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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Water-use dynamics of an alien invaded riparian forest within the summer rainfall zone of South Africa" *by* Bruce C. Scott-Shaw and Colin S. Everson

Anonymous Referee #1

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GENERAL COMMENTS

This study is a useful and needed contribution to knowledge about water use across different tree species and it is generally well written. Coming from a background of more ecosystem scale hydrology, I am not well qualified to comment on the details of the HPV and SS methods, and focus more the sampling design and scaling up of the results. The rationale for tree selection and methods of scaling up the numbers to the stand level requires more description than is currently given.

SPECIFIC COMMENTS

The description of the sampling design and its rationale needs more detail in the text.

Papers should be written to allow some level of replicability of the method to other sites. How and why were sites, species, and particular trees chosen? How did sites differ topographically, distance from river, soil properties, etc? Why were different numbers of trees of different species chosen? What is the likely or known age range or age structure in the indigenous and the invasive trees at the sites? Are the indigenous trees necessarily older? How did the species and the size classes of the trees compare to that of mature indigenous Eastern Mistbelt forest? Are any early successional? What is the typical composition of Eastern Mistbelt forest in terms of the proportion of trees that are deciduous? Deciduousness effects the water use of the trees. Was this proportion mimicked in the selection of trees to monitor? Were the Acacia and Eucalyptus trees near maturity?

Two of the three Acacia's and one of the two Eucalyptus trees measured had larger diameters than the indigenous trees, except for the L. sericea. Is statement on pg 7 ln 11 that "the introduced species used 2.4 times more water than the indigenous species" made by comparing individual trees of similar sizes or of similar ages?

The description of how the scaling up from individual tree water use to stand scale water use also needs more detail. Was the water use from different indigenous trees measured and applied across all trees of all species and size classes across the stand? Were water use figures of the individual measured trees applied to trees of the same species and/or functional group (e.g. deciduous or not, similar growth form or not, similar wood density) or similar size class? Wouldn't water use of mature trees be different to the young ones measured in this study? What was assumed to the be the size class distribution in the invaded and restored scenarios? The same as current or larger more mature trees assumed?

These aspects need to be described in the methods and the effects of the assumptions made, and alternatives, discussed in the discussions.

As such the figures of species level and stand level water use should also have some

estimates of likely uncertainty.

TECHNICAL CORRECTIONS

Pg 2, Ln 21-23 unnecessary to cite the paper twice in the sentence

Pg 3, Ln 35-37 The statement " invasive species use 189% more water than indigenous dominated stands" needs more clarification: this number is too specific to apply to all three of the cited studies. Was this the highest or lowest value from these three studies? Perhaps give the range of values across multiple studies. Does this only refer riparian forests compared to invaded stands?

Pg 4, Section 2.2 requires more details in the text as to the numbers of trees of different species and why they were chosen as well as how the scaling up calculations were done.

Pg 7 Ln 43 There is no citation for Everson et al 2016 in the reference list

pg 8 ln 4 typo: "bcome"

pg 15 Table 1 – typo: "Eucalyptus nitenss"

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