Ecohydrology of a groundwater-dependent Alder carr

J. Severyns[1], J. Fourneau[2], O. Batelaan[3] & F. De Smedt[3]
[1] Vrije Universiteit Brussel, Faculty of Applied Sciences, Department of Hydrology and Hydraulic Engineering, Pleinlaan 2, 1050 Brussels, Belgium (jo.severyns@vub.ac.be)
[2] Universiteit Antwerpen, Department of Ecosystem Management, Universiteitsplein 1, 2610 Wilrijk, Belgium
[3] Vrije Universiteit Brussel, Faculty of Applied Sciences, Department of Hydrology and Hydraulic Engineering, Pleinlaan 2, 1050 Brussels, Belgium (Batelaan@vub.ac.be, fdesmedt@vub.ac.be)

The “Living Common Meuse” project aims to restore the natural river processes at the Flemish and Dutch sides of the river Meuse by means of river rehabilitation interventions. These measures will be implemented in 12 locations along a river stretch of ±30 km. This study focuses on the project location ‘Vijverbroek’, a protected area in an ancient oxbow of the Meuse River with a groundwater-dependent mesotrophic Alder carr. Aim of the study was to investigate the ecohydrological conditions favourable for the presence of Alder carr and the effects of restoration of nearby gravel pits on these conditions. A groundwater model was set-up with MODFLOW for simulating groundwater heads, discharge zones and intensities. Also, the recharge areas associated with each discharge area were delineated with MODPATH. The model predicts higher groundwater levels and an increase in groundwater discharge areas and discharge intensities for the situation after restoration of the gravel pits. The groundwater quality was investigated by means of groundwater sampling at 45 piezometers in the study area and soil probes were sampled to investigate soil texture. From the mapped vegetation data, groundwater quality analysis, soil data and the results of the groundwater modelling the abiotic factors for vegetation development in the area were identified using DCA (Detrended Correspondence Analysis) and CCA (Canonical Correspondence Analysis). The study can serve as a reference for groundwater dependent areas or locations in river valleys where the river itself has a minor and/or indirect influence.