1. Introduction

Nutrient pollution of surface waters by point and non-point source emissions is one of the major environmental issues. The Water Framework Directive requires all inland and coastal waters in the European Union to reach "good status" until 2015 or at least 2027. To find out the “good status” for water bodies in Berlin, the question be answered how the anthropogenic impacts changed the water status over the last 150 years.

Since the long-term processes of industrialization and urbanization in Berlin, it is also widely accepted that increases in nutrient loads are due to anthropogenic activities. However, the long-term monitoring data are often lacking. Therefore the magnitude of the nutrient load changes is poorly known.

This study attempts to define the temporal and spatial trend of surface water quality and to reconstruct the changes of nutrient loads in Berlin waters during the last 150 years. Finally, those estimated loadings will be compared to the recent monitoring data.

To give a detailed and comprehensive view on the development of nutrient loads in Berlin water bodies over the last 150 years, a system of different model approaches is applied. These approaches base on the MONERIS model and some new developments for Berlin conditions and are suitable for the reconstruction objectives because they required only extensive input data.

A harmonized data base is to be compiled for Berlin City as well as the upstream and downstream catchment areas of the river Havel, Spree and Dahme over the last 150 years. This database includes information on population and urban development, water supply system, the waste water collection and treatment system, land use and also information on social-economic conditions in the form of digital worksheets or digital maps.

Previous studies on nutrient loads in water bodies of Berlin have already tried to quantify the nutrient emissions from urban areas. However, these studies were limited in the time solutions as well as lack of the connections with the upstream and downstream areas in the Havel catchment. The nutrient loads from all areas upstream of Berlin over the last 150 years were estimated. The time period of 1850-2000 shows a typical profile of the urban development from the pre-industrial to the recent time, with the basic changes in population, infrastructure, living standards and also social contexts. Through this study, the possibility of reconstruction nutrient loads and their sources from a city since the pre-industrial time is also tested.