Geophysical Research Abstracts
Vol. 14, EGU2012-802, 2012
EGU General Assembly 2012

Characterizing hot spots throughout the catchment

N. Welti (1,2), D. Lockington (1,2), T. Jakeman (1,3), and R. Hunt (4)

(1) National Centre for Groundwater Research and Training, Australia , (2) University of Queensland, School of Engineering, Brisbane, Australia , (3) Australia National University, Fenner School of Environment & Society, Canberra, Australia, (4) U.S. Geological Survey, Wisconsin Water Science Center, Middelton, Wisconsin, USA

Few catchments in the world are left truly undisturbed. Rather, they are under anthropogenic stress for a variety of reasons ranging from climate forcing to meeting the basic water allocation needs of the population. Reduction in the number of inundation areas has significantly decreased the nutrient and organic matter retention capacity along the river corridor, with major consequences for the both the riverine and coastal ecosystems. Cumulative stress may build up to a “tipping point” which can cause a change or set of changes which could occur non-linearly. In order to mitigate the environmental stress on these ecosystems, management plans are created to balance the needs of the dependent populations and those of ecology. While these catchment-wide plans aim to improve the ecological function of aquatic areas over the large scale, this sledge-hammer approach ignores the inherent heterogeneity in the catchment. Societal (and policy) decisions involve more than abiotic quantification of water storage and flow. A more encompassing ecohydrological view facilitates a more rounded policy framework that has flexibility to accommodate multiple social drivers, and one that can accommodate an "ecosystem improvement" rather than single species improvement. Not every spot in the landscape is equally valuable for specific societal values. Areas of high activity may provide the resilience capacity necessary to prevent catastrophic changes. In times of ecological instability, ecosystem resilience is of paramount importance in maintaining essential ecosystem services. Hot spots of biogeochemical cycling will occur where unique situations arise, such as areas of surface and groundwater interaction, creating spots of localized, high activity. In order to understand the systems’ potential to support various habitat niches in the large scale, the identification of specific hot spots or hot moments is necessary. A basal understanding of the concurrent biogeochemical cycles enables the subsequent predictions of the alternative ecosystem responses. This study aims to understand the where and why of hot spots in selected catchments in southeastern Australia and Midwestern United States. The ecosystem response to changes in the catchment will be generated based on various biotic parameters, with the ultimate goal of incorporation into a policy framework at the catchment scale.