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集水區氮總量管理策略之研究

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摘　　要　本研究以南投縣水里溪集水區爲研究對象，運用集水區總量管理模式模擬管理策略之效益，以協助集水區總量管理策略的制定。研究可分爲三部份，第一部份首先模擬集水區無機氮總量，包括氨氮與硝酸鹽氮，模擬結果均顯示冬季數值最高。第二部份爲重要模擬參數校正，然受限於集水區現有資料，研究中針對硝化作用與脫硝作用相關參數進行校正，校正後結果均顯示模擬值甚符合觀測結果。第三部份爲集水區氮總量管理效率模擬，透過模式模擬結果，發現以同時治理第 5、14 號子集水區農地之效果最好，氮總量削減效益爲每年減少總量 9.31 噸。研究中亦證明在土地利用管理策略中，管理農地效率明顯優於都市區將近 8 倍。雖然管理成效已達 9.31 噸/年，但集水區仍有氨氮含量高峰超過台灣的水質標準，因此未來仍需配合其他管理辦法來加強此區之水質管理。

關鍵詞：總量管理、氮總量、集水區管理。

Watershed Management of Total Maximum Daily Nitrogen Load

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ABSTRACT　The goal of this study is to simulate the efficiency of total maximum daily load (TMDL) management of total nitrogen in the Shuili Stream watershed, Nantou county, Taiwan, by the TMDL model. Processes were divided to three parts. The first part sought to simulate inorganic nitrogen (including nitrate and ammonia) content in the watershed. Both simulation results showed the highest values were all in winter. The second part was to integrate important parameters relating to total nitrogen. Owing to a lack of a basic database in Taiwan, we focused on nitrification and denitrification parameters. The results exhibited that the simulation values very corresponding to observations. The third part sought to simulate the efficiency of land use management strategies. According to the simulation results, the best performance was obtain when we converted agriculture land into forest land in the No. 5 and 14 subbasins simultaneously. The efficiency of reducing total nitrogen loading was 9.31 ton/year. We also proved that the management efficiency of agriculture land was much better than that of urban areas, i.e., the former was almost 8 times greater of the latter. Although we got good efficiency of management strategies of 9.31 ton/year, some ammonia nitrogen loadings were still higher than Taiwan's standards. Therefore, we should reduce total nitrogen load with other

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methods in future.

Key Words: management of TMDL, total nitrogen TMDL, watershed management