

**Subject:** RE: Conservation planning in the face of Anthropocene risk

**From:** "Verburg, P.H." <p.h.verburg@vu.nl>

**Date:** 2020-01-10, 00:48

**To:** Richard Schuster <richard.schuster@glel.carleton.ca>, Rachel Buxton <rachel.buxton@colostate.edu>, Jeffrey Hanson <jeffrey.hanson@uqconnect.edu.au>, Jeremy Pittman <jpittman@uwaterloo.ca>, "Tulloch, Viv" <v.tulloch@ubc.ca>, "Frank A. La Sorte" <fal42@cornell.edu>, "Garcia, Raquel [rgarcia@sun.ac.za]" <rgarcia@sun.ac.za>, "Amanda D. Rodewald" <arodewald@cornell.edu>, "Wilson, Scott (EC/EC)" <scott.wilson@canada.ca>, Peter Arcese <peter.arcese@ubc.ca>, Hugh Possingham <hugh.possingham@tnc.org>, Joe Bennett <JosephBennett@cunet.carleton.ca>, Alison Johnston <aj327@cornell.edu>

Hi Richard,

Thanks for sharing. This sounds like a nice approach, I like the framing. In the intro we need to be very careful as risks are not something like cost-benefit/returns to investment, these types of risk are not suitable for such 'economic' approach and there is of course a clear tradeoff of protecting the 'one' species versus the risk of not being successful. I think that is a great challenge to discuss. In the Netherlands there is now a big discussion of our previous policy in which very small areas with specific species were protected (leading to a very fragmented protected area network) that fails due to nitrogen deposition of nearby agriculture, ground water level changes due to nearby agriculture etc. So, in the design, while the protection itself is 'perfect', these risks of externalities impacting on the areas was not accounted for. I think it is important to state that the risks here accounted for have very different character: climate risk basically threatening the existence of the ecosystem directly, land use change pressure can be reduced by protection, but, in general in areas of high land use change protection is less efficient/effective, and the socio-economic risk is of course affecting multiple aspects: the stability of protected areas (some weird president suddenly taking away protected status again); the enforcement of protection; the abundance of illegal activities/poaching etc. Now, the world bank indicator 'stability' is one that is indeed proven to be good and I think the strong point is that you have the other paper to refer to, so you can refer to that study. In the past we also tried some other indicators for several studies and found that the 'corruption/law enforcement' indices are sometimes also useful for certain processes (but hard to interpret). For poaching and illegal logging it may be a good indicator to capture that (so, subdividing the socio-economic risk in two: the risk of illegal activities (corruption index) and the risk of instability of governance (stability index).

Attached some small comments already on the framing.

Hope this helps, best wishes Peter

-----Original Message-----

From: Richard Schuster <richard.schuster@glel.carleton.ca>

Sent: woensdag 8 januari 2020 18:15

To: Rachel Buxton <rachel.buxton@colostate.edu>; Jeffrey Hanson <jeffrey.hanson@uqconnect.edu.au>; Jeremy Pittman <jpittman@uwaterloo.ca>; Tulloch, Viv <v.tulloch@ubc.ca>; Frank A. La Sorte <fal42@cornell.edu>; Garcia, Raquel [rgarcia@sun.ac.za] <rgarcia@sun.ac.za>; Verburg, P.H. <p.h.verburg@vu.nl>; Amanda D. Rodewald <arodewald@cornell.edu>; Wilson, Scott (EC/EC) <scott.wilson@canada.ca>; Peter Arcese <peter.arcese@ubc.ca>; Hugh Possingham <hugh.possingham@tnc.org>; Joe Bennett <JosephBennett@cunet.carleton.ca>; Alison Johnston <aj327@cornell.edu>

Subject: Conservation planning in the face of Anthropocene risk

Hello everyone,

We have made good progress on the "Conservation planning in the face of Anthropocene risk" analysis setup and wanted to share a very rough methods outline with you. Methods start at line 106 and are hopefully enough information to understand the general approach. In a nutshell, we are using all terrestrial vertebrate ranges from IUCN (n = 30930) as features in our prioritization scenarios. We also include socioeconomic risk, land use change risk and climate risk in the prioritization analysis. Instead of only the classical min set problem formulation (minimize cost while maximizing feature representation) for each risk layer, we are using a hierarchical problem formulation, where costs (or risks in this case) can be added all at once ([https://www.gurobi.com/documentation/8.1/refman/working\\_with\\_multiple\\_obje.html](https://www.gurobi.com/documentation/8.1/refman/working_with_multiple_obje.html)).

It would be great if you could have a look at the current approach, and share your thoughts on the following:

1) Is the current approach sound or do you think we need to tweak things?

2) Do you have ideas on how to best present the results? (a summary table is included on Line 101, which shows how much land each approach would require; the attached csv file shows how many 100x100km cells were selected per country in each of the eight scenarios investigated)

3) Could you express your interest in joining a group call to discuss this in more detail?

Thanks very much,  
Richard

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Richard Schuster, Ph.D.

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— Attachments: —

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