2021 REPORT

IMOS Integrated Marine Observing System

National Marine Microplastics

Program overview

Marine microdebris is comprised of anthropogenic solid waste, including microplastics (plastics smaller than 5 mm in length), that has been indivertibly or intentionally disposed in marine environments. With global plastic production rising, microdebris contamination is predicted to increase.

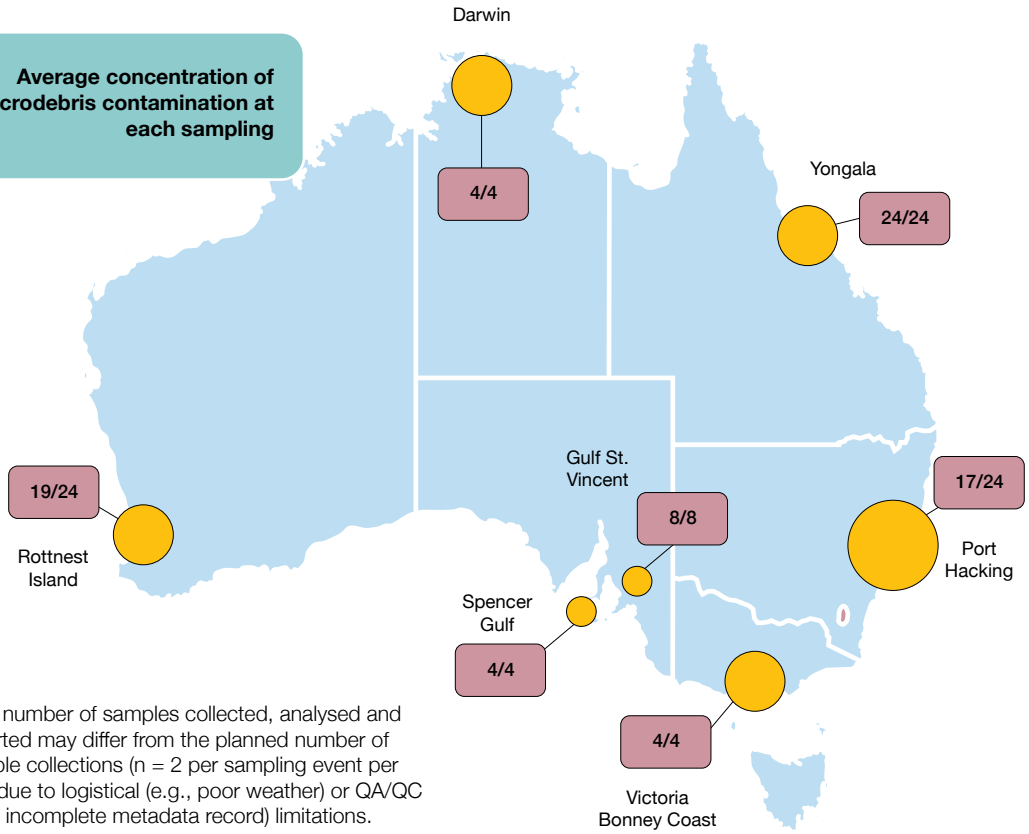
The IMOS Marine Microdebris Monitoring New Technology Proving project was established in 2021 to monitor temporal and spatial variations in microplastic pollution across Australian waters and provide critical insights to support environmental management and policy decisions.

This series of Marine Microplastics report cards documents the extent of contamination at each sampling site and summarises trends in pollution levels. This 2021 report provides a comprehensive annual summary for all monitored sites for January to December 2021 and serves as the baseline for future report cards. Future reports will leverage this baseline data to identify contamination hotspots, support pollution target-setting, and evaluate the effectiveness of local management practices.

Findings are reported as microdebris abundance per cubic metre of water (MPs m^{-3}), along with diagnostic physical and chemical characteristics — essential data for identifying sources, assessing ecological risks and informing policy decisions.

Sample collection at Yongala, Great Barrier Reef

Average concentration of microdebris contamination at each sampling



Total number of samples collected, analysed and reported may differ from the planned number of sample collections (n = 2 per sampling event per site) due to logistical (e.g., poor weather) or QA/QC (e.g., incomplete metadata record) limitations.

Microdebris per m³ of water

Microplastics loads are reported as low, medium and high based on the quartile distribution of concentrations found across all sites in 2021

Low
<= 0.02

Medium
> 0.02 & < 0.07

High
>= 0.07

Number of samples processed and reported on / number of planned sample collections per site

Example:

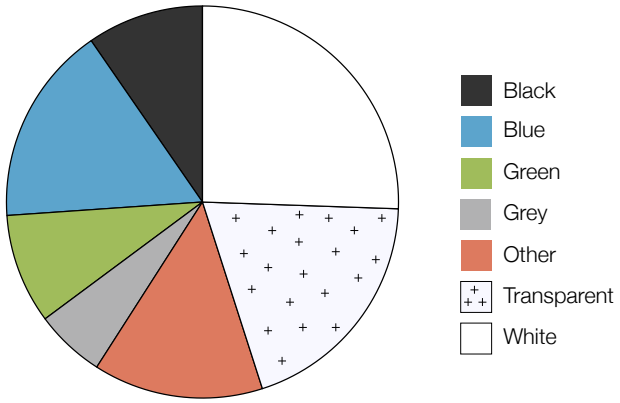
17/24 Port Hacking

Microdebris up close: What it looks like

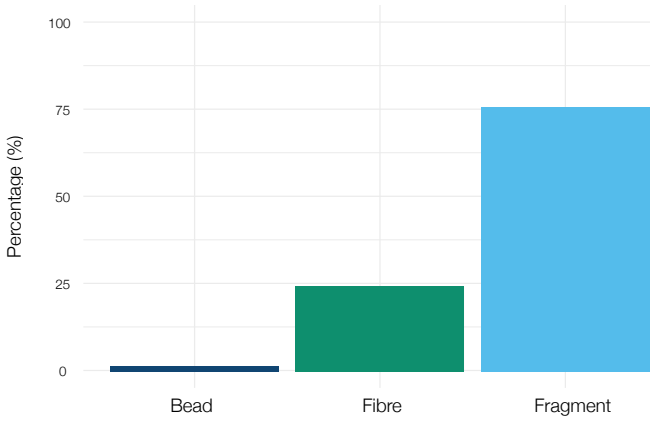
Shape, colour, size and chemical composition characteristics are presented for all microdebris found in 2021. This is a representation across all sites.

Refer to the site-specific graphs for the most common polymer types found at each site for the year.

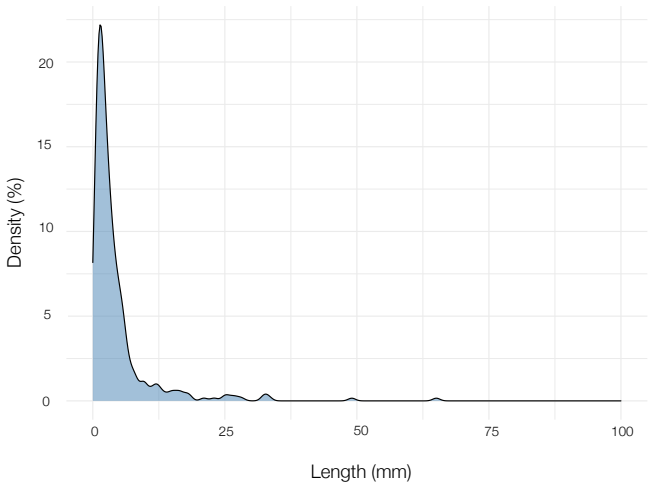
Colour %



Shape %

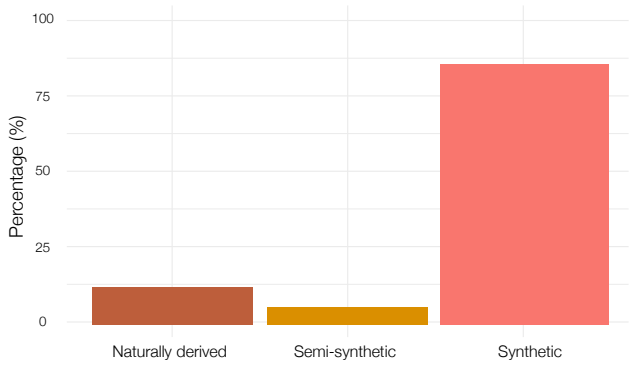


Size %

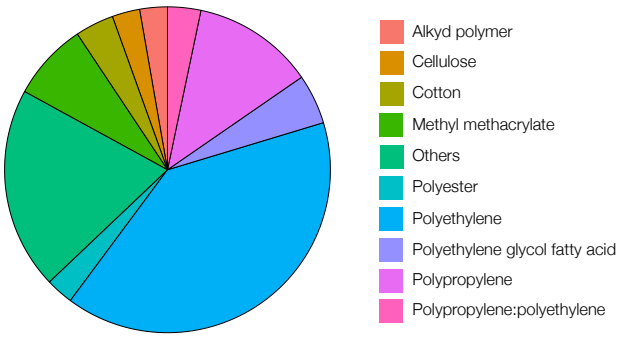


Chemical composition %

Percentage of polymer category



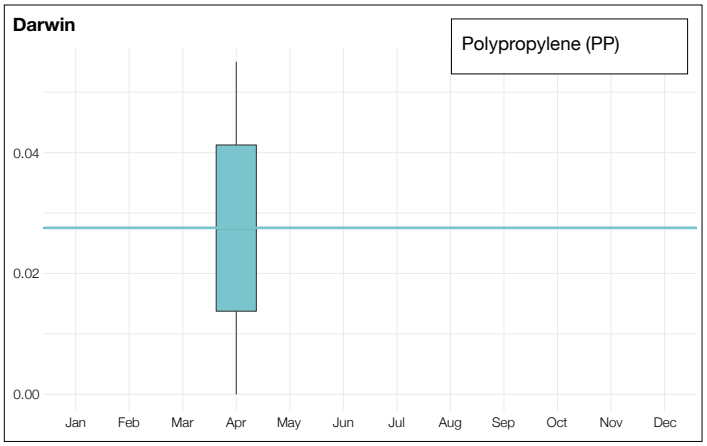
Polymer type distribution

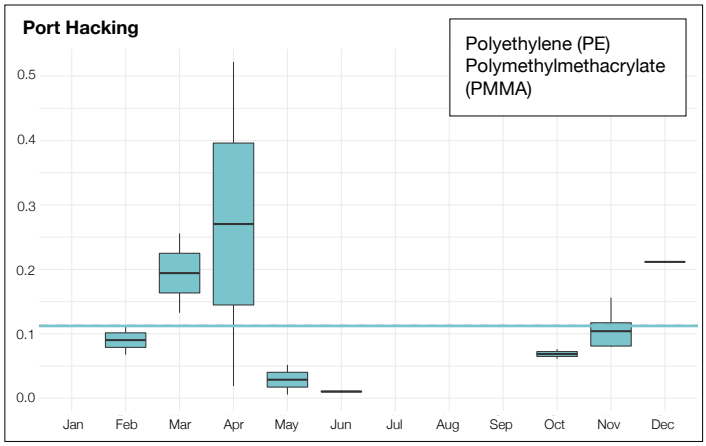


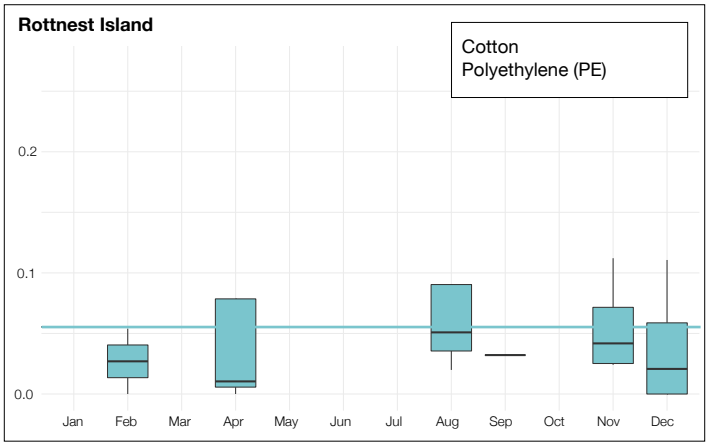
Where and when: Microdebris levels and characteristics across sites

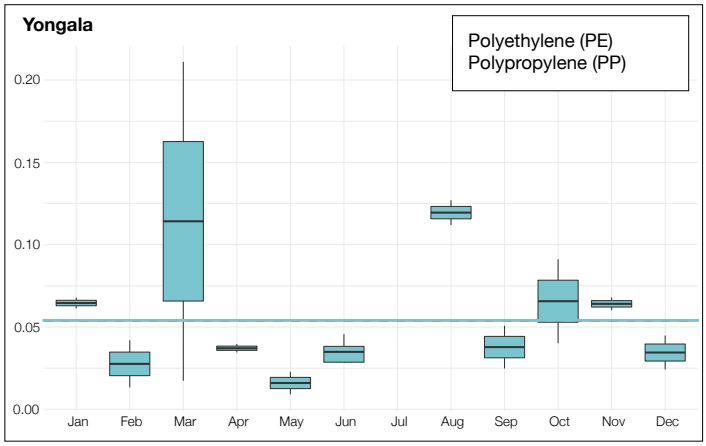
These graphs illustrate microdebris contamination levels (items per cubic meter of water, MP $^{m-3}$) recorded in 2021, categorised by month and sampling location. Because of logistical constraints, some months may feature multiple sampling events - these months are duplicated on the relevant graph.

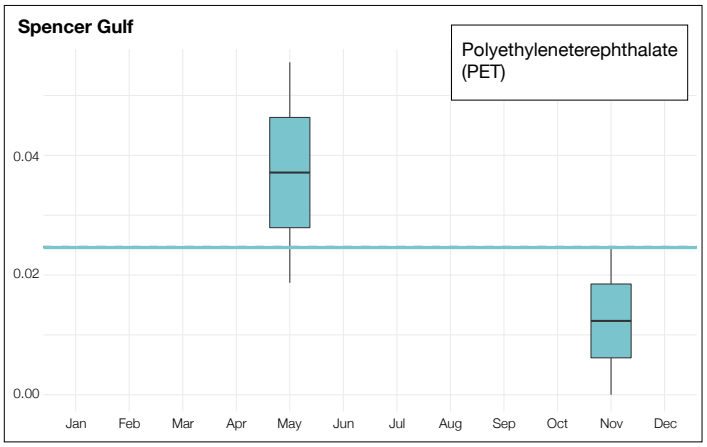
Months without any sampling events are left blank. Plots are supplemented with additional data, including annual averages of microdebris concentrations for 2021 (represented by a continuous line). Additionally, the most abundant polymer types identified at each site are provided.

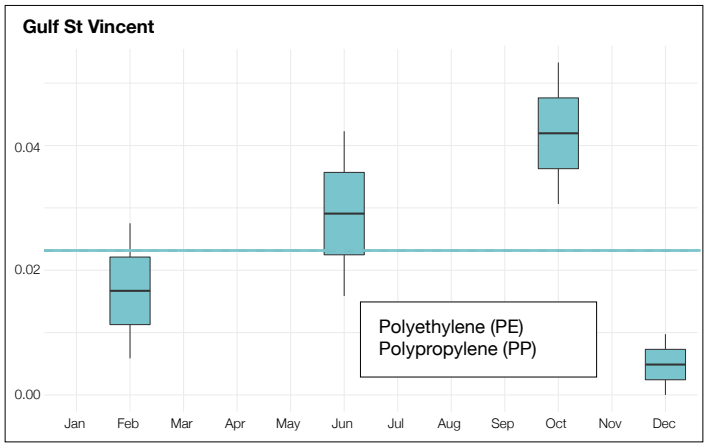


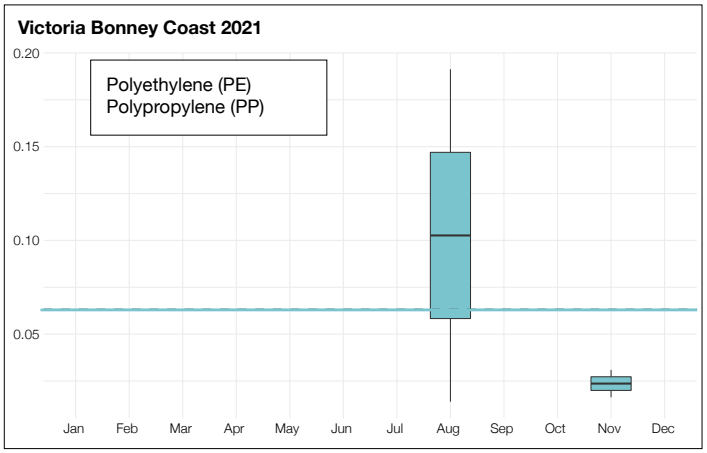












2021

Important Notes

- Each microdebris item was physically and chemically characterised using stereomicroscopy and Fourier transform infrared spectroscopy. Potential extraneous contamination (e.g., staff clothing fibres) were excluded following standardised procedures.
- Caution should be taken when comparing data as sampling frequency differs between sites (refer to the map).

ACCESS THE DATA

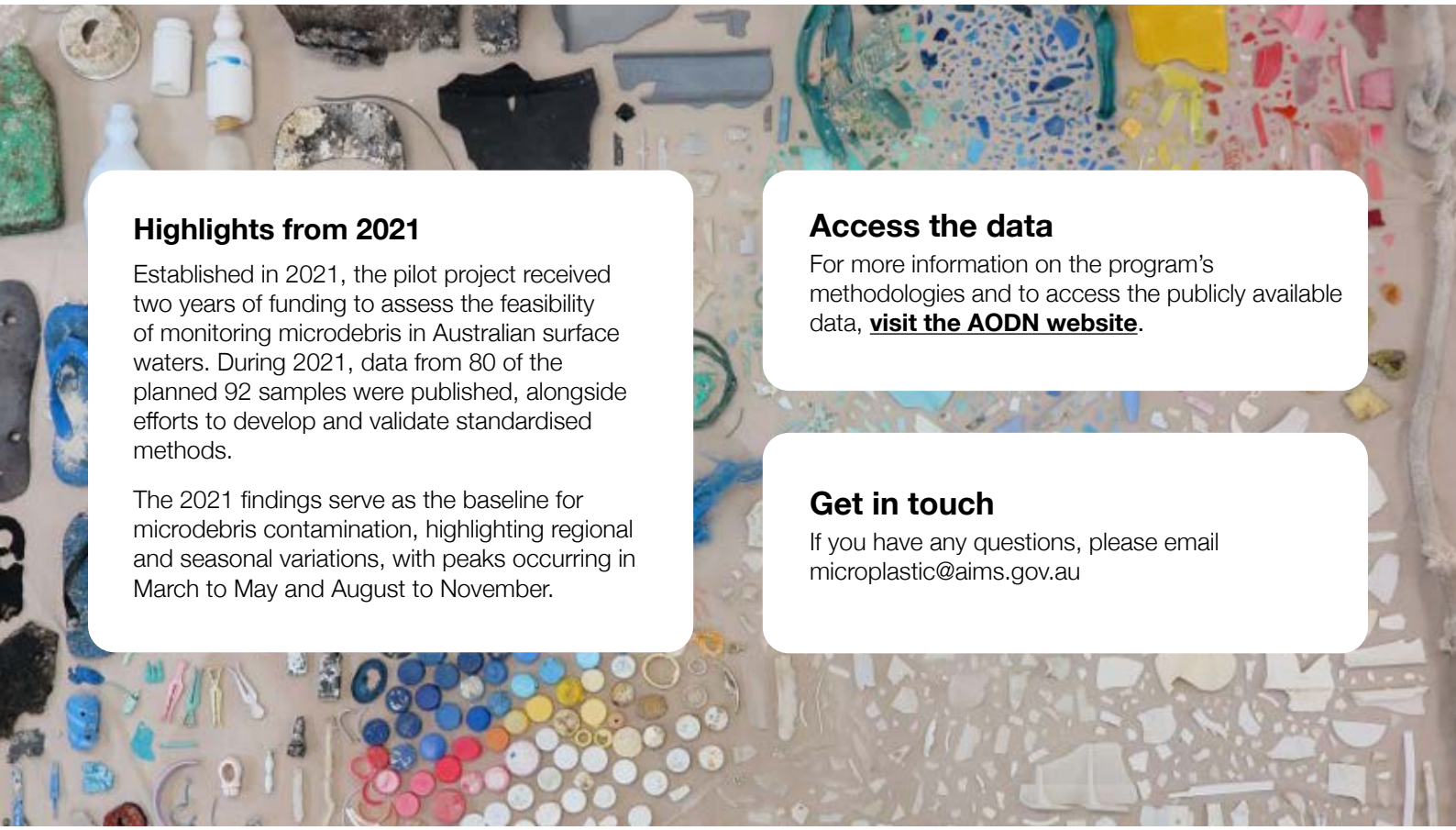
Understanding the impact: What the data tells us

The IMOS Marine Microplastics sub-Facility aims to provide insightful data for better understanding trends of microplastic contamination over time and across the different sampling locations.

This dataset complements other IMOS long-term ocean observation datasets (e.g., surface salinity, current, plankton and fish larvae) and will aid in identifying environmental factors that potentially influence the distribution of such contamination or its potential impacts.

The data contributes to determining potential sources, fate, and impacts of microplastics in Australian marine waters thereby informing environmental management at local and national scales.

The IMOS Marine Microplastics sub-Facility is operated by AIMS, in partnership with CSIRO, SARDI, NSW-DCCEEW and Deakin University.



Highlights from 2021

Established in 2021, the pilot project received two years of funding to assess the feasibility of monitoring microdebris in Australian surface waters. During 2021, data from 80 of the planned 92 samples were published, alongside efforts to develop and validate standardised methods.

The 2021 findings serve as the baseline for microdebris contamination, highlighting regional and seasonal variations, with peaks occurring in March to May and August to November.

Access the data

For more information on the program's methodologies and to access the publicly available data, **visit the AODN website**.

Get in touch

If you have any questions, please email microplastic@aims.gov.au

Australia's Integrated Marine Observing System (IMOS) is enabled by the National Collaborative Research Infrastructure Strategy (NCRIS). It is operated by a consortium of institutions as an unincorporated joint venture, with the University of Tasmania as Lead Agent.

IMOS acknowledges the Traditional Custodians and Elders of the land and sea on which we work and observe, and recognise them as Australia's first marine scientists and carers of Sea Country. We pay our respects to Aboriginal and Torres Strait Islander peoples past and present.

Motti C & Santana M (2025). National Marine Microplastics 2021, Integrated Marine Observing System, Hobart.