

流量對農田渠道棲地之影響評估

—以宜蘭深溝二番仔圳為例

Effects of Discharge Management on Fish Habitat in Erfanzai Channel, Yilan County

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摘要

本研究以宜蘭縣員山鄉深溝地區之二番仔圳農田渠道做為研究案例，探討不同流量條件下，渠道內水域棲地型態及魚類棲地適合度之變化，以尋求最佳管理流量，期以提升渠道棲地品質。研究中透過現地環境調查(渠道特性與水理條件)及水理模擬，了解現況及模擬安全流量範圍內不同流量條件下之水域環境特性(流速、水深)，進一步計算不同流量情境下之棲地型態分類及棲地適合度。於棲地適合度計算中，參考深溝釣魚大賽調查成果，選定台灣三種特有種魚類—明潭吻鰕虎 (*Rhinogobius candidianus*)、台灣石鱸 (*Acrossocheilus paradoxus*)、及粗首馬口鱮 (*Opsariichthys pachycephalus*) 作為指標物種，並參考經濟部水利署建立之魚種棲地適合度曲線，分析不同流量條件對指標物種棲地適合度的影響。結果顯示流量變化對於研究區域內之棲地型態與指標物種棲地適合度有所影響：現況流量 (0.03–0.06 cms) 時主要棲地型態為淺流，當流量提升至 0.2 cms 時轉為淺瀨，0.4 cms 以上則以深流為主；在棲地適合度方面，流量提升對明潭吻鰕虎及台灣石鱸具正面效益，當流量由現況分別提升至 0.1 cms 及 0.6 cms 時，其棲地適合度將由 0.58-0.64 及 0.63-0.84 提升至 0.71 及 0.97-1.00，然而粗首馬口鱮之棲地適合度則隨流量上升而下降，由現況之 0.93-0.98 逐漸降低。本研究結果可作為研究區域之渠道棲地改善策略研擬之參考，有助於提升渠道棲地品質。

關鍵詞：農田渠道、棲地營造、棲地型態、棲地適合度、流量管理

Abstract

This study investigates the effects of different channel discharges on aquatic habitat types and fish habitat suitability in Erfanzai Channel in Yilan County to seek the optimal management discharge to enhance channel habitat quality. The research employed field environmental surveys (channel characteristics and hydraulic conditions) and hydraulic simulations to understand current conditions and aquatic environmental characteristics (flow velocity and water depth) under different channel discharges. Habitat type classification and habitat suitability under various discharge scenarios were further analyzed. For the habitat suitability assessment, three endemic fish species from Taiwan, *Rhinogobius candidianus*, *Acrossocheilus paradoxus*, and *Opsariichthys pachycephalus*, were selected as indicator species. Results show that discharge variations affected habitat types and indicator species habitat suitability within the study area: glide was the primary habitat type under current flow conditions (0.03–0.06 cms), it transitioned to riffle and run when the discharge increased to 0.2 cms and 0.4 cms, respectively. For the habitat suitability, discharge increases positively affected *Rhinogobius candidianus* and *Acrossocheilus paradoxus*. When the discharge increased from current conditions to 0.1 cms and 0.6 cms, respectively, their habitat suitability improved from 0.58-0.64 and 0.63-0.84 to 0.71 and 0.97-1.00. However, habitat suitability for *Opsariichthys pachycephalus* decreased with increasing discharge, declining from 0.93-0.98. The research can serve as a reference for developing channel habitat improvement strategies in the study area and contribute to enhancing channel habitat quality.

Keywords: Agricultural Channel, Habitat Restoration, Habitat Type, Habitat Suitability, Discharge Management