to assess macroplastic flows. In addition, there is a wide range of different potential objectives underpinning the monitoring of riverine macroplastic contamination, including assessments of plastic export, sources, transport, or accumulation. These generate different research questions, which require different solutions, and may necessitate the collection of data in different forms.

Nevertheless, there is an international demand for generating monitoring datasets that are comparable and can be used to create a holistic picture of macroplastic contamination across the globe. For the reasons listed above, harmonisation – through thorough method validation and quality assurance and control (QA/QC) – is likely to be more important than standardisation in this context. Additionally, in some cases there remains a disconnect between the types of data that are produced in monitoring activities and those which are desired by potential end users of the data. It is valuable, therefore, to increase the communicability of datasets and establish a common language for riverine macroplastic contamination. This study undertakes a critical review of existing methodologies for assessing macroplastic flows in river systems and identifies: i) what component of the macroplastic load is measured by each technique; ii) how can these methods be validated; iii) what QA/QC procedures could be implemented to increase the quality, robustness, and harmonisation of monitoring outputs; and iv) how can outputs be tailored to different uses of monitoring data.