

## ***Interactive comment on “A social-ecological approach to identify and quantify biodiversity tipping points in South America’s seasonal dry ecosystems” by Kirsten Thonicke et al.***

### **Anonymous Referee #2**

Received and published: 10 October 2019

This manuscript appears an attempt for a trans-disciplinary, integrated writing-up of a very courageous, extremely needed and useful project. Natural and social scientists, stakeholders, participatory workshop participants etc have all contributed to a very broad collection of ideas on how to tackle ecological problems in this ‘Dry diagonal’ of South America. Focus is on biodiversity loss, which is, no doubt, very substantial and worrying.

To write up results of such an exercise and to frame it in terms of tipping points in a multiple-stable states system that includes societal impacts and the role of societal actors, is laudable. The authors should be provided with every chance to make this a

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success.

However, in my opinion, the present manuscript has failed in this ambition. Indeed I very much agree with the first sentence of the ' Outlook' section: " Implementing the methodological framework to identify and analyse changes in ecological integrity that could lead to biodiversity tipping points and impact ES still requires substantial amount of work."

Yes, a lot of work is still needed. This manuscript has at best been an inventory of the issues ranging from the definition and possible methodologies on tipping points, to many and very diverse examples of what is going on in the region. Its stated aim is to " summarise' the excercise to bring these together and to " review" the literature. To be honest, I do not think this manuscript can be regarded a summary: it is way to long and wide-ranging, too little focused, with too many and diverse examples. It is not a very good review either. Although many sources are cites, there is a lack of a systematic approach for such a review.

I also seem to recognise a multi-author excercise without proper leading editing. Several concepts are repeatedly addressed, in different ways with differing definitions. The very concept of tipping points and resilience is one example, the definition of ecosystem services is another.

On the tipping points, it is unclear whether a tipping point is defined as merely a (non-linear) decline in biodiversity, or whether is also needs to be poorly reversible. While figure 2 represents a pretty exact and technical definition of tipping points including irreversibility, this concept is hardly referred to elsewhere in the text. This definition is essential for both conservation policies and for detection methodologies.

A very useful concept, new to me, is the idea that the value of ecosystem services depends on who benefits from them, and that the impact of their decline can feed back on the system. This may be a very useful thread to build a more consistent article, and indeed a new methodology to approach tipping points and define pro-active policy

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concepts. I would recommend rethinking and rewriting of this MS along these lines.

Detailed comments:

As i recommend complete rewriting, I don't think it is useful to comment in detail. However, a few issues:

- language needs thorough checking. There are many idiomatically poor and confusing sentences - PLEASE PLEASE PLEASE , do not use these abbreviations/acronyms. It does not help, it makes the reader stumble all the time. For example, this sentence: " Because EI metrics can be linked to ES, the impact of BD-TP on (local and regional) livelihoods can be described." is purely based on acronyms.. - in line 130, you mention a ' wide variety ' of communities, and then as an example only mention the quilombos. Surely, these are interesting communities but not the most important ones? - line 165: south-Eastern South America surely is not part of the dry diagonal (running NE-SW) is it? - avoid multiple, different and late definitions of the same thing in several places. - please try and keep sentences legible for everyone. I know writing style can differ a lot between natural and social scientists, but now many sentences are impenetrable. - line 436: I don't know everything about ES, but do you really want to include intensive agriculture production in its definition? Would, for example, hydropower or mining products or land for housing/industry also be ES then? - line 510: where is 1)? - I think figure 3 and the tables are failry useless. They seem a reflection of workshop flip-over notes rather than an attempt to concisely or comprehensibly summarise the issues.

-finally: the very last sentence leaves the reader with confusion: was this paper about exploring tipping points in biodiversity, or about policy measures?

Concluding: I am sorry to have to recommend that the MS in this form is unacceptable, for all the reasons mentioned. I would, however, very much welcome the authors to rethink and rewrite, maybe taking the concept of ES depending on cultural concept and feeding back to the system, as part of a multiple-stable states system. Try to use less examples, avoid each of you wanting to broadcast their own messages with

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examples etc, take a rigid approach along a clearly defined methodology to develop a system and a policy framework.

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