翡翠水庫蓄水範圍保護帶設置對水庫水質改善影響

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摘 要 翡翠水庫係為大臺北地區民生用水重要來源，其污染來源以非點源污染為主。保護帶設置為非點源污染最佳管理作業方法(BMP)，也是目前翡翠水庫管理策略之一。本研究應用地理資訊系統(GIS)以及暴雨管理模式(SWMM)，模擬保護帶(Buffer Strip)設置後對翡翠水庫集水區非點源污染削減量，模擬水質包含懸浮固體(SS)、總磷(TP)及生化需氧量(BOD)。研究結果顯示，在蓄水範圍四周設置 50 公尺保護帶時，設置保護帶的子集水區 SS 輸出削減率超過 80%，TP 削減率超過 50%，BOD 削減率達到 70%。保護帶設置對整個翡翠水庫集水區，此三種水質削減率最高可達 5%。另外利用 Vollenweider 公式模擬保護帶設置對水庫水質影響，若以水庫總磷濃度 10μg/L 為目標值，則集水區總磷污染量尚需削減 19.0%~22.2%。設置 50 公尺保護帶可削減總磷每年約 800 公斤，佔目標削減量 1/3-1/4。除了設置保護帶外，還需透過其他非點源污染控制措施才能達到此削減量。

關鍵詞：保護帶、SWMM、Vollenweider 公式、非點源污染。

Effects of Buffer Strips on Reducing Nonpoint Source Pollution and Improving Water Quality in Feitsui Reservoir

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ABSTRACT The Feitsui reservoir is the drinking water source for Taipei metropolis, and the nonpoint source pollution has been considered as an important issue. Buffer Strip is one of the best management practice (BMP) and is used in Feitsui reservoir management. In this study, we integrated geographic information systems (GIS)and Stormwater Management Model (SWMM) to assess the effects of buffer strips in Feitsui reservoir. The major water quality items contain suspended solids (SS), total phosphorus (TP) and biochemical oxygen demand (BOD). The results show that 50 m width of the buffer strips around the reservoir can reduce 80% of SS, 50% of TP, and 70% of COD for the subwatersheds with buffer strips. For the entire watershed, the 50m buffer strips mitigate up to 5% of pollutants. In addition, Vollenweider model is utilized to assess water quality in the reservoir and the results show that 19-22% of pollution reduction rate is required to achieve the goal of 10μg/L of TP. The 50m width of buffer strip contributed 1/3-1/4 reduction loads, which is 800 kgTP/yr. More BMPs in addition to buffer strips are necessary in the Feitsui reservoir watershed management.

Key Words: Buffer Strips, SWMM, Vollenweider model, Nonpoint Source Pollution.

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