作者	袁博宇
中文题名	官厅水库富营养化分析评价
英文题名	Eutrophication Impact on the Guanting Reservoir
中文关键词	官厅水库;富营养化;统计方法;人工神经网络;主控因子
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中文文摘	水体富营养化是湖泊演化的一个过程，是水体衰老的一种表现，已成为影响经济社会持续发展的制约因素。本文通过对官厅水库水质状态、营养状态的详细调查分析，判别水体营养状态、演变进程，预测发展趋势，探讨富营养化发生的主要诱发因子，提出水库富营养化的预测方法，为官厅水库开展进一步综合防治、生态修复提供参考与借鉴，为水库水质管理及富营养化的控制提供科学依据。目前官厅水库入库河道水质均为劣Ⅴ类，主要污染物是 TN、TP、氟化物、氨氮、BOD5 和 CODMn。其中的永定河库区 CODMn、TP 呈上升趋势且显著，氨氮、TN 浓度呈下降趋势。妫水河库区水质为Ⅳ类，主要污染物为氟化物，且氨氮、TN 呈下降趋势；CODMn、TP 呈上升趋势。评价富营养化状况为桑干河轻度富营养；洋河、妫水河中度富营养；永定河入库水质最差，达到重度富营养。出库河道轻度富营养化。永定河库区全部处于轻度富营养状态。妫水河库区水体优于永库区，处于中营养状态。本文利用统计软件 SPSS 15.0 进行统计和相关分析，分析影响官厅水库富营养化一些相关因素。库区断面 Chla 均与 TP 呈正相关关系，与 TN 呈负相关关系，官厅水库是磷控制型湖泊。水库水体总氮含量已经超过藻类生长的需要，总氮含量降低有助于氮磷比降低，反而促使藻类生长。目前，水库氮磷比逐年下降，接近藻类生长最佳值。本文利用多年实测水质资料建立了经验统计模型，对 Chla 与 TP、TN、CODMn 和 SD 等参数进行回归分析。该模型结构简单，在模拟预测过程中所需资料少，计算快捷简便，可以快速评价和预测水库水质，可以作为日常管理预报水域富营养化的工具。藻类的生长受到众多因素影响，本身是非线性现象。本文将人工神经网络（ANN）技术应用于富营养化潜势预测，建立了官厅水库富营养化人工神经网络模型，通过网络训练，得到比较理想的预测结果。为防治污染和减轻富营养化程度，建议在强化流域环境管理、控制外源污染物数量的基础上推动水库及沿岸地区的生物治理，把水资源保护和水源涵养与库区周边生态环境建设结合起来，进一步改善库区水质和水生态环境。
外文文摘	Water eutrophication is a process of lake evolution and aging manifestation of water body, which has become constraint factor of sustainable economic and social development. Through deeply analyzing of Guanting reservoir’s water quality and nutritional status, the author judged water body’s nutritional status, evolution process, predicted tendency of development, discussed main inducing factors of eutrophication, and then put forward predicting method of reservoir’s eutrophication. The forecast method can be used to reference for Guanting reservoir’s further integration of prevention and treatment, provide scientific basis for ecological restoration and water quality management and control.At present, Guanting reservoir’s inflow condition is poor, inferior V category of water quality, the main pollutants are TN, TP, fluoride, ammonia-nitrogen, BOD5 and CODMn. The CODMn, TP in reservoir area of Yongding River shows significant increase tendency, in contrast, and ammonia, TN concentration decrease. Guishui River’s quality in reservoir area belonged to IV type, the main pollutant are fluoride, and ammonia, TN presented downward trend; CODMn, TP tends to rise. Assessment results of eutrophication status are, Sangganhe river, mild eutrophication; Yanghe river, Guishui river, moderately eutrophic; Yongdinghe river is the worst, severe eutrophication with mild eutrophication for reservoir’s issue. The discharge water from reservoir is mild eutrophication. Water state of reservoir region of Guishui River, a state of medium nutrition, is better than water quality in reservoir area of Yongding River. Chla in sections of reservoir area is a positive correlation with TP, but negative correlation with TN. Guanting reservoir is type of lake controlled by phosphorus. Total nitrogen content of reservoir water has exceeded amount of growth need of algae. Fall of total nitrogen content helps reduce ratio of nitrogen to phosphorus, but promote algae growth.This dissertation adopted measured water

	quality data for many years to establish statistical experience model, to conduct regression analysis aimed at parameters of Chla and TP, TN, CODMn, SD and so on. The model can quickly evaluate and predict water quality, which can be used as everyday management tool for water eutrophication's forecast. In view of Guanting reservoir's characters, this paper applied artificial neural network (ANN) to predict eutrophication potential, established model of artificial neural network in Guanting reservoir eutrophication, and got more satisfactory results through network training.To combat pollution and reduce degree of eutrophication, we proposed to promote biological treatment in reservoirs and coastal areas, to combine water resources protection and water sources conservation with construction of ecological environment around reservoir region to further improve water quality and aquatic environment in the reservoir area. All the proposals are based on efforts to strengthen river basin environmental management, control pollutant sources based on number of reservoirs.
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