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Comment on gc-2022-13

Anonymous Referee #2

Referee comment on "GC Insights: Nature stripes for raising engagement with biodiversity loss" by Miles Richardson, Geosci. Commun. Discuss.,
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This paper presents nature stripes, a data visualization of the Living Planet Index (LPI) inspired by the warming stripes. LPI is a measure of biodiversity. The goal of the nature stripes is to enhance awareness of, and attention given to, the loss of biodiversity, which is a parallel crisis to climate change.

As a visualization researcher, I am approaching this from the perspective of visual data science and visualization for communication. With only the knowledge of a layperson in the topics of biodiversity and climate, I cannot speak to, for example, the soundness of the chosen data set.

The paper addresses the important issue of loss of biodiversity and has a clear goal to increase the awareness of this problem in the general public. The problem is motivated well through a description of relevant literature. The warming stripes were undoubtedly a success and transferring this impactful visualization to another important topic is in principle a good idea. The chosen colormap from a vibrant green through yellow to grey induces an intuitive understanding of the loss of biodiversity.

However, I have serious concerns about the practice of manipulating data to create a desired visualization. By adding random noise to the smooth data set, one might get a more aesthetic visualization, but at the same time visual artifacts are introduced that are not present in the data. This is misleading as viewers of the visualization get the impression of yearly fluctuation and might wonder what happened in a particular year to make the biodiversity change drastically from the previous and subsequent years. Manipulating the underlying data may likely lead to loss of credibility for the important topic.

The introduced random noise also makes the results difficult to reproduce, as for each run of the implementation one will get a different stripe design, although it is based on the

same data. In the visualization field, these types of artifacts are called hallucinators (see "An Algebraic Process for Visualization Design" by Kindlmann and Scheidegger (2014), doi: 10.1109/TVCG.2014.2346325) and should be avoided as it communicates a change in the data that is inexistent.

As the author states "[...] given the LPI is a single value representing many species globally, the decline since 1970 is smooth, the color changes are too subtle for clear stripes to emerge [...]". Instead of adding artificial "stripes" to the data, a better reasoned approach would be advisable. My suggestions would be to either visualize a derived property of the data, e.g., rate of change in each year or the change compared to last year, or change the colormap so that the subtle changes in the LPI can be seen without simply adding random noise to the colormap. It is of course also possible that this visualization technique simply does not provide the desired visual result with this data set and a possibly novel visual representation could be applied to achieve the same iconic effect.