

摘要

本研究主要是利用水族環境生物檢測法 (Aquatic Organisms environment Diagnostics, 簡稱 AOD), 以此作為評估河川水體自淨的能力。

根據AOD值的分析結果, 柯子湖溪中下游自淨作用發生最顯著的河段在Site 5 (水門一下游) 至Site 6 (水門二上游) 之間的 0.5km河段, 以及Site 7 (水門二下游) 至Site 8 (新甲一號橋) 之間的 1km河段。污染源主要是來自Site 2 (復興橋) 至Site 3 (關馨橋) 之間, 以及Site 6 至Site 7 之間。Site 5 至Site 6 魚類AOD值自淨效率在 $0.511 \sim 0.578 (\% / m^2)$; 蝦類AOD值自淨效率在 $0.506 \sim 0.578 (\% / m^2)$ 。Site 7 至Site 8 魚類AOD值自淨效率在 $0.12 \sim 0.26 (\% / m^2)$; 蝦類AOD值自淨效率在 $0.198 \sim 0.278 (\% / m^2)$ 。此兩河段的自淨效率差異可能是因為自淨效率在短於 0.5km之內就已經達到檢測之上限。

柯子湖溪流域在 2001 年進行了水岸整建, 中下游由 Site 3 至 Site 8 間, 設計成兩岸為生態護坡、椰纖護網為底和約為 6m 固定河寬的河道。估計若流量大於 0.38 CMS 的時候, Site 3 的 AOD 值仍可維持在 1800%, 此時關東橋地區所排放的污水因沖釋作用的關係將不會對柯子湖溪造成影響。

經由本研究之結果分析後, 水族環境生物檢測法能確實反映水體品質, 且較其他水質評估指標更能顯現出樣站間水體品質的變化。此外, 根據新竹頭前溪支流柯子湖溪魚類調查及 AOD 結果, 建議將短吻紅斑吻蝦虎魚列入河川水質魚類指標中輕度污染的指標生物。

Abstract

Aquatic Organisms environment Diagnostics (AOD) is used in this research for estimating the water self-purification influence of stream.

According to the AOD results, the water self-purification influences occur most significant between Site 5 and Site 6, and Site 7 and Site 8 in midstream and downstream of Ke-tzu-hu creek. The pollution sources mostly come from two canals at the sections between Site 2 and Site 3, and between Site 6 and Site 7. The efficiency of self-purification based on AOD value of fish is 0.511~0.578 (% / m²), and the efficiency of self-purification based on AOD value of shrimp is 0.506~0.578 (% / m²) between Site 5 and Site 6. The efficiency of self-purification based on AOD value of fish is 0.12~0.26 (% / m²), and the efficiency of self-purification based on AOD value of shrimp is 0.198~0.278 (% / m²) between Site 7 and Site 8. The difference in these two sections of self-purification efficiency may be the efficiency of self-purification have been reach test limit in shorter than 0.5 km.

Water shore plan of Ke-tzu-hu creek was proceeded in 2001 from Site 3 to Site 8, the stream width was designed as 6m with ecological network protection along two shores, and the riverbed was covered by networks made of coconut fiber. When the flow is over 0.38 CMS, AOD value of Site 3, the most polluted site, will reach 1800%. Under this condition, the Guan-dong Bridge area discharged sewage will be clear up by dilution influence.

Our data shows that AOD can reflect the water quality faithfully and is a better method than other water quality indices to tell the minor differences between samples. According to the fish fauna and the AOD results in Ke-tzu-hu creek, a branch of Touchien River, Hsien-chu, *Rhinogobius rubromaculatus* is suggested to be used as the slight-pollution level index of water quality.