北投溫泉區生態監測整合研究：酸性硫酸排水對水生物影響

Integrated Ecological Monitoring Study of Beitou Hot Spring Area: Impact of Acid Mine Drainage on Aquatic Life

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摘　要

本研究探討磺溪與磺港溪的生態系統與水質變化，關注溫泉放流水對生態環境的影響。近年來的北投溫泉區經濟開發，造成大量溫泉酸性廢水排入溪中，對溪流水質及生態造成不同程度的影響。研究針對磺溪及磺港溪的水環境與水生生態調查，以每月一次之頻率進行調查，評估上下游受到溫泉放流水污染與未受污染之河段，其不同季節下水質與生態的變化。透過這項研究，瞭解溫泉放流水對環境的實際影響，並提出相應的保護與修復策略，以維護陽明山溪流的生態平衡與水質安全。

經問卷調查及 FAHP 分析評估因子權重，經綜合平均「河川生態」權重為 0.42 最大，「溫泉需求」權重為 0.09 最小。依綜合平均權重計算各方案之加權分數後，最優先方案為方案二「泉源公園溫泉泡腳池停止使用及引水工程」。此外，本研究針對未來關渡地區的農業與生態環境永續發展提出建議，建議成立關渡灌區上游河川水資源及生態資訊交流平台會議，可透過固定召開會議，討論水域生態環境、溫泉區河道水質、關渡平原灌溉用水量及水質等議題，搭配適應性管理方法推動機制，可有效地推動關渡灌區水資源水質改善。

關鍵詞：酸性硫酸排水，水生物影響，溪流生態，生物多樣性

Abstract

This study explores the ecological systems and water quality changes in Nothern Sulfur creek and Huanggang Creek, focusing on the impact of hot spring effluent on the ecological environment. In recent years, economic development in the Beitou Hot Spring Area has led to large amounts of acidic hot spring wastewater being discharged into the streams, affecting the water quality and ecology to varying degrees. The study involves monthly investigations of

the water environment and aquatic ecology of Nothern Sulfur creek and Huanggang Creek to assess the seasonal changes in water quality and ecology in upstream and downstream sections polluted by hot spring effluent versus unpolluted sections. Through this research, we aim to understand the actual impact of hot spring effluent on the environment and propose corresponding protection and restoration strategies to maintain the ecological balance and water quality safety of the Yangmingshan streams.

Based on questionnaire surveys and FAHP (Fuzzy Analytic Hierarchy Process) analysis to evaluate factor weights, the comprehensive average weight for "river ecology" was the highest at 0.42, while "hot spring demand" was the lowest at 0.09. After calculating the weighted scores for each plan based on the comprehensive average weights, the top priority plan was Plan 2, which involves stopping the use of the hot spring footbath pool at Quanyuan Park and implementing water diversion projects. Additionally, this study proposes suggestions for the sustainable development of agriculture and the ecological environment in the future Guandu area. It is recommended to establish an information exchange platform meeting for upstream river water resources and ecology in the Guandu irrigation area, where regular meetings can be held to discuss issues such as aquatic ecological environment, river water quality in hot spring areas, and the quantity and quality of irrigation water in the Guandu Plain. Coupled with adaptive management methods, this mechanism can effectively promote improving water resources and water quality in the Guandu irrigation area.

Keywords: Acid Mine Drainage, Impact on Aquatic Life, Stream Ecology, Biodiversity