



Hamdhani Hamdhani <hamdhani@arizona.edu>

Freshwater Biology - Manuscript ID FWB-R-Jul-19-0392

Srinidhi Srinivasan <onbehalf@manuscriptcentral.com>

Tue, Oct 22, 2019 at 12:29 PM

Reply-To: FWBoffice@wiley.com

To: hamdhani@email.arizona.edu, hamdhani@fpik.unmul.ac.id

Cc: hamdhani@email.arizona.edu, hamdhani@fpik.unmul.ac.id, mbogan@email.arizona.edu, deppehimer@email.arizona.edu

22-Oct-2019

Dear Mr. Hamdhani

Your manuscript ID FWB-R-Jul-19-0392 entitled "The effects of treated effluent addition on streams: water quality, ecology, and future research directions" has now been assessed by the reviewers, whose reports are included at the bottom of this letter.

Regrettably, the reviewers have raised substantial concerns regarding your manuscript, and in view of their comments I am unable to accept your paper for publication in its current form. However, while the referees have been very critical, they do see strengths in the paper and have laid out clear guidelines as to how the paper might be improved. If you can revise the paper along the lines suggested, I would be happy to see the new paper submitted to Freshwater Biology. However, this would have to be treated as a new submission and reviewed afresh.

The main reason why the submission has to be revised completely is laid out in the comments by referee #1. I agree with this reviewer that a more formal statistical treatment of the results (e.g., in form of a meta-analysis) will substantially strengthen the review. Modifying your paper in that way will also require re-arranging several parts of the manuscript, as suggested by the reviewers.

If you wish to revise and resubmit your paper, you will be unable to make your revisions on the originally submitted version. Instead, please revise your manuscript using a word processing programme and save it on your computer. Once your new version is completed, go to <https://mc.manuscriptcentral.com/fwbi> and login to your Author Centre. Click on "Manuscripts with Decisions," and then click on "Create a Resubmission" located next to the manuscript number. Then, please follow the steps for resubmitting your manuscript. Please submit your manuscript by 21-Oct-2020.

Yours sincerely,

Dr. Thomas Mehner
Associate Editor, Freshwater Biology

Reviewer(s)' Comments to Author:

Referee: 1

Comments to the Author
Review of Hamdhani et al.
General Comments

This manuscript provides a broad literature review of stream ecosystem responses to effluent from wastewater treatment plants. The authors report on the distribution and frequency of studies, the types of studies performed, and then interpret general patterns, trends, and provide specific anecdotal results. Having completed several review-style papers before, I commend the authors on their due diligence in finding papers for this review, but wish that they had gone a bit further and completed a formal meta-analysis of some sort. As of right now, this manuscript reads as a lit review that talks about some general patterns and provide specific case studies that fit the authors narrative. While I don't doubt any of their results, the fact that the authors have already extracted all of these papers and seemingly have extracted all of the data already anyway, it seems like it wouldn't be much more work to incorporate some sort of effect size into the manuscript. In addition to this need for a more formal analysis, I felt that the structure of the paper was a bit muddly. The first half of the results section reads like a very cut and dry results section, which is fine. The second half of the results section reads more like a 'results and discussion' section, which is also fine. What is not fine is to have these two different foci within the same results section. I think that incorporating more statistical analyses will allow the results section to stand more on its own and a lot of the commentary in the results can be shifted to the discussion, where it really should be at anyway. This

issue with too much discussion in the results section further led to a short, and honestly sort of bland discussion section. It felt like the authors weren't sure what else to say so they threw some things in there (i.e., the management recommendations section doesn't really fit with the rest of the manuscript). Moving the discussion points from results to the actual discussion will improve this, too. There's also some issues on clarity and concerns about why the authors made certain choices during the analytical/paper extraction stages, and suggestions for improving the figures, but these are all detailed below. Overall, I think that this review is important and provides some novel insights both on the impacts of wastewater treatment plants, but also the key knowledge gaps that need more research. But I think that it would be much more effective with a restructuring and incorporation of a meta-analytic framework.

Specific Comments:

Lines 47-48: I suggest the authors change the wording in this sentence. "speed up natural purification processes" suggests that treatment plants are an additional natural process. Suggest changing to something like "enhance natural purification processes" or similar.

Line 51: Suggest adding in using reclaimed water for residential irrigation, potentially adding in toilet-to-tap approaches as well.

Line 65: ammonia? Or ammonium?

Line 84: Suggest adding in recent work from Richmond et al. showing accumulation of pharmaceuticals in aquatic invertebrates and riparian spiders:

Richmond, EK, EJ Rosi, DM Walter, J Fick, SK Hamilton, T Brodin, A Sundelin, and MR Grace. 2018. A diverse suite of pharmaceuticals contaminates stream and riparian food webs. *Nature Communications* 9:4491. DOI: 10.1038/s41467-018-06822-w

Lines 108 - 113: It seems unnecessary to separate 'main papers' from 'additional papers'. If all of the papers help answer the overall question, they all should be grouped together regardless of how they were originally identified. Maybe there's more justification later in the paper.

Line 116: Does an individual study only fall into one category? It seems like papers would often fall into multiple categories. Was there any systematic way how the authors decided which category was the primary emphasis? Also, I thought the authors said that they discarded studies focused specifically on the wastewater treatment process itself. In addition, it is unclear what the authors mean in terms of 'infiltration' and some of the other categories are vague. More explicit detail on how these categories were selected and what they mean would be helpful (maybe a table? Or a supplement?)

Line 122 (and elsewhere): A bit of a semantics comment, but the authors didn't actually determine whether a study was effluent dominated or not. They identified or quantified it. The study itself was already done by someone else, so the authors had no 'determination' opportunities. Not a big deal, just semantics...

Line 125: bacteria aren't (always) primary producers (but I recognize cyanobacteria and others have primary production capabilities...). Suggest recasting this as basal resources or something like that...

Line 141: I wanted to read through the manuscript completely before making this comment, and I have now done so. I strongly encourage the authors to expand on this work by using a formal meta-analysis approach to analytically quantify the impact of effluent on the various response metrics. By calculating some form of effect size (i.e., response ratios, Cohen's d, etc), the anecdotal results reported below will be given more statistical support. As it is, this reads like a fairly straightforward literature review (albeit a good one), but it would be much stronger by incorporating a formal analytical framework. I recognize that not all of the results will lend themselves to this, but it seems like a fairly straightforward analysis, at least for the upstream-downstream comparisons.

Line 147: Are these percentages (i.e., 28 and 23%, respectively), the proportion of US studies that occurred in each region? Or are these the proportions of all studies that occurred in these regions. I assume the former because the US numbers add up to 100%, but this needs to be clarified. Same comment for the European breakdown in the next sentence.

Line 163: I regularly see review papers saying something along the lines of "Interest in Topic X has expanded dramatically in recent years" based on the number of papers published on the topic. This disregards the fact that there has also been an exponential increase in the overall number of papers published in recent decades. Here the authors don't necessarily say that interest has increased or anything like that, but I feel that it should be acknowledged either here or in the discussion that this increase in publications could also be simply due to more papers published per year overall.

Lines 166-167: Do the authors state earlier what they mean by 'basic water quality'? I think I remember seeing it in the methods but in case I didn't, make sure this is clarified.

Line 170: Missing an "and" in here between chemical and biological.

Beginning on Line 182, it seems like the authors began combining results and discussion (which is okay by me) but it was a marked difference from the previous results sections. I suggest ensuring the tone and focus of the sections is consistent.

Lines 207 - 209: This seems more like discussion than results, which is fine if the authors want to do a bit of both here, but elsewhere in the results section it felt more consistently like just results were reported and they would be discussed later. Also, I don't really find this result too surprising. Just because you have reduced bacterial richness doesn't necessarily mean that you would expect reduced productivity. If there was reduced biomass that would be a bit more surprising, but still not unheard of. Monocultures are often the most productive ecosystems in the world...

Lines 214 - 216: How does this relate to assimilation rates by primary producers? Did the authors report (or estimate) assimilation rates associated with GPP?

Lines 226 - 230: Suggest incorporating more work by Emma Rosi (formerly Rosi-Marshall) and her colleagues, especially Erinn Richmond, Sylvia Lee and John Kelly, into this section. They might not have had as much focus explicitly on

WWTPs, but they have done a lot of work on pharmaceuticals and biofilms. These should either be included here or at least in the discussion.

Line 284: The reference stream comparison studies are difficult for me, because it's hard to isolate the effluent effect without knowing the integrity of the rest of the watershed. I'd imagine that most of these sites receiving effluent have a range of other stressors that could also be driving various response metrics.

Line 288: Or low DO, or warmer temperatures...

Line 296: Again, Richmond et al. 2018 (Nature Communications) would be good to incorporate into this paragraph.

Line 306: It felt like a lot of the results was actually results and discussion...

Line 363: The authors suggest that effluent leads to increased diel variability in flow, but effluent also can make for more stable flows throughout the year, right? This could be particularly true in urban streams which are characterized often by reduced baseflow and increased flashiness, both of which could be counteracted by effluent.

Line 379: The entire 'Management recommendations for effluent-fed streams' section seems very much like an add-on and not well thought out. I don't necessarily disagree with any of these recommendations, but it doesn't really make sense where these recommendations are coming from. Furthermore, if the authors want to talk about management recommendations, there should be more of a focus on management practices in the analysis. Overall, I think this section doesn't really add anything to the review and should be removed from the manuscript.

General comment about figures 3 - 5: I highly recommend modifying these figures so that it's less obvious that the authors just use the base Excel guidelines for creating the figures. I know it doesn't necessarily change the message of the figure in any way, but it signals to the reviewer and the reader that the authors have put substantial time into thinking about how they are presenting the data (vs. using standard excel formats signals that the authors did not take as much time to work on the figures...)

Figure 3: For panel A, I suggest organizing these from most to least number of studies moving from left to right.

Figure 4: It would be more informative to plot this out for every year instead of arbitrarily breaking them out into different decades.

Figure 5: Suggest re-organizing this figure. First, I would order the studies in the reverse chronological as they are currently (i.e., have 1970's at the top). Second, I would maybe recast this as papers/year to account for the fact that there are fewer years to pull from for 2010 - 2017. Third, I would probably put the different taxonomic groups together (i.e., have all of the algae from 1980's next to the inverts, fish and riparian veg/macrophytes from the 80's). I'm kind of 50-50 on the last point, but I think the first two are necessary.

Referee: 2

Comments to the Author

Review of: The effects of treated effluent addition on streams

Reject with minor revisions

Some of the inline citations are missing commas. I've marked the ones I caught, but I might have missed some.

Introduction:

Line 41: Rivers are among of the most – “rivers are one of the most” or “rivers are among the most”

Line 66: Citation issue – comma needed in Birge et al., 1989

Line 68: Citation issue – comma needed in Birge et al., 1989

Line 75: Citation issue – remove italics from Broots et al., 2006

Methodology

Lines 112-113: “All 147 papers were read carefully to extract more detailed information.” This should be a given, so this sentence is not necessary.

Lines 116 & 118: “...classified papers into one of nine...” and “...sediment, and/or...” If papers were only classified by one category, then only or should be used in line 118. If papers were sorted into more than category, make this clear and use and.

Line 131-132: “So, we consider this study a baseline review to identify those main concerns.” The word “so” needs to be dropped from the sentence, and which main concerns should be reiterated.

Line 139: comma needed “...review, we...”

Results

Line 170: “...chemical, and biological...”

Line 202: delete comma “...group, and comprised...” should be “...group and comprised...”

Line 207: Citation issue – comma needed in Drury et al., 2013

Line 228: Citation issue – comma needed in Wilson et al., 2003

Line 234: It is somewhat unclear whether 27% applies to the 31 studies or the 81% that compared upstream and downstream. Either way, 27% does not translate into a whole number, even rounded. If it is a percentage of the 31 studies, 8 studies would be 26% and 9 studies would be 29%. If it is from the 81% (25 studies), then 6 studies would be 24% and 7 studies would be 28%. Double check the math.

Line 259: The colon in “(Chironomidae: Diptera) seems to be the wrong punctuation mark. Was a comma intended?”

Line 281: delete comma “...productivity, and thus...” should be “...productivity and thus...”

Line 290: "...high levels of..." How high were the levels?

Line 293: "...at lower concentrations." What was the degree of change?

Line 297: need a hyphen after "endocrine"

Discussion

There is little discussion of why dissolved oxygen levels are lower. It is mentioned in Line 335 that higher nutrient levels can result in decreased dissolved oxygen. Lower dissolved oxygen can also be due to increased temperature. If there is uncertainty as to which of these factors plays a larger role, or if it is a combination of the two, then this should be indicated as an area that requires future study.

Line 328: Citation issue – comma needed in Birge et al., 1989)

Line 351: "some TrOCs are attenuated in as little as 2 km" Which ones? Knowing their identities could assist with management practices. If there is no consensus in the research (e.g. ibuprofen attenuated in 2 km in one study and 10 km in another), either the complicating factors should be addressed, or this should be added to the list of future research directions.

Lines 361: delete comma "...zones, and how..." should be "...zones and how..." Also, "...how they interact..." is somewhat unclear. It seems to refer to "communities within hyporheic zones", but it could also potentially refer to "benthic sediment and surface-groundwater interactions". Consider different wording.

References

Line 453: does this citation need pp. before the pages? I'm not as familiar with APA as some other styles, but this seems incorrect.

Table 1

Nitrate: Need an "s" added to "move" – "...as flow moves downstream..."

Figure 4

Unless this will be published in color, consider using a wider greyscale to make distinguishing between the two categories easier.

Table S1

Entries 46, 61, & 82 do not have an "x" designating whether the study was Single or Multiple Stream. If this is a mistake, it needs to be corrected. If it reflects lack of information from the original studies, this needs to be noted.



Hamdhani Hamdhani <hamdhani@arizona.edu>

Freshwater Biology - Manuscript ID FWB-R-Dec-19-0649

Vigneshwari Uthayakumar <onbehalf@manuscriptcentral.com>

Wed, Dec 25, 2019 at 9:56 AM

Reply-To: FWBoffice@wiley.com

To: hamdhani@email.arizona.edu, hamdhani@fpik.unmul.ac.id

24-Dec-2019

Dear Mr. Hamdhani

Your manuscript entitled "The effects of treated effluent addition on streams: water quality, ecology, and future research directions" has been successfully submitted online.

Your manuscript ID is FWB-R-Dec-19-0649.

Please mention the above manuscript ID in all future correspondence. If there are any changes to your contact details, please log in to ScholarOne Manuscripts at <https://mc.manuscriptcentral.com/fwb> and edit your user information as appropriate.

You may also view the status of your manuscript at any time by checking your Author Centre after logging in to <https://mc.manuscriptcentral.com/fwb>.

Thank you for submitting your manuscript to Freshwater Biology.

Yours sincerely,

Vigneshwari Uthayakumar
Freshwater Biology
Editorial Office



Hamdhani Hamdhani <hamdhani@arizona.edu>

[EXT]Manuscript Accepted - Updates Approved FWB-R-Dec-19-0649.R1 [email ref: ENR-AW-1-e]

Vigneshwari Uthayakumar <onbehalf@manuscriptcentral.com>

Wed, Apr 8, 2020 at 8:39 PM

Reply-To: FWBoffice@wiley.com

To: hamdhani@email.arizona.edu, hamdhani@fpik.unmul.ac.id

External Email

08-Apr-2020

Dear Mr. Hamdhani:

Manuscript id: FWB-R-Dec-19-0649.R1

The final files that you submitted for your manuscript have been checked and have been found to be suitable for publication and so will be forwarded to the publisher shortly.

Sincerely,
Freshwater Biology Editorial Office