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# Discharge of cleaned Waste Water into the Hamme-Lesum River

**Kunde:** Stadtwerke Osterholz-Scharmbeck GmbH

**Lokation:** Hamme-Lesum Basin, Deutschland

**Untersuchungsumfang:** Setup a 2D transport model (nitrate, phosphate), identification of critical system state and boundary conditions, simulation of contaminant distribution and mixing

**Methodik:** Simulation of contaminant transport

## INTRODUCTION

Due to modernization of sewage systems in Osterholz-Scharmbeck the discharge point of the central sewage plant had to be shifted to another location. Therefore we were asked to simulate contaminant transport and mixing for different discharge points.

## METHODOLOGY

Therefore, a 2D contaminant transport model (Fig. 1) was setup and calibrated using water levels from gauges and ADCP measurements.

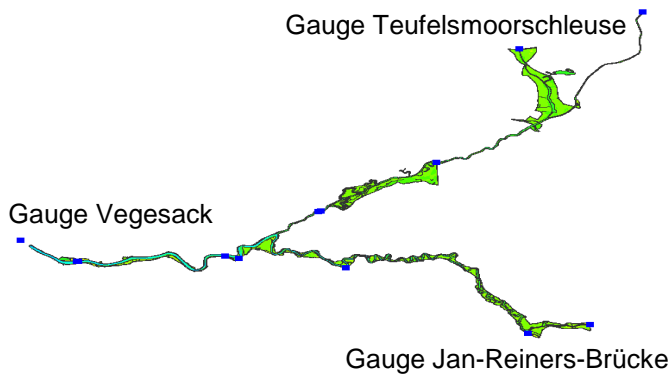


Figure 1: 2D Contaminant Transport Model for the Hamme-Wümme-Lesum Basin (L = 67 km)

The storm surge barrier "Lesumsperrwerk" and Lock Ritterhude were introduced as continuously controllable structures (Abb. 3). A critical phase for the operation of Lock Ritterhude was identified for the very warm summer 2005 (Abb. 2). Tidal boundary conditions were setup for a mean Neap-Spring-Cycle (2 weeks).

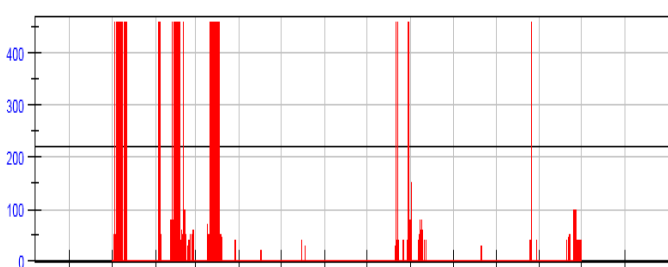


Figure 2: Opening periods and width of Lock Ritterhude in 2005 (in this case: Gate 1)

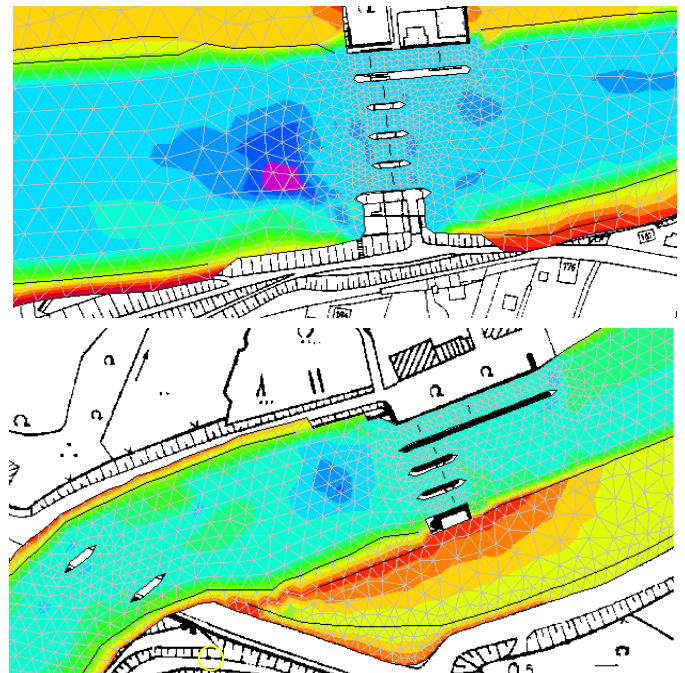


Figure 3: Storm Surge Barrier "Lesumsperrwerk" (above) and Lock Ritterhude (below)

## RESULTS

Numerical simulations showed that the discharge point can even be shifted 50 m downstream Lock Ritterhude, if the lock is adequately operated (Fig. 4).

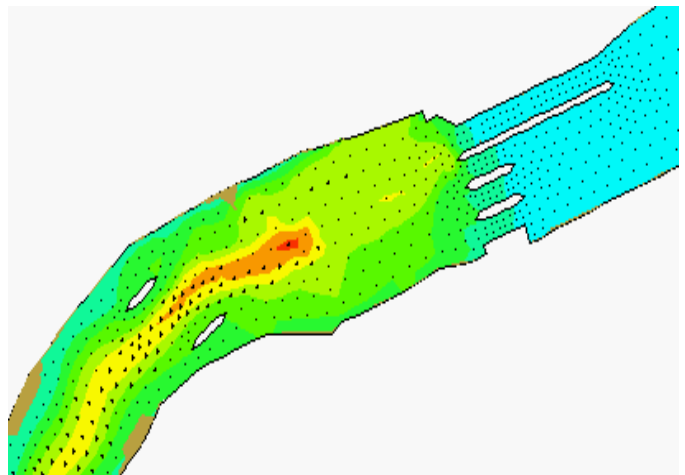


Figure 4: Concentrations ( $N_{ges.}$ ) for a Discharge 50 m downstream Lock Ritterhude