

中文摘要

一般人工建造物對河川生態的影響研究，大多著重於壩體的阻隔作用或生物棲地的改變。關於攔河堰或水庫的洩洪、排砂和周邊地區施工等操作營運對河川生態的影響，在國內仍然少有相關的研究。

本研究在位於濁水溪的集集攔河堰週邊地區進行長期性的河川生態調查，將所得的結果經由豐度、歧異度、均勻度和魚類數量與洩洪、排砂和斷流等操作營運因子的分析，以探討攔河堰對河川生態造成的影響。

研究結果顯示靠近集集攔河堰上、下游的區域，不論魚類或甲殼類的數量都呈現逐年減少的現象，而距離攔河堰較遠的兩個樣站則有緩慢恢復的趨勢。攔河堰下方是所有樣站中生物數量減少最劇之處，物種的豐度、歧異度和均勻度變化亦顯示此區的環境已經逐漸惡化。各項操作營運因子與魚類數量的關係均呈現負相關，以斷流與魚類數量減少的判斷係數最高，其中又以粗首鱲(*Zacco pachycephalus*)和高身小鰾鮒(*Microphysogobio alticorpus*)兩種魚類，受到攔河堰操作營運的影響最大。

本研究發現集集攔河堰對河川生態的影響甚劇，除了阻隔作用和棲地改變外，對生物傷害最大的原因就是完全的截斷水流，其次是洩洪與排砂。針對營運操作因子與不同魚種的相關性分析後，建議將粗首鱲和高身小鰾鮒列為濁水溪生態保護的指標性魚種。同時建議攔河堰在營運操作時應避免產生任何的斷流，並且減緩洩洪或排砂時閘門關閉的速度。

Abstract

In general the research of river ecology focuses mainly on man made construction which can become an obstacle for migratory species or disrupt habitats. However, few studies have discussed the ecological influence of weir or dam operation, like flooding, sediment discharging and construction around the weir.

In this study a long term river ecological record of the Ji-Ji Weir in the Chou-Shui River was performed. The methodology include analysis of the richness, diversity and evenness of the fish and crustacean present. Linear regression analysis was also utilized to correlate weir operation with the amount of a particular species.

The findings here indicated that areas closest to the weir have experienced a significant decline in the amount of fish and crustacean over the years, whilst sites further away showed an increase following an initial decline during weir construction. In addition, a highly negative correlation between fish number and location relative to the weir strongly suggested a detrimental influence. It was discovered that the Ji-Ji Weir has affected the natural ecology of the Chou-Shui River. The greatest effects were observed at the intercept of the river where flooding and sediment discharge were commonly experienced.

Analysis of the operational factors with different fish species suggests that two common species *Zacco pachycephalus* and *Microphysoogobio alticorpus* were suitable markers of the fish level index for the Chou-Shui River. We also suggest that Ji-Ji Weir should avoid any intercept of the river when operating, and slow the operating rate of the water gate.