



Surface and groundwater drought evaluation with respect to aquatic habitat quality in the upper Nitra River Basin in Slovakia

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Hydrological drought is being broadly studied within last decades in many countries. It is because of increasing frequency of drought periods occurrence also in mild climate conditions, leading to unexpected and undesired consequences for environment and various spheres of the state economy. Drought affects water availability for plants, animals and human society. Natural conditions of drought occurrence are often combined with human activities strengthening drought consequences. Lack of water in the nature, connected to meteorological and hydrological drought occurrence, increases at the same time needs for surface and groundwater in many types of human activities (agriculture, industrial production, electric power generation...). Drought can be identified within the low flow phase of the flow regime. Flow regime is considered for one of the most important conditions influencing quality of the river ecosystems.

Occurrence of meteorological, surface and groundwater droughts was analyzed for the upper part of the Nitra River catchment in Slovakia. Drought occurrence was studied in two gauging profiles on the Nitra River – in Klacno and Nedožery, both representing the headwater profiles. The threshold level method was used for groundwater drought analysis. Base flow values were separated from the discharge hydrograms using the HydroOffice 2010 statistical program package. The influence of surface water drought on groundwater level was analyzed.

Habitat suitability curves derived according to IFIM methodology were constructed for different fish species at Nedožery profile. The influence of different low flow values from 600 to 150 L/s on fish amount, size and species variability was studied. In the end, the minimum flow, below which unfavourable life conditions occur, was estimated. The results showed the necessity of taking into account the ecological parameters when estimating the ecological status of surface water bodies. Such an approach is fully compatible with the requirements of the Directive 2000/60/EC and with the integrated water resources management strategy.

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