

# Bringing the Micro Into View Through a Microlitter Reduction Framework

A seemingly small pollutant, with a big impact.

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A lack of a strategy to reduce microlitter (1-5mm) has contributed to ill-informed management of a growing pollution problem. In response, AUSMAP developed created a ‘**Microlitter Reduction Framework**’ based on hotspot identification, source tracking and stakeholder action.

## STUDY BACKGROUND

- Since the 1970s, plastic debris has been a critical ecological problem, and with at least 80% generated from local sources, land-based mitigation is urgent.
- Microplastics (MP <5 mm in diameter) can be either primary (e.g. nurdles, industrial shards), or secondary (fragments or styrofoam).
- AUSMAP, Australia’s leading microplastic monitoring program, is quantifying microplastics (1-5mm) in aquatic environments using a citizen science approach, with over 500 samples collected nationally.
- In 2021, AUSMAP’s monitoring efforts expanded to include source tracking and source reduction to reduce land-based inflow of microplastics.

## AIMS & METHODS

- **Study Site:** Dee Why Lagoon on Sydney’s northern beaches, is a protected and ecologically valued wetland - was identified as a microplastic hotspot in 2019, with loads in excess of 935 MP/m<sup>2</sup>, with samples dominated by foam, hard fragments and nurdles.
- **Aim:** Track microplastic pollutants back to their source to reduce inputs into Dee Why Lagoon, alongside increasing microplastic literacy in a range of stakeholders (NSW EPA funded project).
- **Method:** Exploratory sampling using end-of-pipe netting to identify potential catchment sources highlighted the Cromer area as a likely litter source.
- 14 stormwater traps (Cleanwater Group, 1mm x 1mm mesh) were installed across 3 land use types in the Cromer area: industrial, recreational, and residential.
- Monthly trap collection over 8 months with partners from Macquarie University and local community, were analysed by citizen scientists using the AUSMAP methodology.
- Study undertaken during La Nina with litter volumes reflective of a wet sampling period.

## FINDINGS & IMPLICATIONS

- Street-level drain traps prevented 450 kg of debris from entering DY lagoon in 8 months (98% organic and 2% synthetic).
- 10kg, or 76,000 items were synthetic and >63,000 were microlitter.
- Study showed that each land use type had different litter signatures.
- Extrapolation for the DY catchment (268 ha), estimates >3.1 million microplastics would enter Dee Why Lagoon over a 12 mth-period.
- This study demonstrated that microplastics can be traced back to source, and that they are evident in high loads at the streetscape level before entering waterways.
- This highlights that the stormwater system is a major conduit for microplastics and that any management should consider mechanisms to control this form of plastic pollution.
- The MRF is a preliminary model based on monitoring, assessment and the use of infrastructure (nets and traps) to identify key littered items and reduce microplastics in a catchment.
- Further trials have been successful in South Australia in 2022/23.

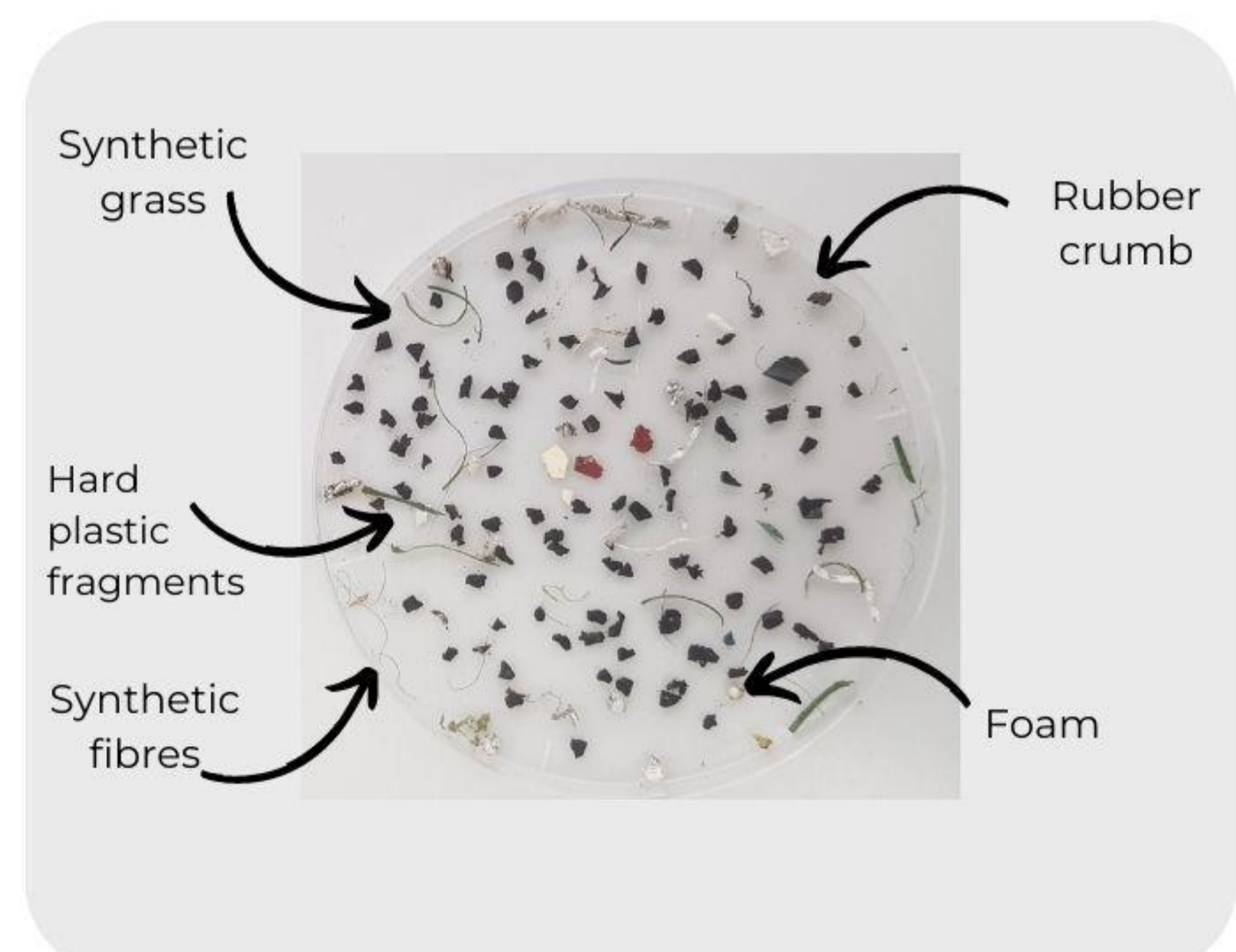


Figure 2: Representative microplastic sample from Dee Why Lagoon with a range of litter inputs.

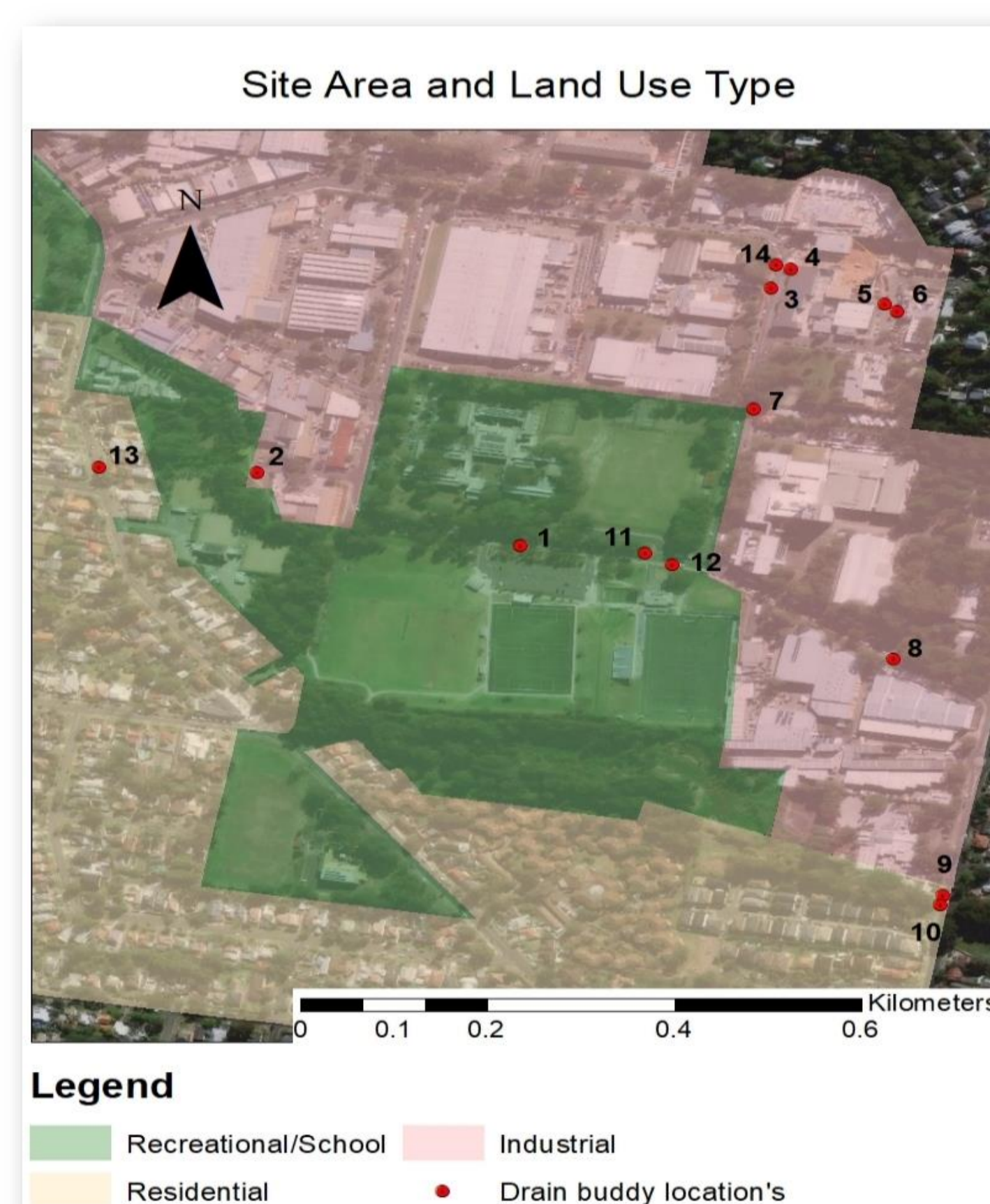


Figure 1: Location of street-level drain traps showing different land use types – recreational, residential & industrial

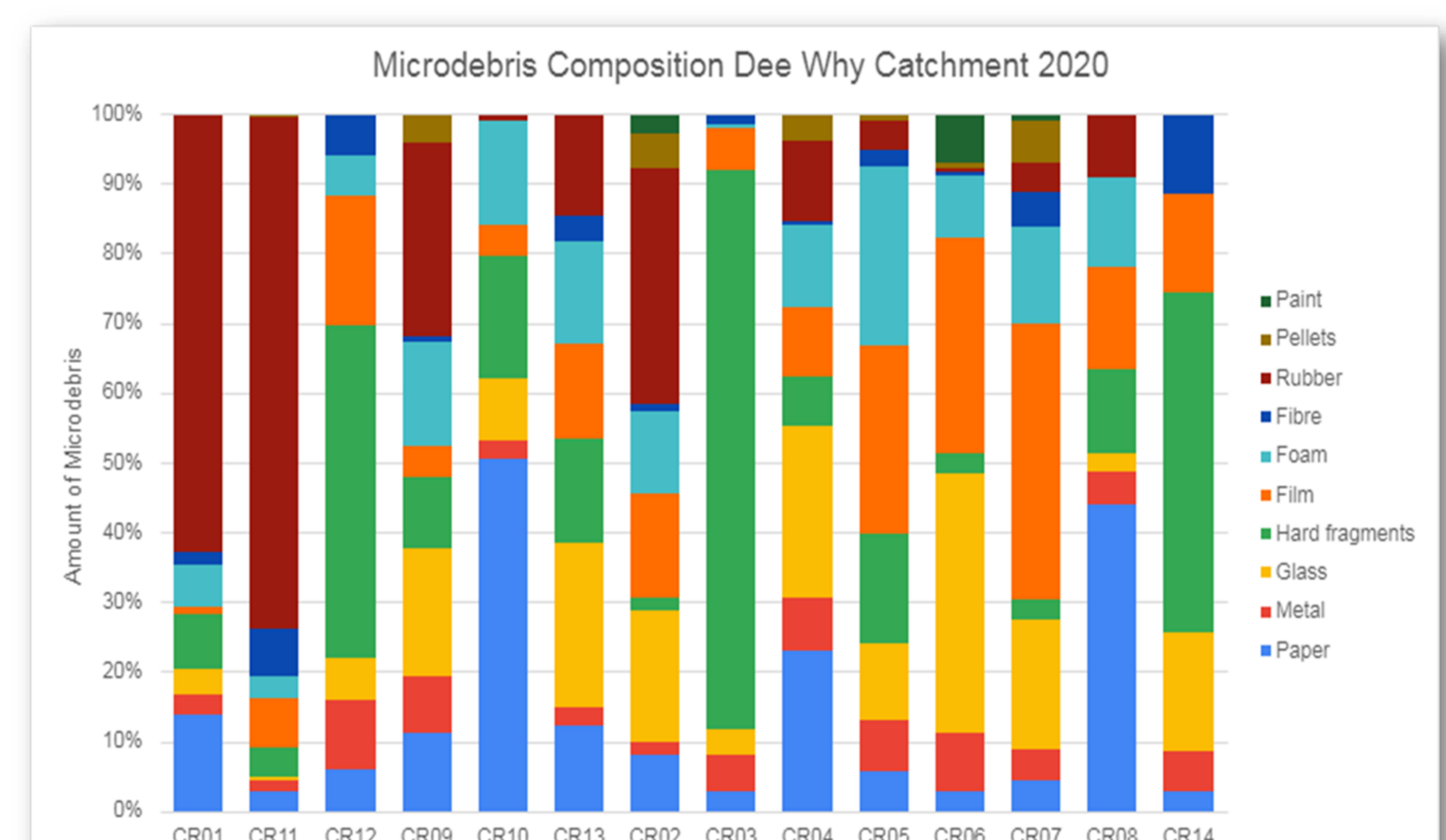


Figure 3. Ratios of the different types of microlitter found in each drain trap across the Dee Why Catchment Area.

## FOR FURTHER INFORMATION

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## REFERENCES/ACKNOWLEDGEMENTS

<sup>1</sup> <https://www.science.org/doi/10.1126/science.175.4027.1240>  
<sup>2</sup> <https://www.frontiersin.org/articles/10.3389/fmars.2017.00419/full>  
<sup>3</sup> <https://www.epa.nsw.gov.au/>