研究生：孫明德

學號：88842001

論文名稱: 景觀生態分析應用於集水區保育治理之研究

英文論文名稱: A Study on Application of Landscape Ecological Analysis in Watershed Management

【中文摘要】

集水區是複雜生態系統交互作用下集合而成的高異質性區域，由能量、物種、物質，以及空間互動行為組成不同的系統，深入瞭解與預測土地利用的空間格局與變遷是集水區保育治理的重要工作之一。本研究目的在於應用景觀生態分析方法於集水區保育治理，做為後續集水區保育治理與景觀生態環境規劃之依循。

本研究以南投縣上安集水區為研究區域，運用層級分析法建構集水區保育治理架構，以疊圖法分析出保育治理上敏感區域；以鳥類現地調查為基礎，以迴歸法建構鳥類棲地適宜性迴歸式，估算出全區鳥類棲地敏感區位；以集水區生態保育為目的，依據保育治理上敏感區域及鳥類棲地敏感區位，擬定出不同的治理對策，應用土地利用轉換及其效益模式(The Conversion of Land Use and its Effects at small regional extent; CLUE-s)，模擬集水區在不同規劃與管理對策下未來土地利用的情境，並以 Fragstats 景觀生態指數模組計算不同土地利用情境之景觀結構變化，比較不同土地利用情境及各保育治理區位下景觀生態格局差異性。

集水區生態棲地多樣性及景觀完整保全 AHP 分析結果顯示，上安集水區東側山區、中間林地及河岸區域為敏感度較高的區域；鳥類棲息地適宜性分析結果發現溪流兩側及研究區的中間地帶鳥類棲息適宜度較高的區域。集水區保育治理推估 2015 年土地利用變遷模擬、變遷區位分析及景觀生態結構比較結果發現，進行鳥類棲地適宜性高的區域管制，或者是同時保育集水區治山防災與保育之敏感度高及鳥類棲地適宜性高的區域時，有助於集水區景觀生態環境維持。

【英文摘要】

Under the interaction among ecological elements of energy, species, physical materials and spatial patterns, watershed area is a heterogeneity region which represents complicity and diversity as numerous eco-systems. To realize and to prediction the transition of land-use pattern is one of the crucial works in watershed management. The study is aiming at watershed management by introducing landscape ecological analysis to establish guidelines for landscape planning and environmental management.

In this study, Shan-An watershed, Nan-Tou county was selected as study area, to set up framework of watershed management by using analytic hierarchy processes (AHP), and designate sensitive areas through geographic mapping. Further, base on bird census, introducing regression analysis to establish regression model of bird's habitat suitability to estimate the amount and allocate the sensitivity areas. Finally, on the objectives of ecological preservation, to frame management strategies relatively according to assigned sensitivity areas both on preservation and bird habitat aspects. In addition, applying The Conversion of Land Use and its Effects at small regional extent model (CLUE-s) to simulate consequent land-use contexts under different planning and management strategies, and compare the variation on

landscape ecological patterns under different land-use conditions and locations via calculating the changes on landscape structures by using Fragstats model of landscape ecological index modules.

The AHP analysis of watershed ecological habitat and integrated landscape preservation has illustrated that East-bound hillside areas, middle woodlands and riverbank areas of Shan-An watershed are areas that with higher sensitivity. While the bird habitat suitability analysis has come out with that riverbank areas and borderland of the study areas are proper habitat for birds. Stand on the simulation and estimation of land-use transition by 2015, transformation location analysis and the comparison on landscape ecological structures, to enforcing environmental control in higher sensitivity areas of bird habitat, or potentially vulnerary areas are contributive to the landscape and ecological maintenance of environment of watershed.