作者	丁洪伟
中文题名	通州新城水系水质水量联合调度分析研究
英文题名	Research on Union Dispatch of Water Quality and Quantity for the River System in Tongzhou Town
中文关键词	水质水量联合调度,通州新城,数值模拟
英文关键词	union dispatch for water quality and quantity, Tongzhou Town, numerical simulation
中文文摘	通州新城是北京市新城规划重点发展的对象之一，是北京市“东部发展带”的重要节点，其水问题严重，水任务艰巨，亟需通过合理的规划调度来加强水系综合整治，提高水质和景观等级，为落实通州新城乃至整个北京市新城的规划发展提供必要的技术支撑。要加强通州水系的综合治理和维护，提高水系防洪能力和优化水环境，就要弄清通州新城的水系情况及问题，建立本流域相关的水量水质模型，深入研究其水质和水量问题。论文综合考虑该区域自身的特点，结合水系现状河道和污染物情况，采用一、二维相结合的方法构建分布式水文模型和非点源模型，河流水动力学模型和水质模型，集成开发了通州新城水系的水质水量联合调度模型系统，有选择性和针对性地进行水质水量联合调度研究，从而为通州新城河流水环境保护和水量水质优化调度提供基础，也为流域水质改善和达到河流生态健康的功能目标提供切实有效地科技支撑：（1）针对通州新城区域的地形、下垫面及水文水质条件，利用现有成熟模型效地模拟单次暴雨或短期内连续降雨引起的地表径流、洪水波演进和非点源迁移的分布式水文和非点源模型，为流域水动力学和水质模型提供边界条件；（2）利用水动力学和水质模型，包括水系一维水动力学模型和水质模型，同时针对北运河水系主要水工程建筑物的特点，按设计工况模拟重点闸坝运行状况，并进行相应的计算分析，优化水系闸坝调度方案；（3）在通州新城一维河网的基础上，对北关闸-甘棠橡胶坝之间的重点河段进行二维水动力和水质的重点模拟，计算该河段各计算点上的水深、流速和水质结果，并研究分析该河段富营养化爆发的可能性。论文遵循统筹考虑、突出重点的原则构建适合的水质水量联合调度模型，为合理配置水资源、制定水污染控制措施和设计河道生态工程提供技术依据。通过相应的计算分析，可为改善通州新城水系的水利条件、促进河道生态健康、加强水环境保障与科学研究提供相应的技术手段和数据支撑，达到实施生态管理和保护、生态修复技术支撑、水资源水量分配的需要，确保其生态治理达到目标。关键词：水质水量联合调度；通州新城；数值模拟
外文文摘	Tongzhou is one of the key development objects for new towns planned in Beijing city. It is also an important node of the eastern development belt in Beijing. The water problem is serious, and the water task is arduous. It is urgent to strengthen the comprehensive improvement of water system through reasonable planning and scheduling, and to improve water quality and landscape level, so as to provide the necessary technical support for the implementation of the planning and development of Tongzhou Town and the whole city of Beijing.To strengthen the comprehensive management and maintenance of the river system in Tongzhou and to improve the flood control capacity and optimize the water environment, it is necessary to understand the situation and problems of the river system in Tongzhou Town and establish the water quality and quantity model of the basin, so as to study thoroughly the water quality and quantity problems. Considering the characteristics of the region itself and combining the current situation of rivers and pollutants in water system, the paper adopts the method of combining one and two dimensional to build the distributed hydrological model, nonpoint source model, river water dynamic model and water quality model, integrated develops the model system of water quality and quantity for the water system in Tongzhou Town, studies selectively and targeted on the joint operation of water quality and quantity. It provides the basis for the river environment protection and optimal dispatch of water quantity and quality in Tongzhou Town. It also provides real and effective scientific and technological support for the river basin water quality improvement and function achivement of river ecological health.(1) In view of the terrain, the underlying surface and the hydrological conditions of Tongzhou Town, the distributed hydrological and nonpoint source model is built to effectively simulate the surface runoff,

	flood wave evolution and nonpoint source migration caused by single rainstorm or continuous rainfall in the short term, so as to provide boundary conditions for the river basin water dynamics and water quality models.(2) The water dynamics and water quality model of Tongzhou Town is developed, including the one-dimensional hydrodynamic model and water quality model of the river system. Meanwhile the simulation module of sluice and dam is developed according to the characteristics of the major water projects in Beiyun River system.(3) On the basis of one-dimensional river network of Tongzhou Town, the key simulation of two dimensional hydrodynamic and water quality in the key river reach between Beiguan Gate and GAntang Rubber Dam is carried out to calculate the water depth, flow velocity and water quality results of each calculation point, so as to study and analyze the possibility of eutrophication in this river reach.The thesis follows the principle of overall consideration and prominent emphasis to build a suitable model for water quality and water quantity, which provides technical basis for rational allocation of water resources, water pollution control measures and design of river ecological engineering. Through the corresponding calculation and analysis, it can provide the technical means and data support to improve the water conservancy condition of river system in Tongzhou Town, promote river ecological health and strengthen the water environmental protection and scientific research, so as to achieve the implementation of ecological management and protection, ecological restoration technology support, the need of water resources allocation, to ensure the goal achievement of the ecological governance.Key words: union dispatch for water quality and quantity; Tongzhou Town; numerical simulation
答辩日期	2015.12.17