Biogeosciences Discussions

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Comment on bg-2022-209

Anonymous Referee #1

Referee comment on "Understanding the impacts of peatland catchment management on DOM concentration and treatability" by Jennifer Williamson et al., Biogeosciences Discuss., https://doi.org/10.5194/bg-2022-209-RC1, 2023

General comments

This review paper pulls together studies on the effect of peatland restauration measures on DOM quantity and quality on receiving waters. It states a very diverse response to these measures and calls for more experimental studies. The paper matches the scope of Biogeosciences.

While I very much appreciate the overview on this body of literature I have major concerns regarding the resulting manuscript. For me parts of the abstract and the introduction are too long and detailed while other aspects are underrepresented. The study seems to have a UK focus but sometimes takes in international papers. It remains unclear to what extent the results and conclusions can be transferred to other places. I major shortcoming is the lack of discussion on the timescale of the reviewed studies and on the role of time in water quality response to the measures. Finally, references in the text are sometimes sparse and not all statements are underpinned with literature.

I hope my specific comments below will help to improve this manuscript.

Specific comments

Abstract

For me the abstract is too long and too detailed. e.g. L16-23 can be greatly condensed to introduce the problem to be solved.

L29-28: It would be easier to read the result part if the names of the four management options listed above would show up here explicitly. Rather details (e.g. sentence with Sphagnum) blur the picture.

Chapter 1: Introduction

L48f: This first statement would profit from a reference to the Net Zero strategy.

L53f: Wording - "tend to be relatively high". Relative to what? Why "tend"?

L61f: It would be helpful to state that there are diverging views on the cause of DOM concentration increases and surely more than two references are needed.

L67f: Is there a reference for this last statement or are you the first one systematically asking the question on the impact of restoration on water quality?

Figure 1: I would expect a statement of the number of sites being part of that plot.

L79: No need to define an abbreviation for DWI when this term is not used in the manuscript a second time.

L78-89: This is way too long and detailed for a paper with a focus on management options and not on the chemistry behind disinfection byproducts.

L90-103: Is DOM composition a point later on in the result section? If not, try to boil this down to the information necessary to understand the rest of the manuscript.

L108f: What is the time reference of costs? Overall, per year? For this and the following statement a reference is needed!

L112ff: Here "peatland restauration" kicks in a bit surprisingly. Why only looking at peatland restauration? Yes, mentioned in the first sentence of the introduction. However, the definition of peatland as the dominant source of DOM in headwaters was not that clearly done so far. This needs a better connection. It is totally fine to limit the review to peatland restauration but it needs to be justified and clearly narrowed down in the introduction section.

L116f: Why stating "qualitative" here? Because literature does not allow a quantitative view? The latter would be much more helpful for the water industry, right? Wouldn't it be rather a result and conclusion than an objective that only qualitative but not quantitative assessment is possible with the given literature? I miss the statement on the four management options that are presented in the abstract.

Chapter 2: Evidence for the efficacy...

L124: You jump in directly with ditch blocking without introducing earlier why this specific measure may help DOM reduction

Fig. 2: Homogenize style of the different text elements. E.g. capitalized letters or not, colon or not... Right part of the figure on the water treatment is too small to be really helpful and may need a reference for the figures source. Strange to see, again, the catchment and reservoir in this part of the figure. Figure 2 seems not to be referenced in the manuscript text and also does not clearly follow the structure of chapter 2. Where, e.g., is ditch blocking in the figure?

L128-130: This statement needs a reference.

L133: It would make sense to state the temporal scale of this reduction quantity. There can be initial effects and a longer-term evolution of concentrations. This is also true for the section L138-143. This information is in Tab. 1 but not in the text!

Tab. 1: In this style I suggest to move the table to the supplement. Maybe rather condensed and/ or visual information could be shown? e.g. as a bars with % increase/ decrease on y and time since blocking on x? I do not insist here, acknowledging the point that studies are hard to compare. However, the table is hard to grasp for the reader as information is hidden in text sections within the table.

L179-181: You mention "suitable timescales" of observation but do not define them nor introduce them earlier on in the introduction section. However, this is obviously a relevant point that needs more scientific background earlier on.

L188-192: These statements needs references.

L193f: If research is limited on what basis was the decision made that re-vegetation needs an own chapter? I am not in doubt here but the manuscript does not explain that to the reader.

L206: Check consistent spelling of re-vegetation.

L235f: Given the large body on literature on forestry-water quantity and -quality issues I suggest to cite rather review-style papers here than this very narrow selection.

Table 2: This table is not embedded in the text of the matching chapter 2.3 (between lines 233 and 258). Which information is given in the text and which in the table? Compared to Table 1 there is no temporal reverence on the before-after comparison. Is there a reason why this table focus on UK only but Table 1 have a more international width? Other than that I suggest to consider, similar to Table 1 alternative forms to display information.

Chapter 2.3 as a whole: I have problems following the logic of this chapter and the switch of topics from section to section. This makes it hard to see the bigger picture of knowledge on forestry and DOM.

Table 3: I like the idea of the color scheme here. The type of catchment intervention does only parly match the structure of the manuscript so far. This needs improvement.

Chapter 3: Catchment management impacts

The first part of this chapter seems to be a discussion and interpretation on missing knowledge. However, it seamlessly propagates into another result section on DOM processing in the catchment. Some parts of the studies reviewed before already contains instream processes as they have been observed in stream. This drawing of a line between upstream and downstream processes is totally unclear for the readers. After this part the text comes back to a recommendation on future research... All this needs a clearer structure.

Chapter 4: Conclusions

L425-429: In this concluding section no new knowledge should be introduced. This is rather part of the introduction.