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Construction and Application of Coral Reef Resources Garden Engineering Based on Ecological Value Assessment

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ABSTRACT

This paper proposes a method for evaluating the ecological value of coral reef resources and garden engineering construction assets. By analyzing the state transition of coral reef ecosystems after multiple disturbances, it is shown that ecological resilience is crucial to maintaining the stability and sustainability of the system. Among the many factors that determine coral reef ecosystems, the loss of biodiversity will make the system more vulnerable to external disturbances and continue to degrade. On the basis of relevant research work at home and abroad, combined with China's coral reef ecosystem monitoring capabilities, a set of evaluation index systems for China's coral reef ecosystems are proposed to provide a reference for in-depth understanding of the resilience of China's coral reef ecosystems, and establish a system to protect and improve coral reefs. Ecosystem-oriented management will provide more options for addressing the degradation of coral reef resources.

KEYWORDS

Assessment, Coral Reef, Ecological Value, Landscape Engineering

1. INTRODUCTION

Coral reefs are a very unique type of ecosystem in the ocean and are known as the "tropical rainforest in the ocean" and the "oasis in the blue desert" due to their high primary productivity and biodiversity (Wang & Li, 2021). It not only provides abundant marine products, medicines, and construction and industrial raw materials to human society, but also has the ecological benefits of bank protection, environmental protection, and high aesthetic and scientific research value (Ai et al., 2022). It is an important life support system. Coral reef ecosystems are sensitive to changes in the external environment (Ju et al., 2022). In recent years, due to climate change and human activities, global coral reefs have experienced significant decline (Xu et al., 2022). Aubrecht et al., (2008) present a satellite-based approach to gather information about the threat to coral reefs worldwide. Continuing coral-reef degradation in the western Atlantic is resulting in loss of ecological and geologic functions of reefs. With the goal of assisting resource managers and stewards of reefs in setting and measuring progress toward realistic goals for coral-reef conservation and restoration, Kuffner et al., (2016) examine reef degradation in this region from a geological perspective. Hoegh-Guldberg et al., (2018) argue for a coordinated, global coral reef conservation strategy that is centered on 50

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large (500km) regions that are the least vulnerable to climate change and which are positioned to facilitate future coral reef regeneration. Bellwood et al., (2019) present a blueprint for future reef conservation that recognizes the need to better understand the processes that maintain Anthropocene reefs and the growing imperative to reform conservation efforts to address both specific local issues and larger-scale threats. Therefore, when using coral reef resources, it is necessary to carry out scientific assessment, formulate reasonable development strategies, strengthen management, and correctly handle the relationship between economic development and coral reef protection, so as to achieve the maximum benefit and sustainable utilization of resources (Guo & Wang, 2021). The evaluation of the value of natural resources is an inevitable trend of establishing and improving a socialist market economy and an inevitable requirement for building an ecological civilization and promoting economic development and transformation (Sowińska-Świerkosz et al., 2021). As one of the core concepts of ecological civilization construction, the evaluation of natural resources marks that the author's country's natural resource management is undergoing, and will continue to undergo, a major transformation, from focusing only on the physical form of natural resources to also attaching importance to the value form of natural resources (Hongyun et al., 2012). The rational allocation of resources turns to also focus on the rational disposal of natural resource assets (Tan & Yin, 2021).

The evaluation of the value of natural resource assets is of great significance for multiple reasons. First being, it helps to evaluate the total amount of natural resource assets in a country or a region, so as to judge the natural resources of a country or region (Ramadhan & Nuryanti, 2021). The increase or decrease in total resource assets serves as an important basis for assessing total natural capital (Abbas, 2022). Second, through the evolution and deepening of the natural resource balance sheet from a physical scale to a value scale, it is helpful to deduct the corresponding reduction in the value of natural resource assets from the economic accounting results and to achieve (statistical department) true "green accounting" (Martínez-Rendis et al., 2020). Third, it helps to promote the dynamic grasp of the changes of natural resource assets in development, utilization, protection, restoration, and other links. It helps to promote a timely grasp of the value changes of natural resource assets in the process of transfer between various uses and realize the preservation and appreciation of natural resource asset (Qian et al., 2019). Fourth, it assists in promoting (operating) natural resource assets to participate in rational operation in the form of sale, lease, shareholding, mortgage, guarantee, etc., to provide important support for economic growth, and to ensure the preservation and appreciation of natural resource assets in the process of operation (Song et al., 2022). Finally, it is the basis for scientifically and rationally confirming the taxes and fees of natural resource assets and promotes the rational distribution of income from natural resource assets (owned by the whole people or the state) (Zhang et al., 2022).

In the report of the 19th National Congress of the Communist Party of China, General Secretary Xi Jinping clearly put forward the focus of future work to "accelerate the reform of the ecological civilization system and build a beautiful China" (Liu et al., 2022). It specified work requirements such as, "increasing the protection of ecosystems," "improving the quality and stability of ecosystems," and "improving the ecological environment management system" (Moarrab et al., 2021). It also points out a new direction for the study of coral reef ecological protection (Lei & Jain, 2022). At present, there are relatively mature studies on the value of ecosystem services abroad, which are used in the current research and future planning of coral reef ecosystems, and relevant planning and standards have been formulated according to these (Beceiro et al., 2022). This paper aims to provide reference standards for the evaluation and protection of coral reef ecosystem services by exploring and studying the status quo of coral reef and the key points of protection.

2. MATERIALS AND METHODS

2.1 Characteristics and Status of Coral Reef Resources

Coral reefs are considered to be the most biologically diverse system in the marine ecosystem (Do et al., 2022). They are formed by the accumulation of coral skeletons that grow in situ and develop in

Computational System to Support Bovine Nutritional Behavior

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