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Comment on hess-2022-116

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Community comment on "An improved model of shade-affected stream temperature in Soil & Water Assessment Tool" by Efrain Noa-Yarasca et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-116-CC1>, 2022

From an eco-hydrological perspective, this is potentially exciting work. It opens the possibility of linking the service-providing units of riparian vegetation with the river processes by the plant traits involved in controlling water temperature and the hydrological processes.

In the current form of the article, the shade factor and restoration scenarios approach is simplistic and almost decoupled from plant diversity management in the riparian area. I would suggest adding a paragraph in the introduction and perhaps a comparative table about the existing literature on shade factors in the riparian context and a section in the discussion about the potential use of the model (and its future developments) in assisting riparian vegetation management.

There are only 89 articles for "shade factor" AND riparian on Google Scholar; many are highly relevant to the paper's topic. An analysis of the most relevant ones would provide the reader with an image of the role of plant species and their measurable traits on the shade factor, as well as on approaches to estimating the shade factor. In this context, the methodological option used in your article would have a context.

I don't know if your scenarios could be refined in sub-scenarios with different species compositions to test the model's sensitivity to species diversity. This would be extremely valuable for biodiversity management. If it cannot be done now, it could be at least discussed.

The context can then be used in the discussion to analyze the potential cooperation between hydrologists and ecologists for riparian forest management. Riparian vegetation is involved in producing many ecosystem services, not only in water temperature control, and some tradeoffs are between. To what extent is there flexibility in vegetation management compatible with the same water temperature control? Once such questions

are formulated, and a tool such as your model is provided, one could expect the development of more interdisciplinary approaches.