Geophysical Research Abstracts,
Vol. 11, EGU2009-7371-1, 2009
EGU General Assembly 2009

What makes an instream organism (hydrologically) happy?

S.N. Lane
University of Durham, Geography, Durham, United Kingdom (s.n.lane@durham.ac.uk)

The last decade has demonstrated the importance of landscape-scale appreciation of hydrological processes for the structure and function of instream aquatic communities. Demonstration of the critical ways in which water connects processes operating in the wider landscape, through both river floodplains and the hyporheic zone, to the stream; as well as interactions within the stream between physical, chemical and biological processes; all emphasise the importance of hydrological investigation for instream ecology. However, here I will argue that whilst this opens up a range of new opportunities for hydrological investigation, I will argue that the classical approach pursued by hydrologists to this problem needs a radical reformulation. All too often, the hydrologist, informed by an army of laboratory- and field-based studies, grounds their analysis in a process cascade where the starting point is a series of physical processes associated with the water environment and the end point is some sort of assumed ecological impact, possibly involving some kind of analysis of feedbacks and interactions. The system can be broken down into its constituent parts and then rebuilt, either through careful field/laboratory experimental design, or through assembling process relationships, to create a mathematical model. The holistic response of the system is understood through an implicitly reductionist analysis. In research terms, the approach becomes self-sustaining: the exposure of conceptual/mathematical models to scrutiny by field data encourages us to look for more complex model formulations; these more complex formulations require new forms of field data and their assimilation into our models. Using a series of projects concerned with aiming to improve and to restore aquatic communities, I will argue that this way of working has more to do with what hydrologists perceive matters to hydrology than it does the hydrological needs of instream communities. The implication is that we need to make ecological information much more central to how we decide what to model in investigations of instream aquatic communities. As hydrologists, this may cause us much scientific discomfort, as we discover just how much our favourite processes don't really matter. But for fish, bugs and other living organisms, it may result in a basis for stream and landscape management that is informed by the right hydrology, one that is much more comfortable for aquatic life.