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Discussions



# *Interactive comment on* "Illustrating a new approach to estimating potential reduction in fish species richness due to flow alteration on a global scale" *by* S. Yoshikawa et al.

**Anonymous Referee #2**

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This manuscript represents a valuable exercise in expanding to the global scale the use of ecologically relevant hydrologic metrics for predicting changes to biodiversity. It is well recognized that multiple components of the flow regime must be considered when predicting ecological change, with most studies at the basin or smaller scale. At the global scale, data availability has limited the resolution of both hydrologic and ecologic indicators when making such predictions, focusing mostly on mean annual discharge (MAD) and species richness. This study highlights the potential of increasing hydrologic resolution beyond MAD, while remaining bound to species richness as the ecologic indicator. While results are intuitive - illustrating the broader range of eco-



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logical changes expected when more components of the flow regime are considered - they are not particularly informative as is. I feel the following major and minor revisions are needed before recommendation for publication.

Major: 1) The 26 basins selected for this study exclude some of the most important biodiversity regions in the world (eg, south Asia). It would be worthwhile to look at other discharge data sets that include these regions for inclusion in the study. The study currently has a strong hydrologic and ecologic bias by being so heavily focused in the north, severely limiting the model domain and transferability of results. This point is by far my most important. 2) The authors mention the caveat of having excluded water use and dams/reservoirs from their study, even citing the studies that are currently addressing these issues (eg, Doll). The study would benefit greatly from including at the very least a case-study sensitivity analysis that addresses how water use and dam operation would affect results. For example, look at WaterGap/HydroSheds/GranD and additional efforts by Doll and others. 3) Some discussion of how the hydrologic metrics selected are relevant at broader scales than previously assessed is needed.

Minor: 1) Language editing urgently needed. Vocabulary and grammar are incredibly difficult to wade through. Flow also needs real work. 2) Clarity of points is needed. The introduction mentions the goal of setting environmental flows at the global scale. This is confusing given the scale of e-flow prescriptions and utility. Perhaps an error related to language? Also confusing is the mention of the goal to "combine" Xenopolous' and Iawasaki's models....I imagine the authors meant to compare? Such confusions abound. 3) Tables with basins studies and hydrologic metrics assessed should be included in main paper. 4) Authors should use more conventional abbreviations, such as MAD for mean annual discharge.

I hope to see a revised version of this paper again at some point.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 7837, 2013.