

General comments

I was reviewer in the first round and like the idea of this manuscript. The evident lack of consistent studies on the effect of measures in the catchments is something to be brought to the biogeochemical community. I think the paper is much clearer now and the authors carefully addressed the raised points. I still have some suggestions. My major point is that half of the discussion chapter is addressing DOM production in surface waters and nutrients N&P that was not at all part of the result chapter. Two things follow for me: I miss a brief overview on processes known for water fluxes and pathways and DOM sources, mobilization and fate in peatland catchments accompanying Fig. 2. That can be really brief but would help the reader to better understand the effect of measures. This may also include the production of DOM in the surface water and therefore allow to shift part of the discussion to that. In general I miss some consistency in the terms used for measures in peatland catchments - the manuscript offers quite a variety here. Finally, I don't like that the methodology is part of the result chapter. For more details and minor things refer to my specific comments below.

We thank the reviewers for their comments and feedback, they are much appreciated. We have added an opening paragraph on DOM production and fate in the opening paragraph to allow the discussion to provide more detail on this. We also suggest removing the original opening paragraph as the information contained within it is covered elsewhere in the introduction and the information flows better without it being there. In addition, we have suggested that the catchment schematic figure becomes Figure 1 so that the overall picture of the areas covered is clear at the start of the review.

Answers to specific points are written in italics in the text below.

Specific comments

Abstract

L25-26: Do you use effectiveness and efficacy as synonyms? Not clear for me.

We have changed the use of efficacy to effectiveness

Introduction

L76: I cannot find this reference in the reference list. Is that focused on UK as the mentioning of the Drinking Water Directorate suggests? Please check references in general – in times of reference managers I cannot imagine how a reference can vanish from the list.

We are not sure how Endnote lost the reference – we have added it in and have checked all others, thanks for spotting. The reference refers to the potential carcinogenic nature of THMs and other DBPs.

L94-101: This is a nice section but I am not sure if this explanation is needed for the reader as you already mentioned the same fact in line 59-61.

We feel that the two sections are different enough for the explanation to remain – lines 59-61 are referring to the reason for DOM concentration increases in raw water, while the later section is covering what the impact is on the water companies treating the water. We think the latter is important to remember especially as water treatment companies are in the news at present for their impacts on downstream water quality but the wider impacts of spending priorities on human health from a drinking water perspective should be remembered too.

L109: "understanding the extent" refers to a quantification, right? Totally fine. What about understanding processes that lead to the changes in DOM concentrations? If that is an aim here, it should be mentioned.

It wasn't a main aim – the overarching aim of the literature review was originally to demonstrate the what rather than the why -so to answer the questions whether the peatland management would change DOM concentrations not to review the processes behind that change.

L112f: I think the objectives cannot be given in one single sentence only. This needs more focus and detail: Spatial and temporal scale? UK only or beyond? What is meant with "impacts" – concentration, flux, quality?

We have added more information to the objectives as follows: In this study, we review the available peer-reviewed literature relating to the impacts of peatland restoration on DOM concentrations and treatability of raw drinking water. Finally, we consider the possible influence of catchment land-use on in-reservoir DOM cycling, and what impact this may have had on drinking water treatability. We focus on the UK as a well-studied area in which peatlands make an important contribution to drinking water supplies, and where rising DOM concentrations are having a significant impact on water treatment processes and costs, but the conclusions of the work are likely be relevant to other areas with peat-derived water supplies.

Evidence...

The first section is a method and not a result section. With some additional information as requested below I would rather make it an own chapter than a part of the results. I moreover wonder if there was any filter applied for the country and continent the papers are referring to. *We have changed the layout so that the methods paragraph sits within its own methods section and added the information on the peatland regions prioritised in the review. The filter applied on first search was to keep results from temperate peatlands and to include those from outside the UK and Ireland where there was insufficient evidence in the UK and Irish contexts. We have added the following sentence to clarify the spatial scale: Given the geographic focus of the project, we prioritised papers from the UK and Ireland where available, but also drew on data from other temperate peatland regions where required.*

L117: This question is not fully similar to the objective and somewhat new. Is peatland catchment management similar to peatland restoration?

Yes, this is covering the same, we have changed the wording to match the introduction.

L124f: For me it would make sense to state the numbers of papers considered for the different steps and how much have been finally considered. Maybe this could be enlarged to the countries/continents the studies are referring to.

We have added the following information to demonstrate the numbers of papers included in the review: From the original searches, 272 papers were considered relevant enough for further reading and 104 were included in the review.

L129-131: These statements need a reference. Or is that all covered by Clark et al in the next sentence?

We have added reference to Holden et al 2011 – who measured water table depths in drained, rewetted and intact areas of peatland

L134: Is conservation here used similar to restoration? If yes, I suggest to avoid using different terms for the same thing. If yes, please define the term here.

We have changed conservation to restoration for consistency.

L137: Consider to adjust this sentence. I had to read it several times to get it.

We have rewritten as follows: ...DOM concentrations had been assessed in pore waters, in ditches and in streams...

L139: Is peat soil water the same as pore waters in the sentence before?

Yes, changed terminology for consistency.

L146ff: Would be interesting to know if some of these 11 studies are also mentioned in the 5 studies that found the decrease in pore water. That would better underline the statement in L144. *As mentioned in Table 1 only one measured both and the changes were not consistent.*

Table 1: The meaning of "chronosequence" and "survey" as a study design is not clear from the table description.

We have added some additional text to improve clarity as follows: Reference to chronosequence in the survey design refers to a sampling strategy whereby sites that had had interventions at different times were used as a proxy for control sites, while survey refers to a short term one-off sampling of multiple locations.

L231: Why is there a reference to Table 3 here that is actually describing forestry activities?

The reference to Table 3 refers to the table summarising all the restoration actions. I think the table legend is on the previous page with the current formatting.

L248-261: This is the first time you actively mention studies outside UK. As written above this should be already mentioned in the objectives and methods.

The initial premise of the review was to focus on UK and Irish specific studies where there was evidence available as these would be the most relevant to UK and Irish water companies. However, as the initial searches included all temperate peatlands where there was potentially relevant evidence from outside UK / Ireland this was included rather than saying that there was no evidence available. We have clarified the approach used in the methods section.

L311ff: I have problems following here. What is "such restoration" referring to? Forest to bog with tree to waste? Would be helpful to make that clear here.

We were referring to forest to bog restoration – have changed the wording to clarify.

L333: The reference to fig. 2 is not clear for me.

The reference to Figure 2 refers to the managed burning shown in the whole catchment schematic. Note that this has been changed to Figure 1 (see above)

Table 3: Another term for the (I assume that) same thing: catchment intervention. The term "clearfell" is not used in the manuscript and not fully clear for me.

We have changed tree felling on line 276 to clear felling to clarify that we are talking about the large scale felling of trees across an area not individual tree removal. Catchment intervention in Table 3 was used because it provides an overarching term that covers human interventions in the drinking water catchment without a-priori stating whether they are positive or negative. The other option could be catchment management.

Discussion

L362f: Is there a review paper you can cite here for the other positive effects?

Added a recent reference from Loisel and Gallego-Sala (2022) covering the ecological resilience of restored peatlands.

L394-444: I have issues that a completely new point is raised here. Until this section the manuscript was about terrestrial sources and mobilization but not about DOM production in the surface water and N and P. This hints to a missing overview on DOM sources, pathways and budgets in peatland catchments in general that this review may provide as an overview in the starting chapters. This section could be integrated there as well as this is not based on a result of this manuscript. Overall the weight of this section is too large in the discussion compared to the preceding part that is based on the reviewed papers in the result section.

We have included an opening overview of DOM sources, pathways and budgets as the opening to the manuscript to highlight that the DOM that is in the water at the point of abstraction is not necessarily the same as the DOM that is released from the peat in the catchment (irrespective of peatland restoration). We have also signposted this section in the final paragraph of the introduction as a "this needs to be considered in future when considering catchment management as an approach to improve water quality and when considering the design of studies at a catchment scale". We have separated the discussion into sections to highlight this approach. We have also reduced the length and detail of the section to reduce the weight of this compared to previous.

L444: Interesting that the water industry should develop the tools. I would enlarge that a bit – science obviously needs to provide underlying process knowledge. I see it then more of a joint task of scientists and practitioners to provide more monitoring-based evidence on the one hand and to develop predictive models on the other hand.

We agree and have expanded the sentence to say that research science and the water industry need to work together to develop the monitoring and modelling needed.