
REGIONAL PROBLEMS OF ENVIRONMENTAL STUDIES
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Spatial Planning as a Tool of Marine and Coastal Nature Management in Krasnodar Krai

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Abstract—To solve the problems of ensuring the sustainable development of coastal ecosocioeconomic systems and adjacent marine areas marine spatial planning (MSP) tools are used as one of the approaches to territorial planning. This paper assesses the possibilities of using the MSP tools to improve the efficiency of joint activities of economic entities and minimize environmental risks of environmental management. As a territorial object, the coastal zone of Krasnodar Krai as a coastal subject of the Russian Federation is examined and the ecological and economic state of the territory is analyzed. Based on analyzing the international and Russian practice, the principles and stages of the MSP process are considered, as well as the opportunities and prospects for using the MSP principles for Krasnodar Krai, including in terms of the necessary legal base. It is shown that due to the geographical, economic, and ecological features of Krasnodar Krai and to the lack of the federal and regional legal system in the field of strategic planning of coastal ecosocioeconomic systems and adjacent marine areas, implementation of MSP tools can be the missing link in the decision-making process for the development of regional maritime activities. An analysis of the experience from using the MSP tools for Krasnodar Krai shows that sustainable development of the coastal territories and the adjacent waters areas depends primarily on monitoring maritime activities and the environment to prevent degradation of the ecosocioeconomic situation. Requirements for the use of elements of the MSP tools for Krasnodar Krai have been developed, which should be aimed at providing recommendations for effective decision making to administrative bodies and economic entities in specific maritime sectors of natural resource management.

Keywords: coastal ecosocioeconomic system, adjacent marine area, maritime activity, ecology of nature management, legal system, decision-making process

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INTRODUCTION

Since the end of the 20th century intensification and integrated development of marine and coastal resources has been observed. Marine spaces, despite the almost complete absence of a permanent resident population, are nevertheless a territory of economic activity in various spheres, including maritime navigation, energy, tourism, mining, and biological resources. In addition, new marine protected natural resources are constantly being created as territories for the conservation of aquatic ecosystems and biodiversity.

One of the main goals of the Russian Federation as a maritime power is a comprehensive solution to the problem of studying and developing the spaces of the World Ocean, as well as effective marine and coastal nature management for sustainable economic devel-

opment and ensuring the national interests of the country [1, 2]. However, with an increase in the scale of economic activities, accompanied by an increase in anthropogenic pressure on marine and coastal ecosystems, the number of possible conflicts on the part of the main users of water resources is steadily growing. In most cases, this leads to an unambiguous deterioration in the state of the environment, and free access to certain types of resources (recreational resources, some types of biological resources) often leads to them being excessively used, with their possible depletion.

To solve the above problems in international practice since the 1980s, marine spatial planning (MSP) is applied as an approach to the territorial planning of marine areas as a practical tool for determining the methods of the most effective use and distribution of the sea space, as well as establishing a mechanism for interaction between the users of this space in order to

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Table 1. Steps in the marine spatial planning process [3]

Stage	Process
Preparation for site planning	Authoritative bodies and stakeholders were identified, a work plan was drawn up, problems at the initial stage were identified, the principles and goals of planning were determined, its boundaries and horizons were set.
Analysis of the planning process	The initialization of data collection and organization was carried out, the analysis of existing and future conditions was carried out, the space-time parameters of conflicts and their compatibility were determined, the principles of organizing the portal/data atlas were developed.
Development of the MSP Plan	Preliminary management actions and performance indicators have been identified, a plan for monitoring and evaluating the effectiveness of making recommended management decisions has been drawn up
Drawing up a MSP Plan	MSP plan completed but not yet approved
Approval of the MSP Plan	MSP plan approved at the appropriate level of government
Implementation of the MSP Plan	The management decisions recommended by the Plan have been implemented, monitoring and evaluation of the effectiveness of the Plan is carried out
Revision (verification) of the MSP Plan	Plan revised, modified, and adapted

achieve a balance between industrial and socioeconomic development and nature conservation within this water area through open discussion with the involvement of all interested parties [3]. However, taking the increasing degree of inseparability of nature management in coastal territories and adjacent sea areas into account, the MSP should be considered as a tool for nature management for a single coastal space that unites these land and sea spaces.

The purpose of this work was to assess the possibilities of using the MSP toolkit to improve the efficiency of joint activities of business entities and, as a result, to minimize the environmental risks of environmental management using the example of the coastal zone of Krasnodar Krai as a coastal subject of the Russian Federation.

THE CONCEPT AND PRINCIPLES OF MARINE SPATIAL PLANNING

The planning concept is key in the management of any kind of business activity. The process of applying the MSP toolkit provides a spatial vision and a comprehensive coastal area and offshore management plan. At the same time, the MSP takes the contradictions of nature users into account and makes it possible to provide the successful ecological and socioeconomic development of territories [4].

The main goal of MSP is to promote sustainable development and rational use of coastal territories and sea space for various types of economic activities. The following principles of MSP can be distin-

guished: limited space, integrity, ecosystem, joint participation, strategic planning, and adaptability [5, 6]. The stages of the MSP process are shown schematically in Table 1 [3].

The MSP procedure proposed in the UNESCO Marine Spatial Planning Guide is implemented in various forms in more than 66 countries of the world (44% of coastal countries) [3, 4]. This allows one to achieve an important result, the creation of the so-called blue economy, based on the sustainable use of the economic potential of the World Ocean [7].

For the socioeconomic development of the Russian Federation, the importance of coastal territories and adjacent water areas continues to grow steadily: there is an orientation towards the development and use of various marine and coastal resources, the development of marine economic activities and deeper scientific knowledge about coastal ecosocioeconomic systems, seas, and oceans [8–13]. These processes cannot be carried out in isolation from the use of MSP tools and increasing the efficiency of their use in various spheres of maritime economic activity.

Certain steps in the development of the MSP toolkit in Russia were made by scientists and specialists in economic and geographical works [14–19]. To some extent, individual elements of the MSP toolkit were developed for the Baltic Sea [20, 21], the Arctic [7, 22, 23], and the Pacific [9, 24–26] regions. Nevertheless, such components as the identification of MSP objects and their hierarchy, division, zoning of coastal and marine spaces, principles of nature management and

assessment of the formation of spatial combinations of activities within coastal ecosocioeconomic systems and marine areas remain insufficiently studied.

COASTAL TERRITORIES AND ADJACENT WATER AREAS OF KRASNODAR KRAI: ECOLOGICAL AND ECONOMIC ASPECTS

Krasnodar Krai, as a coastal subject of the Russian Federation that is located in the southwest of the country, is washed by the waters of the Azov and Black Seas. The total length of its shores is approximately 740 km. The region's seaports provide direct access through the Azov and Black Seas to international foreign trade routes and process more than 35% of Russian foreign trade and transit cargo from Russian seaports. The port cities on the Azov Sea are Yeisk and Temryuk, and on the Black Sea: Port-Caucasus, Taman, Anapa, Novorossiysk, Gelendzhik, Tuapse and Sochi. At the same time, the ports of Novorossiysk and Tuapse provide transshipment of 75% of the dry cargo passing through the port facilities of the south of Russia and serve one-third of the Russian oil exports.

One of the most important sectors of the economy of Krasnodar Krai is tourism, which is actively developing on the coast. The contribution of tourism to the GRP of Krasnodar Krai is more than 14%, while in Russia as a whole, the contribution of tourism to GDP is less than 1.5%. Such seaside resorts of federal and regional significance as Sochi, Gelendzhik, Anapa, and Yeysk play a central role in the field of tourism. In addition, the Yeisk and Tuapse districts, on the outskirts of Novorossiysk, Slavyansky, and Temryuk districts are considered the seaside tourist centers of the region.

Krasnodar Krai is one of the most stable regions of Russia in terms of ecology. The main share of pollutants in coastal regions is automobile emissions. In the region, the seaside resort towns in which there are almost no industrial enterprises and large ports are considered the most favorable, where the ecosystem is able to neutralize a significant proportion of atmospheric pollution. Such cities include Gelendzhik and Anapa, which differ from Novorossiysk and Tuapse, where large port complexes are significant polluters.

In general, for Krasnodar Krai, the following main types of activities can be distinguished that need to be considered from the point of view of the MSP toolkit: shipping (sea transport), port facilities, mining of biological resources, mining (sand, gravel, etc.), underwater cables and pipelines, alternative energy, marine aquaculture, creation of artificial structures and islands, recreation and tourism, coastal and marine specially protected natural areas (SPNA), preservation of natural and cultural and historical heritage, and research activities, including geological exploration, naval activities, and other marine economic activities on land within the coastal ecosocioeconomic system.

THE OPPORTUNITIES AND PROSPECTS FOR USING THE PRINCIPLES OF MSP IN KRASNODAR KRAI

The only federal legislative act that exists in the Russian Federation that contains an approach close to the MSP is the Strategy for the Development of Maritime Activities of the Russian Federation until 2030 [2]. The strategy sets the transition to integrated planning for the development of coastal waters and coastal territories and their consideration as a separate single object of state management as one of the main priorities for the development of the country's maritime activities. The document emphasizes the need to develop coastal-marine components of strategies for the socioeconomic development of coastal constituent entities of the Russian Federation and development programs for coastal municipalities, as well as individual programs for integrated management of natural resources in coastal territories and coastal water areas, which in essence is the MSP toolkit [2].

At the same time, among the main problems and contradictions in the legislative framework of the Russian Federation, the following can be noted [7, 21, 27].

- MSP is considered as an analogue of territorial planning, while the absence of a legislative act regulating relationships between state authorities of the Russian Federation, constituent entities of the Russian Federation, and local self-government, as well as individuals and legal entities in all possible types of maritime economic activities leads to significant difficulties in complex consideration of coastal ecosocioeconomic systems and adjacent marine areas and their interactions. It should be borne in mind that the sea areas are in the jurisdiction of the federal executive bodies of the Russian Federation.

- In the Federal Law On Strategic Planning in the Russian Federation there is no possibility of using MSP tools in the system of strategic planning documents and maritime activities within the framework of programs of different levels.

- The Water Code of the Russian Federation does not contain the concept of marine spatial planning.

- There are difficulties associated with determining the types of maritime economic activities and taking all types of nature management in the coastal and marine spaces in connection with the division of powers of different levels of government for certain types of activities into account.

Thus, it is necessary to coordinate the documents of territorial planning and the MSP, as well as to carry out legislative work to include the MSP in the current legal system of the Russian Federation, which regulates the powers of the authorities of various territorial levels in the field of strategic planning. At the same time, the planning of the types of maritime economic activities that benefit the country's national interests, including in the exclusive economic zone of the Russian Federation, should be carried out at the federal

level by ecoregion; in the territorial sea and in the internal waters of the Russian Federation, the powers to use the MSP tools can be delegated to the level of the subject of the Russian Federation, taking the tasks of the federal level into account [27]. This will make it possible to supplement the developed documentation on strategic and territorial planning of coastal subjects and municipalities of the Russian Federation with sections on the MSP [21].

For Krasnodar Krai, based on its geographical, economic, and environmental characteristics and the maritime industries defined above, the most typical type of conflict is the contradictions between infrastructural and recreational activities, which can be seen in the development of port activities and coastal recreation. The conflict between these two types of nature management in the region is more pronounced than in other regions, and depending on specific zones, the possibility of combining these types of activities ranges from being undesirable to permissible in a limited manner. An equally important issue for Krasnodar Krai from the point of view of the MSP toolkit should be the protection of coastal ecosocioeconomic systems and adjacent sea areas. This element is primarily associated with the need to establish standards for permissible impacts on ecosystems, identify sources of impacts, accumulate financial resources for environmental protection and restoration measures, and insure environmental risks in an increased volume, depending on the level of the district's recovery potential. The fragmented nature of the legal measures currently in force is poorly combined with the comprehensive approach required to protect coastal and marine systems, which indicates the need for additional environmental protection measures [28].

However, the Strategy of socioeconomic Development of Krasnodar Krai until 2030 [29], built on a sectoral economic principle, does not envisage the separation of the coastal zone into a separate multifunctional sea-economic macro-region due to the special importance of coastal ecosocioeconomic systems and adjacent sea areas. Of the seven designated economic zones, four are coastal: the Northern, Central, and Black Sea economic zones and the Sochi agglomeration. However, only the last two zones can be considered as maritime regions [29]. The allocation of a single coastal macroregion will allow consideration of its socioeconomic characteristics and more efficient solution of both existing and possible future contradictions of the branches of the maritime complex and conflicts that arise from the conduct of various types of economic activities in a given territory.

In order to make effective management decisions for rational use of natural resources in the coastal ecosocioeconomic system and the adjacent sea area of Krasnodar Krai, it is necessary to develop and use the following elements of the MSP toolkit:

- determination of uniform quality standards for ecosystems and the creation of a unified monitoring system, data exchange, etc.;

- regular transformation of data on the coastal ecosocioeconomic system and the adjacent sea area of the region into spatial information using the dynamic mapping methodology, including the creation of a unified coastal geographic information system (coastal GIS);

- identification of centers of spatial combination of various conflicting types of maritime economic activities and the development of recommendations for the implementation of the most effective joint activities of economic entities, with the coordinating role of the administrative bodies of the regional, district, and local levels;

- determination of coastal and sea zones critical for the conservation of biodiversity and the productivity of ecosystems (organization of protected areas, restrictions on irrational and incompatible economic activities, accounting for especially vulnerable zones, etc.).

In this case, the use of the MSP toolkit will meet the goals of sustainable development of maritime activities, including the following:

- promoting the balanced sectoral development of the coastal ecosocioeconomic system and the adjacent sea area of the region, as a framework for the sustainable development of various spheres of maritime economic activity, which will help to increase profits and the employment of the population;

- optimization of coastal and marine nature management, since there will be an increase in potential profits due to the location of the goods of marine economic activity in the most suitable places;

- a decrease in cost indicators, since the cost of obtaining and using information, regulation, planning, and making effective management decisions will decrease.

CONCLUSIONS

Marine spatial planning is an integrated, strategic, and participatory decision-making tool aimed at maximizing the compatibility of maritime activities and reducing conflicts both between users of natural resources and between users of natural resources and nature.

In view of the physical, geographical, economic, and environmental characteristics of Krasnodar Krai on the one hand, and the practical absence of a federal and regional regulatory system in the field of strategic planning of coastal ecosocioeconomic systems and adjacent sea areas on the other hand, the introduction of the MSP toolkit may become a missing link in the adoption effective management decisions for the development of the region's maritime complex. An analysis of the world practice of using the MSP and the use of this experience for Krasnodar Krai shows that

the sustainable development of coastal areas and adjacent water areas depends primarily on monitoring maritime activities and the state of the environment in order to prevent the deterioration of the ecological and socioeconomic situation. At the same time, for the correct application of the indicated elements of the MSP toolkit for Krasnodar Krai, it is necessary to use a combination of regional and local approaches for the rational use of natural resources in coastal ecosocio-economic systems and adjacent sea areas, as well as to introduce broad consultations of economic entities of maritime economic sectors and administrative bodies into practice. The department plans for the ecosocio-economic development of coastal territories and adjacent water areas.

In general, the use of the MSP toolkit in Krasnodar Krai should be aimed at providing recommendations on the adoption of effective comprehensive and complementary management decisions to administrative bodies and business entities in specific maritime sectors of nature management.

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