Sources, Pathways and Environmental Fate of Microplastics

Anne Marie Mahon [1], Róisín Nash[1] Heather Lally[1], Sinead Murphy[1], John O'Sullivan[2], Michéal Bruen[2] , Mark Kelly[1], Noelle Jones[1], Bart Koelmans[3], Ian O' Connor[1]

[1] Marine & Freshwater Research Centre, Galway Mayo institute of Technology, Galway, Ireland
[2] School Of Civil, Structural & Environmental Engineering, University College Dublin, Dublin, Ireland
[3] Aquatic Ecology and Water Quality Management, Wageningen University, Netherlands

www.freshwatermicroplastics.com

Consortium & Expertise

Biologists, Limnologists, Hydrological & Environmental Engineers and Industry Partners collaborating to inform the development and implementation of policy through understanding of the sources, pathways and environmental fate of microplastics in freshwater systems.

Objectives

- Characterisation of microplastic sources with respect to industry, wastewater treatment plants and diffuse sources.
- Describe movement of microplastics from land based sources to aquatic receptors.
- Determine factors affecting dispersal mechanisms in freshwater systems.
- Identify potential pathways and transfer rates for microplastics within freshwater food webs.
- Model critical source areas for microplastics and their potential impact.
- Inform policy and make recommendations for monitoring.

Outcomes and Impacts

- Deliver on national environmental research priorities described in the EPA research strategy 2014-2020.
- Supporting water protection, conservation and management obligations under the Water Framework Directive, Marine Strategy Framework Directive and Floods Directive;
- Provide in-depth knowledge on the specifics of the sources, pathways and environmental fate of microplastics.
- Inform political decisions regarding the possible requirement for inclusion of microplastic monitoring programme under the WFD
- Inform decisions regarding possible regulation of microplastics from various sources.

3 year Project - Kick-Off Meeting January 2017

WP1. Refinement of MP source information
Leader Dr Mahon
Contributions:
Dr Kelly
Dr Jones

WP2. MP movement sources to aquatic receptors
Leader Dr O'Sullivan
Contributions:
Dr Mahon,
Prof Bruen,
PhD Student (UCD)

WP3. Factors affecting MP dispersal in aquatic receptor
Leader Dr Lally
Contributions:
Dr Nash
Dr Mahon
Dr O'Sullivan
PhD students (GMIT & UCD)

WP4. Pathways of MP transferral within Food chain
Leader Dr Murphy
Contributions:
Dr Lally
Dr Nash
Dr Mahon
PhD Student (GMIT)

WP7. Implementation of communication plan
Leader Dr Nash
Contributions:
Dr O'Connor
Dr Mahon
Dr Lally

MP in WWTP model

Data on transport from land to aquatic receptors

Impact of flow, velocity and depth on transport of MPs

Factors controlling MP dispersal

Pathways in food web.

Bio-indicators for monitoring

Communications Plan
Website, conference, publications

Conference report
communications evaluation

WP6. Recommendations for monitoring of microplastic pollution Leader Dr Mahon
Contributions Dr Lally, Dr Nash, Dr Murphy

WP5. Modelling
Leader Prof Bruen
Contributions:
Dr O'Sullivan,
Dr Mahon,
Prof Koelmans
PhD student (UCD)

Pressures of microplastic pollution identified

Policy recommendations concerning microplastic pollution in Ireland

Solutions/alternative suggested to reduce microplastic pollution