

Interactive comment on “Nitrate removal in a restored riparian groundwater system: functioning and importance of individual riparian zones” by S. Peter et al.

Anonymous Referee #1

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This was an easy paper to review. The study design was good and the authors provide multiple corroborating lines of data to support their conclusions. The paper is well-written. I have only a few suggested changes to the text. The only substantive issue with the paper is the low sample sizes. For example why is only data from 1 piezometer used to average discharge conditions (page 6724, L24)? However, the authors provide chemical, hydrology, isotope, and genetic data to make their case all of which seem to point in the same direction. It's very interesting to note that while the willow zone is most efficient, the forest zone contributes greatest to N removal.

The results beg the question of “what is so great about willow zones that makes them

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so good at removing N”. The authors suggest that willow contributes organic carbon to the substrates that fuel denitrification. That may be true, but willows grow where hydrologic conditions are conducive because they require flooding and generally wetter conditions. So, the authors should not exclude the possibility that the willow zones are unique hydrologic features of the river ecosystem. Furthermore, suggesting to grow willow to increase N removal in restored riparian zones will be dependent upon creating the proper hydrologic conditions. In other words, willows will not grow just anywhere.

Specific comments

P6719, L14: comma after “consequence” P6719, L24: use past tenses of verbs P6721, L2: this sentence could use a citation P6724, L24: why only one piezometer P6727, L15: can you apply stats to this comparison of NO₃ removal between restored and channelized section? P6728, L22: why were no samples analyzed for gravel or pasture? P6729, L20: change “individual riparian zones” to the term FPZ P6731, L5-8: this long sentence is vague and difficult to understand P6732, L23: do you mean by transfer times, flow velocity? P6733, L3: here, you could cite Mayer et al 2010 JEQ 39:810–823 P6733, L18: here, you could cite again Gift et al 2010 P6735, L7: change “warrant” to another word. I don't understand the meaning in this context. P6735, L12: what is meant by “ventilate”?

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