

Exploration of Digital Reform in Marine Space Resource Management

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Abstract: Marine resources are an essential component of national spatial governance. Strengthening management can not only improve the rationality and effective utilization of China's natural resource allocation, but also greatly promote the sustainable development of the country. In recent years, with the support of rapid socio-economic progress, significant achievements have been made in the field of science and technology, and promoting the digital reform of marine space resource management has become an inevitable trend. It is crucial for management departments at all levels to strictly comply with the requirements of digital reform, provide targeted solutions to various problems in current marine space resource management, and coordinate the establishment of intelligent management scenarios for marine space resources at the three levels of provinces, cities, and counties, in order to improve the marine space resource supervision system. Therefore, this article explores the digital reform of ocean space resource management, aiming to improve the efficiency of ocean space resource management.

1. Introduction

Marine space resources are one of the most essential marine resources in China at present, providing support and strong guarantee for the sustained, stable and healthy progress of the marine economy. At the same time, they are also a key development strategic space for coastal cities to achieve high-quality progress. Among them, Zhejiang Province is rich in marine space resources. The sea area under its jurisdiction is nearly 44000 Square kilometre, with nearly 44000 islands and a coastline of 7500 kilometers, ranking first in the country ^[1]. Further promoting the digital reform of ocean space resource management can effectively strengthen the protection level and utilization efficiency of ocean space resources, thereby playing a good role in efficient governance. However, based on the analysis of the current situation of ocean space resource management in China, there are various problems such as dispersed ocean data information and long approval cycles for sea use, which require high attention from relevant departments.

2. Problems in the Management of Marine Space Resources

2.1 Scattering of Ocean Data Information

Data information is a crucial component of current marine spatial resource management work, which specifically covers various types of data such as natural background, regional planning, and effective resource utilization. After long-term practice and development, as well as long-term ocean observation, data investigation, and practical management, China has now accumulated a large amount of ocean data information resources and made significant achievements in data information management ^[2]. However, with the vigorous progress of the marine economy and the continuous increase of marine data information, the current management functions and levels of marine spatial resource data are no longer able to meet the needs of marine spatial resource management well. There have been problems such as the inability to centrally manage marine spatial data information,

low standardization of management, high labor investment costs, and insufficient data information sharing, which urgently need to be addressed.

2.2 Long Approval Cycle for Sea Use

The approval of project sea use is an important component of the current management of marine space resources. Further improving the efficiency and quality of approval can improve the implementation speed of sea use projects. This is also a favorable measure for the transformation of government departments' functions and the continuous deepening and implementation of the "streamlining management and service" reform, as well as the optimization of the business environment. However, based on the analysis of the current approval situation for some projects in China, due to factors such as the need for a large number of approval materials, multiple approval processes, and long manual approval time, the overall approval cycle of project sea use projects is ultimately long. Based on this, relevant management departments need to establish a sound and comprehensive project sea use approval system, set standardized approval materials, reasonably optimize the review process, ultimately improve the efficiency of project sea use approval, and shorten the approval cycle [3].

2.3 Difficulty in Closed-loop Supervision of Marine Space Resources

The main content of marine space resource supervision work includes the supervision and management of sea areas, islands, and coastline, with a focus on marine ecological protection areas, coastal wetlands, surrounding reclamation areas, etc., and timely organization of supervision and management of illegal and irregular use of sea islands, project development and utilization behavior, etc. At present, Chinese government departments have developed and introduced a supervision and management mechanism for illegal and irregular behaviors, regularly identifying suspicious behaviors and issuing appropriate rectification work requirements to local departments. However, due to the long verification, review, and governance cycle of suspected illegal and irregular behaviors, some projects even need to go through a review cycle of 1 to 2 years. Currently, there is a lack of a closed-loop full process supervision mechanism and a full cycle supervision system for sea use projects.

3. Several Suggestions on Promoting the Digital Reform of Marine Space Resources

3.1 Establish and Improve a Data Ledger

In order to further improve the management level and efficiency of marine spatial resource data, relevant management departments need to make good use of the "resource intelligent management scenario", establish and improve the data information storage warehouse, integrated driving warehouse, etc., so as to realize the centralized management of marine spatial resource data and the Information visualization of spatial data. The data storage warehouse needs to include regional planning, spatial resources, resource utilization, and sea use topics, gradually realizing the correlation of marine spatial resources [4]. The cockpit can adopt a column design, with the left column displaying overall statistical data information such as the current spatial resource base, specific usage of sea space, and historical issues related to reclamation. The right column displays specific island, coastline, and sea area usage data information.

The intelligent data information scene requires the integration of remote sensing technology, panoramic sensing technology, and three-dimensional imaging technology, in order to truly achieve the visualization of full scene sea area spatial resources and provide corresponding staff with a comprehensive and intuitive display of the current use of sea area spatial resources. Currently, China has integrated panoramic data of islands and coastline from multiple counties such as Pinghu and Yuhuan, as well as three-dimensional images of islands in seven fields. The next step for relevant management departments is to gradually implement a three-dimensional real-life marine resource management model by utilizing technical means such as 3D modeling and digital management mode for coastal data images and terrain data information throughout the province.

3.2 Improve Approval Efficiency

In order to maximize the approval efficiency of ocean space resource utilization projects, relevant management departments and staff need to establish a project sea resource approval management module with the help of the “intelligent and intelligent management scenario”. This work module can reshape the project approval process by combining specific project content and approval reform requirements, omitting unnecessary and lengthy approval processes, thereby improving the standardization and efficiency of sea use application materials and processes. The relevant management departments need to actively apply the functions of project sea use review application, review, query, and statistics, strictly follow the approval authority and specific business processes for authorization management of provincial, city, and county level users, conduct a logical review of the submitted data and information materials, and try to enter the data and information in a dropdown box format as much as possible ^[5]. In addition, the corresponding departments also need to develop the sea area use fund calculation function, input the basic data information of the project, and automatically calculate the sea area use taxes actually required to pay for the project. Reviewers can also check the progress of approved projects online and provide feedback.

The pre-functional review function can detect routine errors in the application materials in a timely manner before the project sea use declaration, which can minimize the workload of reviewers and improve the efficiency of project sea use approval. During the process of inputting basic project information, users must pass a pre-review before submitting a sea use application, in order to further optimize the logic of the review work.

3.3 Build a Comprehensive and Full Cycle Marine Regulatory System

For approved marine space resource utilization projects, relevant management departments need to fully utilize the “intelligent resource management” scenario design project card. The project card should include data information on various aspects of the project, such as review vouchers, development and utilization plans, dynamic regulatory information, and illegal investigation and punishment, in order to truly achieve the full cycle and comprehensive closed-loop management of “review, approval, utilization, and management” of marine space resource utilization projects. The various types of data information contained in the project card need to be integrated into various business processes, and real-time input, update, error correction, etc. should be carried out in the actual management module, and a data information exchange channel should be reserved with the dynamic supervision system of some natural resource sea areas and islands. On this basis, relevant pipeline departments and staff need to gradually connect with law enforcement departments, tax management departments, etc., establish and improve a real-time update mechanism for data information, and ensure the completeness, timeliness, and accuracy of data information related to the use of marine space resources in corresponding projects.

In response to the illegal and irregular use of marine space resources, relevant management departments can use the “intelligent and intelligent management scenario” to design a suspicious zone area supervision function module ^[6]. This module is mainly aimed at verifying and disposing of suspected illegal and illegal use of marine space resources, in order to truly achieve closed-loop management of suspicious areas such as issuance, verification, reporting, review, and disposal. In this way, suspicion prompts staff to view network maps of suspicious areas, and with the support of remote sensing information technology, collect and report information, forming a closed-loop management of marine spatial resources.

4. Application Effectiveness and Future Prospects

Based on the analysis of the current digital reform of ocean space resource management in China, the “intelligent resource management scenario” has gradually achieved an online operation and management mechanism with joint efforts at the provincial, municipal, and county levels, and has achieved significant application results. The preliminary application of intelligent scenarios has

established and improved long-term management mechanisms for the collection, supplementation, update, and governance of marine spatial data information, maximizing the sharing of data information among various business processes, and establishing an integrated data information resource service management system. In addition, it has greatly improved the efficiency and quality of project approval, strengthened the standardization and intelligence of the approval process for sea use projects, and greatly shortened the approval process for sea use projects. The application and approval cycle has been shortened by nearly half compared to the past. A relatively complete lifecycle supervision system for sea use projects has been established, and timely verification and disposal of various illegal and irregular behaviors have been carried out. A closed-loop supervision workflow has been formed, effectively curbing illegal and irregular sea use behavior [7].

Against the backdrop of continuous innovation and progress in the field of science and technology in China, the next step of “resource intelligence application scenarios” needs to be combined with the needs of marine space resource management work, gradually developing coastal line management models, historical problems handling models for reclamation, intelligent site selection, early warning management mechanisms, etc., timely optimizing and implementing functions based on different application scenarios, maximizing the advantages and effectiveness of digital reform in ocean space resource management. In addition, relevant departments should also strengthen the construction of perception end and promote its coordinated progress with business work, in order to improve the application effectiveness of various types of data information, and gradually build a marine spatial resource management system with clear and complete data information and intelligent location selection [8].

5. Conclusion

In summary, it is crucial and necessary to continuously promote the digital reform of marine space resource management. Relevant management departments need to strengthen digital reform efforts based on the management of marine space resources in person, gradually develop functions such as coastline management, intelligent site selection, early warning supervision, optimize them based on application scenarios, maximize the improvement of various functions, enhance data effectiveness and application value, and gradually build a sound, reasonable, intelligent approval, and comprehensive supervision system for marine space resource governance, providing support for high-quality protection and effective utilization of marine space resources.

References

- [1] Feng Zhenzhou, Mao Keqin, Wang Peng, Zhu Junxia, Chen Jijing, Chen Chong. Exploration of Digital Reform of Marine Space Resource Management in Zhejiang Province [J]. Ocean Information Technology and Application, vol.38, no.2, pp.108-114, 2023.
- [2] The Key Laboratory of Marine Space Resource Management Technology of the Ministry of Natural Resources landed in Yuhang [J]. Zhejiang Land and Resources, no.1, pp.9, 2023.
- [3] Qiu Hongliang. Teaching Process Design for Integrating Marine Safety Education - Taking “Marine Space Resource Development and National Security” as an Example [J]. Geography Teaching, no.21, pp.61-64, 2022.
- [4] Zhang Zefei, Mao Keqin, Jiang Chanjuan, Yang Wankang. Research on the Application of Solr Based Marine Space Resource Search [J]. Ocean Development and Management, vol.38, no.12, pp.98-102, 2021.
- [5] Zhang Jianli, Song Derui, Zhou Chao, Xu Jingping, Sun Rong. Research on the Current Situation of the Use of Marine Space Resources in China’s Marine Industry [J]. Marine Environmental Science, vol.39, no.5, pp.703-708, 2020.
- [6] Mao Keqin, Key Technology and Application of the “One Map” Comprehensive Supervision Platform for Marine Space Resources in Zhejiang Province Zhejiang Province, Zhejiang Academy

of Marine Sciences, June 18, 2020.

[7] Shi Xuefa, Application demonstration of marine spatial layout optimization technology system and decision-making service system constructed by “Shandong Peninsula Blue Economic Zone”. First Institute of Oceanography, Ministry of Natural Resources, Shandong Province, April 27, 2019.

[8] Shan Chunhong, Lin Xiuyue. Research on the Carrying Capacity of Aquaculture Seas and the Coordination of Marine Space Resource Utilization in Shandong Province [J]. Marine Economy, vol.6, no.3, pp.33-39, 2016.