

PAME II-2018: Agenda 9(b) Reviewer response to comments to Draft 1

This document reflects the comments received since the release of Draft 1 previous to the workshop in Akureyri 5-6 June 2018.

The comments are ordered chronologically and the [text in blue describes how the comments have been addressed by GRID-Arendal in the process of producing Draft 2](#) submitted to the 2018 PAME-II meeting that will be held in Vladivostok 1-4 October 2018. .

17/05/18 Sarah Kalhak and Derek Muir (Canada – AMAP HoD)

I asked Derek Muir to review the zero-draft of the marine litter desktop study from a CEAC perspective and a Canadian AMAP perspective. Since PAME didn't provide any guidance as to the nature of this review, and given the early stage of this document (and tight turn-around), we've stuck to fairly high-level feedback, e.g. identifying any missing studies/papers or angles on the issue, glaring errors, etc., as I expect that there will be other opportunities for more detailed review at a later stage. I trust that these comments will be helpful as this stage of review:

- The draft document on marine litter from PAME was read and compared it with Chapter 2.17 in the CEAC. Basically this new document captures all the earlier work cited in the CEAC but is far more comprehensive. The field of microplastics measurements is moving so quickly that the CEAC chapter is somewhat out of date already eg the most recent reference in it is from early 2016 and most are from 2014 or earlier. A lot of new reports particularly from the European Arctic and Greenland are mentioned. There is even a recent sampling transect thru the Canadian arctic (Cózar et al Sci Adv 2017), that was part of a circumpolar study, which we weren't aware of.
[Chapter 2.17 of the CEAC Report has been consulted to cross-check all information in there is included and reference to the CEAC Report has been made in the Desktop Study. Efforts to include the most up to date literature have been made as mentioned here.](#)
- One topic that seems to be missing is discussion of the type of plastics being detected, detection limits eg micro vs nano, and quality assurance issues. Standardization of methods is mentioned (quoting Provencher et al). These QA and methods issues are obviously important if temporal trends are going to be assessed for water or in biota. Some mention could also be made of emerging technologies on the particle detection side ie using pyrolysis mass spectrometry to characterize the polymers, which will help confirm type of plastics and therefore narrow down possible sources.
[For the sake of simplicity not many details have been provided on the methodological considerations regarding detection limit and Quality Assurance. This should be fully developed when devising the monitoring plan for marine litter and microplastics.](#)
- This early draft needs some good graphics (there are none at the moment) and could use the CEAC as a guide on that.
[Graphics will be developed for the next draft of the Desktop Study.](#)
- Other than that we don't see any glaring errors and have no missing studies to identify at this time (other than CEAC, s mentioned below).

12/06/18 Melanie Bergmann and Rita Fabris (Germany)

- File with edits and comments provided

The edits and comments have been merged to the Masterfile with track changes and addressed. For details and responses on how each comment has been addressed please see CHANGES file.

15/06/18 Maria Granberg (Sweden)

- File with edits and comments provided
The edits and comments have been merged to the Masterfile with track changes and addressed. For details and responses on how each comment has been addressed please see CHANGES file.

26/06/18 Sarah Da Silva (Canada)

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29/06/18 (Denmark -AMAP)

- We would like to support the comment on p. 33 on the need for a distinction between ingestion and impact. Further to this, we suggest a differentiation between impacts related to the material itself and impacts related to associated chemicals. The latter has been widely discussed in the scientific literature and elsewhere and may deserve a more prominent place in the review. The review currently cites the study by Herzke et al. (2016) on effects of plastic-associated contaminants on seabirds. A relevant study on fish is that by Koelmans et al. (2014) Environ. Pollut. 187, 49-54. The paper by Lohmann (2017) Integr. Environ. Assess. Manag. 13, 460-465 includes a list of bioaccumulation studies involving microplastics and contaminants and provides its own assessment of contaminant uptake via plastic ingestion. [The distinction between ingestion and impact has been made and the references have been incorporated.](#)
- OSPAR has conducted beach litter monitoring for several years. We wonder if relevant data exist that allows for the description of a temporal development of beach litter amounts. Furthermore, OSPAR's work on plastics in Northern fulmars and the related Ecological Quality Objectives might be suitable for the assessment of temporal developments if such data have been collected over time. Both beach litter and fulmar data can provide geographical trends, which are described in the review to some extent. It would be helpful for the reader if maps were created to present this information. [The information available on temporal trends have been incorporated in the text and tables. These will be further researched to see if graphs with temporal trends and maps with geographic trends can be developed to illustrate geographic trends.](#)
- There are a number of new publications dealing with risk assessment and risk communication (e.g. Rist et al. (2018) Sci. Total Environ. 626, 720-726; Koelmans et al. (2017) Environ. Sci. Technol. 51, 11513-11519). These topics are not covered in the current draft, but might be worth considering even though the current publications do not specifically address the Arctic. [These publications addressing risk assessment, perception and communication have not been incorporated so far as they are not relative to the Arctic. They could be incorporated at a later stage.](#)

13/08/18 Tom Barry (CAFF Executive Secretary)

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14/08/18 Nicole Kanayurak (ICC)

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15/08/18 Sigurrós Friðriksdóttir (Iceland-AMAP)

Regarding the revised version of PAME's Marine Litter Desktop Study I have some general comments:

- Development of a regional action plan on marine litter: Close cooperation with the relevant entities would be important, e.g. OSPAR as OSPAR has developed and implemented a regional action plan for marine litter, addressing both land based and sea based sources and removal actions, as well as education and outreach activities. Data sharing and avoidance of duplicating data would be vital.
This has been added to Section IV: Recommendations next steps for consideration
- Monitoring: AMAP's mandate is „to monitor and assess the status of the Arctic Region with respect to pollution and climate change, document levels and trends, pathways and processes, and effects on ecosystems and humans“ (see the Arctic Council's website). It should be emphasized that as regards the monitoring of marine litter, in particular microplastics, the responsibility should be with the working group which has the mandate as determined by the Arctic Council. Address recommendation to Senior Arctic Officials that the relevant Arctic Council Working Group evaluates how such monitoring can be achieved.
This has been added to Section IV: Recommendations next steps for consideration

15/08/18 Georg Hanke (EC)

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15/08/18 Jan Wouter Strietman (EU)

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15/08/18 Inger Johanne Wiese (Norway – ACAP HoD)

Here are some comments from Norway, co-ordinated with our PAME representative:

- The desktop study on Marine Litter provides an interesting overview of the relevant agreements and instruments to build on to reduce marine litter to the Arctic. From an ACAP point of view it is also important that the Stockholm Convention, is given attention, due to the fact that a lot of plastic waste contains POPs, PCBs etc. There seems to be several instruments at the international level relating to shipping and fishing in the Arctic, but less on land based pollution sources. The desk-top study also underlines, in the gap analysis, that it might be more easy to reduce marine litter from shipping and fishing and more difficult to reduce it from land-based sources. Most often such land-based sources are regulated either by national law or EU directives in different countries, but this is given less attention. It would be interesting to know more about the weak aspects, lack of implementation of national regulations etc .

[Comment relates to Section II](#)

- Given the fact that the "Report on plastics in the Arctic" (2018) shows that the marine litter on Svalbard is from EU (43 pst), Norway and Russia(41 pst), and only 9 pst from other countries, this might be an indication that implementation of existing regulations are too weak or that regulations need to be tighter? There seems to be a potential and need for stronger co-operation, on sea-based and land-based sources among Arctic states – knowledge and information sharing. Issues relating to marine litter, from land-based sources, might also be relevant to ACAP.

[This pertains to the Section IV: Recommendation on next steps and the text in that section already emphasizes the need for cooperation](#)

15/08/18 Rita Fabris (Germany)

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16/08/18 Anja Elisenberg (Norway)

I got some comments from the Norwegian Polar Institute. The general view is that the evolution of the text is really good and that there is not much to add.

- Regarding the marine mammals section, only old studies are cited while those years, more and more cases of ingestion and deaths of marine mammals like sperm whales are reported in the media. Many of them are not published unfortunately but some are. We should add something about that, some pictures for example. Here are a paper and some links providing information (but perhaps not reliable enough...):

<https://edition.cnn.com/2018/04/11/health/sperm-whale-plastic-waste-trnd/index.html>

<https://www.theguardian.com/environment/2018/jun/03/whale-dies-from-eating-more-than-80-plastic-bags>

[This has been addressed in the ingestion subsection](#)

- They agree with the comment on p. 64 that some information on sewage and treatment plants (and particularly the lack of those in some Arctic regions) should appear somewhere in the text.

[This has been addressed in the subsection on land-based sources and on the subsection on pathways](#)

- At many places in the text, it is said that we don't know anything (or not much) about impacts, contamination levels, sources, sinks, etc. Maybe this could be summarized in a paragraph in the perspectives? Maybe this will be added in the Section V "Conclusion". A comment has been added in the Conclusion section still to be developed to remember this input.
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17/08/18 Helga Jónsdóttir (Iceland)

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17/08/18 Melanie Bergmann (Germany)

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07/09/18 Elizabeth MacLanahan(USA)

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