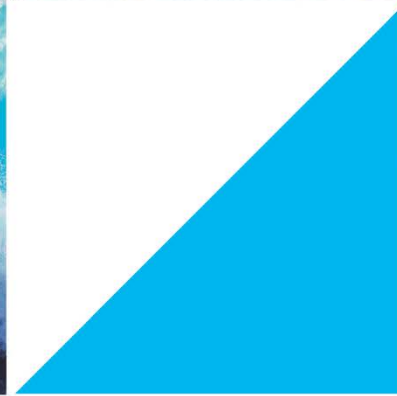


CSA OCEANS

JPI Oceans support action



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Preamble

This deliverable was already submitted as the second part of deliverable “D7.2 Proposal for a JPI Oceans Foresight Process”.

The first part of that report develops the concept of a two-pronged foresight process in order to support the implementation of JPI Oceans (a *strategic*, thematically open and bottom-up approach on the one hand, and a *programmatic*, thematically targeted and more top-down approach on the other hand. While the strategic approach is only described in principle, the programmatic approach is developed in full detail at operational level.) The second part of the proposal applies the (programmatic) foresight process to the field of microplastics in the oceans as a recommendation for a test foresight exercise. The report, therefore, comprises both deliverable “D7.2 Proposal for a JPI Oceans Foresight Process” and deliverable “D7.4 Recommendation for a foresight process test exercise”.

I. Applying the Programmatic Foresight Process: A Pilot Exercise in Micro-plastics

Introduction

Marine litter consists primarily of plastic (Browne et al. 2011), a material that degrades very slowly and whose concentration in the oceans is increasing from year to year due to a rising production (Plastics Europe 2006) and bad waste management on land and sea (Ribic et al. 2010). Bigger pieces of marine litter pose problems for animals like birds, seals, fishes and turtles as they can get entangled and wounded or accumulate it in their stomachs (Derraik 2002). But smaller fragments of plastic debris – so called micro-plastics – also stress the marine ecosystems worldwide.

The term “micro-plastic” is generally used for plastic particles with diameters of less than 5mm (Arthur et al., 2009) and it can be found at the sea surface, the sea column and at the seabed. There are mainly two formation ways for micro-plastics. Primary micro-plastic is produced as such, for instance, for cosmetics as a peeling or as pellets for further processing and is transported into the ocean through the sewage systems. Secondary micro-plastic emerge by fragmentation of larger pieces into smaller ones through mechanical processes triggered by wind, waves or by sunlight. One common source of secondary micro-plastics are fibers from synthetic clothes which break away during the washing process and find their way into the sewage system and ultimately the oceans.

Ingestion by animals is one of the principal threats emanating from micro-plastics in the marine environment. As micro-plastic pieces are comparable in size to plankton, they can enter the food chain at the bottom and may reach higher levels (Thompson et al. 2004), thus, potentially ending up in the human food chain. During this process, micro-plastics may operate as transport vectors for toxins (Gregory 2009) since plastic is able to absorb persistent organic pollutants (POPs) which include toxic substances. Once a plastic particle is ingested by an organism, toxins and ingredients like plasticizers may be released thereby harming the animal, as the substances accumulate in its cells and tissues (Moos et al. 2012). Furthermore animals may be (fatally) harmed by sharp edges on freshly fragmented pieces or due the fact that plastic cannot be excreted by many animals leading to an accumulation in the stomach and finally to starvation.

Since micro-plastics pose a real threat for both the marine ecosystem and potentially human beings, it is a societal challenge that is widely recognised to require action. Yet our understanding of the scope of the problem and possible solutions is still underdeveloped. Therefore, innovative research and technology development are needed to address this issue. As micro-plastics in the marine environment constitute a global problem that calls for cross-cutting and long-term approaches, international cooperation is required in this field.

The Management Board of JPI Oceans has therefore decided to tackle this problem area, a decision that is reflected in two ways. On the one hand, the Management Board has launched a pilot action in the field, which proposes to standardise monitoring methodologies, to determine and quantify micro-plastics in the marine environment, to investigate sources and sinks for micro-plastics as well as mechanisms for their release, transport and deposition, and to look at possible remediation measures. The pilot action thus principally aims to improve our understanding of the problem area at hand. While such an understanding is absolutely necessary to grasp the problem, there is a range of further ecological, socio-economic and technological issues which need to be addressed in order to move towards a solution of the problem. The Management Board has therefore endorsed the instigation of a programmatic pilot foresight process on the topic of micro-plastics in the context of the Coordinating and Support Action (CSA Oceans). A proposal for such a foresight process is outlined in the following sections on the basis of the six-phase programmatic foresight proposal developed in part II.

1. Instigation of the foresight process (Pre-foresight)

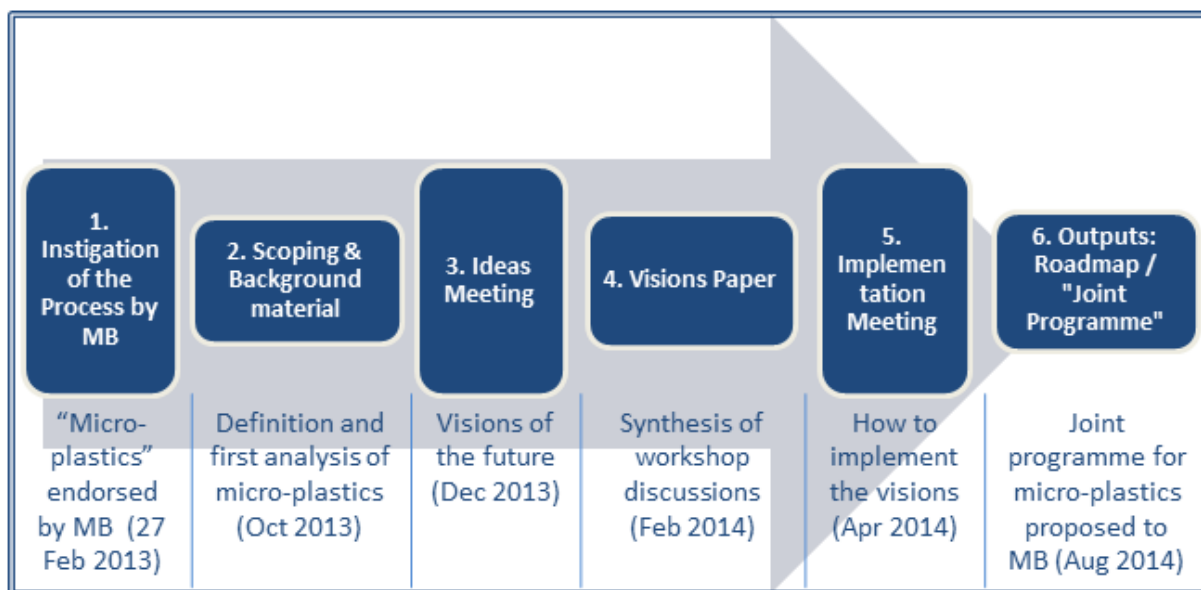


Figure 1 A programmatic foresight process for micro-plastics

Since the pilot foresight exercise is conducted in the framework of *CSA Oceans*, there are a few particularities that differentiate this exercise from the proposal for a *JPI Oceans* foresight process. However, these differences are mainly related to the administration and steering of the exercise, rather than the content and procedures.

Firstly, the exercise has been launched by the CSA – rather than by the MB, albeit, the topic for the exercise has its endorsement – and will thus be financed through this project.

The Steering Committee of the pilot foresight will consequently have a slightly different composition. The Management Board is invited to nominate one MB member as well as a member of the Strategic Advisory Board to join the Steering Committee¹. External expertise will be provided, amongst others, by Mr Totti Könnölä (*Impetu Solutions*, Finland/Spain), a foresight expert who has experience in the Joint Research Centre's Institute for Prospective Technology Studies and who has been involved in several European transnational foresight exercises. Since the pilot exercise principally aims to test and develop a procedure for a JPI Oceans foresight process, it is essential to acquire such procedural expertise. Apart from these individuals, the CSA Oceans Work Package 7 will also be represented on the Steering Committee, and will assume the project management. Furthermore, Work Package 7 will also assume all administrative tasks of the pilot foresight process, i.e. the work foreseen for the dedicated member of the Secretariat in the foresight process. The Steering Committee shall seek to ensure that the foresight exercise is developed in complementarity to the JPI Oceans pilot action "ecological aspects of micro-plastics".

All Management Board members interested in participating in the foresight exercise are also encouraged to nominate a national contact point. This individual will be invited to participate in the workshops and should assist in the identification and mobilising of stakeholders at the national level. Moreover, the national contact points will be invited to contribute towards the background paper, visions paper and the final roadmap. National contact point should preferably be experts on micro-plastics, e.g. scientists or industry representatives, so that content expertise is brought into the exercise.

2. Scoping and inputs for the foresight exercise

In phase two, the Steering Committee needs to identify a limited number of experts in the field of micro-plastics – e.g. scientists and industry representatives, members of civil society or of public administrations – that will be invited to participate in the workshop(s). The national contact points should also be consulted in this selection process. Please note that the participants in both workshops do not need to be identical (see below).

Secondly, background material, which will serve as input for the ideas workshop, will have to be prepared. This material will provide a first analysis of the micro-plastic topic area and will take on the form of a report or reports. Specifically, the report(s) should give a definition of micro-plastics and provide a sort of literature review. They should highlight the main challenges and problems of micro-plastics in the marine environment, that is, inform about the main sources of micro-plastic, delineate why micro-plastics pose a problem and threat, and give an overview of the principal obstacles to solving the problem in terms of

¹ Nominating these two individuals is not strictly necessary given that the process is conducted in the CSA, however, such involvement would help to ensure that the foresight process stays closely connected to JPI Oceans.

research, technology, the legal and policy framework and socio-economic factors. It is envisaged that a report will be drafted by Aleke Stöfen (*University of Trier*), a law researcher on micro-plastics, and Heather Leslie (*VU Amsterdam*), ecotoxicologist, who will be engaged by Work Package 7. This report(s) will be circulated among the national contact points for comments, and will subsequently be distributed to all workshop participants prior to the workshop in order to create a basic common understanding of the micro-plastics challenge and to provide a basis for the workshop discussions. Moreover, national contact points may further disseminate the paper and collect input from domestic expert communities.

3. The Ideas Workshop

The selected stakeholders will be invited to participate in a one-day workshop. The principal objective of this workshop is to analyse the challenges associated with micro-plastics in the ocean and to develop normative visions of the future for this topic area. It might address such questions as: by how much should we reduce the amount of micro-plastics in the marine environment, for instance, by 2035? What do we need to know about the effects of micro-plastics on marine ecosystems and human beings? What kind of technological advances do we require in order to prevent plastics from reaching the oceans, and what technology would be needed and desirable in order to clean up the seas?

In order to get the participants to think and debate creatively about desirable futures, a range of foresight methods will be employed. Moreover, the selection of workshop participants shall reflect the aim of developing visions of the future. At this stage, the participants do not necessarily need to have detailed technical knowledge of micro-plastics and the scientific challenges surrounding it, knowledge that national contact points will bring into the process. Instead, the workshop should have a slightly wider range of participants in order to foster critical debate and alternative thinking among the individuals.

4. Visions paper

Work package 7 will prepare a visions paper, based on the discussions of the ideas workshop. This report will synthesise the workshop results and outline the visions developed. It will thus delineate, for instance, the key future challenges and needs in research and technology development in the field of micro-plastics that have been identified and provide an overview of the obstacles or needs for changes in the policy and legal frameworks.

This paper will be drafted by Work Package 7, with input from both external experts and national contact points. The paper will be circulated among the workshop participants for comment and will be presented at the implementation workshop, thus serving as a basis for discussion and for the development of JPI Oceans' action proposals. National contact points may want to circulate this paper among domestic expert communities with a view of gathering ideas and input for the implementation workshop.

5. Implementation workshop

Building on the visions developed, the aim of this workshop is to develop proposals of how JPI Oceans can address the challenges of micro-plastics in the marine environment. The workshop participants will be encouraged to come up with suggestions of how the previously developed visions can be realised and how the challenges and needs that were identified can be addressed. Specifically, the workshop will seek to extract recommendations of how the visions can be translated into concrete actions in the JPI Oceans framework.

The composition of workshop participants should reflect this ambition. Since this workshop focuses on the implementation of solutions, the participants should primarily comprise those groups that are likely to be implementing any recommendations made, i.e. scientists, industry representatives and JPI Oceans Management Board members. There may thus be a difference in participants compared to the ideas workshop.

6. Roadmap or “Joint Programme”

The final product of this foresight process will be a JPI Oceans roadmap for micro-plastics, which will effectively be a proposal for a “joint programme”. This roadmap will outline the challenges associated with micro-plastics as well as the developed visions and make recommendations of how to implement these through JPI Oceans, thus bringing together all elements of the foresight process. The joint programme should comprise concrete proposals for JPI Oceans’ actions also taking into account ongoing activities, such as the pilot action “ecological aspects of micro-plastics”.

The roadmap will be drafted by Work Package 7 with assistance from external experts and the national contact points. Drafts of this roadmap may be circulated among workshop participants for comment as well as among domestic expert communities through the national contact points. The final draft will then be presented to the JPI Oceans Management Board, which may choose to implement any of the actions proposed.

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