

The Hyporheic Network: Record of workshop discussions, 11-12 July 2007

Workshop number: Day 1, Group 2

Workshop leader: Dr Mike Rivett, Birmingham University

Workshop goal:

“Identify recent and important research developments (on GW-SW / HZ processes), and consider which ought to most influence policy makers (at EU/Westminster level). Develop a short ‘H-Net Position Statement’ setting out the key science that you think policy-makers should take into account in developing new policies.

Outcomes:

- **List of important recent research**
- **Views on existing policies and shortfall re basis in science**
- **Structure for a H-Net position statement (leader might want to draft a version beforehand)**
- **Bullet points of the main topics that need to go into the position statement”**

RECENT RESEARCH CONTRIBUTIONS

It was generally agreed from the wide-ranging expertise gathered that over the past decade there had been some significant advances in science and understanding relevant to the hyporheic zone (HZ). Although much research work remains to be undertaken, recent research contributions were evident across all sub-topics. It was believed a cross cutting review paper could be written to illustrate such advances drawing upon recent peer review and grey literature. Such a paper could underpin a more succinct and less technical position statement. Scientific advances were evident in the following interlinked areas (no particular order):

- Overall and detailed (compartmental) conceptual model understanding
- Ecology – e.g. biomonitoring, Early warning systems to pollution occurrence

- Vegetation, macrophytes, microbes, vertebrates – controls on their distribution, their influence, inter-relationships
- Influence of physical structures, sedimentation
- Central importance of riverbed permeability
- Our increased ability to monitor the HZ (albeit with bias to more easily monitored areas/issues)
- Automated or non-invasive monitoring methods, e.g. geophysics, transducers, contaminant flux
- Biogeochemical – attenuation of contaminants, e.g. nitrification/denitrification, organic contaminant sorption and (bio)degradation
- Contaminant flux – understanding and measurement
- Wealth of relevant research in groundwater contaminant natural attenuation that may be relevant to the HZ
- Geochemical and redox gradients, aerobic vs anaerobic conditions
- Temporally dynamic flow and attenuation
- Physical flow and its nuances
- Numerical modelling – multi-scale problems, sophistication, multi-process

INFLUENCE ON POLICY MAKERS

In relation to HZ-related policy development, policy makers should consider the following science issues / expressed needs. With some rewording these may form the basis of a "Position Statement". There is a need to:

- explicitly consider the HZ in relevant policies, e.g. it is only implicit to the WFD
- recognise and develop upon the existing science base (outlined above) and to continue strategic funding of that underpinning and cross-cutting science
- classify and recognise the value of the HZ
- consider the HZ within the context of the wider landscape and catchment
- establish baseline data / build upon datasets currently available (e.g. LOCAR, EA, SEPA, DoE-NI)
- further develop an integrated approach that demonstrates its importance in an inter-disciplinary / cross discipline way
- further adopt cost-effective, science-based and targeted data collection; there is an on-going need to identify key parameters
- distill the key processes – e.g. to develop protocols or policy documents based on the key processes and controlling parameters
- to further develop and apply models to explore processes at various levels of complexity, e.g. from assessment of detailed specific science/processes to applied management of real systems