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Solid Earth Discussions

Interactive comment on "Trail impact monitoring in Rocky Mountain National Park, USA" *by* J. Svajda et al.

Anonymous Referee #2

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General Comments: This is an interesting study that addresses an important topic within parks around the world, giving it definite international interest. The study was well-designed and carried out and data analysis was sound.

The manuscript needs a careful reading for and improvement of English use. If any of the authors are native English speakers they need to give the manuscript a careful read. If none of the authors are native English speakers, I encourage them to ask a native speaking friend to carefully read the manuscript. English issues are pretty minor in most of the paper, but they increase significantly in the Discussion section. There are many awkwardly-worded phrases, incomplete thoughts, and a few misspelled words in the Discussion. Just as one example, on page 3133 it says "The lack of precise measurements, especially for CSA and trail boundary determinations

(historic vs. recent erosion), could be influenced." Influenced by what? This is an incomplete thought/statement. The same page, line 9, it says ". . .places where trails where manually. . ." – that should be ". . .places where trails were manually. . .".

The Conclusion section needs to be rewritten. Several issues are brought up for the first time in the entire paper in the Conclusion, such as the idea of using boardwalks, check dams, or clay-based trail treads as management techniques. The Conclusion section should summarize the most important findings of your research. These management techniques were not addressed anywhere in the paper previously, therefore, they do not belong in the Conclusions. Likewise, the statement ". . .to keep tramping and compaction to a minimum." is made in the Conclusions, but there were no measures of compaction in this study.

Overall, I think the paper is suitable to Solid Earth and reports on a research project worthy of being published, after its problems are cleaned up.

Specific Comments: Page 3118, Line 21 – Chrisfield et al. should be 2012, not 2013 (it says 2012 in the references).

Page 3119 – I recommend adding Monti and MacKintosh, 1979; Godefroid and Koedam, 2004; and Özcan et al., 2013 (already cited in your paper) to Dixon et al., 2004 and Farell and Marion, 2001. This better communicates the idea of large amounts of research.

Page 3119, Lines 5-7 – I recommend adding Brevik and Fenton, 2012 to this list of references.

Page 3120, Line 24 – I recommend adding Zdruli, 2014 and Ibáñez et al., 2015 to Barros et al., 2015 as references.

Page 3126, Line 26 – Change 1.2 m to 120 cm to maintain constant units (all other measurements are given in cm).

Page 3127, Line 1 – Change "Maximum incision ranged. . ." to "Incision ranged. . ." (Your

numbers are not maximum incision numbers, they are ranges in incision numbers).

Page 3127, Lines 8-10 – This sentence repeats verbatim the information given in Figure 3. Either delete the sentence or remove the figure.

Page 3127, Lines 19-22 – This sentence needs to be modified to make it clear to the reader that these values are for low, medium, and high traffic levels, respectively.

Page 3128, Lines 12-14 – The wording here in regards to correlation coefficients is confusing, please clarify.

Page 3128, Line 15 – ". . .elevation – smaller number. . ." should be ". . .elevation due to a smaller number. . ."

Page 3128, Line 21 – I suggest changing ". . .meaningful results." to read ". . .meaningful insights."

Page 3129, Lines 10-11 – "Our work supports and emphasizes the use of factors such as trail widening and soil loss to be the most significant types of trail degradation." This work did not measure and evaluate a large number of types of trail degradation, including but not limited to soil compaction, soil fertility levels, soil organic matter content, plant species abundance, soil ecosystem measures, etc. This statement is far too broad a claim for this study, and needs to be deleted or significantly reworded. Your work supports the use of factors such as trail widening and soil loss as measures to indicate trail degradation. It does not indicate that these are the most significant types of trail degradation. I would argue that a widened trail that still maintained a decent amount of vegetative cover and relatively (by trail standards) healthy soils is in better shape than a narrow trail with severe degradation within that narrow area, for example.

Page 3132, Lines 14-15 – ". . .however longer time is effective in improving most of the soil properties in the topsoil (Özcan et al., 2013)." What does this mean exactly? Do you mean ". . .however, long periods of closure are necessary to improve most soil properties (Özcan et al., 2013)."? This is another example of an area of unclear

wording in the Discussion. Also, I would like to point out that studies have documented significant impacts from trail traffic in soils even after more than 100 years of time for natural recovery (e.g., Sharratt et al, 1998; Brevik and Fenton, 2012). If your point is that it takes a long time for soil properties to recover, it seems that references like the latter two would be relevant here.

Page 3133, Lines 3-4 – The statement "LiDAR derived terrain models could greatly speed up collection of measurements." would benefit from a reference. I recommend Nadal-Romero et al., 2015.

Table 2 – Needs a title/caption that explains the table.

Figure 3 – Font size on the pie chart needs to be increased, as it is now it is hard to read.

Figure 4 – Font size on the box plots needs to be increased.

Figure 5 – Font size needs to be increased.

Figure 6 was not called for in the manuscript. A call to the figure needs to be added or it needs to be deleted.

References: Brevik, E.C., and Fenton, T.E. Long-term effects of compaction on soil properties along the Mormon Trail, South-Central Iowa, USA. Soil Horiz., 53(5), 37-42. doi:10.2136/sh12-03-0011, 2012.

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