

**MEASUREMENTS AND AKWA-M®-WATER BALANCE SIMULATIONS WITHIN
A PROTECTED LARGE WETLAND AREA WITH LIMITED SURFACE WATER
SUPPLY - WATER BALANCE PERSPECTIVES UNDER CLIMATE CHANGES**

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The nature conservation project Teichgruppe Niederspree-Hammerstadt is located in the north-eastern part of Saxony and comprises an area of 52 km²; interconnected ponds and wetlands cover about 7 km² of the total area. The ponds, which are partially used for fishing and the wetlands are habitat to many valuable species to be protected by nature conservation. The water feeding of ponds and wetlands depends mainly on highly variable surface water inflow from the corresponding watershed with an area of 360 km². The ponds and wetlands are partially surrounded and influenced by agricultural drainage systems constructed around 1970 by collectivised socialist agriculture. Land use attitudes have changed since 1990.

About 230 ground- and surface-water measuring points have been established within the project area. Discharge measurements started 1963; climatic and groundwater level information dates back to the year 1950. A detailed monitoring programme within the project area began in 1998.

Based on these field data we are investigating the interaction between surface water inflow, pond and wetland water levels, infiltration of pond water into the underlying aquifers and pond water management practices with the help of our water balance model AKWA-M® and other surface-groundwater models. The effects of drainage system closure can be shown by field experiments and previous simulation respectively. The water balance simulation shows clearly the shift of the area outflow due to the pond and ground water storage.

Furthermore we describe the strategy for pond water management under time variable surface water inflow targeting on optimal water levels within the protected wetland areas consistent with the further existence of fishing. The climate change prognosis for Saxony around the years 2040 - 2059 is used to simulate the possible water balance of the watershed and the project area. Results of the simulations are compared with the actual water balance situation. Strategies for compensating the decreasing inflow are presented and supported by the expected probabilities (quantity, time distribution, water level). Due to the actual changing agricultural land use as a consequence of the stepwise altering economic conditions, the future land use and water management policies within such watersheds should consider primarily ecological targets rather than pure agricultural or forest production targets.