Distribution & Accumulation

It is estimated that each year, about **10 million tons of plastic,** corresponding to approximately **5 - 10% of worldwide production, end up at the ocean** (Jambeck et al., 2015)

Approximately **80% of marine litter** derives from land based sources while **20% results from marine and maritime sources**. These figures are vary regionally. Plastic represents between 50 to 80% of marine litter (Barnes, 2009)

Plastic litter has a global distribution, being found from montain tops to the bottom of the ocean, including polar regions (Woodall, 2014, Bergmann

At the sea surface, there are 5 accumulation areas, known as gyres, where marine litter has the tendency to aggregate

It is estimated that **5.25 trillion plastic fragments of all sizes and shpes, weighting 269,000 tons,** could be floating in all world's oceans (Eriksen et al., 2014)

A recent study in the **Great Pacific Garbage Patch** estimated the mass of plastic to be approximately **80,000 tons, which is 4-16 times higher than previous studies in that gyre** (Lebreton et al., 2018)

The main materials found at **sea surface** are plastic bottles, caps, bags, styforofoam, fishing buoys, bait boxes, processed wood, fishing nets, fishing gear and rigid plastics (UNEP, 2005)

The materials found in **deep sea** are fishing gear, cables, nets and traps, glass, metal cans, ceramic, tires, rigid plastics (Galgani et al., 2015)

Marine litter found in **coastal areas** is composed of plastic packaging, metal cans, paper, cardboard, cigarett filters, toys, straws, ropes, nets, diapers, cotton swabs, wipes, glass, lamps, ceramic, baloons, lightbulbs and tires.

References

Barnes, D.K.A., et al., Accumulation and fragmentation of debris in global environments. Philosophical Transactions of the Royal Society B: Biological Sciences, 2009. 364(1526): p. 1985-1998.

Bergmann, M., Mutzel, S., Primpke, S., Tekman, M., Trachsel, J., Gerdts, G., (2019) White and wonderful? Microplastics prevail in snow from the Alps to the Arctic

Eriksen M, Lebreton LCM, Carson HS, Thiel M, Moore CJ, Borerro JC, et al. (2014) Plastic Pollution in the World's Oceans: More than 5 Trillion Plastic Pieces Weighing over 250,000 Tons Afloat at Sea. PLoS ONE 9(12): e111913. doi:10.1371/journal.pone.0111913

Galgani, F., Hanke, G., Mæs, T., 2015. Global distribution, composition and abundance of marine litter. In: Bergmann, M., Gutow, L., Klages, M. (Eds.), Marine Anthropogenic Litter. Springer, pp. 29–56.

J.R. Jambeck, R. Geyer, C. Wilcox, T.R. Siegler, M. Perryman, A. Andrady, R. Narayan, K.L. Law 8 (2015) Plastic waste inputs from land into the ocean. Science, 347 (6223) (2015), pp. 768–771.

Kanhai, L.D., Johansson, C., Frias JPGL, Gardfeldt, K., Thompson, R. C., O'Connor, I., (2019). Deep sea sediments of the Arctic Central Basin: A potential sink for microplastics. Deep Sea Research Part I: Oceanographic Research Papers

Pagter, E., Frias, J.P.G.L, Kavanagh, F; Nash, R., (2020). Varying levels of microplastics in benthic sediments within a shallow coastal embayment. Estuarine Coastal and Shelf Science. 1(4):140317

UNEP RSP (2005). Marine Litter and Abandoned Fishing Gear. Nairobi. www.unep.org/regionalseas/marinelitter/publications/docs/RS_DOALOS.pdf

Woodall LC, et al. (2014). The deep sea is a major sink for microplastic debris. R Soc Open Sci

Open access photo credits

NOAA (Flickr)
Marine litter (pxfuel)

Managing for Microplastics: A Baseline to Inform Policy Stakeholders

IRISH RESEARCH COUNCIL
An Chomhairle um Thaighde in Eirinn

CAROLINE
Collaborative Research Fellowships for a Responsive and Innovative Europe

MARINE AND FRESHWATER RESEARCH CENTRE

GMIT
INSTITIÚID TEICNEOLAÍOCHTA NA GAILLIMHE-MAIGH EO
GALWAY-MAYO INSTITUTE OF TECHNOLOGY

Irish Whale and Dolphin Group