

The impact of microplastics on freshwater ecosystems

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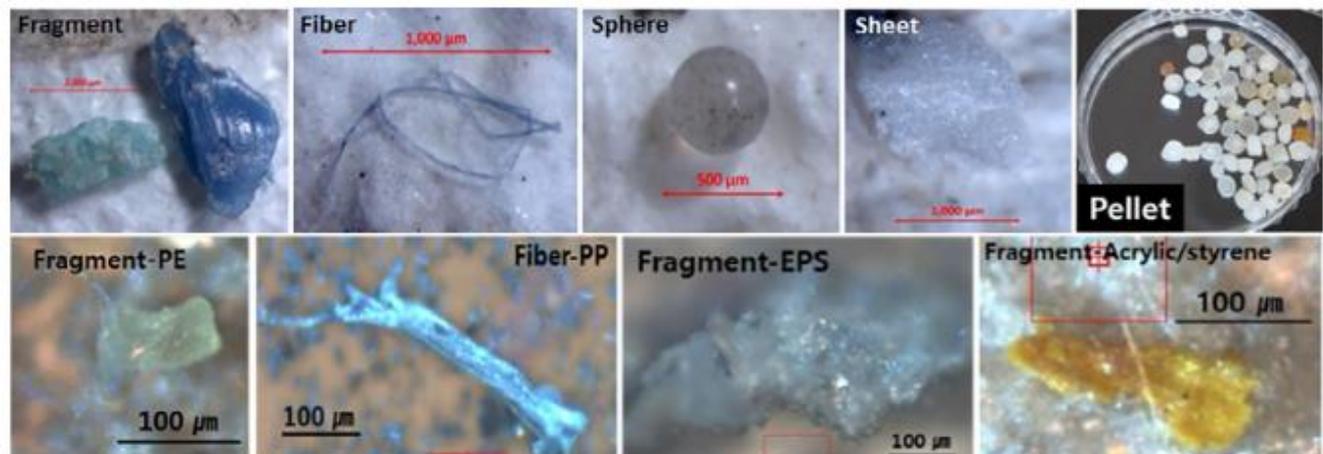


What is microplastic?

- Plastic particles < 5mm (>0.001mm)
- Fragments, pellets, fibres, films
- Primary and secondary microplastics
- Various different organic polymers: PE, PP, PS, PVC, PES, PA, PET, PC, etc.
- Often contain additives, e.g. plasticizers, flame retardants etc.
- Can adsorb (accumulate) organic chemicals



Source:
<https://www.sciencenewsforstudents.org/article/help-for-a-world-drowning-in-microplastics>



Source: Shim, Hong, Eo, 2018, Marine Microplastics: Abundance, distribution, and Composition. In: Microplastic Contamination in Aquatic Environments; An emerging matter of environmental urgency, Elsevier B.V.

Where is microplastic?

- **Antarctic waters, mountain lakes, Arctic ice, deep-sea sediment**
- **Marine environment: around 100 publications, from around 0.00001 to 10000 per m³**
- **Freshwaters likely a vector but < 10% of publications**

	Sediment	Water column
Pearl River, China	80-9600 per kg ¹	380-7900 per m ³
Edgbaston Lake	3 per kg ¹	
MAN ship canal	~900 per kg ¹	

Source: Lin et al, 2018, STOTEN
 Vaughan et al 2017, Environmental Pollution
 Hurley et al 2017, Environmental Science & Technology



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NEWS

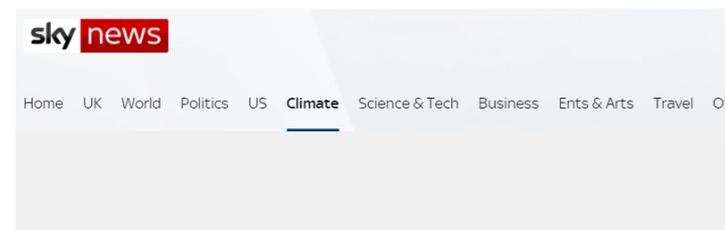
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Science & Environment

Microplastic in Atlantic Ocean 'could weigh 21 million tonnes'

By Victoria Gill
 Science correspondent, BBC News

18 August

sky news

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Microplastics: Scientists find highest level ever on seabed as they discover currents pull 99% to seafloor

Scientists found bottom currents sweep microplastics into concentrated hotspots on the seabed.

Microplastic in Windermere

- Standardised protocol and analyses
- 54 lakes in 22 countries
- Microscopically classification and polymer identification

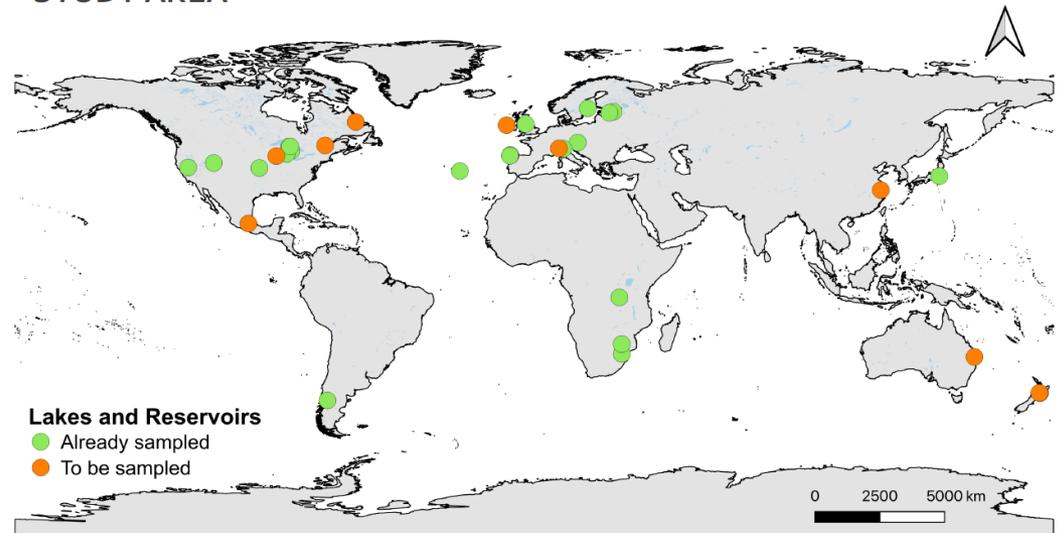


GALACTIC: GlobAl Lake miCroplasTICs

Project lead by Veronica Nava and Barbara Leoni

GALACTIC: GlobAl Lake miCroplasTICs

STUDY AREA



Microplastics: ecological impacts

Large scale mesocosm experiment: impacts of MPs on lake food web



Working with: Jessica Richardson, Dilvin Yildiz, Gülce Saydam, Boris Jovanovic, Derya Öztürk, Lucka Vebrova, David Boukal, Djuradj Milošević, Dimitrija Savić, Jelena Stanković, Melisa Metin, Deniz Balkan, Yasmin Akyürek & Meryem Beklioğlu

12 cylindrical-shaped mesocosms (1.2 m & 1m) (1360 L/each)
on a floating platform

Two different MP concentration

Next steps

1. **Impact of microplastics on zooplankton food quality (together with Cardiff University)**
2. **Future Places Project: Fate of plastic waste in Morecambe Bay (together with Lancaster University)**
3. **Seek funding for plastic or biodegradable plastic mesocosm experiment at UKCEH facility**



Source: https://en.wikipedia.org/wiki/Morecambe_Bay

