Ecohydrology – an interdisciplinary tool for integrated protection and management of water bodies

Maciej Zalewski

With 3 figures in the text

Abstract: Freshwater ecosystems are situated in depressions in the landscape and, as a consequence, their water quality has been to a great extent dependent on human population density and its whole range of activities. Anthropogenic impacts on freshwater environments can be defined in two dimensions: technological and environmental. For example, emission of pollutants, which can be controlled by technology, and environmental impacts which are primarily of a physical character, such as modification of hydrological and biogeochemical cycles due to deforestation, urbanization, canalization etc.

Ecohydrology is a new paradigm, developed over the lifetime of UNESCO IHP-V, 1997–2001, which attempts to combine these two approaches. It is a new concept which suggests that the sustainable development of water resources is dependent on our ability to maintain the naturally established processes of water and nutrient circulation, and energy flow at the basin scale, by using a dual regulation: biota by hydrology and hydrology by biota (Zalewski 2002). Our profound understanding of a whole range of processes is based on understanding the role of aquatic and terrestrial biota in the dynamics of water over the whole range of scales, from molecular to the landscape basin.

The general question in the formulation of the Ecohydrology concept was how to regulate biological processes of freshwater ecosystems using hydrology, and vice versa, how to use biotic ecosystem properties as tools in water management. Both should serve as a reference system for enhancing the capacity of ecosystems to absorb human impacts by using ecosystem properties as management tools. This, in turn, depends on the development, dissemination and implementation of interdisciplinary knowledge based on recent progress in environmental sciences.

Key words: Ecohydrology, river basin, regulation processes, integrative restoration.

Author’s address: European Regional Centre for Ecohydrology under the auspices of UNESCO in Lodz, Polish Academy of Sciences, Tylna str. 3, PL-90-364 Lodz, Poland; or Department of Applied Ecology, University of Lodz, Banacha str. 12/16, PL-90-237 Lodz, Poland; E-Mail: mzal@biol.uni.lodz.pl