Theme session J 2021

ICES/PICES session - Advances and challenges in marine litter pollution

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16:00-17:00 CEST

Marine litter covers an extremely wide variety of materials and sizes, originating from many unspecified sources. It is one of the most serious, rapidly developing, and worsening global environmental problems. The annual global production of waste has reached 4 billion tonnes and this figure is expected to double by 2025. About half of this amount concerns non-biodegradable material (i.e. plastics and metals).

Periodic assessments of the state of the marine environment, monitoring, and the formulation of environmental targets are perceived as part of the adaptive management process within Regional Sea Convention Action Plans (OSPAR in the Northeast Atlantic or HELCOM in the Baltic Sea) and within the MSFD for EU member states.

In the Northeast Atlantic and the Baltic Sea, a better understanding of marine litter pollution and the implementation of monitoring to support reduction measures are the main objectives, with a focus on some specific aspects of marine litter pollution such as the evaluation of sources, distribution, fate and impact of marine litter.

With some indicators already in place and new developments to come that will cover all aspects of marine litter pollution, the aim of the session was to present the most recent and updated information on this issue with consideration to all compartments of the marine environment.

Evaluation of sources, distribution, fate and impact of marine litter, and specific issues such as interactions with the fishery sector have been addressed. New concepts and insights, shared and harmonised methodologies, coordinated environmental monitoring were also considered to support dedicated guidelines and reduction measures.

The session has taken into account both science and management to:

- provide new insights, methods and concepts
- develop shared and harmonised methodologies
- coordinate environmental monitoring, mapping and data management
- translate information in guidelines

Interactions with the fisheries sector were also considered as an important aspect of marine litter pollution, where results from ongoing research projects in the North east Atlantic and Baltic sea were analysed and discussed.

The presentations received could be grouped into the following main topics:

- Microplastics
- Seafloor trawling
- Ingestion (macro or micro)
- Ghost gear

There were 10 presentations and 3 posters, covering a broad range of sub-topics, including improvement of our understanding of plastic pollution in different sectors (e.g. aquaculture as a source of plastic, a review on additives), management tools to support policy or solutions (e.g. an app to collect data on fishing gear stranded onshore, stronger links between research with SDG 14) and the current suitability and directions for monitoring guidelines (relevant to WGML activities). We especially want to highlight the following three presentations:

- The first one "Marine litter in the water column of the North Sea – composition, distribution, abundance and potential sources" from Bastian Huwer (DTU Aqua, Denmark) in relation to mid-water trawling, using existing trawling efforts in the North Sea, provided novel data on litter in the water column. The results indicated that this compartment is important to investigate further, in addition to existing schemes covering other compartments.
- The second presentation "All that glitters is not plastic: the case of open-ocean textile fibres" from Giuseppe Suaria (CNR-ISMAR, Italy) on the relative importance of synthetic fibers in relation to microplastic pollution and the need to distinguish between both types.
- The third presentation "Towards a Long-Term Monitoring Program of Plastic Ingestion by Marine Organisms in the North Pacific" from Matthew Savoca (PICES WG42) on how to use marine organisms to monitor marine litter and its harmful effects.

In the discussions, we allowed the session presenters to select and respond to two pre-defined questions (see list in ANNEX) across two main topics MACRO and MICRO litter. They were given approx. 5 min to reply and discuss with the chairs within the context of their own presentations. The following four questions were those chosen most frequently by the session presenters:

- Which type of **macro plastic** is **most prevalent** in the marine environment?
- Which **marine animals** are **most severely impacted** in your opinion?
- Are **microplastic fibres adequately** sampled and accurately **identified and quantified** using existing sampling and analysis techniques?
- What are your experiences and identified **limitations in comparing MP occurrence data** from different studies?

Conclusions:

According to the session presenters, the most prevalent macroplastic items they observed were single use plastics. This is in line with a recent review, which highlights that up to 45% of all marine litter reported across 36 studies worldwide were single use plastic bags (Morales-Caselles et al., 2021), closely followed by fishing gear. Our session presenters indicated that several types of organisms were affected by marine litter, and that this was highly dependent on the region and seasons according to their findings. In relation to microfibres, the session presenters thought that microplastic fibres are currently not adequately sampled or accurately identified and quantified using existing sampling and analysis techniques. There is a need to separate microfibres from other types of microplastics, not just in terms of analysis, but also in relation to reporting. The session presenters all confirmed that there is a need for harmonisation across regions in the long term, while we should start with standardisation of techniques to allow for some comparability in the short term. These issues are recommended as focus areas for ICES WGML in the coming years.

ANNEX

MACRO Questions:

1. Which environmental **matrices** are most relevant to **monitor** macro plastic and why?
2. Are **removal and clean-up actions useful** and where?
3. Which type of **macro plastic** is **most prevalent** in the marine environment?
4. How long does it take to **breakdown a plastic item** based on what you personally have observed in the environment: years, decades, centuries and what **influences the process**?
5. Which **marine animals** are **most severely impacted** in your opinion?
6. How should we **best assess** the **impacts of macro litter** on the marine environment and what are the current **knowledge gaps**?
7. What are your experiences and identified **limitations in comparing macro litter occurrence data** from different studies?
8. Should we develop a **global agreement on plastic pollution** and what would it look like and regulate?

MICRO Questions:

1. Which environmental **matrices** are most relevant to **monitor** MP and why?
2. What are the current **limitations** preventing a more widespread monitoring of **MP** at the national level and how do we overcome these?
3. Which industries are the **major contributors of MP** to the marine environment?
4. Should **MP** have a **dedicated monitoring programme** and how should monitoring locations be selected?
5. Are **microplastic fibres adequately** sampled and accurately **identified and quantified** using existing sampling and analysis techniques?
6. How should we **best assess** the **impacts of MPs** on the marine environment and what are the current **knowledge gaps**?
7. What are your experiences and identified **limitations in comparing MP occurrence data** from different studies?
8. Should we be considering **monitoring of nanoplastic?**