

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2  
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## Comment on hess-2021-175

Anonymous Referee #2

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Referee comment on "A novel method for increasing water-yields, pine forests of the Northern Gulf of Mexico, USA " by Christy Ann Crandall et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-175-RC2>, 2021

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The goal of the study to study the likely effects of restoring longleaf pine forests from current slash pine forests on water yield. The authors adopted a rather simplistic approach (necessarily) for a large area. The novelty of the work is merging general relationships between forest water use and forest structure (basal area and LAI). The research addresses an important questions and had important implication to forest management. However, I raise concerns of the research methods. The annual water yield model is not validated for the study region for baseline. A preliminary test of the model performance with local USGS gaging station watershed is necessary to give some confidence to apply to the study region. Applying a model to new place requires rigorous model evaluation.

I was surprised about the mean LAI values are less than 1.0 for dense slash pine forests. Does the LAI include understories? Would the relationship between BA and LAI for the trees or all vegetation? Water table depth is of course extremely dynamic in time and space. It is unclear how the water table data are derived. These are important information for a hydrology paper.

It is unclear why water yield can be negative for an averaged condition. This suggests the water yield has issues when applying to a HUC scale or a pixel. Water yield should be set to zero if is calculated as negative.

Minor comments

The Introduction section is rather long, not all are relevant to the focus of the study.

Mis-citation:

"Annual water yields, subject to change on from intra-annual precipitation variability, are a conservative process and generally shows little variation over time if vegetation and precipitation are relatively stable (Oishi et al., 2010)." Water yield is not conservative. That paper states that ET is *conservative*, not varying a lot from year to year.