

Interactive comment on “What causes cooling water temperature gradients in forested stream reaches?” by G. Garner et al.

Anonymous Referee #3

Received and published: 25 July 2014

I have read the manuscript and two previous reviews, and agree with all of the comments and suggestions of the other reviewers. Therefore, I will not repeat suggestions from the other two reviewers. The manuscript is interesting and provides useful information for potential riparian management strategies. However, the manuscript currently lacks the detail necessary to support the conclusions.

General Comments

The manuscript would benefit from a sensitivity analysis of each model parameter and variable. There is currently no discussion of how model inputs may affect the outcome and ultimately the conclusions of the paper. Lagrangian modelling techniques are very sensitive to changes in spatial and temporal scales. Therefore, an analysis and veri-

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fication of water transit times within the reach is necessary. Stream width would also likely be a very sensitive parameter given the model structure. It is important to know how width parametrization affects model results given the focus that has been placed on riparian shading in terms of a driving factor.

Further to verifying stream temperature simulations it would be useful to know the error in each of the simulated fluxes (and how bed heat flux was calculated). This is particularly important for the interpretation of results and was noted in previous reviews.

The assumption that lateral groundwater inflow is negligible is not well supported. Further discussion from previous work may help support this argument. Also, the description of hyporheic exchange flow is not supported. Are there any data available to support the negative flux that is assumed over the entire reach? These terms are not included in the model; therefore, it's reasonable to assume that these fluxes are not key drivers if the model is simulating stream temperature correctly and there are no compensatory variables or parameters. A sensitivity analysis would help strengthen this argument.

Specific Comments

Page 6445 - What width are you referring to? i.e. wetted, channel, bankfull?

Page 6447 - What is the temporal response time (resolution) of the stream temperature sensors? They are located within close proximity to one another the data are likely autocorrelated.

Please include units of measurement for all variables.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 6441, 2014.

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