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厦门筲箕湖生态修复技术策略研究

Study on Technological Strategies for
Ecological Restoration in Xiamen Yundang
Lagoon

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摘要

“一部人类文明的发展史，就是一部人与自然的关系史”，近年来，环境污染问题的频发、资源稀缺问题的突显和生态系统退化问题的日趋严重，都让人们越来越深刻地意识到生态环境保护的重要性和紧迫性。党的十八大明确提出了生态文明建设。面对如今的生态环境问题，生态修复正逐渐成为人类抑制各种生态破坏行为、改善和保护地球生态环境的重要方法。它是以生态学及相关学科所揭示的生态系统与环境之间的关系为基本法则，包括了从宏观到微观的一系列措施，并具有影响因素多而复杂、在理论研究和应用实践上都是多学科交叉等特点；它体现了人与自然和谐相处的理念，是理性人群正确认识自然、善待自然的观念的有效表达方式之一。而完善生态修复效果、实现生态修复目标，又需要既针对具体、实际的环境问题、又综合考虑了社会、经济、文化效益相结合的技术策略。总的来说，生态修复技术策略在同步创新防治理念和防治方法、改善环境现状、解决生态问题、实现资源与经济的可持续发展等方面都显示了它愈加重要和突出的地位、作用。

本文以厦门筼筮湖生态修复工作为案例，概述了厦门筼筮湖从“景致优美的天然港湾”到“鱼虾绝迹、臭气熏天”的湖区再到“城市绿肺”的历史沿革和环境变迁，立足于筼筮湖的现有问题及其成因，搜集、整理国内外相关的理论、实验依据，结合已有的实验室研究及现场示范的经验和成果，提出了针对筼筮湖生态系统现状和未来生态环境改善方向的技术策略，即以筼筮湖流域综合整治为基础，尤其是其中的污染控制和清淤疏浚工程，在初步改善的湖区水质、底质环境中，实施以生物修复为主的筼筮湖生态修复技术路线，具体包括红树林湿地建设、生态浮床技术、大型海藻修复技术以及食物链构建等四项主要措施。此外，在各项措施实施的过程中，需注意按时的生态监测与及时的技术调整。

本文的研究内容主要包括了生态修复相关概念的介绍及相关领域的研究进展介绍、筼筮湖历史沿革与污染现状、筼筮湖生态修复技术策略的基本思路、以生物修复为主的筼筮湖生态修复技术路线详述、筼筮湖生态修复的综合管理与保障机制等五个方面的内容，通过将科学原理、科学试验结果及科学技术等与现实问题相对应，论证了筼筮湖生态修复技术策略的可行性，分析了该技术策略的合理性，探讨了该技

术策略的实施对筓筓湖水质的净化、对富营养化程度的降低以及对赤潮的抑制起到的积极作用，叙述了以生物修复技术为主的筓筓湖生态修复策略优势，阐释了该技术策略的各步骤之间相辅相成、互补统一的关系，提出了如何科学地实施该技术策略的意见和建议。同时结合政府管理、媒体宣传、公众参与等多方面的措施，以期形成一个融合了科学技术和公共管理的综合性技术策略，服务于筓筓湖区乃至厦门市的社会、经济、文化、环境效益的全面提高，并对相似的问题的应对方案提供参考与借鉴。

关键词：生态修复；技术策略；综合整治；管理

Abstract

“The history of human civilization development is the history of relations between human beings and nature.” In recent years, the frequent occurrence of environmental pollution problems, resource scarcity and ecosystem degradation are becoming more and more serious, which makes people be aware of the importance and urgency of ecological environmental protection more profoundly. So the construction of ecological civilization has been put forward. In the face of the specific environmental problems, ecological restoration has become a very important approach for preventing natural or man-made ecological destruction, improving the ecological environment and protecting the earth. Ecological restoration is based on the relationship between the ecosystem and the environment, including a series of measures from macro to micro, and having characteristics of multidisciplinary cross in both theory research and practical application. It not only embodies the idea of the harmony between human beings and nature but also expresses correct understanding of the nature that we need to advocate. As to improving the effect of ecological restoration and achieving the goal of ecological restoration, it needs technological strategies not only aiming at actual environmental problems but also considering the comprehensive benefit of society, economy, culture and environment. It highlights the increasingly important role of innovating precaution ideas and management approaches synchronously. Moreover, it is a combination of effective measures that can solve ecological problems, improve the quality of environment, and finally achieve the sustainable development of resource and economic.

This study briefly introduced the historical evolution of Xiamen Yundang Lagoon and also briefly showed the effect of comprehensive improvement there, then point out the existing ecological environment problems which remain serious. So this study takes ecological restoration in Yundang Lagoon as the object of study

and it is conducted basing on collecting available material related to the causes of existing problems and improvement approaches with the combination of the results for experimentation in the lab. Furthermore, this study put forward the basic thoughts and technological strategies for ecological restoration in Yundang Lagoon. The basic thoughts emphasizes the fundamental role of the comprehensive improvement, especially attach importance to dredging and pollution control. As water quality and sediment conditions in Yundang Lagoon has preliminarily improved, the bioremediation measures of technological strategies for ecological restoration in Yundang Lagoon can be carried out. These technological strategies include four main technological measures: the mangrove wetland construction, the ecological floating bed technology, the macroalgae restoration technology, and food chains reconstruction. In addition, each process of technological strategies needs to be ecologically monitored and modified if necessary in a regular basis.

This thesis consists of 6 chapters and the main contents include the related concepts of ecological restoration, research progress in related field, historical evolution of Yundang Lagoon and its present situation of the pollution, basic thoughts of ecological restoration and the technological strategies for ecological restoration in Yundang Lagoon, as well as the implementing and guarantee of ecological restoration technological strategies in Yundang Lagoon. The thesis not only demonstrates the feasibility and rationality of the technological strategies, but also illustrates the advantage of these strategies, discusses the relationship among the steps of the technology strategies and gives suggestions on how to implement the technological strategies with both technology and management methods. Hope this study can make contributions to improving the benefit of society, economy, culture and environment, then provide the reference of solving analogous problems as well.

Keywords: Ecological restoration; Technology strategy; Comprehensive improvement; Management

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