

研究论文

城市湖泊退化过程中水生态系统服务功能价值演变评估——以肇庆仙女湖为例

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摘要 运用市场价值法、碳税法、造林成本法和工业制氧影子价格法、影子工程法以及价格替代等方法, 以肇庆仙女湖为例, 对城市湖泊水生态系统自然资产价值部分的演变进行了评估。结果得出, 仙女湖水生态系统退化过程中, 导致水生态系统有些服务功能的大幅度降低, 如大气调节功能价值由1999年的460124元降低到2004年的8元、水质净化功能价值由1999年的11480元降到2004年的904元等; 但并非各项生态系统服务功能价值都降低, 有些项目的生态系统服务功能可保持不变, 如水资源调节功能价值; 甚至升高, 如物质生产价值由1999年的152400元增加到2004年的241200元。该研究给退化生态系统的修复带来很大启示, 即在退化生态系统的修复过程中要针对性的就退化生态系统的结构和功能进行修复, 提高生态系统的总体服务功能价值, 而非退化生态系统的各项服务均需提高, 有些项目的生态系统服务价值可以保持不变, 甚至降低。

关键词 城市湖泊 水生态系统 生态系统服务 价值评估

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Evaluation on the changes of ecosystem service of urban lakes during the degradation process: a case study of Xiannü Lake in Zhaoqing,

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Abstract With the further study of ecosystem, people begin to pay more attention to the services provided by ecosystems that have been ignored for many years and begin to use measurable methods to express the values of ecosystem service, so the evaluation of ecosystem service is taken into account and is becoming an advanced ecological issue in recent years; at the same time, as more and more ecosystems degrade, studies on ecosystem succession is becoming another hot spot and when ecosystems degrade, the ecosystem service changes too, but little previous research has been carried out about the change of ecosystem service value.

Based on the literatures, ecosystem services are classified into two categories: value of natural resources and the value of humanities. The value of natural resources included matter value (including food, material, etc.), ecosystem process value (including water purification, atmosphere regulation, etc.) and habitats value. The value of natural resources could be evaluated directly or indirectly, but up to now there are not recognized methods to evaluate the value of humanities (scientific research, education and tour, et al) because it is influenced by so many factors. In present paper, the natural resource value of the urban lake ecosystem services, Xiannv Lake as a case, during the degrading process was evaluated and some methods, such as, the market value approach, reforestation cost approach, shadow project method, surrogate market method, carbon tax approach, et al, were employed. Results showed that some ecosystem service values decreased quickly with the degradation of Xiannv Lake ecosystem, such as gas regulation (460,124 Yuan in 1999 and 8 Yuan in 2004) and environmental purification values (11480 Yuan in 1999 to 904 Yuan in 2004). Not all functions decreased with ecosystem degradation. Some functions such as water resources regulation remained unchanged because lake volume was unaltered. Yet other functions increased, for example, fish production increased from 152400 Yuan in 1999 to 241200 Yuan in

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n 2004. The study has a significance for restoration of a degraded ecosystem. As a degraded lake is restored, ecosystem functions or services such as CO₂ fixation, O₂ release, and environmental purification services would increase significantly, but other functions may remain unchanged or decrease. The methods applied in this paper are convenient and widely used, but further improvement in the criteria and principles of evaluation, particularly for lake ecosystem services, is required.

Key words urban lake aquatic ecosystem ecosystem service valuation

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