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Peer review history for:

Dahms HTJ, Greenfield R. A review of the environments, biota, and methods used in microplastics research in South Africa. *S Afr J Sci.* 2024;120(5/6), Art. #16669. <https://doi.org/10.17159/sajs.2024/16669>

HOW TO CITE:

A review of the environments, biota, and methods used in microplastics research in South Africa [peer review history]. *S Afr J Sci.* 2024;120(5/6), Art. #16669. <https://doi.org/10.17159/sajs.2024/16669/peerreview>

Reviewer C: Round 1

Date completed: 08 November 2023

Recommendation: Accept / **Revisions required** / Resubmit for review / Decline

Conflicts of interest: None

Does the review fall within the scope of SAJS??

Yes/No

Is the review written in a style suitable for a non-specialist and is it of wider than only specialist interest?

Yes/No

Do the Title and Abstract clearly and accurately reflect the content of the review?

Yes/No

Does the review provide a significantly novel perspective or significant recent advances in the field?

Yes/No

Is the objective of the review concisely stated?

Yes/No

Is appropriate and adequate reference made to other work in the field?

Yes/No

Do current debates and points of contention receive appropriate coverage?

Yes/No/Not applicable

Are gaps in the literature adequately identified?

Yes/No/Not applicable

Does the review provide direction for future research?

Yes/No/Not applicable

Is the methodology and statistical treatment appropriate?

Not applicable/Yes/No/Partly/Not qualified to judge

Are the interpretations and recommendations aligned with the objective?

Yes/Partly/No

Please rate the manuscript on overall contribution to the field

Excellent/**Good**/Average/Below average/Poor

Please rate the manuscript on language, grammar and tone

Excellent/Good/**Average**/Below average/Poor

Is the manuscript concise and free of repetition and redundancies?

Yes/No

Is the supplementary material relevant and separated appropriately from the main document?

Yes/No/**Not applicable**

Please rate the manuscript on overall quality

Excellent/**Good**/Average/Below average/Poor

If accepted, would you recommend that the article receives priority publication?

Yes/No

Are you willing to review a revision of this manuscript?

Yes/No

Select a recommendation:

Accept / **Revisions required** / Resubmit for review / Decline

With regard to our policy on '[Publishing peer review reports](#)', do you give us permission to publish your anonymised peer review report alongside the authors' response, as a supplementary file to the published article? Publication is voluntary and only with permission from both yourself and the author.

Yes/No

Comments to the Author:

General comments:

Thank you for the opportunity to review the manuscript entitled "The state of microplastic research in South Africa: A review of the current research". This manuscript presents a systematic review of microplastic literature in South Africa, which despite having the most publications in Africa, lags behind developed countries. The importance of microplastic research in South Africa lies in its potential ecological and human health implications. Understanding the prevalence, sources, and impacts of microplastics in the environment is crucial for mitigating their harmful effects, protecting ecosystems, and safeguarding public health. Additionally, addressing this issue on a standardized basis can contribute to a global understanding of microplastic pollution and its management. The approaches used are appropriate and provide useful context into the state of microplastic research. However, there are a number of comments below which I have outlined according to the line numbers in the submitted manuscript. In addition, a couple of statements in the discussion that address the potential limitations/uncertainties associated with the review should be addressed. Following careful consideration of these comments, the manuscript would become suitable for publication and will make a valuable contribution to the understanding of microplastic research in South Africa.

Specific comments:

Line 1: In my opinion, the two halves of the title (the state of research and a review of current research) are a repeat or very similar to one another, I suggest changing the title into something that is more concise.

Lines 40, 157, 211, 228, 278: On these lines the authors provide units that often differ from one another (g vs mg vs kg for example) . I think that part of the problem is that there are many metrics, specifically concentrations of microplastics that can be quantified. In a scientific publication, the reader should be able to distinguish between these units more easily, please use standard metric units in all sections where concentrations or number of particles are stated. I also think that a couple of sentences can be dedicated towards the difficulty of this quantification, essentially the challenges associated with microplastic accounting.

Lines 49-55: The authors have used personification here, "their physical nature... they have the ability to... their physical and chemical impacts". I suggest a change in wording for the impacts of microplastics, the tone is too conversational in my opinion.

Line 59-60: Please unpack these UN SDGs briefly, include the SDG's that microplastics impact the most.

Line 75: Should the sentence state: The papers were then screened by importance and "ordered" chronologically from 2023 to 1990?

Line 82- 85: The section on "statistical analysis" is far too brief, what (if any) statistics were performed? What aspects of the data were analysed? There could be far greater analysis on the papers reviewed, for example what was the range of microplastic concentration in marine or freshwater ecosystems? I provide further suggestions below.

Lines 86-97: I find the section on Microplastic research in Africa too brief as well. I think this first paragraph is a decent introductory paragraph, but following the heading, this section warrants more unpacking and

greater detail with respect to the amount of publications, debates in the literature, what countries of Africa have been working on this and what they were investigating. The section title suggests that this should be a much longer and more detailed view of microplastic research in Africa. It seems as though the African perspective was included as an introduction into South African research, but there is a missed opportunity here.

Line 105: I suggest a change to the word "unfortunately", it suggests that what has been done was not adequate and (without intention) sounds as though the authors are "judging" the body of work that was produced.

Line 109: I suggest the authors remove the word "massive", that is far too conversational.

Line 109: As mentioned earlier, if the authors were to more closely unpack the literature from Africa, the sentence would be more definitive. Is this a major gap in the literature in Africa? Following this review, the authors should be able provide evidence to answer this.

Lines 112-118 (Table 1): I appreciate the effort made into this table, in my opinion, it does a good job at stating what was collected, however the table is far too long and there needs to be further thinking into how this information can be split up and further analysed. Rather than just providing a collection of literature, which is difficult for a reader to digest as it is far too long, group the literature into the themes that are discussed later in the manuscript. The extraction and visualisation methods are mentioned later (section starting on line 302) in the manuscript, I suggest the authors unpack each of these methods briefly, including the limitations and errors associated with each, this should be stated before the table is presented as it will provide the reader greater context with respect to the methodologies used.

Line 119 (Figure 1): It is peculiar that there was such a large gap between the first (1990) and second publication (2012). Please provide context or reasons why there was this large gap here, is it consistent with other trends, globally or in Africa?

Line 120: Consider a different beginning to this paragraph, remove "as previously mentioned".

Lines 122-136: This section is simply a summary of the early papers in microplastic research of the marine environment, however, there needs to be more reflection and unpacking of the literature. At this point I am struggling to see the informed direction or important points that the manuscript is intending to highlight as this is just providing a summary.

Lines 176-180: Why is this paragraph on its own? It seems out of place, I also suggest that the authors pay close attention to the conversational tone that often creeps into the writing, for example: "The final publications in 2023, again only...", the text is sounding more and more like a story. Much of this sort of writing should be removed in this section and throughout the manuscript. Is this the final publication of 2023? Or is it just the last one that was identified during the systematic review? Also, there needs to be greater quantification of the papers that were omitted during the literature collection process, how many papers were first identified? How many were removed? And why were they removed?

Lines 184-186: Where is the literature and examples of papers that have done this elsewhere? It would be great to include these even if they are outside of Africa, as the methodologies and negative consequences are most likely the same or similar. Rather than just stating this, refer to the literature and cite appropriately where this has been demonstrated to have been a successful investigation in the literature. This would demonstrate the importance of investigating all three (water, sediment and biota) "matrices" - not sure if this is the correct word.

Line 192-194: Again, as before, link this to the literature rather than just stating it.

Lines 202-204: Why is this,? Please unpack for the reader why this trend has occurred in SA and globally.

Lines 204-206: This sentence is not clear.

Lines 213-216: Is it not the other way around, surely we would want to sample sediments instead of species and use sediment as an indicator? That would be much less invasive.

Line 217: State the year, it makes this text sound less like a story.

Line 229-230: This sentence is unclear, there needs to be further detail and again, this sounds more of a summary rather than a critical engagement of the literature. The style of writing makes it difficult to identify what has been critically assessed and what remains as a future research priority.

Lines 260-266: This section provides better reflection and more critical engagement of the literature versus previous sections, perhaps that is because the studies are more comparable and were conducted during the same period of time.

Line 273: Again, the use of the word "finally" sounds as though the authors are passing judgment, rather just state it more plainly, line 280 as well.

Line 287: Replace the word "tiny" with the actual number, the authors need to quantify rather than use descriptive text.

Line 290: Quantify

Line 293: Why are these recommendations here? Is there not a section for recommendations further on? It seems a bit out of place.

Lines 302-330: As stated before, I suggest a brief overview of these methods come in before table 1. Although this section does a good job at engaging with the methodological limitations used in each study.

Line 313: Remove the word "much"

Line 322: What is poor? Again, this sounds as though the authors are passing judgment, was it the actual identification that was poor or the amount of studies? Be specific.

Line 324: Most available or most commonly used? Be specific and then quantify.

Line 335: The word "barely" is not a very good scientific term, this is quite descriptive, the authors need to quantify these descriptive sentences.

Line 337-339: I do not see the value of this sentence, why is this so? What makes the authors say this? Was the analysis done previously performed incorrectly, or was it expensive or too slow? Rather provide the reasons why this would be necessary, versus just stating it. Is there evidence that the current methodologies are too slow, or not accurate or not cost-effective. The authors need to provide evidence for this statement.

Line 339-340: This sentence could be framed better as an international future research aim, and so recommendations could be that SA would follow a similar research methodology once it has been established.

Line 346-349: This last section does not constitute a full paragraph and I think it looks out of place, is this a conclusion? If so, then please provide the main points of focus that were identified following the systematic review, otherwise it is just random sentences that do not link back to the literature that was reviewed.

Author response to Reviewer C: Round 1

In my opinion, the two halves of the title (the state of research and a review of current research) are a repeat or very similar to one another, I suggest changing the title into something that is more concise.

AUTHOR: Corrected

The second half has been removed.

On these lines the authors provide units that often differ from one another (g vs mg vs kg for example) . I think that part of the problem is that there are many metrics, specifically concentrations of microplastics that can be quantified. In a scientific publication, the reader should be able to distinguish between these units more easily, please use standard metric units in all sections where concentrations or number of particles are stated. I also think that a couple of sentences can be dedicated towards the difficulty of this quantification, essentially the challenges associated with microplastic accounting.

AUTHOR: Rebuttal

The authors understand that in a manuscript that units need to be similar, however, the authors feel that changing the units that were used within manuscripts would be incorrect. The differences highlights the challenge in microplastic studies and the various methods used. We have however included a section to highlight the challenge through all the different reporting units seen in the method section

Lines 346-348 “The contextualisation of the environment and a standardised method would similarly allow for a singular reporting unit of microplastics, compared to the various units seen in the studies reported in the review paper.”

The authors have used personification here, "their physical nature... they have the ability to... their physical and chemical impacts". I suggest a change in wording for the impacts of microplastics, the tone is too conversational in my opinion

AUTHOR: Corrected

The authors have scanned the entire manuscript to remove the personification of microplastics.

Please unpack these UN SDGs briefly, include the SDG's that microplastics impact the most

AUTHOR: Corrected

The authors have mentioned some of the more prominent goals impacted by microplastics.

Lines 62-63: “..... such as life below water, life on land, clean water and sanitation, and good health and well-being.”

The authors wish to go into much more detail on the goals, however, with the already large review paper the authors decided to rather focus more on the review of the research in South Africa.

Should the sentence state: The papers were then screened by importance and "ordered" chronologically from 2023 to 1990

AUTHOR: Corrected

Line 78 “...screened by relevance and ordered chronologically from 2023 to 1990.”

The section on "statistical analysis" is far too brief, what (if any) statistics were performed? What aspects of the data were analysed? There could be far greater analysis on the papers reviewed, for example what was the range of microplastic concentration in marine or freshwater ecosystems? I provide further suggestions below

AUTHOR: Rebuttal

Due to the various different methods used in microplastic research it prevents the comparing of results between studies. Too many known and unknown variables impact microplastics when sampled. This is one of the greater challenges of microplastic research and has so been mentioned in the review paper.

I find the section on Microplastic research in Africa too brief as well. I think this first paragraph is a decent introductory paragraph, but following the heading, this section warrants more unpacking and greater detail with respect to the amount of publications, debates in the literature, what countries of Africa have been working on this and what they were investigating. The section title suggests that this should be a much longer and more detailed view of microplastic research in Africa. It seems as though the African perspective was included as an introduction into South African research, but there is a missed opportunity here

AUTHOR: Rebuttal

The section on Africa was kept brief and used as an introduction for South Africa. Due to there being at least 3 review papers of microplastics in Africa, the reviewers didn't want to include information that has already been reviewed elsewhere. The key of the review was to intensely look at the research within South Africa, as it has been found to be the leading African nation for microplastic research. It is important to see how it changed over time, where the research was conducted and how, to determine the advantages and shortcomings made in the various studies.

I suggest a change to the word "unfortunately", it suggests that what has been done was not adequate and (without intention) sounds as though the authors are "judging" the body of work that was produced

AUTHOR: Corrected

Unfortunately removed.

Lines 109-110: "It is important to acknowledge that of all 41 publications,..."

The authors would like to stress they are not judging any research produced, but critically evaluating what has been done and where the shortcomings have been in the field.

I suggest the authors remove the word "massive", that is far too conversational

AUTHOR: Corrected

Line 113: "large"

(Table 1): I appreciate the effort made into this table, in my opinion, it does a good job at stating what was collected, however the table is far too long and there needs to be further thinking into how this information can be split up and further analysed. Rather than just providing a collection of literature, which is difficult for a reader to digest as it is far too long, group the literature into the themes that are discussed later in the manuscript. The extraction and visualisation methods are mentioned later (section starting on line 302) in the manuscript, I suggest the authors unpack each of these methods briefly, including the limitations and errors associated with each, this should be stated before the table is presented as it will provide the reader greater context with respect to the methodologies used

AUTHOR: Corrected

The authors will move the table to after the sections have been discussed.

The methods have now been unpacked more to highlight the shortcomings and positives.

Lines 325-328

335-337

343-349

(Figure 1): It is peculiar that there was such a large gap between the first (1990) and second publication (2012). Please provide context or reasons why there was this large gap here, is it consistent with other trends, globally or in Africa?

AUTHOR: Rebuttal

This trend is similar to what has been found globally.

This is mentioned in lines 212-214

Consider a different beginning to this paragraph, remove "as previously mentioned"

AUTHOR: Corrected

Line 127 now begins with "In" instead of the previously mentioned phrase.

This section is simply a summary of the early papers in microplastic research of the marine environment, however, there needs to be more reflection and unpacking of the literature. At this point I am struggling to see the informed direction or important points that the manuscript is intending to highlight as this is just providing a summary

AUTHOR: Rebuttal

The authors have provided the information chronologically to indicate where the research began, what was found and how it evolved from different environments and research goals.

Unfortunately, the studies cannot be compared because of the different methods used. A challenge for microplastic research globally.

The goal is to view where microplastic research has occurred to highlight where most research has been conducted and which areas have not been researched for marine and freshwater environments. It then follows to the methods where the shortcomings are mentioned.

The aim is to then elaborate how a standardised monitoring method that can consistently be used across studies to finally compare results is needed.

It is, therefore a review/summary of what has been conducted, with the gaps and needs mentioned in the methods and recommendations section.

Why is this paragraph on its own? It seems out of place, I also suggest that the authors pay close attention to the conversational tone that often creeps into the writing, for example: "The final publications in 2023, again only...", the text is sounding more and more like a story. Much of this sort of writing should be removed in this section and throughout the manuscript. Is this the final publication of 2023? Or is it just the last one that was identified during the systematic review? Also, there needs to be greater quantification of the papers that were omitted during the literature collection process, how many papers were first identified? How many were removed? And why were they removed?

AUTHOR: Corrected

Paragraph has been linked to the top.

Line 185 changed to "the most recent publications"

The authors only omitted papers that were not conducted in South Africa. The method used to identify papers and how it was summarised is presented in the methods section.

Line 84-86 have been included to be more clear on which documents were accepted or not included.

Where is the literature and examples of papers that have done this elsewhere? It would be great to include these even if they are outside of Africa, as the methodologies and negative consequences are most likely the same or similar. Rather than just stating this, refer to the literature and cite appropriately where this has been demonstrated to have been a successful investigation in the literature. This would demonstrate the importance of investigating all three (water, sediment and biota) "matrices" - not sure if this is the correct word

AUTHOR: Rebuttal

The importance of investigating all three matrices and to contextualize the environment are mentioned later in the freshwater and method section. It is mentioned in detail there because it applies and has been the best described in river environments.

Again, as before, link this to the literature rather than just stating it.

AUTHOR: Rebuttal

Please see previous comment.

Why is this,? Please unpack for the reader why this trend has occurred in SA and globally.

AUTHOR: Correction

Lines 216-218: "The first discovery of microplastics in the ocean and research bias have been described as reasons for the dramatic difference in research between the two environments.⁵⁹"

This sentence is not clear

AUTHOR: Correction

Lines 218-220: "After a review by Verster et al.¹⁹, the author highlighted the gap of microplastic research in freshwater environments, which was then followed by a significant increase of microplastic research in the freshwater environments.

Is it not the other way around, surely we would want to sample sediments instead of species and use sediment as an indicator? That would be much less invasive

AUTHOR: Rebuttal

Benthic macroinvertebrates are a good bioindicator of various pollutants and anthropogenic impacts in rivers. There are multiple benefits to sampling them as they present a representation of the pollutant now where they were collected and can be an indication of the presence of microplastics in the ecosystem.

It might also be easier to sample and extract microplastics from Chironomid larvae than sediment.

The larvae are also a large part of the biomass of riverbeds, not sensitive to pollution, and could be an indication of which polymers may be in the food chain.

There are still many question regarding microplastic research that must be answered and the benefits and pitfalls of Chironomids as a bioindicator is one.

State the year, it makes this text sound less like a story

AUTHOR: Corrected

Lines 232: "Only two publications were produced in 2019,..."

This sentence is unclear, there needs to be further detail and again, this sounds more of a summary rather than a critical engagement of the literature. The style of writing makes it is difficult to identify what has been critically assessed and what remains as a future research priority.

AUTHOR: Corrected

The authors apologize for the incomplete sentence.

Lines 240-242: "Microplastics in the reservoir were regarded as a direct negative health impact on people dependent on the reservoir, highlighting how microplastics could be in isolated water bodies."

This section provides better reflection and more critical engagement of the literature versus previous sections, perhaps that is because the studies are more comparable and were conducted during the same period of time.

AUTHOR: Answer

Yes the similar environment provided the chance for some comparison not to the microplastic totals collected but the different methods, species, and matrices used. During this time (2020 onwards) more guides and some similar techniques such as density separation were used across studies.

Again, the use of the word "finally" sounds as though the authors are passing judgment, rather just state it more plainly, line 280 as well.

AUTHOR: Correction

"Finally" has been removed. Line 293

Replace the word "tiny" with the actual number, the authors need to quantify rather than use descriptive text.

AUTHOR: Correction

Lines 309-310: "Only thirteen studies have attempted to determine the microplastic in two or more components of the environment, with only two investigating all components of the ecosystem to determine how the distribution is impacted."

Why are these recommendations here? Is there not a section for recommendations further on? It seems a bit out of place

AUTHOR: Rebuttal

The authors included a short recommendation in the marine and freshwater section with an overall recommendations and conclusion section for the entire review. The individual section recommendations are the authors attempt to bring all the research that was reported together to show where the shortcomings and positive points of the research has been in each environment.

As stated before, I suggest a brief overview of these methods come in before table 1. Although this section does a good job at engaging with the methodological limitations used in each study.

AUTHOR: Correction

The authors thank the reviewer for his comment. We have now moved the table to after this section to create a better flow for the table and review paper.

Remove the word "much

AUTHOR: Correction

"Much" removed (Line 337: for reference)

What is poor? Again, this sounds as though the authors are passing judgment, was it the actual identification that was poor or the amount of studies? Be specific.

AUTHOR: Correction

More the ability to do so and amount of studies that did was poor.

Line 356: "poor" replaced with "limited"

Most available or most commonly used? Be specific and then quantify.

AUTHOR: Correction

Most available.

Lines 359-360: "Only thirteen studies have attempted to determine the microplastic in two or more components of the environment, with only two investigating all components of the ecosystem or try to determine how the distribution is impacted"

The word "barely" is not a very good scientific term, this is quite descriptive, the authors need to quantify these descriptive sentences.

AUTHOR: Correction

Line 370: "Barely" has been replaced by "scarcely".

The authors have quantified this in previous sections and feel that quantifying it again would be too repetitive.

I do not see the value of this sentence, why is this so? What makes the authors say this? Was the analysis done previously performed incorrectly, or was it expensive or too slow? Rather provide the reasons why this would be necessary, versus just stating it. Is there evidence that the current methodologies are too slow, or not accurate or not cost-effective. The authors need to provide evidence for this statement.

AUTHOR: Correction

Lines 371-381 have been significantly updated.

The authors do not suggest the previous research was poorly done, slow, or incorrect. If a standard method and monitoring protocol can be established in South Africa, research conducted here could finally be compared and reproduced consistently.

For such a protocol to be adopted it must be fast, reliable, accessible, time, and cost effective. Not all research institutions have all the instruments required for microplastics research, such as polymer analysis instruments.

With the review findings such as FT-IR being the most conducted method, the review could be used as a starting point for which methods and tools that are most available and used, could be used to create the monitoring protocol. It is a summary of the research and a stepping stone to better microplastics research in South Africa.

This sentence could be framed better as an international future research aim, and so recommendations could be that SA would follow a similar research methodology once it has been established.

AUTHOR: Rebuttal

A singular prescribed animal to use internationally can be difficult considering the different environments worldwide. An African or South African representative organism could be better at the current time.

This last section does not constitute a full paragraph and I think it looks out of place, is this a conclusion? If so, then please provide the main points of focus that were identified following the systematic review, otherwise it is just random sentences that do not link back to the literature that was reviewed.

AUTHOR: Correction

This section has been removed.

Reviewer D: Round 1

Date completed: 07 November 2023

Recommendation: Accept / Revisions required / **Resubmit for review** / Decline

Conflicts of interest: None

Does the review fall within the scope of SAJS??

Yes/No

Is the review written in a style suitable for a non-specialist and is it of wider than only specialist interest?

Yes/No

Do the Title and Abstract clearly and accurately reflect the content of the review?

Yes/No

Does the review provide a significantly novel perspective or significant recent advances in the field?

Yes/No

Is the objective of the review concisely stated?

Yes/No

Is appropriate and adequate reference made to other work in the field?

Yes/No

Do current debates and points of contention receive appropriate coverage?

Yes/No/Not applicable

Are gaps in the literature adequately identified?

Yes/No/Not applicable

Does the review provide direction for future research?

Yes/No/Not applicable

Is the methodology and statistical treatment appropriate?

Not applicable/Yes/No/**Partly**/Not qualified to judge

Are the interpretations and recommendations aligned with the objective?

Yes/**Partly**/No

Please rate the manuscript on overall contribution to the field

Excellent/Good/Average/**Below average**/Poor

Please rate the manuscript on language, grammar and tone

Excellent/Good/**Average**/Below average/Poor

Is the manuscript concise and free of repetition and redundancies?

Yes/No

Is the supplementary material relevant and separated appropriately from the main document?

Yes/No/**Not applicable**

Please rate the manuscript on overall quality

Excellent/Good/Average/**Below average**/Poor

If accepted, would you recommend that the article receives priority publication?

Yes/No

Are you willing to review a revision of this manuscript?

Yes/No

Select a recommendation:

Accept / Revisions required / **Resubmit for review** / Decline

With regard to our policy on '[Publishing peer review reports](#)', do you give us permission to publish your anonymised peer review report alongside the authors' response, as a supplementary file to the published article? Publication is voluntary and only with permission from both yourself and the author.

Yes/No

Comments to the Author:

The state of microplastic research in South Africa: A review of the current research

This paper attempts to summarise the research conducted on microplastics in South Africa over the last 30 years. Research into the distribution and impact of microplastics in the environment has become an issue of global concern and is a rapidly advancing field. The topic is thus relevant to a general scientific audience.

Ideally, a review article should provide a comprehensive and critical overview of the current state of knowledge, identify gaps in the literature, and provide directions for future research that will produce useful and achievable outcomes. In my review, I address each of these aspects below.

Comprehensiveness

The authors do a good job of identifying and categorising studies that have focused on quantifying microplastics in the South African environment. These are summarised in Table 1. There are several other studies and reports that I feel warrant inclusion. In particular, the authors should acknowledge the work the Water Research Commission (WRC) has funded and published on this topic. It is also important the authors contextualise their work by highlighting other recent reviews and commentary articles that have identified gaps in microplastics research in South Africa. Relevant studies not mentioned in this paper include:

- Godfrey L. (2020). Are there gaps in our understanding of marine plastic pollution? *S Afr J Sci.* <https://doi.org/10.17159/sajs.2020/8170>
- Arabi S, Nahman A. (2020) Impacts of marine plastic on ecosystem services and economy: State of South African research. *S Afr J Sci.* <https://doi.org/10.17159/sajs.2020/7695>
- Verster, C., & Bouwman, H. (2020). Land-based sources and pathways of marine plastics in a South African context. *South African Journal of Science*, 116(5/6). <https://doi.org/10.17159/sajs.2020/7700>
- Iroegbu AOC, Sadiku RE, Ray SS, Hamam Y. (2020). Plastics in municipal drinking water and wastewater treatment plant effluents: challenges and opportunities for South Africa - a review. *Environ Sci Pollut Res Int.* <https://10.1007/s11356-020-08194-5>

The authors state that no microplastic work has been done at Lake St Lucia (L297). However, they could refer to the following study: Govender et al. (2020) Towards Characterising Microplastic Abundance, Typology and Retention in Mangrove-Dominated Estuaries. <https://www.mdpi.com/2073-4441/12/10/2802>

Critical evaluation

The authors present a summary of the research conducted to date, which they structure in chronological order. As a result, their review of the literature is highly descriptive and a more critical evaluation would strengthen the discussion. Related to this, the authors could provide context for the microplastic concentrations they quote. How do values from South Africa compare with other developed or developing countries (or urbanised vs non-urbanised), and what insight does this provide in terms of identifying problematic areas that require additional scientific attention? Perhaps the authors could construct some plots to illustrate this.

The authors are critical of studies that did not attempt to investigate microplastics in organisms (a point repeated several times in the manuscript), but this really depends on the objectives of the study. Not every study necessarily needs to incorporate biota, does it? There are times when I feel the critique of the literature is perhaps a little superficial.

Recommendations for future research

In my view, this is the weakest aspect of the review. The authors make several broad statements relating to the need to investigate 'more environments and biota', but offer vague recommendations on how this could be best achieved. Such statements are scattered throughout the manuscript (e.g., L249- 251, L265-266, L293-294, L335-336, L341-342). Which systems are most at risk, what research should be prioritized going forward, and how will this feed into policies and regulations? Simply stating that research needs to be conducted in more environments is an unsatisfying recommendation.

A discussion of specific and achievable goals needs to be presented. What considerations do we need to take into account in guiding future research in this area? Is it good enough to quantify and characterise microplastics in the environment, or do we need more specific information? Some examples might include: identifying important sources/sinks of microplastic contamination, modelling plastic flows and impacts,

assessing the links between routes of exposure and human health risks, and identifying solutions and interventions for mitigating microplastic pollution (e.g., development of bio-based plastics). Is there a greater need for collaboration between different areas of science in tackling this problem?

Specific comments:

Significance description: these are rather trivial and do not offer much insight into microplastic research and future goals in South Africa.

L86: After describing how literature for this review was searched using the keyword “South Africa” and ‘microplastics’, it is odd to follow this up with a section on “Microplastic research in Africa”. This short section is very generalised and doesn’t contribute much to addressing the objectives of the paper. I suggest deleting it.

L109: This review focuses on studies conducted in South Africa. Generalised (and unsupported) statements about the rest of Africa should be avoided.

L249-251: “This characterisation is critical to understand how toxic microplastics are in the South African environment and how it can be related to toxicological testing” It is not clear to me what the authors mean by this. The issues related to possible toxicological impacts require unpacking.

L265: “must be considered to determine the entire distribution of microplastics in an ecosystem” What is meant by “entire distribution”, and is this really feasible or necessary? None of the studies cited consider the distribution of microplastics in every component of the environment/ecosystem.

L346-347: “Only after these recommendations is it likely that South African policy change and the policing of plastics waste can occur.” How will the recommendations made in this paper feed into policy change? This requires substantially more unpacking. The formula for sodium chloride is reported incorrectly (NaCl_2) throughout the paper.

In most cases, the format of the concentration units used is incorrect. As an example, it should be particles per g OR particles g^{-1} (not particles per g^{-1}). Density values should be given as g cm^{-3}

“KwaZulu-Natal” is the correct spelling (not Kwa-Zulu Natal)

Author response to Reviewer D: Round 1

Significance description: these are rather trivial and do not offer much insight into microplastic research and future goals in South Africa

AUTHOR: Corrected

1. More than 40 publications on microplastics have been produced in South Africa.
2. Microplastics have been discovered in multiple aquatic environments.
3. Polymer analysis remained limited in previous research.
4. A standard method is required for comparing between studies.
5. Terrestrial and atmospheric microplastic studies are required.

After describing how literature for this review was searched using the keyword “South Africa” and ‘microplastics’, it is odd to follow this up with a section on “Microplastic research in Africa”. This short section is very generalised and doesn’t contribute much to addressing the objectives of the paper. I suggest deleting it.

AUTHOR: Rebuttal

This section was meant as an introductory part to mention microplastic research in Africa and where South Africa falls within that. This then leads to microplastic research in South Africa.

The authors would prefer to keep this section but can easily be removed upon the next round of review if insisted by the reviewer.

This review focuses on studies conducted in South Africa. Generalised (and unsupported) statements about the rest of Africa should be avoided.

AUTHOR: Correction

Lines 116-117 “and, possibly, the rest of the African continent.” Has been removed.

This characterisation is critical to understand how toxic microplastics are in the South African environment and how it can be related to toxicological testing” It is not clear to me what the authors mean by this. The issues related to possible toxicological impacts require unpacking

AUTHOR: Correction

Line 269-271: Included “Currently, microplastic studies use concentrations and combinations of plastic polymers that cannot be regarded as environmentally representative, and therefore greater research of make-up of microplastic polymers is required.⁶⁰”

must be considered to determine the entire distribution of microplastics in an ecosystem” What is meant by “entire distribution”, and is this really feasible or necessary? None of the studies cited consider the distribution of microplastics in every component of the environment/ecosystem.

AUTHOR: Rebuttal

By “entire-distribution” the authors refer to the distribution of plastic in the ecosystem, and not only the environment. The interaction of biotic and abiotic components and the place of microplastics within that is critical to determine where they are distributed. Microplastics do not diffuse across water bodies, they are particles that are impacted by the ecosystem. To understand their place in the ecosystem, they must be investigated through the ecosystem. This is necessary to determine where they move, how they move, and what they impact in the ecosystem.

Only after these recommendations is it likely that South African policy change and the policing of plastics waste can occur.” How will the recommendations made in this paper feed into policy change? This requires substantially more unpacking.

AUTHOR: Corrected

This section has been removed as requested by Reviewer C.

The formula for sodium chloride is reported incorrectly (NaCl_2) throughout the paper.

AUTHOR: Corrected

Corrected through the document.

In most cases, the format of the concentration units used is incorrect. As an example, it should be particles per g OR particles g^{-1} (not particles per g^{-1}). Density values should be given as g cm^{-3}

AUTHOR: Rebuttal

The authors preferred to not change the the units as reported in various manuscripts to highlight the challenges from using different methods for microplastic research and the challenges that poses to relating between studies.

“KwaZulu-Natal” is the correct spelling (not Kwa-Zulu Natal)

AUTHOR: Correction

Corrected through the document.

Reviewer C: Round 2

Date completed: 14 February 2024

Recommendation: Accept / **Revisions required** / Resubmit for review / Decline

Conflicts of interest: None

Does the review fall within the scope of SAJS??

Yes/No

Is the review written in a style suitable for a non-specialist and is it of wider than only specialist interest?

Yes/No

Do the Title and Abstract clearly and accurately reflect the content of the review?

Yes/No

Does the review provide a significantly novel perspective or significant recent advances in the field?

Yes/No

Is the objective of the review concisely stated?

Yes/No

Is appropriate and adequate reference made to other work in the field?

Yes/No

Do current debates and points of contention receive appropriate coverage?

Yes/No/Not applicable

Are gaps in the literature adequately identified?

Yes/No/Not applicable

Does the review provide direction for future research?

Yes/No/Not applicable

Is the methodology and statistical treatment appropriate?

Not applicable/Yes/No/**Partly**/Not qualified to judge

Are the interpretations and recommendations aligned with the objective?

Yes/Partly/No

Please rate the manuscript on overall contribution to the field

Excellent/**Good**/Average/Below average/Poor

Please rate the manuscript on language, grammar and tone

Excellent/**Good**/Average/Below average/Poor

Is the manuscript concise and free of repetition and redundancies?

Yes/No

Is the supplementary material relevant and separated appropriately from the main document?

Yes/No/Not applicable

Please rate the manuscript on overall quality

Excellent/**Good**/Average/Below average/Poor

If accepted, would you recommend that the article receives priority publication?

Yes/No

Are you willing to review a revision of this manuscript?

Yes/No

Select a recommendation:

Accept / **Revisions required** / Resubmit for review / Decline

With regard to our policy on '[Publishing peer review reports](#)', do you give us permission to publish your anonymised peer review report alongside the authors' response, as a supplementary file to the published article? Publication is voluntary and only with permission from both yourself and the author.

Yes/No

Comments to the Author:

In my opinion, the authors have adequately addressed almost all of the comments that were put forward in the first round of this review.

I also found that the language and structure of the manuscript in this revised version is greatly improved.

I have some additional comments that I believe would be easily resolved by the authors. I trust that the editor can oversee that these comments are addressed and, unless otherwise asked by the editor, I do not feel the need to review the manuscript following these comments.

Please also note, as a first rule in the response to reviewers process, I was taught to always thank the anonymous reviewers for their time and effort in reviewing and commenting on the manuscript.

I refer to the lines contained within track changes document in this response:

I think there should be some consideration towards the headings contained in this manuscript. I find that the text under Statistical Analysis (line 88 in the TC document) does not warrant the preceding heading. I would suggest omitting the heading and simply integrating the text into the previous paragraph. This is also due to there being no statistical analysis or hypothesis testing conducted for the study, and the map

creation does not count as statistical analysis in my view.

Again, the section concerning Microplastic research in Africa (lines 92-104) is still misleading to a potential reader in my view. I understand that there are three other reviews of this already conducted, but I still do not think it warrants a section as brief as this. Please strongly consider unpacking, in detail, what each of those three reviews (at least those three) of microplastic research found in the African context, this would add to the purpose of your study and frame what has already been conducted on the continent. Currently, I feel an "introductory paragraph for South Africa" is not good enough for a potential reader and this remains as a major missed opportunity in this section.

Lines 190-199, the authors provide some strong statements and recommendations following the section on marine microplastic research in SA. I believe that these statements should all be referenced with local or international literature. In addition, the short paragraph from lines 196-199 should not be separate from the previous paragraph.

Line 252. The text should read: the authors found no relationship between

Line 287. How can research distribute? I think this sentence could be corrected by stating: During 2023, research was conducted in different river systems of South Africa.

Lines 310-318. Again, as with the previous comment, in the last paragraph concerning microplastic research in freshwater ecosystems of South Africa, these recommendations should all be referenced.

Lines 334-336. I find the inclusion of this text to be valid, however I think it has been worded clumsily. The authors have already asked the question, so the answer to that question needs to be determined. Consider an alternative sentence: "Due to various densities of plastics, the question remains whether a singular standard solution density must be used for microplastic analysis, this has yet to be determined".

Line 369. This is not a "document", this is intended for scientific publication, and this is not future use, but future research. Rather state that: "Following the review of microplastic research in South Africa, multiple recommendations for future research avenues have been presented".

Line 377. The word "lacks" should be "lack"

Line 387. The authors have used the words determined and determine in the same sentence. Consider rephrasing.

Note that in the response document, the title of the manuscript is different to the title that is presented in the track changes document. I personally prefer the title "A chronological review of microplastics in South Africa." as it represents more accurately what was conducted in this research. I would state the title as follows: "A chronological review of microplastic research in South Africa"

Author response to Reviewer C: Round 2

Line 88

Reviewer heading (statistical analysis)

AUTHOR: Corrected

The heading has been removed and text included into the previous paragraph.

Lines 90-96

Again, the section concerning Microplastic research in Africa (lines 92-104) is still misleading to a potential reader in my view

AUTHOR: Corrected

We have included more information in this section, for example, prominent environments investigated, and species found to ingest microplastics. The authors hope this would suffice and again would like to stress

that the size of the review prevents us from going into detail of microplastics in Africa and is not what the aim of the review is. The reviews cited are extensive reviews on the subject and the authors feel it would be unnecessary to cover the subject again.

Lines 113-313

AUTHOR: Correction

The authors have re constructed the "Marine" and "Freshwater" sections to group the different environments together based on the reviews of reviewer B and C

Lines 192-200

The authors provide some strong statements and recommendations following the section on marine microplastic research in SA. I believe that these statements should all be referenced with local or international literature. In addition, the short paragraph from lines 196-199 should not be separate from the previous paragraph

AUTHOR: Corrected

The paragraphs have been merged and references that highlights the importance of studying the ingestion of microplastics in humans have been included.

Lines 308-316

Again, as with the previous comment, in the last paragraph concerning microplastic research in freshwater ecosystems of South Africa, these recommendations should all be referenced

AUTHOR: Corrected

Citations have been included to support the recommendations. The authors would like to highlight that these recommendations are made based from the review of all the literature reviewed.

Lines 313-322

Consider an alternative sentence: "Due to various densities of plastics, the question remains whether a singular standard solution density must be used for microplastic analysis, this has yet to be determined".

AUTHOR: Corrected

Sentence changed to "Due to various densities of plastics, the question of whether a singular standard solution density must be described for microplastic analysis, this has yet to be determined."

Line 367

This is not a "document", this is intended for scientific publication, and this is not future use, but future research. Rather state that: "Following the review of microplastic research in South Africa, multiple recommendations for future research avenues have been presented".

AUTHOR: Corrected

Sentence changed to "Throughout the review, recommendations for future research avenues have been presented."

Line 375

The word "lacks" should be "lack"

AUTHOR: Corrected

Changed to Lack

Lines 384-385

The authors have used the words determined and determine in the same sentence. Consider rephrasing.

AUTHOR: Corrected

Sentence changed to "Most importantly, methods to sample microplastics accurately and consistently across studies must be determined".

Title

Note that in the response document, the title of the manuscript is different to the title that is presented in the track changes document. I personally prefer the title "A chronological review of microplastics in South Africa." as it represents more accurately what was conducted in this research. I would state the title as follows: "A chronological review of microplastic research in South Africa".

AUTHOR: Corrected

The authors changed the section written chronologically and therefore have changed the method to " A review of the environments, biota, and methods used in microplastics research in South Africa."

Reviewer D: Round 2

Date completed: 14 February 2024

Recommendation: Accept / Revisions required / Resubmit for review / **Decline**

Conflicts of interest: None

Does the review fall within the scope of SAJS??

Yes/No

Is the review written in a style suitable for a non-specialist and is it of wider than only specialist interest?

Yes/No

Do the Title and Abstract clearly and accurately reflect the content of the review?

Yes/No

Does the review provide a significantly novel perspective or significant recent advances in the field?

Yes/No

Is the objective of the review concisely stated?

Yes/No

Is appropriate and adequate reference made to other work in the field?

Yes/No

Do current debates and points of contention receive appropriate coverage?

Yes/No/Not applicable

Are gaps in the literature adequately identified?

Yes/No/Not applicable

Does the review provide direction for future research?

Yes/No/Not applicable

Is the methodology and statistical treatment appropriate?

Not applicable/Yes/No/**Partly**/Not qualified to judge

Are the interpretations and recommendations aligned with the objective?

Yes/**Partly**/No

Please rate the manuscript on overall contribution to the field

Excellent/Good/Average/**Below average**/Poor

Please rate the manuscript on language, grammar and tone

Excellent/Good/**Average**/Below average/Poor

Is the manuscript concise and free of repetition and redundancies?

Yes/No

Is the supplementary material relevant and separated appropriately from the main document?

Yes/No/**Not applicable**

Please rate the manuscript on overall quality

Excellent/Good/Average/**Below average**/Poor

If accepted, would you recommend that the article receives priority publication?

Yes/No

Are you willing to review a revision of this manuscript?

Yes/No

Select a recommendation:

Accept / Revisions required / Resubmit for review / **Decline**

With regard to our policy on '[Publishing peer review reports](#)', do you give us permission to publish your anonymised peer review report alongside the authors' response, as a supplementary file to the published article? Publication is voluntary and only with permission from both yourself and the author.

Yes/No

Comments to the Author:

The revised manuscript submitted by the authors is little changed from the original version I previously reviewed. I note that the authors have provided responses, and in some cases corrections, to the specific line-numbered comments I provided, but have failed to address (or respond) to key concerns about the review's lack of depth and critical analysis. This is disappointing as the major concerns I had with this review

article are not adequately addressed in the revision. For easy of reference, my previous comments on these aspects of the review are provided below.

In my view, the authors have catalogued research not provided a critical review of the existing literature. As a result, the evaluation and critique presented in this review is somewhat superficial and does little to advance the current state of knowledge. There needs to more indepth analysis. My concerns regarding the lack of analysis and critical evaluation were shared by two other reviewers of the manuscript.

It is odd that the authors have chosen not to consider the additional, and in my view relevant, literature on microplastic research in South Africa. No explanation is provided.

The formatting of concentration units presented throughout the manuscript is still not correct. Particles per L⁻¹ or particles per mg⁻¹ is not correct in any context. This should be “particles per L” or “particles L⁻¹”.

Previous comments:

Comprehensiveness

The authors do a good job of identifying and categorising studies that have focused on quantifying microplastics in the South African environment. These are summarised in Table 1. There are several other studies and reports that I feel warrant inclusion. In particular, the authors should acknowledge the work the Water Research Commission (WRC) has funded and published on this topic. It is also important the authors contextualise their work by highlighting other recent reviews and commentary articles that have identified gaps in microplastics research in South Africa. Relevant studies not mentioned in this paper include:

- Godfrey L. (2020). Are there gaps in our understanding of marine plastic pollution? S Afr J Sci. <https://doi.org/10.17159/sajs.2020/8170>
- Arabi S, Nahman A. (2020) Impacts of marine plastic on ecosystem services and economy: State of South African research. S Afr J Sci. <https://doi.org/10.17159/sajs.2020/7695>
- Verster, C., & Bouwman, H. (2020). Land-based sources and pathways of marine plastics in a South African context. South African Journal of Science, 116(5/6). <https://doi.org/10.17159/sajs.2020/7700>
- Iroegbu AOC, Sadiku RE, Ray SS, Hamam Y. (2020). Plastics in municipal drinking water and wastewater treatment plant effluents: challenges and opportunities for South Africa - a review. Environ Sci Pollut Res Int. <https://10.1007/s11356-020-08194-5>

The authors state that no microplastic work has been done at Lake St Lucia (L297). However, they could refer to the following study: Govender et al. (2020) Towards Characterising Microplastic Abundance, Typology and Retention in Mangrove-Dominated Estuaries. <https://www.mdpi.com/2073-4441/12/10/2802>

Critical evaluation

The authors present a summary of the research conducted to date, which they structure in chronological order. As a result, their review of the literature is highly descriptive and a more critical evaluation would strengthen the discussion. Related to this, the authors could provide context for the microplastic concentrations they quote. How do values from South Africa compare with other developed or developing countries (or urbanised vs non-urbanised), and what insight does this provide in terms of identifying problematic areas that require additional scientific attention? Perhaps the authors could construct some plots to illustrate this.

The authors are critical of studies that did not attempt to investigate microplastics in organisms (a point repeated several times in the manuscript), but this really depends on the objectives of the study. Not every study necessarily needs to incorporate biota, does it? There are times when I feel the critique of the literature is perhaps a little superficial.

Recommendations for future research

In my view, this is the weakest aspect of the review. The authors make several broad statements relating to the need to investigate 'more environments and biota', but offer vague recommendations on how this could be best achieved. Such statements are scattered throughout the manuscript (e.g., L249- 251, L265-266, L293-294, L335-336, L341-342). Which systems are most at risk, what research should be prioritized going forward, and how will this feed into policies and regulations? Simply stating that research needs to be conducted in more environments is an unsatisfying recommendation.

A discussion of specific and achievable goals needs to be presented. What considerations do we need to take into account in guiding future research in this area? Is it good enough to quantify and characterise microplastics in the environment, or do we need more specific information? Some examples might include: identifying important sources/sinks of microplastic contamination, modelling plastic flows and impacts, assessing the links between routes of exposure and human health risks, and identifying solutions and interventions for mitigating microplastic pollution (e.g., development of bio-based plastics). Is there a greater need for collaboration between different areas of science in tackling this problem?

Author response to Reviewer D: Round 2

AUTHOR: The authors have taken the reviewers comments on board and have attempted to correct or rebuttal as best we can the suggestions the reviewer made. We have particularly attempted to include the citations mentioned but remain steadfast on excluding any research that has not been published in reputable peer-review journals. Please see below for the formal rebuttal.

In my view, the authors have catalogued research did not provide a critical review of the existing literature. As a result, the evaluation and critique presented in this review is somewhat superficial and does little to advance the current state of knowledge. There needs to more in-depth analysis. My concerns regarding the lack of analysis and critical evaluation were shared by two other reviewers of the manuscript.

AUTHOR: Corrected

The authors have re-written the Marine and freshwater section. The authors would like to stress that the aim of the review was to present the research that has been conducted, which highlights which environments have been under studied, which biota have not been assessed, and which shortcomings in the methods occur across the studies that prevents comparing between microplastic research.

It is odd that the authors have chosen not to consider the additional, and in my view relevant, literature on microplastic research in South Africa. No explanation is provided.

AUTHOR: Corrected

The citations have been included. The authors would again like to highlight that four of the suggested papers are other reviews and the fifth which investigated microplastics in estuaries was published in a journal regarded by the Authors institution as a predatory journal. The authors have included the citation, but it can be removed if the editor wishes to do so.

Various units used through the review paper

AUTHOR: Rebuttal

The authors refer to the issue with varying units in the recommendations in line 346. The authors feel we cannot change the units that have been used by various authors in the studies they conducted even if they have been used in various forms that have been published. The authors agree this is a major error in the field that must be highlighted by showing the various units used. This also highlights the need for standardization as mentioned in the manuscript.

Lines 79-90

It is odd that the authors have chosen not to consider the additional, and in my view relevant, literature on microplastic research in South Africa. No explanation is provided. (WRC Reports)

AUTHOR: Rebuttal

The authors have mentioned why they have excluded WRC reports, please refer to lines 79-80, the authors did not wish to include work that has not been peer-reviewed and published in reputable scientific journals.

Line 387

The authors are critical of studies that did not attempt to investigate microplastics in organisms

AUTHOR: Rebuttal

Comparing the concentrations with other nations falls outside the scope of the study. Critically, due to various methods used across the globe, microplastic researchers cannot compare concentrations between studies, this is again highlighted in the review; Lines 387-388.

Reviewer C: Round 3

Date completed: 27 February 2024

Recommendation: **Accept** / Revisions required / Resubmit for review / Decline

Conflicts of interest: None

Does the review fall within the scope of SAJS??

Yes/No

Is the review written in a style suitable for a non-specialist and is it of wider than only specialist interest?

Yes/No

Do the Title and Abstract clearly and accurately reflect the content of the review?

Yes/No

Does the review provide a significantly novel perspective or significant recent advances in the field?

Yes/No

Is the objective of the review concisely stated?

Yes/No

Is appropriate and adequate reference made to other work in the field?

Yes/No

Do current debates and points of contention receive appropriate coverage?

Yes/No/Not applicable

Are gaps in the literature adequately identified?

Yes/No/Not applicable

Does the review provide direction for future research?

Yes/No/Not applicable

Is the methodology and statistical treatment appropriate?

Not applicable/Yes/No/Partly/Not qualified to judge

Are the interpretations and recommendations aligned with the objective?

Yes/Partly/No

Please rate the manuscript on overall contribution to the field

Excellent/**Good**/Average/Below average/Poor

Please rate the manuscript on language, grammar and tone

Excellent/**Good**/Average/Below average/Poor

Is the manuscript concise and free of repetition and redundancies?

Yes/No

Is the supplementary material relevant and separated appropriately from the main document?

Yes/No/Not applicable

Please rate the manuscript on overall quality

Excellent/**Good**/Average/Below average/Poor

If accepted, would you recommend that the article receives priority publication?

Yes/No

Are you willing to review a revision of this manuscript?

Yes/No

Select a recommendation:

Accept / Revisions required / Resubmit for review / Decline

With regard to our policy on 'Publishing peer review reports', do you give us permission to publish your anonymised peer review report alongside the authors' response, as a supplementary file to the published article? Publication is voluntary and only with permission from both yourself and the author.

Yes/No

Comments to the Author:

The authors have presented a manuscript titled: A review of the environments, biota, and methods used in microplastics research in South Africa.

This is an additional round of responses to the authors for this manuscript. As mentioned in my previous response document. The authors DID NOT thank the anonymous reviewers for their time and effort in the review process. I want highlight that, once again, in this iteration the still authors DID NOT thank the reviewers after having read my initial comment about this. I thought perhaps that this was a simple oversight and it would be corrected. It is very disappointing to see that this was not corrected. I want to reiterate that the peer-review process is critical as it helps to ensure that the manuscripts presented answer meaningful questions and offer accurate conclusions. In the world of academia, as shown by this manuscript as a perfect example, scientists will review a lot more often than they publish. This process takes a lot of time out of our schedules, our role is to produce an evaluation of a manuscript that can be trusted within the broader scientific literature. Since scientific knowledge is a culmination of works that builds on through time, this trust is particularly important. I also want to stress that this process is also conducted to ensure that manuscripts improve, and I think once again, the three reviewers have done their best to guide the authors to improve the standard of this manuscript. I want to stress to the authors again, whenever submitting a manuscript, please ensure that you THANK the reviewers and the editors involved, no matter how much the authors disagree with their comments and recommendations, it is a given part of the process.

I find that some of the comments I presented in the previous review are either incomplete or not presented in this response document. Please ensure to include all of the text for every comment, this is standard procedure and makes it look as though the authors rushed through the previous response document. It is also difficult and time consuming to go back and look at what my previous comment was, in full. These comments should never be shortened as was done in the latest response to reviewers document.

Specific comments:

Line 16 in the abstract, apologies for not spotting this previously, the word "healthy" could be misleading, I suggest using the word "sufficient" or "adequate" instead.

Line 86-106. Section on Microplastic research in Africa. I see that the authors have responded to my previous comment in part. I appreciate the addition of detail to the text, however, as a reader, the audience has not had the benefit of looking through the previous reviews conducted in Africa. I repeat, and am insisting that the authors simply state how many reviews on microplastic research have been conducted in Africa, what countries or regions were involved (this is already stated for some of them) and the main findings for each (also already stated for some of them). The paragraph is very broad and not very specific enough in its current state. Please be more specific in your writing, I agree that section does not constitute the basis of your review, but it is there and so it should be highly detailed.

In the sections: Microplastic in the marine and freshwater environment, all of the text is written as "Track Changes" which makes it very difficult for the reviewer to see what was actually changed from the previous version. In future please only include track changes to the sections or text that was changed and leave the remaining text as is, it is much easier to track what has been changes in this way. I think the text has greatly improved in this sections and all other sections.

In my opinion, once the authors have made the small adjustments to the section on microplastic research in Africa, the manuscript should be accepted for publication, I am satisfied to leave this to the editor to oversee.

Author response to Reviewer C: Round 3

AUTHOR: The authors would again like to thank the reviewer for their comments of the latest version of the manuscript. The authors have attempted their best to try and make corrections from the comments made by the reviewer, rebutting only when we felt it was the best intention for the review paper.

Lines 404-405

General comment on the authors not thanking the reviewers.

AUTHOR: Response

The authors would like to request that the reviewer refers to the previous corrections document. On the first line of the table for each reviewer (in line with their title in bold, "Reviewer A"), the reviewer will notice that the authors thanked each reviewer for their reviews and for their general improvement of the manuscript.

Thank you for your time. We truly appreciate your efforts.

*We have included an extra line within the acknowledgement to thank the reviewers.

Line 16

in the abstract, apologies for not spotting this previously, the word "healthy" could be misleading, I suggest using the word "sufficient" or "adequate" instead.

AUTHOR: Correction

"healthy" has been removed and replaced with "adequate"

Lines 87-111

Section on Microplastic research in Africa. I see that the authors have responded to my previous comment in part. I appreciate the addition of detail to the text, however, as a reader, the audience has not had the benefit of looking through the previous reviews conducted in Africa. I repeat, and am insisting that the authors simply state how many reviews on microplastic research have been conducted in Africa, what countries or regions were involved (this is already stated for some of them) and the main findings for each (also already stated for some of them). The paragraph is very broad and not very specific enough in its current state. Please be more specific in your writing, I agree that section does not constitute the basis of your review, but it is there and so it should be highly detailed.

AUTHOR: Correction

More information on the reviews of microplastics in Africa has been included, specifically the number of reviews, the total countries with microplastic studies, the spread of research in marine vs freshwater environment and microplastics in water vs sediment vs biota.

We have also included more recommendations from the review papers.

87-92 changed to "Microplastic research in Africa has increased over the last decade; however, three recent reviews of microplastic research in Africa have found that African nations are still trailing behind developed countries.¹²⁻¹³ This is concerning considering the large scale of plastic pollution on the African continent.¹² The reviews found that microplastics have been discovered in multiple African environments in over 11 African countries, including the Nile River, where microplastics were found in two fish species.¹²⁻¹⁴ "

96-99 "The review by Alimi et al.¹⁴ further highlighted that microplastic research in Africa was primarily divided between freshwater (22) and marine (37) environments, which was further split between studies that discovered microplastics in surface water (15), sediment (22), and in biota (22)."

108-111 "The reviews of microplastics in Africa, further elaborate that many studies did not include experimental controls, lack of polymer analysis, and that there was limited information on the interactions between microplastics and metals in the African environment.¹²⁻¹⁴"

Sections: Marine and Freshwater

In the sections: Microplastic in the marine and freshwater environment, all of the text is written as "Track Changes" which makes it very difficult for the reviewer to see what was actually changed from the previous

version. In future please only include track changes to the sections or text that was changed and leave the remaining text as is, it is much easier to track what has been changes in this way. I think the text has greatly improved in this sections and all other sections.

AUTHOR: Rebuttal

The authors apologize for the whole section being written as track changes. As mentioned in the previous corrections document, lines 128 – 329 was completely re-written and the comments made in this section was no longer applicable.

Reviewer D: Round 3

Not applicable

Reviewer B: Rounds 1, 2 and 3

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