

# It is all about interactions: What governs the character of river ecosystems?

Martin Thoms<sup>1</sup>, Mike Delong<sup>2</sup>

<sup>1</sup>University of New England, Armidale, NSW 2350, Australia

<sup>2</sup>Winona State University, Winona, Minnesota 55987, USA

- **This abstract is for an Oral.**
- **Indicate the Proposed Session: *Ecology, Biology and Geomorphic Process***
- **Please bold the presenting author in the author list above**

## ABSTRACT

Debate over what is the primary driver of river ecosystem character still exists despite being a focus of research for over 100 years. The flow regime as the 'master variable' that shapes river ecosystems is a dominant paradigm of river science, and one that influences many river management strategies, globally. However, riverine landscapes are a product of the interactive effect of hydrology and their physical character, and this defines temporal variance and spatial heterogeneity of ecosystems within these landscapes. Studies examining the interactive effect of heterogeneity and variability – environmental complexity – on river ecosystem function are limited. Using a database from 70 river ecosystems, from different geographic and climatic regions, we examined relationships between physical heterogeneity ( $P_H$ ) and ecosystem function (food chain length - FCL). A strong positive effect of  $P_H$  on FCL establishes the physical template as the primary driver of ecosystem function with hydrological variance acting as a regulator in riverine landscapes. Ecosystem size had no effect on FCL. It is incorrect to assume that flow is the only management lever for restoring river ecosystems. Given the combined effect of  $P_H$  and flow variance on ecosystem function, greater emphasis on interactions – hydrogeomorphology - would promote more effective river restoration.