**Conservation planning in the face of Anthropocene risk**

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**Abstract.** Curbing biodiversity loss in a rapidly changing global environment is a convoluted race against time. Predicted changes in biological, economic, social, and political systems mean that current conservation investments are risky. However, investing in conservation projects that have high socio-political risk may be the most feasible mechanism to buffer high biodiversity against future change. As climate change and land-cover change continue to intensify in the coming decades, their interaction with socio-economic systems will influence the effectiveness of conservation tools such as protected areas and species management. Existing spatial prioritization approaches identify areas crucial for conservation predominantly on the basis of measures of regional biodiversity or ecosystem services and current patterns of land use. These approaches do not balance cost nor do they address sources of risk such as political instability and corruption; weak governance; systemic crisis; the probability of project failure; climate change; and projected land use change. Here we outline the elements of risk in global conservation spending for land protection and identify geospatial predictors that can help optimally allocate conservation investments given future pressure for change. We incorporate the cost of land and risk predictors into a robust planning tool to prioritize global land conservation.

**Key words:** biodiversity, decision-making, protected areas

**Introduction**

Making decisions about conservation in a rapidly changing world are risky and the stakes are high (Díaz et al. 2019). As we lose biodiversity at an alarming rate, protected areas are one of the best tools for conservation; however, human-caused change results in high uncertainty of the performance of conservation land in the future. Effective decision-making must operate within the context of climate change, land use change, and complex interconnected socio-economic-ecological systems that interact and result in systemic environmental risks, or Anthropocene risk (Keys et al. 2019).

In the context of rapid human caused change, deciding where to invest in conservation is convoluted. To prioritize conservation investments, generally the most cost-effective actions are weighed against the biodiversity benefits. However, both cost and benefit will look much different in the future, making investing without any consideration of future conditions risky.

Biodiversity crisis

Need to make sure to maximize return on investment – investing in conservation may not make sense because in X years it will be gone.

Protection needs to be resilient re: land use change, climate effects, socio political risk

Must balance your risk as an investor with risk to biodiversity in priority places: need to incorporate risk into conservation planning

Framework to account for risk of change

We might aim to set conservation priorities that are robust to risk and uncertainty (BenHaim 2001; Nicholson and Possingham 2007). Here we need to know (or estimate) the likelihood that an unplanned but conservation relevant event may occur, such as the risk of a hurricane, fire, or coral bleaching event, or the risk that a conservation action will not be carried out correctly (the inverse of its likelihood of success). We can then either prioritize actions (or locations to carry out an action) that meet conservation targets while minimizing some combination of risk and cost (yet another trade-off ) (Game et al. 2008), or prioritize actions that maximize the expected or likely conservation benefits for a fixed budget (Joseph et al. In Press-b). Note that these solutions represent modifications of Equations (1) and (2), respectively.

*Results*

Where are the priority areas using current IUCN data?

How do priorities change when we take into account risks?

Interplay of risks

Overarching considerations

*Discussion*

Conclusion paragraph

Literature cited

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