

## ***Interactive comment on “Using high-resolution phosphorus data to investigate mitigation measures in headwater river catchments” by J. M. Campbell et al.***

**Anonymous Referee #1**

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The manuscript uses high-resolution phosphorus data to assess the impact of land-use management on phosphorus concentrations from both point and diffuse sources. Overall the manuscript is well-written and provides some new data and issues relating to detecting change post-mitigation, which would be of interest to reader of HESS. Before full-publication there are just a few issues which should be addressed as documented below. Introduction. In places the introduction starts to sound a bit conversational, especially with the repeated use of “wicked” and “filthy”, I think the writing here could be tightened up. P10967 ln 15-17: states that high resolution monitoring is preferred and Harris and Heathwaite (2012) is cited. Perhaps some other literature should be

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included here as there are many authors who have stated this and some well before 2012. P10968 ln 7: states that rising and falling limb relationships are going to be investigated along with seasonal changes.... I think this could be explored more in the discussion, at the moment it feels like this analysis is missing. P10968 ln 25: LU ha-1, perhaps define this unit? Methods. The sections need some rearrangement, currently section 2 outlines just the soil analyses and the water quality data is not introduced until section 2.2. It would be clearer to the reader if section 2 provided a brief summary of all of the data collected followed by more detailed descriptions of the soil and water quality data in subsequent sub-sections. P10969 ln 16-17: was there only one sample taken per field? How was the sampling location chosen? How did you ensure the sample was representative? Are these also classed as high resolution as the manuscript title suggests? P10969 ln 18: states a “reasonable period since the application of fertiliser” – what is a reasonable period? More details needed. P10969 ln 22-23: need rationale for the two different soil analyses in the two catchments P10970 ln 1-3: this paragraph needs some rewording, it sounds like the original samples were re-analysed rather than a new set of samples collected from the field. Perhaps reword to clarify. P 10971 ln 24-27: sentence is not clear, reword – especially last section “despite different plant available tests....” Results. P10975 ln 3: “Despite this small set-back” – sentence sounds a bit conversational, reword P10975 ln 22: Phosphorus concentrations used, referred to as TP elsewhere in the manuscript – should be kept consistent P10975 ln 25: (and other places in results) states “small decreases in concentrations” - it would be useful for the reader to have some actual numbers here rather than a small decrease. P10976 ln 7: “although there had been a strategic replacement of four and eleven” – do these refer to septic tanks? Not clear. P10976 ln14 and 19: state significant increase – these should be back up by stats in the text, or do not use the work significant without specific evidence. P10976 ln 15: the changes in concentration stated are small, perhaps some comment needs to be made regarding the precision of the measurements and whether these subtle changes are real effects or within the noise? P10976 ln 16-18: raises an interesting question regarding the length of the dataset and our ability to

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detect trends, this could be an interesting point to raise in the discussion. Discussion. Some of the paragraphs feel a bit long winded when read, perhaps try to make a little more concise. P10978 In 10: add some numbers and stats to support “significant increase in TRP” as the data is not shown in the manuscript. P10978 In 14: annual TP load – presumably this is average annual TP load from the recorded data? Clarify P10980 In 20-25: this is a particularly long sentence which would benefit from some reorganisation Conclusions. I would rethink if the first bullet point regarding instrument performance is necessary, it feels a little out of place.

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