

Conference Paper

Problems of Sustainable Development of Russian Fishing Industry in the Concept of Rational Nature Management of Arctic Resources

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Abstract

In recent years, special attention has been paid to the issues of rational nature management and ecological state of the natural environment of the Arctic zone, given the important economic, social and environmental role of this region. The active industrial development of the Arctic zone unambiguously leads to a change in the living conditions of marine biological resources. The Arctic plays an important role in Russian fisheries.

The paper considers the conceptual provisions of rational nature management in the conditions of industrial development of the Russian Arctic and identifies the problems and conditions for sustainable development of the Russian fisheries.

Keywords: rational nature management, sustainable development, fisheries industry, the Arctic, industrial development.

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Received: 24 December 2019

Accepted: 9 January 2020

Published: 15 January 2020

Publishing services provided by
Knowledge E

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Selection and Peer-review under the responsibility of the BRDEM-2019 Conference Committee.

1. Introduction

The Arctic possesses a unique potential resource of animal and natural world. However, the constant increase in fishing and anthropogenic impact on nature in the Arctic has led to downsizing of many populations. The active industrial development of the Arctic zone clearly leads to changes in the habitat of marine biological resources. The rational use of marine resources -- biotic, abiotic, mineral and water -- is a national problem for any country having access to sea. The global practice shows that economic success in the development of the marine resource potential is possible only in the presence of a comprehensive and integrated approach to the management of different branches of marine nature management [2].

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In modern conditions the main directions for marine activity in the Arctic are maritime transport; fisheries; exploration and development of hydrocarbon resources; naval, research, and environmental activities.

Fishing remains one of the key sectors of the economies of the Arctic Nations, despite the inaccessibility of the Arctic resources. The Arctic plays an important role in the Russian fisheries. However, currently the Russian fishing industry is in a difficult situation and has many problems requiring complex solutions.

2. Main Body

Under the conditions of active development of the Arctic areas and resources, the environmental issues of the fragile Arctic ecosystem are becoming more relevant. This is especially true of Arctic marine ecosystems, which are extremely vulnerable to anthropogenic impacts due to the cold climate, high ice cover, low intensity of water movement, and chemical and biological activity of the habitat.

The most important indicator of large ecosystems stability is species diversity. It is influenced by all known abiotic factors associated with anthropogenic pressures: emissions from utilities and industrial enterprises, products of exploration, extraction and processing of hydrocarbons, heavy metals and other metallurgical waste, pollutants from coastal military bases, waste of vessels running on nuclear fuel, and climatic changes. In this context, the task of searching for modern methods of early diagnostics and forecasting (medium- and long-term), assessment of environmental conditions, including the condition of benthic communities of the Arctic seas becomes very relevant, as one of the important markers being able to detect even minor changes in marine ecosystems at different time stages. This is especially important for monitoring the influence of technogenic factors in the areas of active anthropogenic impacts associated with offshore projects for hydrocarbon extraction.

Scientific research and technological developments based on the principles of interdisciplinary knowledge [6], allowing comprehensive and integrated assessment of environmental parameters, are considered to be relevant. The most important factor in solving this complex problem is the task of combining the efforts of academic science and higher education in order to create a specialized (Arctic) innovative scientific and technological ecosystem integrated into the national (and global) innovative ecosystem and providing for organizing the ultramodern scientific laboratories and engineering centers that allow conducting based on the principles of collective use, advanced scientific research and technological development in the field of the Arctic maritime use,

including the development of modern methods of monitoring, assessing, predicting, and preventing the risks of anthropogenic impacts on marine Arctic ecosystems arising from an active Arctic development [3].

In this regard, the research in the field of sustainable development of Arctic socio-ecological and economic systems at various levels based on a systematic (comprehensive, structural, holistic) analysis of influence factors arising from the active development of the Arctic spaces and resources is of great practical interest.

For the effective development of aquatic biological resources and preservation of Russia's position among the leading maritime powers, the task is to transfer the fishing complex to an innovative development mode with large-scale modernization and technical re-equipment of industry enterprises, updating the fishing fleet, creating a scientific and production base, and creating highly qualified personnel potential [1].

Meanwhile, during the growing economic activity in the Arctic, including the implementation of major investment mega-projects on production of hydrocarbons offshore and the growth of shipping traffic along the NSR, the conflict of cross-sectoral groups interests is increasingly visible. And this is obvious because one of the main objectives of the Russian state policy in the Arctic is expanding the resource base of the Russian Arctic zone, capable to meet the growing needs for hydrocarbon resources for which the aim to increase the reserves of mineral resources of the Arctic offshore fields by exploring and developing oil and gas fields of the continental shelf is set. Therefore, there is a necessity for additional research in the field of sustainable, balanced, and competitive development of the regional fisheries under the conditions of the big challenges associated with the development of areas and resources in the Arctic. Herewith the consideration of fishing industries as an open complex structured system in a holistic concept of sustainable development of the economic system of the region provides an opportunity for analysis and design of effective mechanisms for intersectoral cooperation, which will allow forming an optimal structure of the fishing industry in a balanced manner and in a consistent interaction with other segments of the regional economy, which actively influence the sustainable development of fisheries.

Currently, a lot of research is being carried out aimed at finding the solutions to the problem of sustainable development of the fishing complex in the context of active industrial development of the Russian Arctic zone.

The key problems of fisheries' development in the conditions of active industrial development of the Arctic are directly related to the features of the Arctic marine ecosystem. In a cold Arctic climate, marine ecosystems are very vulnerable due to ice, slow wave motion, and low chemical and biological activity. Currently, the greatest

difficulty in developing an urgent concept and possible mechanisms for the long-term sustainable use and conservation of aquatic biological resources in the Arctic zone is the lack of comprehensive scientific data on the state of stocks of various types of hydrobionts.

At present, a plan for an expedition of research vessels of the Federal Fisheries Agency for 2019 has been agreed: one of the key events will be the joint Antarctic expedition of the Federal Fisheries Agency and the Russian Academy of Sciences. The purpose of the voyage is to search and evaluate new reserves of aquatic biological resources that are promising for commercial development; assessment of the background state of marine ecosystems of the Russian continental shelf in the areas of hydrocarbon development and production; elucidation of the functioning mechanisms of the Arctic marine ecosystems; a comprehensive assessment and forecast of their condition for the medium term in a changing climate and growing anthropogenic impact.

In addition to the problem of the lack of complete information on the status of reserves, there is another serious problem aggravating the situation of uncertainty -- this is the problem of climate change and influence of such changes on the functioning of the Arctic marine ecosystem. The changes in water temperature and ice cover in Arctic waters largely determine the state of stocks and areas of hydrobiont distribution. To prevent these negative consequences, the adoption of a new long-term stock management strategy with scientific justification is necessary. The observed climate changes put on the Arctic policy agenda the issues related to the need of developing and creating a mechanism for regulating fishing activities in those waters of the Arctic ocean and Arctic seas that are outside the national EEZs of coastal states.

The lack of quality information on the resource potential of the Arctic waters complicates the development and adoption of effective measures within the framework of the adopted "Strategy for the development of the Arctic zone of the Russian Federation", where among other things, it is stated that in order to modernize the fishing sector in the Russian Arctic zone it is necessary to develop and take appropriate measures to preserve and develop the resource potential of fisheries; to use effectively the main commercial species of aquatic biological resources and involve non-traditional objects in fishing; to prevention and suppress the illegal extraction and trafficking of aquatic biological resources [8].

Another problem in the development of the Russian fisheries is the international legal regulation of economic activity in the Arctic and, in particular, the legislative regulation of fisheries: the incompleteness of the delimitation issues in the Arctic also carries some

tension when conducting fishing activities here, especially in those areas where it is conducted almost year-round.

Internal problems of fishing (fleet, coastal infrastructure, allocation of quotas, taxation, etc.) also impede the development of Russian fisheries [4, 7].

It is impossible to prioritize solving these problems, so the approach should be systematic.

3. Results

The implementation of the sustainable development concept involves the formation of a new methodological approach to the study of environmental problems and a new worldview, which is based on:

preservation of the reproductive potential of natural ecosystems equilibrium-stable state of which is a guarantee of sustainable development of socio-ecological-economic systems, including the human environment;

risk-oriented management of technogenic natural-economic systems, the environment-forming function of which should be equivalent (not exceeding) to the natural functional state of ecosystems;

formation of a green economy by replacing the dirty production with environmentally friendly technologies, including environmental rehabilitation through systematic measures to eliminate the negative anthropogenic (technogenic) consequences of human activities.

The characteristics of fishery complex resource potential should include an assessment of habitat of aquatic biological resources through a system of indicators of the generally allowable catch, the actual amount of catch, pollution of the oceans as a result of active industrial development of the territory and the state of environmental activities.

Even though the biological resources of the world's oceans are virtually inexhaustible, the exploitation of aquatic biological resources should be based on precautionary and ecosystem approaches. Furthermore, the rational management of resources is irreparably affected by illegal, unreported and unregulated (IUU) fishing, which occurs in virtually all areas of the world's oceans, both in areas of national jurisdiction and on the high seas. Some fishermen do not comply with fishing regulations, others with prohibited fishing seasons and areas, and still others do not report (or report incorrect information) about their catches. The owners of some vessels operate under the flag of states that are unable or unwilling to control properly the fishing activities of vessels.

Such fishing undermines national and international measures for the conservation and management of aquatic bioresources and leads to the resource depletion [7].

4. Conclusion

The development of the conceptual framework for the rationalization of marine Arctic nature management should be carried out in the concept of ensuring the sustainable development of the Arctic. This approach will allow solving the following problems:

- 1) development of conceptual provisions for the formation of the environmental policy of marine Arctic nature management;
- 2) natural-resource and environmental-economic zoning of the water area of the Arctic zone of the Russian Federation;
- 3) allocation of marine natural complexes with a dominant environment-forming function and their rational distribution in the sea space;
- 4) drawing up a large-scale spatial development scheme for marine environmental industries and related infrastructure, considering the formation of coastal transport and logistics communications, coastal settlement systems, ecological capacity of marine landscapes, and the tasks of preserving the natural diversity;
- 5) assessment of technical, economic and environmental conditions for the development of forms of industries of biotic and mineral resource management [5];
- 6) establishment of environmentally and economically determined spatial relationships between economically used water areas and protected marine natural complexes, which ensure the conservation of both natural diversity and satisfying ecological situation within the sea area of the Russian Arctic.

Solving the identified problems will allow us to create the conditions for the rational use of aquatic biological resources (biotic) and mineral raw materials (hydrocarbon) natural resources in the Arctic.

Acknowledgement

The authors would like to thank their colleagues for their contribution and support to the research. They are also thankful to all the reviewers who gave their valuable inputs to the manuscript and helped in completing the paper.

Conflict of Interest

The authors have no conflict of interest to declare.

References

- [1] Agarkov, S.A. (2017). The Economy of the Arctic Macro-Region: Urgent Tasks of Staffing the Fishery Complex of the Northern Basin. *Fisheries*, vol. 5, pp. 11-16.
- [2] Vasenkina, E.Yu., Mazurov, Yu.L. (2012). Environmental Management: Geographical Context. *Environmental Management: Theory, Practice, Education*, pp. 32--39.
- [3] Ermakova, N.A., Kaloeva, A.T., Razumovsky, V.M. (2013). Protected Areas and Environmental Management in the Region, *in the materials of the International scientific-practical conference "Contemporary regional studies: structure, problems, and prospects"*. St. Petersburg, Russia. St. Petersburg State University of Economics.
- [4] Karpova, G.A., Razumovsky, V.M. (2016). Problems of greening the planning of regional development. *Journal of legal and economic research*, vol. 1, pp. -- 118-123.
- [5] Motina, T.N., Shchegolkova, A.A. (2017). Characteristics of the Fishery Complex of the Northern basin in the Concept of Economic Security of Russia. *Fisheries*, vol. 6, pp. 15-19.
- [6] Razumovsky, V.M. (2017). On the Regional Concept of Nature Management in the Arctic zone of Russia. *Izvestiya SPbGEU*, vol. 103, pp. 107 -- 114.
- [7] Razumovsky, V.M. (2015). *Economic-geographica studies of environmental management. Socio-economic geography in Russia*. The Russian Geographical Society. Vladivostok: Dalnauka.
- [8] Stolbov, A.G. (2017). Formation of the Organizational and Economic Mechanism for the Rational Use of Aquatic Biological Resources. *Vestnik MGTU*, vol. 20 (3), pp. 644--653.
- [9] Cherepovitsyn, A.E., Larichkin, F.D., et al (2018). Formation of the concept of rational environmental management in the arctic territories, contributing to their sustainable industrial and socioeconomic development. *Territorial Development Issues*, vol. 5 (45).
- [10] Sokolov, K.M., Bokhanov, D.V., et al (2013). *Assessment of threats to the marine ecosystem of the Arctic associated with industrial fishing, using the example of the Barents Sea*. Moscow: World Wide Fund for Nature (WWF).