

# Dynamic Simulation of the Grassland Connectivity and the Effects of Landscape Pattern in China's Poyang Lake from the Integrated Perspective of Habitat and Biology

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## Abstract

Analyzing the dynamics of landscape connectivity is of great significance for biodiversity conservation, but the description of multiple ecological processes and the depth of coupling requires to be strengthened. Taking the grassland of Poyang Lake as a case, based on the integrated perspective of habitat and biology, comprehensively considering the ecological process of water level change and species diffusion, this study firstly analyzed the changes of landscape connectivity of grassland with different water levels and diffusion distances by using the graph-based connectivity indices. then, landscape pattern indices were applied to analyze the dynamics of landscape pattern of grassland and further study the effects of landscape pattern on connectivity. The results showed as follows: (1) From the perspective of habitat, grassland connectivity showed a sharp decrease with the increase of water level. From the perspective of ecology, the species diffusion distance had an absolutely positive impact on landscape connectivity. With the increase of diffusion distance, grassland connectivity increased significantly. (2) The dynamics of landscape pattern of grassland showed that with the increase of water level, the patch area shrank, the patch shape tended to be simple, the patch density decreased and the patch fragmentation aggravated. (3) The correlation results between landscape pattern and connectivity indicated that F had a significant positive relationship with PD, ED, PC had a strong significant positive relationship with LPI, COHESION, and NC had a negative relationship with LPI, ED, COHESION. This study provides theoretical guidance for the conservation and management of grassland in Poyang Lake.

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