



Assessment of nutrient sources and entry pathways in lowland river catchments

B. Schmalz and N. Fohrer

Dep. Hydrology and Water Resources Management, Ecology Centre, Kiel University,
Olshausenstr. 40, D-24098 Kiel, Germany

(bschmalz@hydrology.uni-kiel.de / Fax: +49-431-8804607 / Phone: +49-431-8801268)

The achievement of a good water quality in all water bodies until 2015 is legally regulated since December 2000 for all European Union member states by the European Water Framework Directive. The aim of this project is to assess the nutrient sources and entry pathways into the rivers of a complex mesoscale catchment conducting measurements, analyses and eco-hydrological modelling.

The investigated mesoscale Treene catchment is located in Northern Germany as a part of a lowland area. Sandy, loamy and peat soils are characteristic for this area. Land use is dominated by agriculture and pasture. Drainage changed the natural water balance. In a nested approach we examined two catchment areas: a) Treene catchment 517 km², b) Kielstau catchment 50 km². The nested approach assists to improve the process understanding by using data of different scales. Therefore this catchment serves not only as an example but the results are transferable to other lowland catchment areas.

In a first step the river basin scale model SWAT (Soil and Water Assessment Tool, ARNOLD et al. 1998) was used successfully to model the water balance. For the Treene it was achieved a Nash-Sutcliffe Index of 0.89 (correlation: 0.95), for the Kielstau catchment of 0.71 (0.82). Furthermore the water quality was analysed to distinguish the significance of both point and diffuse sources. The entries from agriculture, wastewater treatment plants and sediment release were regarded and the influence of tributaries on the main channel water quality was estimated. The results show that the tributaries in the Kielstau catchment contribute high amounts of nutrients, mainly nitrate and ammonium. For nitrate, ammonium and phosphorus it was observed as a tendency that the annual loads were increasing along the river profile of the Kielstau.