

Re-review of the paper by Nehren et al.

General comments

The paper has been improving in quality after the first round of comments, but is still in need of a substantial major re-editing before it is fit for publication as a scientific paper. In general there's still sections that are not too the point or superfluous, methodological or discussion aspects that are included in the results section, and too many figures and tables.

For the figures I suggest that all separate figures that map the NbS (figure 3, 4, 5, 6, 7, 9) are supplied as supplementary/annex materials and that 1 overview map with the broad location indicators for each of the areas is created. In the final lay-outing of the paper the tables may better be positioned in landscape-format (will this be something that is done by the journal?) edit the full results section in line with these changes.

One of the key conclusions is posed in line 508-514. This is an important message, but it's not reflected well in the conclusions (in the abstract there is mentioning of it). Another one is the use of the TWI, which is not reflected well in the abstract and the conclusions.

There is mentioning of the use of the sinuosity as an indicator for potential options for NbS in the results, but this method is not carried out for the entire study area, nor is it well described in the methods section. Ideally this analysis is carried out for the full study area and included in the methods. Together with the TWI it is an important method in the identification of potential areas for NbS and more emphasis may be placed on this methodological issue.

The case study description is too long, and contains too much detail and needs to be substantially shortened.

Results section: help the reader a bit and make clear how 3.1 is the first step of your analysis, and how this is then used for the further mapping -> how does the reporting of result fit with the analyses you described in the methods section.

In general: in results sections avoid reference to studies that are not your own, unless it is really necessary. Most of those referenced bits need to go to either introduction, methods or discussion.

In the conclusions: add more on the TWI as a technique and the finding that the role of NbS on slopes is ignored to make this a stronger message coming from the paper to answer the question/recommendation on how to identify a full set of NbS for flood risk management, that includes both the valley and slopes, and that the TWI is a helpful too in mapping the opportunities for that.

Language wise: avoid the word 'also' and similar where possible, avoid the use of 'we', 'our' etc. e.g in section starting at line 92

More detailed comments:

Line 14: add 'qualitatively' before evaluating

Line 16: instead of multiple: how many? => add the number

Section starting at line 88 – 104 is too long and needs shortening by condensing the sentences in the objectives.

Line 106: after mitigation add 'for this area'

Line 124-132 can be removed as it is not relevant for this study.

Line 143-148: too detailed : either shorten or remove

Line 148-151: sentences more suited in the introduction

Line 156-158: this aspect needs to go to 2.3

Line 159: remove the start of the sentence and start with 'The erft basin'

Line 161 – what do you do with the information you provide on the mining in the rest of your analysis? (why does a reader need to know? It feels a bit like 'ballast/too much detail')

Line 170: remove the start of the sentence, and start with 'the study area lies...'

Line 175: I'm a bit puzzled by how you report your methodology, as you start with the data gathering, but I don't know for what: start the analysis section with a short explanation of what you will be analysis, and then go into data acquisition

Paragraph 2.2 reads very much like a report, shorten and make more concise, avoid the 'we'. E.g. baseline data was gathered from x and y (table 1 for details). Remove the 'aim' part (that's introduction)

Line 190: clarify 'containing the implemented pilot multifunction'.

Line 191: what type of nbS?

Line 194: how was it calculated?

Paragraph 2.3 – lacks mentioning of the analysis on sinuosity

Line 202: why are you using an American DEM that is 26 years old for your analysis? Surely there's something better available from national sources and at higher resolution? Resolutions of 1 arc second (better write approx.. 30 m) is quite poor for flood mapping if local terrain shifts (such as levees and infrastructure may be blocking water flow).

Line 205: slope classes

Line 208-209: the added sentence the dem and slope were use to do what? (to calculate the topographic wetness index (this index still needs more explanation on how it is calculated and why you select the specific classes you selected).

Line 211-213 – I don't understand the added sentence: how does the TWI influence higher soil moisture – if you don't take into account a soil composition map, or land use practises (after all: the amount of organic matter in a soil is highly important in the soil moisture content, and this is influenced by agricultural practice/management and soil composition rather than by slope alone.)

⇒ The whole section on TWI will benefit from more emphasis in the full methods section, results and discussion.

Paragraphs line 214-219: I don't fully understand what you do with this information. In general it's unclear how you merge the different pieces of analysis, and also why in some cases you discussed the sinuosity in the results, but it's lacking in the methods. It would be good to add a figure on how the different bits of mapping and analysis fit together in selecting which NbS is suitable where.

Figure 1 was probably not your own results, but general data and should either be part of 2.1, or be provided as supplementary material.

In general 3.1 should describe the most relevant figures and tables that represent your results. The text is currently difficult to navigate in relation to these figures and tables and there seems to be a lot of general information in it. (e.g. line 225-226, should be part of the case study description, same goes for 231-233)

Line 243: remove the 'as previously mentioned' part and 'also'

Line 247: what are 'vegetation based NbS'?

Section 237-252 – what are really new results? What was already known and you added it to your inventory?, what did you do with the information you describe here in the mapping? Why do you refer to literature here? That should be part of the discussion. Same goes for the discussion on fragmented ownership.

Line 263-265: not a result – remove from the results chapter.

Line 269: you state a volumetric nr of retention capacity-> how is this linked to what is needed overall in terms of capacity? => in order to better understand this value it is helpful to refer to the overall needed volume for a certain floodlevel

Line 270 – flood retention is expected to be reaching around 339Mm³ by 2027 (by today – spring 2026, the question arises if this is going to be reached -> discussion?

Line 271-276 -> move to discussion

Line 284 : remove 'founded by the romans', move rest of the sentence, and the one after to the case study description or remove.

Line 286: edit: NbS 'in the Colonge area'

Line 290: 'flood wave peak s will be' => unclear sentence, edit.

Table 2: are the risks and challenges those identified in the documents you got the information from? => might be good to specify this.

Table 2: the first 2 measures are expressed in reduced flood wave heights, the others in M3 => can this be harmonized for clarity?

Table 2: some of the measures list as a risk "limited retention capacity" while they don't seem much smaller than others or that argument is not mentioned for similar sized ones. -> why?

Line 310-219: case study description, not result.

Table 3: for the pluvial nbS I miss dedicated ones such as wadis/bioswales, green roofs, why are they not in?

Line 343: small retention basins sentence => move to discussion.

Related to line 379-380: are you familiar with the Dutch concept of cyclic floodplain rejuvenation that the way this is helpful in floodplain vegetation management in line with flood risk management? It would be good to discuss this in the discussion. See e.g. Baptist, Martin J., et al. "Assessment of the effects of cyclic floodplain rejuvenation on flood levels and biodiversity along the Rhine River." *River Research and Applications* 20.3 (2004): 285-297. Or Cornelissen, Perry, et al. "Forest development in a restored floodplain: Effects of grazing, inundation and vegetation." *European Journal of Environmental Sciences* 9.1 (2019): 21-32.

Line 403-408: not results : move elsewhere or remove.

Line 408: remove 'with'

Line 416: remove 'as discussed above'. Sentence starting with 'the topographic wetness: move to methods, and explain better the 'response to drought part. Why use the word 'forest plant species' (you mean trees?)

Sentence starting with 'across' in line 421: edit for clarity

Line 328: and further: move to methods.

Line 431: what is a 'plain landscape'?

Line 434: remove sentence starting with 'riparian vegetation'

Line 436: replace 'below' with 'downstream'

Line 450 : why did you do this analysis only for this section of the study area? Unclear, also add to methods and do for the full study area.

Line 454-467: remove paragraphs– unnecessary discussion, not in line with the results, nor the discussion of the used methods. Same goes for more parts of the discussion – keep the discussion focussed on the topic that is the core of your work, so e.g. 471-478 can be removed too.

Line 480: what do you mean by ‘different challenges’?

Line 487: edit sentence ‘with some simple...to remove the word ‘some’ and not use ‘we’, change ‘designed’ to ‘identified’

Line 489. Remove sentence ‘the TWO indicates...=> move to methods

Line 508-512: this is a major and important result and conclusion that needs a lot more attention in your full paper. It’s now hiding away here, but must but more emphasised in the discussion and conclusion.

Line 520: what do you mean by ‘some time’? => too vague

Line 522: remove ‘also’; rather than ... floodplains- add ‘only focus on’ at the dots

Line 525: remove ‘often exacerbated by cc

The newly added part of the discussion from line 531-573 is relevant, but a bit long, please see if it can be condensed and more closely aligned with the results and core messages from this paper. (as in: discuss your results, not start a philosophic tract far wider than the topic of the paper on NbS in general)

Table 6: caption ‘potential NbS’: do you mean ‘the mechanisms of the NbS’/core functional properties?, for the caption river section: do you mean catchment, or only the study area, or also the topographic zone in the landscape (from the top of the hill, to the slopes, to the river valley?.

Table 6: I often feel the classification in the ‘river section’ class can be expanded. (e.g. all 3 last lines can be implemented everywhere, same for the bufferstrips. Reforestation in the upper and middle section, grass swales and ditches in the valley of the entire river, terracing on the hills (upper/middle?) etc. please revise.

Next time you submit a paper: please be careful in proofreading with the check whether pieces of text are in the right section of the paper (intro/method/results/discussion) as it has taken me a lot of time to go over all these style errors that should have been fixed before submitting, and I could have easily rejected the paper based on just that if I was not of the opinion that the core message was sufficiently interesting.

