Editor in Chief of Freshwater Biology

Sydney, 30th January, 2015

Dear Dr. Alan Hildrew, Dr. Colin Townsend

Please find enclosed our manuscript **“Heterogeneous flows foster heterogeneous assemblages: relationships between functional diversity and hydrological heterogeneity in riparian plant communities”**, which we have submitted for consideration as a Standard Research Paper in *Freshwater Biology*.

Measures of functional diversity derived from functional traits are increasingly being seen as superior descriptors of ecosystem functioning than taxonomic metrics of diversity. Riparian ecologists have recently begun to explore functional traits as a means to characterise and compare disparate assemblages with respect to their adaptations to hydrological conditions, but scant research has been published on riparian functional diversity. We believe ours is the first study to describe relationships between hydrological conditions and functional diversity.

Our study describes variation in functional diversity in riparian plant communities at 15 sites throughout south-eastern Australia, across a broad range of hydrological conditions. We found strong positive associations between functional diversity and variability in hydrological conditions and the intensity of rare, high magnitude flooding events, but not with average patterns of flow.

We believe this manuscript is suitable for publication in *Freshwater Biology* as it addresses the fundamental ecology of plant-environment interactions in riparian systems as well as being directly relevant to riparian conservation efforts. With expanding hydrological modification, as well as increasing climatic variability and magnitude of extreme events being predicted globally over the next century, this work provides insight into the mechanisms by which changes in hydrology might impact diversity and ecosystem functioning in riparian plant communities.

We confirm that this manuscript is original and is not published or under consideration for publication by any other journal. If you feel this contribution is appropriate for your journal, we suggest the following referees:

Juliet Stromberg, Arizona State University, USA (jstrom@asu.edu)

Angela Arthington, Griffith University, Australia (a.arthington@griffith.edu.au)

Jane Catford, University of Melbourne, Australia(catfordj@unimelb.edu.au)

We submit this cover letter, the manuscript, 3 figures, 4 tables and two supplementary appendices. We have had difficulty submitting the secondary supplementary appendix in a readable format (as it is a large spreadsheet), and therefore request the editors and reviewers to download the second supplementary appendix from the following link: https://github.com/jamesrlawson/functional-diversity/blob/master/docs/to%20submit/Supporting%20Information%20S2.xlsx?raw=true

We also submit a copy of a manuscript which has been accepted for publication with Journal of Ecology and is referred to extensively in the text. Please note that this manuscript has been submitted before, while the aforementioned manuscript was still in review. It was rejected but resubmission was invited once this manuscript had been published.

James Lawson is the corresponding author, and email is the preferred form of contact.

Yours sincerely,

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