



Development of China's marine functional zoning: A preliminary analysis



Ruoyan Feng^a, Xiaoxuan Chen^b, Peng Li^c, Lingling Zhou^a, Jing Yu^{a,*}

^a Ocean University of China, College of Oceanic and Atmospheric Science, Qingdao, 266100, PR China

^b Ocean University of China, School of Law and Politics, Qingdao, 266100, PR China

^c Shandong Institute of Environmental Science, Jinan, 250013, PR China

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ABSTRACT

The government of China aims to protect and improve the marine ecological environment, exploit and develop marine resources in a rational manner, and improve capacities for comprehensive marine management. In light of these objectives, commencing from the beginning of 2010, preparatory work toward the development of a new round of marine functional zoning revisions was initiated. Based on the National Marine Functional Zoning scheme of 2002, and in accordance with the Law of the People's Republic of China on the Administration of the Use of Sea Area and Marine Environment Protection Law of the People's Republic of China, in conjunction with other relevant laws, regulations, and specific policies for national marine protection and development, China has launched the National Marine Functional Zoning Scheme for the period from 2001 to 2020. This paper focuses on the development of China's marine functional zoning system. Based on an analysis of existing problems entailed in the implementation process of original marine functional zoning, it discusses the main adjustments made to improve the scheme. It also reflects on these problems in new Marine Functional Zoning and suggests how they can be addressed during a future round of revisions.

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1. Introduction

In general, the establishment of marine spatial zoning plans for integrated coastal management (ICM) is a widespread practice (UNESCO, 2006). During the past 10 years, the evolution of marine spatial planning (MSP) and ocean zoning has become a crucial step in making ecosystem-based, sea use management a reality (Douve, 2008). For instance, the United States, the United Kingdom, Canada, New Zealand, Australia and other maritime states have developed marine spatial zoning plans, or other similar plans, aimed at coordinating utilization of marine resources and protection of the marine ecological environment (Ehler and Douve, 2009; Kenchington and Day, 2011). Only recently MFZ in China has been characterized as a practice of MSP (Douve, 2008). Commencing from the 1980s, China has carried out a series of marine functional zoning initiatives to better develop and utilize

marine resources and to protect the marine environment. The ocean possess a variety of usage, under prevailing conditions, marine basic function should be best use, any utilization and development activities can not cause irreversible changes to its basic function. Based on the location, natural resources, environmental conditions, and utilization of a marine area, and in accordance with the standards pertaining to marine basic functional zones, sea areas have been divided into different kinds of marine functional zones (SOA, 2010). These initiatives could provide scientific evidence to help promote marine development, protection, and management. Moreover, marine functional zoning comprises a major component of China's marine management, with attendant legal impacts, and should be stringently executed.

2. Development of marine functional zoning

From the end of the 1980s, activities relating to the development and utilization of marine resources have become increasingly complicated and diversified in China. Marine functional zoning was first proposed in China in 1988. Subsequently, the State Oceanic Administration, relevant departments of the State Council, and the

* Corresponding author.

E-mail addresses: ruoyan1992@126.com (R. Feng), Chenxiaoxuan92@126.com (X. Chen), pengli568@126.com (P. Li), linglingzhou@126.com (L. Zhou), by6801@ouc.edu.cn (J. Yu).

governments of coastal provinces, autonomous regions, and municipalities have conducted large-scale marine functional zoning work during three periods: 1989–1993, 1998–2001, and 2009–2012. Marine functional zoning entails the formulation of a holistic, basic, and binding document pertaining to marine development, regulation, and management in China. It also provides an important foundation for the protection and management of the marine environment (SOA, 2012). To date, three main stages have been evident in the development of marine functional zoning.

The first stage focused on rational utilization of marine resources and the promotion of efficient development. From 1989, based on actual marine functions, the State Oceanic Administration, with the support of the State Council, organized national marine functional zoning in coastal provinces, autonomous regions, and municipalities at the national level through the integration of relevant departments. Subsequently, in 1989, experimental units were established in the Bohai Sea (Li, 1998; Lu, 1997). This was the first time to carry out the national Marine functional zoning establishment work in China. At this time, the plotting scale of zoning was 1:200,000. This was smaller than the current scale applied, and was consequently referred to as small-scale marine functional zoning. This zoning process was completed in 1995.

The second stage commenced in 1998, with the launch of a new series of establishment relating to national marine functional zoning. Compared with the previous marine functional zoning scheme, the main plotting scale used for zoning during this stage was 1:50,000. For some key areas, the plotting scale was 1:10,000 or larger. This was, therefore, considered large-scale functional zoning. In August 2002, the National Marine Functional Zoning scheme was finalized. It was subsequently issued by the State Oceanic Administration of China on September 10, 1993 and implemented by the State Council. Commencing from 2004, marine functional zoning was approved for coastal provinces, autonomous regions, and municipalities. The zoning process enhanced rational utilization and protection of the marine environment, significantly contributing to the development of the social economy over this period.

The third stage began with the launch, in 2010, of new round of zoning revisions. On March 3, 2012, the State Council formally approved and implemented China's latest National Marine Functional Zoning (2011–2020) (Lu et al., 2015). This scheme is innovative and includes, for the first time, the goal of quantification. It has further strengthened capacities for comprehensive marine management. The revised scheme entails a number of adjustments in relation to the previous scheme that have enhanced the protection and utilization of the marine ecological environment (Wang and Guo, 2011).

3. Problems entailed in the original zoning

The original zoning scheme was implemented in 2002 and was in effect till 2010. It played an important role in strengthening the marine management, coordinating the sea area using in different industries, and protection and improvement of marine ecological environment (Guan, 2013). However, it also revealed a number of problems, as outlined below.

3.1. Outdated data and lack of foresight

The original zoning scheme applied data extracted from “The National Comprehensive Survey of Coastal Zone and Tidal Flat Resources” conducted in 1987 (Guan, 2013). However, because of extensive socioeconomic and environmental changes in coastal regions, portions of the data are outdated, and do not accurately reflect current natural and social attributes of marine areas.

Furthermore, they cannot provide scientific guidance on the utilization and development of marine resources.

In recent decades, there has been expanded development of China's marine economy, with a growth in added value of the marine industry from a total of 404.153 billion yuan in 2002 to 2237 billion yuan in 2010. Thus, there has been more than a fourfold increase in added value from 2002 to 2010. By 2014, the added value had risen further to 3561.1 billion yuan, indicating an increase in the added value of over eight-fold compared with the added value in 2002 (SOA, 2002, 2010, 2012). With the rapid development of the marine industry, the marine functional zones established in 2002 had become increasingly difficult to meet resource needs, especially for marine engineering. Moreover, with extensive demands for marine engineering development, conflicts between marine construction and farming became increasingly prominent, and the original zoning scheme proved incapable of achieving sustainable socioeconomic development.

In addition, the original marine zoning scheme was mechanistic and simply posited that: “The type of marine utilization should be consistent with the zoning features, and the range of marine utilization should be included in the functional zones”. Consequently, its compatibility was difficult to grasp. Accordingly, disputed sea areas were excluded in relation to compatibility in practice, and sea-level arrangement schemes that were only slightly ineligible in relation to the range of functional zones were denied (Zhao, 2014). Consequently, the project-based situation of marine functional zoning was in a dire state, entailing a drastic reduction in adaptability and foresight.

3.2. Overly simplified content and issues relating to the classification system

The original zoning scheme simply distinguished the functions of areas according to the purpose. Its partitions were excessively single and regulations were relatively rigid, and all effect of marine functional zoning mainly focused on scoping functional areas and their leading functions. It did not conform to the actual conditions and characteristics of marine areas, and disregarded their multiple functions. Furthermore, the objectivity of marine functional zoning was seriously undermined. The natural and social attributes of marine areas were difficult to grasp using this kind of zoning which could not simultaneously reflect both of these characteristics. It could not reflect this character that social attributes were rapidly changeable, whereas natural attributes are relatively stable. Thus, this zoning scheme could be considered less scientific for the above reasons. Other issues associated with the original zoning scheme were management limitations and a lack of clarity and details within regulations on the scale and methods of marine utilization (Cui, 2009). Marine exploitation can only commence when consistency between functions and regulations is achieved. Consequently the zoning scheme served as an inadequate guide for marine industry planning.

The 10 secondary categories of zones were not well connected with the prevailing management system, and the system's classification principles were not in complete harmony. Whereas some parts of the zonal classification types were too detailed to enable a balance to be achieved, parts of the classification types could not be reflected and likely caused confusion. Further, the definitions of some marine functions were not sufficiently accurate in some cases (Yue et al., 2014). Some issues relating to the classification system of original zoning can be found in Table 1. For instance, the primary classificatory zones included a mineral resources utilization zone, a seawater utilization zone, and a marine energy utilization zone, belonging to the same marine mineral and energy type. Because the excessive detailed feature, it is hard to be reflected in space. Four

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