

Interactive comment on “A Synthesis of Three Decades of Eco-Hydrological Research at Scotty Creek, NWT, Canada” by William Quinton et al.

Anonymous Referee #3

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Review of journal article titled: “A Synthesis of Three Decades of Eco-Hydrological Research at Scotty Creek, NWT, Canada” by Quinton et al.

General comments:

This study provides a comprehensive synthesis of research produced at the Scotty Creek Research site. It is well-framed and provides an interesting and useful resource for an audience interested in processes and modelling in cold wetland-dominated regions. I think that the paper is well-written, although does occasionally come across as a series of paper summaries. As this is a review-type of article, I do not find any major flaws within the paper, and think that it can be published after addressing several mostly minor comments.

C1

Overall, I recommend minor revisions, as my comments are minor and easily addressed with some effort. This is an excellent demonstration of the need for and benefits of long-term research locations, and it should be promoted as such. Below are my specific comments.

Specific comments:

Page 2 Line 18: The reference to Figure 2 here is odd, since the figure does not indicate anything about expanding precipitation and stream gauging networks

P2L31: I believe that there is a more current NWWG that could be referred to here (1997).

P4L32: Do any of the numerous Scotty papers document/support this chemically dilute water additions with other indicators (EC, major ions etc)?

Paragraph stating on P6L31: Indeed, the authors have contributed some important findings on peat properties. However, this paragraph seems to be much more about understanding peat physical and hydrological properties than anything specific about Scotty Creek. Although this is fine, the literature discussed is limited to only the work that the authors have done. As the significance of the findings are related to peat properties in general, and the work was largely completed in the lab, it seems prudent to expand beyond exclusively self-citations and include other papers and key findings related to peat properties in general, since this section is not necessarily about Scotty specifically?

P8L34 – P9L7: It is unclear to me the relevance of including this lab-based study on mulching?

P9L9-18: Indeed, here the authors mention the applicability of the findings from Scotty to a large number of other landscapes. This is, in my opinion, a missed opportunity to provide a more comprehensive synthesis of exactly how the decades of research at Scotty are explicitly applicable elsewhere. Expanding on this section could be a val-

C2

able opportunity to integrate the Scotty findings into other landscapes more definitively. A well-crafted paragraph here would strengthen this paper and increase the usefulness and applicability beyond Scotty.

P11L24: There is not a fig.8a in this paper, so remove this? If it was referring to a specific Fig in the Quinton paper, it seems odd and is a bit misleading to this reader.

P12L20-25: Has water fluxes through the talik subsurface flowpaths been quantified? How much (mm/y) is this water loss estimated to be? As the authors demonstrate, the saturated hydraulic conductivity of peat decreases rapidly with depth, so perhaps the K of talik peat is low, and limits these water fluxes? More information / quantifying this would be useful here.

Summary/Conclusions section: I found the last few sections of the paper to be a bit laborious to read through. I think that a guiding conceptual figure would be useful to help keep the reader focussed and engaged, and to help someone not as familiar with the wealth of research from Scotty to more easily grasp the big picture and key findings. I do not know what this would look like, but some type of image that provides an overview / demonstrates the key changes to the landscape and their impact on the hydrological function of this region over the 3 decades of study. I think this would be very useful for potential readers.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2018-409>, 2018.