



## Tuning hydrological models for ecological modelling

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With the European Water Framework Directive there is an increasing demand for use of more sophisticated integrated models in order to study integrated groundwater, surface water and ecological aspects of water management. In Denmark the impact of groundwater abstraction on stream discharge has been assessed on both national and catchment scale using a national hydrological model combined with a set of stream flow criteria based on historical minimum flows and “acceptable” impact levels on different stream types. The national hydrological model is a physical based integrated groundwater-surface water hydrological model covering 43.000 km<sup>2</sup>. Coupling the national hydrological model with stream specific habitat models bridges the gap between groundwater management and stream ecology e.g. linking stream discharge reduction to ecological impact and defining acceptable impact levels depending on seasonal variations. Coupling habitat models with hydrological models requires firstly a translation of habitat suitability curves into physical parameters that makes sense in a hydrological model and secondly development of a habitat specific calibration criteria that allows for the large scale groundwater surface water model to simulate the translated habitat model parameters. We describe a methodology for coupling habitat models with integrated hydrological models, where habitat specific calibration of the hydrological model improves discharge simulations in relation to ecological relevant discharges making the output from hydrological models directly relevant for the purpose of the modelling e.g. combining a hydrological model with a habitat model and assessment of groundwater abstraction impact on stream habitats. We expect that this approach is relevant for combination with all kinds of stream ecology models related to discharge not only habitat models since most other models also focus on low

discharges.