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Evaluation and Regulation of Stereoscopic Spatial Connectivity for Wetland System in Heilongjiang River Basin, China

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The weakened connectivity of wetland system is the key factor leading to the destruction, degradation and disappearance of wetland. Recently, the researches on the connectivity of wetland system mainly focus on the connectivity of hydrology and geomorphology, the impact of wetland system on habitat is ignored. In this study, an innovative method was applied to evaluate and regulate the Stereoscopic Spatial Connectivity (SSC) of wetland systems in the Heilongjiang River Basin in China (HRBC). In the method, the water requirements of typical organisms in the region was considered, and the evolution trend of landscape area in wetland system and the health condition of SSC were analyzed by GIS. The regulation mode of improving Stereoscopic Spatial Connectivity Index (SSCI) was proposed. The results showed that over the past 35 years, the wetland system in the study area had shrunk significantly with the SSCI decreasing from 41.3% in 1980 to 35.08% in 2015. By comparing the correlation between temperature, precipitation, agricultural land, construction land and wetland system in the same period, it proves that human activity is the major driving factor of wetland system shrinkage. Eventually, the key protected areas for maintaining the SSC of the wetland system are clarified, and the key recovery areas are determined according to the three scenarios of "high-medium-low" feasibility, which greatly improves the SSCI and Generalization Route (GR) after regulation. In general, the proposed SSC evaluation and regulation methods can fully reflect the ecological effect of wetland system. The methods also scientifically quantify the significant effect of regulation mode, which has certain reference significance for the evaluation and regulation of wetland system in other regions.