

张汪寿,耿润哲,王晓燕,段淑怀,欧春霞,李世荣,南哲.基于多准则分析的非点源污染评价和分区——以北京怀柔区北宅小流域为例[J].环境科学学报,2013,33(1):258-266

基于多准则分析的非点源污染评价和分区——以北京怀柔区北宅小流域为例

### Assessment and zoning of non-point source pollution by multi-criteria analysis: A case study in the watershed of Beizhai

关键词: [非点源污染](#) [多准则分析](#) [规划](#) [风险评价](#)

基金项目: [中德政府间科技合作项目\(No.2009DFA92440\)](#); [国家自然科学基金项目\(No.40971258\)](#)

作者 单位

张汪寿 首都师范大学资源环境与旅游学院,北京 100048

耿润哲 首都师范大学资源环境与旅游学院,北京 100048

王晓燕 首都师范大学资源环境与旅游学院,北京 100048

段淑怀 北京市水土保持工作总站,北京 100038

欧春霞 密云县水土保持工作站,北京 101500

李世荣 北京市水土保持工作总站,北京 100038

南哲 首都师范大学资源环境与旅游学院,北京 100048

摘要: 非点源污染控制难度大、成本高,因此有必要对污染源划分等级,从而分别进行管理与规划.本研究提出了“风险评价-规划分区-分别管理”的非点源污染规划思路.“风险评价”在借鉴已有的非点源风险评价模型基础上,提出了基于多准则分析的非点源污染评价方法.该评价方法以土地利用因子、径流因子和距离因子为参评指标,采用改进的理想解法(Technique for order preference by similarity to ideal solution, TOPSIS)确定因子权重,减少了人为主观性;“规划分区”依据“适度保护、优先规划、重点管理”的原则,结合风险评价结果,可将流域划分为5类管理分区;“分别管理”是对各类管理区分别配以针对性的BMPs和生态工程措施.“风险评价-规划分区-分别管理”这套方法层层递进不仅能评价流域非点源污染,也能定量为流域内非点源污染源的管理提供科学方案.最后将该方法在北宅小流域进行了应用,结果表明,该方法克服了传统方法的过于主观、局限性大的缺陷,可为类似流域非点源污染评价和管理提供参考.

**Abstract.** Due to difficulty and high cost in controlling non-point source pollution, it was necessary to categorize the sources for planning and management. In this study, the process of "Risk assessment-Planning and zoning-differentiated management" was developed to assess the non-point source pollution. A new "risk assessment" tool based on multi-criteria analysis was developed. Three criteria were formulated to characterize land cover indicator ( $L$ ), runoff indicator ( $R$ ) and distance indicator ( $D$ ), and the weight of pollution was also computed by improved method for order preference by similarity to ideal solution (TOPSIS). Combining with the results of risk assessment, the area was divided into five categories of management planning zones according to the principle of "appropriate protection, priority planning, focus and management". Afterwards, by adopting the technology of BMPs and ecological engineering, "differentiated management" was carried out on these five categories of management planning areas. The process of "Risk assessment-Planning and zoning-Differentiated management" can not only evaluate the various sources of pollution, but also quantitatively provide the scientific scheme for the management of non-point pollution sources. In addition, the method was applied to the watershed of Beizhai. The results show that this process can avoid subjective and limited application, and can provide a reference to non-point source pollution assessment and management for watershed.

**Key words.** [non-point source pollution](#) [multicriteria analysis](#) [planning and zoning](#) [risk assessment](#)

摘要点击次数: 92 全文下载次数: 87

您是第1774254位访问者

主办单位：中国科学院生态环境研究中心

单位地址：北京市海淀区双清路18号 邮编：100085

服务热线：010-62941073 传真：010-62941073 Email: [hjkxxb@rcees.ac.cn](mailto:hjkxxb@rcees.ac.cn)

本系统由北京勤云科技发展有限公司设计