排放控制與河川水質污染之經營-整合性污染控制決策支援模式之應用

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摘 要

水為生命之需，而且水資源對國家的發展也是非常重要 的。現今由於不當的污廢水排放，已造成了不同尺度的河川 污染四處發生；無疑地，地表水資源使用已被嚴重地影響。 因此，對於污染源在排放進入河川之前的管理和的控制，對 於維持水質是非常重要的。本研究中，創新的「整合性污染 控制」及「流域整體性總量管制」的概念將被探討；而且「 整合性污染控制決策支援模式」也被應用於河川水質管理， 以達成所設定的適當目標；而該模式之優點如污染物質之負 荷計算、水質之改善之成本計算及地理資訊的結合等也將予 以探討。案例研究之城市河川系統污染狀況將使用該模式進 行分析，污染現狀及改善策略之結果也可使用 MapInfo 地 理資訊系統來展現。案例研究結果顯示該模式在確認及比對 污染源的能力，模擬的結果也顯示紡織業是主要污染來源， 需要被立即控制且降底污染排放量或改善污水處裡程序。而 且，以生化需氧量來看，該城市內有一半的河川污染值都超 過法定律的水質標準，於某些河川甚至超過水質標準兩倍以 上應該是優先納入改善目標。為改善生化需氧量能符合水質 標準內，其污水處理程序必需升級（由初級處理以上），而 模式亦能計算出其升級的平均成本費用及長期邊際成成本費 用。所估計出廠商所需付出的高昂水質改善費用長可警惕工 廠來降低污染排放量。最後，結合「整合性污染控制決策支 援模式」和 MapInfo 地理資訊系統將可建立污染分佈背景 地圖及相關資料庫，並提供給環境管理單位參考。而所有的 資料將更容易公開及清楚展示，對關心的民眾和相關環保團 體都可來分享資訊。

關鍵詞 : 排放管制、水質、整合性污染控制決策支援模式

目錄

參考文獻

1. Alter, S. L. (1980). Decision support systems: current practice and continuing challenges. Reading, Mass., Addison-Wesley Pub. 2. Benham, B.L., Walker, J.L., and Yagow, G. (2003). TMDLs (Total Maximum Daily Loads) for Benthic Impairments, Virginia Cooperative Extension, Biological systems engineering Publication: 442-556. 3. Burns, L.A. (2004). Exposure Analysis Modeling System (EXAMS): User Manual and System Document, Report EPA/600/R-00/081, Center for Exposure Assessment Modeling (CEAM), U.S. Environmental Protection Agency, Athens, GA. 4. Bouzinac, M, Blair, S.H. and Kawar, W. (2002). Decision Support System for Surface Water Quality Protection in Morocco, Proceedins of Virginia water research symposium 2002 and Drinking water supplies assessment and Management strategies for the 21st Century, Virginia Polytechnic Institute and State University, Blacksburg, VA. 5. Brian, L.B, Jane, L.W, and Gene, Y. (2003). TMDLs (Total Maximum Daily Loads) for Benthic Impairments, Virginia cooperative extension, Biological systems engineering- Publication 442-556. 6. Chapra, S.C. and Pelletier, G.J. (2003). QUAL2K: A Modeling Framework for Simulating River and Stream Water Quality: Documentation and Users Manual. Civil and environmental engineering dept., Tufts University, Medford, MA. 7. Cole, S., Codling, I.D., Parr, W. and Zabel, T. (1999). Guidelines for managing water quality impacts within UK European marine sites, report prepared for the UK Marine SAC Project, Wiltshire, UK. 8. Department of Environmental Quality, Department of Conservation and Recreation, Department of Mines, Minerals and Energy, Department of Health, Commonwealth of Virginia. (2000). Total maximum daily load program, A ten year implementation plan, Commonwealth of Virginia. 9. Druzdzel, M. J. and R. R. Flynn (1999). Decision Support Systems. Encyclopedia of Library and Information Science. A. Kent, Marcel Dekker, Inc 10. Finlay, P. N. (1994). Introducing decision support systems. Oxford, UK Cambridge, Mass., NCC Blackwell, Blackwell Publishers 11. Hersh, R. (1996). A Review of Integrated Pollution Control Efforts in Selected Countries, Discussion Paper 97-15, Resources for the Future, Washington, DC. 12. Jirka, G.H., Doneker, R.L. and Hinton, S.W. (1997). User ’ s manual for CORMIX: a Hydrodynamic Mixing Zone Model and Decision Support System for Pollution Discharge into Surface Water, MixZone Inc., Portland, OR. 13. Keen, P. G. W. and Morton, S. S. (1978). Decision support systems: an organizational perspective. Reading, Mass., Addison-Wesley Pub. Co. 14. Olga, L.R. and Miguel, L.A, (2001) Pollution in Bodies of Water in Southern Sonora, salud publica de mexico, vol.43, no.4, pp1-7. 15. Power, D. J. (1997). What is a DSS? The On-Line Executive Journal for Data- Intensive Decision Support. 16. Power, D. J. (2002). Decision support systems: concepts and resources for managers. Westport, Conn., Quorum Books. 17. Sebastian, I., Lvovky, K. and Koning, H. (1999). Decision support system for integrated pollution control- Software for Education and Analysis in Pollution Management User Guide, The World Bank, Washington, D.C. 18. Smith, B.F. and Enger, E.D. (2002). Environmental Science, 8th ed., McGraw- Hill. 19. Sprague, R. H. and Carlson, E. D. (1982). Building effective decision support systems. Englewood Cliffs, N.J., Prentice-Hall. 20. Watkins, D.W. Jr., and McKinney, D.C. (1995). Recent Developments in Decision Support Systems for Water Resources, U.S. National Contributions in Hydrology 1991-1994, Reviews of Geophysics, Supplement, p941-948. 21. Wool, T.A., Ambrose, R.B., Martin, J.L. and Comer, E.A. (2005). Water Quality Analysis Simulation Program (WASP): User ’ s manual, Version 6.0, US Environmental Protection Agency-Region 4, Atlanta, GA. 22. World Bank (2001). Environmental health in India, properties in Andhra Pradesh, report submitted by Environment and Social Development Unit, South Asia Region, The World Bank Group Publications. 23. Young, G.J., Dooge, J.C.I. and Rodda, J.C. (2002). Global Water Resource Issues, Cambridge University Press: Cambridge, UK.