



Study on the management of marine economic zoning: An integrated framework for China



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ABSTRACT

The paper uses economic zoning methods, marine spatial planning methods, and marine functional zoning methods to construct an evaluation system which considers factors such as social and economic development, carrying capacity on resource and environment, marine development and utilization, and regional development potential. As comprehensive indices, the factors are directly related to the regional marine economic development. Using the evaluation characteristics of different types of marine economic regional development, this paper applies the matrix discriminant method of regional divisions to form the judgment matrix of marine economic areas. With the actual evaluation results of sea area indices, it determines the type of marine economic zoning and proposes a reasonable marine economic zoning scheme. Simultaneously, the adopted methods and system are simple and practical, and general theories of economic and marine zoning are used.

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1. Introduction

Zoning is a form of regulation of the use of land that typically is an ordinance adopted by a municipal government. The zoning ordinance includes text and a zoning map that specifies the allowable uses of all parcels of land in the municipality. This paper examines some aspects of the economics of marine zoning.

A key challenge of marine zoning is balancing environmental, economic, security, social, and cultural interests in delineation of zone boundaries. This paper focuses on economic aspects of marine zoning. Marine economic zoning is the division of marine zones into diverse economic subzones based on territorial divisions of social labor, levels and characteristics of regional economic development (Ling and Yin, 2010), and national economic and social development goals. All of this occurs in concert with marine economic development laws and inherent feature. The establishment of scientifically-based marine economic zones ensures the sustainable development of marine economy and improves national maritime rights. It shows the important political and strategic

significance.

Marine zoning in China does not possess a lengthy history. Jiang Tiemin (Jiang, 1990), who published the book titled *China Marine Regional Economic Research*, illustrated theories of marine zoning and marine functional zoning, and proposed a design scheme of marine economic zoning (Gao, 2009). *National Ocean Development Planning* (1993) (Wang, 2001) which was led by State Oceanic Administration of China (SOA) proposed a zoning plan to develop five key coastal areas and three special development areas. It was a chance happening that the marine development planning of coastal areas developed into one marine zoning plan (Sun, 2007). Zhang Yaoguang (Zhang, 2000), in *Preliminary Discussion on the Division of Comprehensive Marine Economic Area in Liaoning* proposed a design of marine economic zoning about Liaoning. He evaluated the characteristics and development directions of economic zones. And he provided a standardized system and empirical explanation for guiding ideology, principle and indices of marine economic zoning. Zhang (2002) in *Some Problems of Marine Economic Zoning in China* analyzed the economic zoning and development process of marine economy, and he puts forward the concept, characteristics, guiding ideology, primary missions, principles, index system and hierarchical system of marine economy in China.

National Marine Economic Development Planning Outline (2003) (Ocean Development and Management, 2004) which was

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formulated by SOA divided China's coastal area and adjacent sea area into 11 comprehensive economic areas (Sun, 2010). This was the first time when the marine economy was brought into planning for the overall progression of economy in China. This paved the way for implementing a strategy for the development of the marine economy. *National Marine Economic Development "12th Five-Year" Plan* (2012) which was approved by State Council of China stated that the government should fully support the leading roles of the three economic areas of Bohai Sea, Yangtze River Delta, and Pearl River Delta, which should further advance China's northern, eastern and southern regions into three sea economic circles. At the same time, the government sought to cultivate important economic growth poles through implementation of the plan combined with coastal area development (Mao, 2013).

A report from the Eighteenth National Congress of the Communist Party of China suggested that the country should enhance its capacity for exploiting marine resources, developing the marine economy, protecting the marine ecological environment, safeguarding China's maritime rights and interests, and thereby building China into a strong maritime power. In regard to this, marine territory plays an increasingly important role in providing material and space resources, promoting marine sustainable development from an economic point of view and safeguarding national marine rights and interests. At the same time, China also faces a number of problems which can restrict marine sustainable development economics including degradation of the marine environment, unreasonable marine industrial structure and space layout, lack of scientific and technological innovation ability, increasing constraints of resources and ecological environment, and incomplete systems for securing ideal development. Marine economic zones accelerate the implementation of the strategy's main functional areas and promote the development of each region, at the same time providing power to promote the marine economic development. Scientific and effective marine economic zoning will help China and other countries to successfully solve problems in marine economic construction, and will help attain the goal of a healthy, sustainable marine economics.

In this study we propose an integrated framework of marine economic zoning for China. The principles, system, and procedures of marine economic zoning are discussed. We also describe the evaluation system which takes into consideration the marine economic development potential and strengths that are used to determine the various types of units of marine economic zoning and the divisions of marine economic zones. This paper examines the entire sea area that is under China's jurisdiction as research objects for evaluation and considers the division into seven marine economic zones.

2. Principles of marine economic zoning

2.1. In the light of marine conditions

Different sea areas have distinct resource situations and development conditions. This results in different utilization directions (Zhu, 2008). Zoning should fully consider the sea area situation and exploit strengths while avoiding exposure of weaknesses, and create reasonable development strategies. Development of industries and its space selection must be determined carefully for positioning them in suitable locations.

2.2. Orderly development

Marine economic zoning is an orderly planned system of engineering. Based on marine resource conditions and the actual situation of different periods of the development of productive forces,

zoning should develop in an orderly fashion. This ensures the health and sustainable development of marine economies.

2.3. Scientific management

Marine regional problems are common due to the diverse environmental characteristic properties of the sea. The development problems of marine areas change over different periods of time. Marine economic zoning should maintain the integrity of marine traditional jurisdiction and administrative areas (Du, 2008). It is imperative to do management of marine systems in a well to do manner, so one can establish a regional marine management system, can help strengthen the regional marine management function of government, can coordinate the contradiction between development, demand and protection in the marine economic zoning to achieve the scientific and reasonable economic zoning.

2.4. Equal attention to economic development, resource exploitation and environmental protection

Marine economic zoning should take into consideration marine economic development and environmental protection and should be able to guarantee the sustainable development of the marine economy. This strengthens protection and improvement in the marine ecological environment. Marine economic development and the direction of sea area utilization should be adjusted according to resources and environmental capacity (Sun, 2008). Marine economic zoning must follow the path of sustainable development, which encourages economic zoning to coordinate with efforts for sustaining the ecological environment.

3. System of marine economic zoning

Each region of the nation is not considered to be an independent economic entity. Different administrative ranks of marine economic zoning make up the grading system of marine economic zoning, and the classification system is made up of different types of marine economic zoning.

3.1. Grading system of marine economic zoning

In China, based on the administrative rank, the marine economic zones can be divided into three parts: the nationwide, provincial and city/county marine economic zoning. It is showed in Fig. 1.

3.1.1. Nationwide marine economic zoning

Nationwide marine economic zoning is divided on the basis of national economic development. Special consideration is given to natural conditions, economic conditions (Zhang, 2002), industrial structure and direction of marine economic development. This is the highest level of marine economic zoning which provides the scientific basis for marine resource development and all levels of

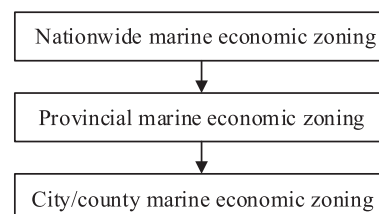


Fig. 1. Grading system of marine economic zoning.

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