

Application of Geographic Information System in the Prevention Measures of Island Reef Degradation through Data Analysis

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Abstract

Coral island reef is one of the important ecosystem types. Due to the special status of the island, reef and low tide highlands in the "United Nations Law Convention on the Convention on the Law, the territory, the territory, the adjoir area and the exclusive economic zone, etc. have important national defense value and the significance of maintaining the national marine rights strategy. With global warming and seawater acidification, the island reef disappears has becoming a global issue. It adopts GIS to repair and evaluate the coral island reef ecosystem to obtain reliable ecological geographic data. This paper has been fully elaborated from the essential role of the island reef, the degradation of the global island reef, the degradation of the island reef, the ecological repair of the island reef. As the island reef of the World Marine Biological Species Genuine and the Marine Natural Medicine Resource Bank, it is important for its ecological environment, and has an important significance for maintaining island reef biodiversity and maintaining its ecological services.

Keywords

Geographic information system, island reef, degradation, ecological repair.

1. Introduction

About 70% of the surface of the Earth is the ocean, the ocean is a cradle that is pregnant, and it also contains rich resources. Due to the special status of the island, reef and low tide highlands in the "United Nations Convention on the Law of the Sea, it involves important defense value and the significance of maintaining national marine rights strategies, etc. Any part of a special island, reef and low tide highlands has become the focus of competition for countries.

China has a large number of islands and a large area. In the "National Island Protection Plan", my country's islands are divided into four first-class protection areas: the Yellow Sea and Bohai Sea, the East China Sea, the South China Sea, and Hong Kong, Macao and Taiwan. Among them, there are more than 700 islands in the Yellow Sea and Bohai Sea, more than 4,200 islands in the East China Sea, and more than 1,800 islands and reefs in the South China Sea. It crosses the three temperature zones of tropical, subtropical and temperate zones, with a total area of about

80,000 square kilometers, accounting for 8% of the total land area [1], accounting for 2.57% of the total global islands and reefs, ranking eighth in the world.

Island is the frontier position of my country's development of marine economy, known as "second coastal belt", although island is small, but with marine economy, transportation, safety, scientific research, ecological equivalence, the development of the inland economy is important significance. The essential hydrological conditions of the island waters have created a wealth of marine species in the sea, and it is also an important fisheries population [2], breeding field [3-4] and Toy Tour [5]. Non-alternative ecosystem service functions such as marine high quality protein supply, oxygen production, climate adjustment, cultural services, species and ecosystem diversity.

Coral island reef ecosystem repair and governance involves large area, many form, wide information data, requires higher level of software data management and analysis capabilities, GIS (Geographic information system) as a decision-making support system, has a variety of characteristics and advantages of information systems. A comprehensive control of the mainstream data source, fast, intuitive, and multi-angle analysis of the spatial distribution and time variation characteristics of each element [6], so that the protection management and comprehensive decision of the coral island reef ecosystem will develop in the direction of diversification, informationization, and integration.

2. Degeneration of the global island reef

The island reef can be divided into three categories of Kharitles, Coquier Island, and Coral Island in the island reef, including 93% of Kids Island. However, in the past 100 years, water temperature, circular mode, marine chemistry, sea level, tropical cyclone and abnormal climate have changed, and human activities such as excessive fishing, illegal damage, excessive tourism development activities have seriously affected the distribution of island reef biological communities. Structures and functions destroy the ecosystem of the island reef, resulting in serious degradation of the global island reef.

The situation in which island reef disappears is becoming a global issue. Since the industrial revolution, the climate warming and global warming of human activities are emitted by a large amount of greenhouse gases. In terms of ocean, the elevation of sea water and atmospheric CO₂ concentration is gradually acidified [7]. As an important composition of the marine system, coral island reef has great ecological and economic value, and is also the most vulnerable rings in marine ecosystems, and inevitable suffering from global warming and octorative acidification [8-9].

As early as 2008, scientists from 96 countries and regions from the world have issued warnings: If the carbon dioxide emissions continue to increase at the current rate, then affected by high temperature and seawater, the global coral reef will gradually die in the next 40 years. At that time, the "2008 World Coral Reef Status" was pointed out that 19% of the world's coral reefs were destroyed or completely lost, and 15% of the coral reefs were lost in the next 10 to 20 years. How to adapt to global changes, the coral island reef ecosystem is related to the issue of coral island reef ecosystems, and is also one of the major challenges of current human society sustainable development.

3. The degradation of the island reef in China

In addition to its own value, my country's South China Sea, the island, reefs, etc. of Nansha, Reef, Japan, and Beach, etc., in addition to its own value, representing my country's territorial seaface point and its extensive exclusive economic zone. The degradation trend of the global island reef is consistent, due to the global seawater temperature rise, excessive fishing of seawater,

fisheries resources, and coastal development, the number and population of the island reef in my country has also present a rapid decline [10]. In the past 30 A, China and Hainan Island's cuts have disappeared about 80%. In the Sisha Islands and the Nansha Islands, the coral coverage of the above sea area has dropped from 60% to 20% in the past 10-15 years [11]. In 1991-2010, the coral coverage rate of the southeastern part of Suzhou Island fell to 17.58%, and the southwestern waters decreased from 80.00% to 8.45%; 2005-2010, the northern waters decreased by 63.70% To 12.10% [12]. Some of the area of coral reef is reduced, and some island reef has even disappeared. Related data shows that the altitude of 2.7 meters in China, the third largest island of Xisha Islands is only 2.7 meters, and the wind erosion caused by the wind erosion makes the altitude of the whole island gradually decrease. It is about 5 meters per year, and the entire island area is shrinking rapidly. A few years ago, the China Construction Island area was approximately 1.5 square kilometers, and now it is now reduced to 1.2 square kilometers.

Only 700 ~ 1000 in the world's reef stone coral, and my country's reef corals have about 300, including 204 of Xisha. South Island Reef is a world marine biological species gene bank and marine natural drug repository. Compared with changes in the global warm water coral reef, the average degradation rate of coral reef in South China Sea is higher than the global average, and the rate of degradation of local area is higher. The decline rate of the variety of the reef corals in Yongxing Island, North Island, Zhao Tao, and Xishazhou were 53.85%, 26.09%, 73.91%, and 70.59%, respectively [13]. In addition, the island reef area contains rich oil and gas and biological resources, and the future may play an important role in relieving energy in my country. Thus, the protective island reef has an ecological restoration work, which is of great significance for maintaining the biodiversity of island reef and maintaining its ecological service.

4. Ecological restoration of island reef

Island reef ecological repair has always been worldwide and research hotspots. The island reef should be suitable for living, suitable for production, natural development, to protect the purpose of protecting the ecology, need to realize the two difficulties of the island reef ecological repair to natural development island, and fully understand the natural succession mechanism of the island reef and Shimple sustainable development mechanism. The core work is to implement ecological recovery projects to optimize biological habitat, which in turn promotes the protection of biodiversity. After the biodiversity level is improved, it can make the biological community structure further optimize, so reciprocating, which can better promote ecological recovery. However, coral reef ecosystems are a complex system with extremely high biodiversity, and their repair work needs to be comprehensive and comprehensive for ecosystem structures (biological and non-organisms), functions, biodiversity and sustainability.

Over the years, my country has very much attention to the protection and repair of the island reef, has obtained a lot of research results and practical experience, through legislation and establishment of the protection zone, to supervise the development and utilization of the island reef in the jurisdiction of the sea area. To strengthen the protection of coral reefs through legislation. The "Marine Environmental Protection Law", "Sea Area Management Law", "Island Protection Law" and "Regulations on the Ordinance of Marine Environmental Management of Pollution in Prevention and Cure Ocean Engineering Construction Project" have clearly defined For Article 20 of the Marine Environmental Protection Law stipulates: "... protect mangroves, coral reefs, coastal wetland ... etc. is typical, representative marine ecosystem ... for important economic and social value To destroy marine ecology, rectification and recovery should be rectified."

Actively fulfill the responsibility and obligation of international conventions such as the Convention on Biological Diversity, and continuously increase the intensity of scientific investment and protection of coral ecosystems. Through the status quo investigation of the island reef coral reef ecosystem, the system master the bottom, current status and structural characteristics of the island Reef ecosystem, the main impact of the construction of the construction of the coral reef ecosystem, accurately assess the structure of the coral reef ecosystem structure and biodiversity, Key structure of healthy coral reef ecosystem.

A number of marine protected areas were established, and 4 national coral reef protected areas such as Xu Wen, Hainan Sanya, and Wanning, and Wanning have been established since the 1990s. Coral reef ecosystem repair work in China is in staying. In the 1990s, coral reef protection and repair related research have been established. Multiple national-level county-level coral reef protected areas, including Hainan Sanya Coral Reef National Nature Reserve, Guangdong Xu Wen Coral Reef National Nature Reserve, Fujian Dongshan Coral Reef Ocean Nature Reserve and the National Ocean Park of the Coral Reef of Guangxi, Guangxi.

China carry out coral recovery research and practice actively. Coral repair is carried out in Guangdong, Xisha and other places to achieve expected results. Coral reef ecosystem repair is aimed at damaged or declined ecosystems, using its own repair capabilities and necessary artificial assistance methods to promote its structures and functions that have returned to the original or close to the original state, so that the coral reef ecosystem is rebuilt. process. According to the degree of damage to coral reef, coral reef ecological repair strategies are generally divided into three major categories: natural repair, biological repair and ecological reconstruction. For relatively healthy, there is a good reef biological and reef biological species replenishment, its own recovery is only a time problem, take corresponding measures to eliminate pressure, avoid people to damage is the most critical repair strategy; for some Damaged coral reef ecosystems, which may take up to hundreds of years through natural recovery, human interventions can accelerate the natural repair process, promote the natural recovery of the ecosystem; however, for severe damaged coral reefs, their ecosystem functions may have Complete degradation or loss, usually requires human intervention, reconstructing ecosystems. The research work in Australia, Israel, Japan, and the United States has shown that active biodiversity protective measures and appropriate human interventions can accelerate the recovery process of coral reef ecology [14-15]. Through human activities effective management and multiple repair technology applications, the degradation trend of coral reef ecosystems in some waters has gains a certain curb, and coral coverage is even improved [16-18].

5. Conclusion and Prospect

The coral island reef should have adhered to the ecological priority concept. It is based on "natural protection and natural recovery, supplemented by artificial intervention". From the perspective of economic, social, cultural, comprehensive analysis of the cost and value of coral reef ecological restoration, and build an ecological Comprehensive Management Framework and Regulatory Strategy System of System of Coral Island Reef.

1) Basic research of the protection and repair of coral island reef ecosystems. The structure and function of the coral island reef ecosystem is systematic, analyzes the interaction between biology, biological and environmental factors and the multidimensional relationship, clearly affect the key factors of the protection and repair of coral island reef ecosystems.

2) Continue to R & D of Coral Island Reef Ecological Reconstruction Technology and Biological Repair Technology. Break through the firmware and three-dimensional reconstruction techniques, establish a base broadcast, proliferative and discharge, maintenance technology

system of coral island reef ecological repair, and to form a multi-dimensional resilience engineering model.

3) Strengthen the monitoring and evaluation of coral island reef ecosystems. Establish a scientific and perfect ecosystem health assessment method, regularly carry out ecosystem health assessment and forecasting, assessing damaged coral reef ecosystem repair or governance effects, guiding coral reef ecosystem protection, repair, and sustainable utilization.

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