



Interactive comment on “Will UK peatland restoration reduce dissolved organic matter concentrations in upland drinking water supplies?” by Jennifer Williamson et al.

Anonymous Referee #2

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Overall, the paper covers an interesting topic that is within the scope for HESS. It is interesting to acknowledge that DOC has been increasing in the UK and is impacting water treatment. The real substance of the paper is assessing literature about catchment management benefits on DOC export, and whether this can be an effective strategy to reduce DOC in waters.

Whilst the paper is relevant and covering an interesting topic, I do not believe it is yet ready for publication. The structure of the paper has problems in my view that detract from the story and I found many sentences and paragraphs lacking the necessary level of precision and accuracy to really support the claims. There are also typographical

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and editorial issues, making it seem it wasn't thoroughly proof-read before submission.

The paper is reviewing literature, mainly specific to material UK, but needs to more obviously try to bring together the story and synthesize the results. After reading the conclusions I was not convinced about the scale or nature of the benefits from different management actions, and yet strong statements are made recommending catchment management.

I also found the section on in-lake processing to be too generic without a clear focus – the message is that lake processes can mediate (increase or decrease) incoming DOC before it hits the treatment plant, but I find lacks any clear conclusion, other than making a connection with nutrient management. What is the typical difference between input DOC and offtake DOC? Even as a broad range to give some indication would make the review much more powerful.

For a review like this I refer to the authors to a document like this one: <https://www.sciencedirect.com/science/article/pii/S221501611930353X> “Method for conducting systematic literature review and meta-analysis for environmental science research” by Mengist et al.

Ideally adding some conceptual models or diagrams bringing together the ideas in the paper would be very beneficial and help add meaning to the literature, which is currently quite mixed in terms of its results, as a way explaining some of the differing reports.

For this reason, I think the paper needs some major revision and re-working to give it improved focus and flow, refine some of the text, and to highlight key take home findings that are supported by the data. It could certainly be a strong paper with some further development, and I have provided some more specific comments below to support the recommendation.

Abstract

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The two opening sentences could be better re-written to highlight the problem to the water industry. Currently it is asserted to be a problem and implied to be associated with colour, but I suspect the concern is related to treatment by-products.

For the sentence “One of the primary evidence gaps is the extent to which catchment management is capable of influencing DOM concentrations at the point of abstraction, field studies rarely extending beyond sub-catchment or stream scale.” . . .needs rewording – the first part makes sense but the second half is a fragment.

Given the lack of evidence is discussed to establish the link between management and response, including something like “research priorities were therefore established” would be logical, rather than ending on the result that evidence is insufficient. Further, the last sentence and second-to-last sentence seem to contradict each other. One says insufficient for wide spread application and then it says the measures have good potential. I think these two sentences could benefit from some rewording to avoid confusion, and make the outcome of the paper more clear.

Introduction

The opening sentence seeks to make the claim DOC is increasing from 1980- to present, but has a citation that is 1989 and 2001. The rest of the paragraph could be polished in terms of wording. Second sentence repeats the claim of 1980's beginning. Last sentence suggests a more recent reference which is good, but comes after a sentence related to international evidence. Overall, the paragraph is somewhat awkward, and could more clearly make the argument that a) UK rivers have experienced rising DOC from 1980 to present, and b) similar trends have also been seen elsewhere in the world. The paragraph also doesn't give much quantitative evidence of how much things have changed. It is probably beneficial to include here a figure (or reproduce a figure?) allowing readers to see an example of what this increasing trend looks like.

Lines 48-60 are describing DOM but no references support the statements.

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Section 1.2 heading issue

Line 73 – why is E coli mentioned? Is it related to DOM? If not provide context. Does this need

Paragraph 1 would sit better after the DBP/THM paragraph, before the paragraph starting as “Higher concentrations . . .” Line 91 – Opening line would benefit from a reference

Section 1.3 is interesting. I think it could be refined to more clearly point out that there are drivers associated with (geo)chemical changes and those associated with hydrological changes; currently they are slightly intertwined. The section could end by summarising the research unknowns that remain. The climate change sentence at the end seems to be less relevant to this section since it is explaining the past and I don't think the single sentence does this issue justice.

Line 140 – I think a sentence that is pivoting like this needs to be with Also, or Further or In addition.

Line 142 – It is asserted here that catchment management activities are not seen at the point of abstraction (presumably you mean at the reservoir outlet?) but it is not obvious from the prior text this is established. Is there a published paper saying this, or just a “hunch”? Section 2 obviously goes into this, but in this case the text is out of order.

Line 147 – ditch blocking mentioned here but not above in the catchment management section, so seems out of context.

I find the aims statement buried in sub-section 1.4, quite deep into the manuscript, to be somewhat awkward. The aims statement is weak in that the aim of the paper “bring together information” and “contribute to our understanding” and “go on to examine”. These aims lack specificity and are overly general in my view, making it difficult for the reader to clearly understand what the outcomes of the paper will be. Whilst I acknowledge it is a review paper, a good review can still have specific aims. E.g “Is

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there evidence that . . .”. or “The review is used to develop a conceptual model. . .”

Line 155 – this paragraph flows well

Line 166 – the line “While these results are persuasive, they do not necessarily imply that effects will be translated through to surface waters and ultimately to the point of abstraction” seems unnecessary at this point, between describing pore water changes and ditch water changes.

Line 175 – I struggled to follow this logic. If a study was from a hydrological point of view then there is a view that DOC decreases? But Wilson says that DOC load went down but not conc? This section could benefit from the authors make a conceptual diagram to synthesise the results.

Line 207 – I don't think the last two sentences of this paragraph are relevant for an international journal. Line 331 – This sentence is not really adding anything – It is great people are doing more work, but in this paper it would be just better to present published findings.

Section 3 – this section reads reasonably well. The key is whether the creation or consumption of DOM is big or small relative to the a) the observed increases mentioned in the introduction, and b) the catchment management activities. I cant tell from reading this.

Conclusions – A lot of the conclusions seems more like opinion, and I'm looking for more specific summary here – scientifically what is the evidence, per km² of land, that DOC will go up or down for a given intervention? Is one intervention more effective? How does land management actions compare to in-lake processes in potential amounts of DOC removal?

Finally, is there a role for models to help compute a DOM budget? It seems that modelling is overlooked, but can be useful for assessing this issue and so should be in the review.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2020-450>, 2020.

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