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**THE CURRENT STATE AND POTENTIAL OF THE NORTHERN SEA ROUTE IN THE ARCTIC ZONE OF RUSSIA**

The increase in the rate of system-wide impact of the negative consequences of the sanctions policy of Western countries and the deterioration of the global environmental situation oblige researchers and industrialists to consider the Northern Sea Route as the most important transport corridor in the Arctic zone of Russia, the issues of its effective use and environmental sustainability are becoming especially relevant these days, which requires the systematic development of industry to meet the needs of the state.

**Keywords:** Northern Sea Route, efficiency improvement, Arctic zone, ecosystem, innovation policy, public investment.

М.Ю. Тарасенко<sup>1</sup>**ТЕКУЩЕЕ СОСТОЯНИЕ И ПОТЕНЦИАЛ ИСПОЛЬЗОВАНИЯ СЕВЕРНОГО МОРСКОГО ПУТИ АРКТИЧЕСКОЙ ЗОНЫ РОССИИ**

Увеличение темпов общесистемного воздействия негативных последствий санкционной политики западных стран и ухудшение глобальной экологической обстановки обязывают исследователей и промышленников рассматривать Северный морской путь как важнейший транспортный коридор в Арктической зоне России, вопросы его эффективного использования и экологической устойчивости становятся особенно актуальными в наши дни, что требует системного развития промышленности для покрытия потребностей государства.

**Ключевые слова:** Северный морской путь, повышение эффективности, Арктическая зона, экосистема, инновационная политика, государственные инвестиции.

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The Northern Sea Route (hereafter abbreviated as the NSR), as the most important transport corridor of the Arctic zone of Russia, has been attracting more and more attention in the international arena in recent decades. In the context of global changes in the economic and political vector of countries, increasing demand for alternative sea routes and strengthening Russia's position in the Arctic region, the use of the NSR is becoming not only a key element of transport infrastructure, but also an important factor in the economic and geopolitical stability of the country.

At the same time, the expansion of navigation along the NSR entails a number of new challenges, among which issues of port infrastructure development, exploration of natural resources on the Arctic shelf and ensuring the environmental safety of the region remain relevant. To ensure the long-term sustainability and safety of using the NSR, it is necessary to introduce modern approaches that take into account not only economic, but also environmental and technological aspects, which requires a comprehensive and multifaceted analysis.

Research interest in the Northern Sea Route in the scientific literature has increased significantly since the beginning of government programs to modernize its infrastructure in the mid-2010s. In the future, the relevance of studying this issue was reinforced again with the adoption in 2021 of the Plan for the Development of the Northern Sea Route until 2035, which led to the expansion of scientific research aimed at improving the operation and optimizing the use of this strategically important transport route [1]. The work of A. Mo., published in 2021, generalizes navigation in the waters of the NSR [2]. This study is aimed at analyzing modern approaches to the operation NSR in three key aspects: the development of transport and technical infrastructure, the development of the resource and mineral base of the region and the solution of environmental problems. To achieve the purpose of the study, quantitative and qualitative data on cargo transportation in the NSR water area were analyzed and an approach to assessing their economic efficiency was presented. A quantitative analysis of the volume of fos-

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sil natural resources has also been carried out and the environmental monitoring system of the Northern Sea Route has been modeled. In the late Soviet period, until the collapse of the country in 1991, the functioning of the NSR transport and logistics system was determined mainly by the principles of state necessity (in the interests of defense and coastal transportation), which ensured its role as a deterrent to the exploration and use of Arctic zones by Western countries. However, with the transition from a planned to a market economy, the role of the NSR in the interests of the state has changed, as modern realities interpret the development of the NSR based on the principles of economic expediency, which in turn implies the need to create a highly profitable infrastructure capable of supporting steady growth in cargo traffic, both for domestic and external supplies. A key element of the modernization of the NSR transport system is its transformation into an international maritime transit corridor that could compete with existing southern routes, in particular, with the transport corridor through the Suez Canal.

According to the statement of A. Likhachev, CEO of Rosatom State Corporation, there are a number of forecasts and instructions for leading companies in terms of transportation volumes through the NSR. Thus, Novatek plans to transport 35.5 million tons, Rosneft – 30 million tons, Gazprom Neft – 6.7 million tons, and Norilsk Nickel – 1.7 million tons. In total, these figures amount to about 74 million tons. Taking into account the forecast of transit traffic, the expected volume of 80 million tons will be reached by 2024, but the statistics below refute this statement [3]. Below, based on open sources, we will conduct a brief comparative analysis of the volume of cargo traffic through the Suez Canal and along the NSR route.

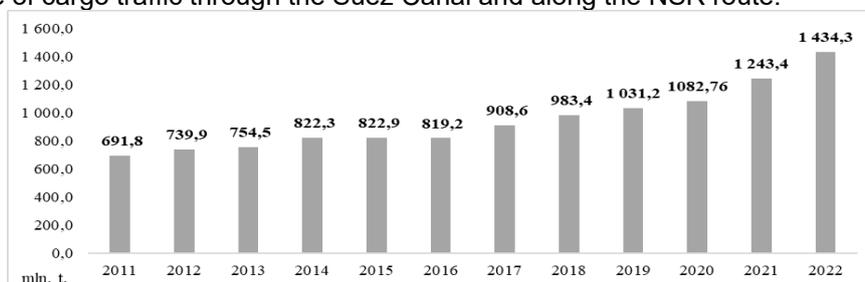


Figure 1 – Dynamics of traffic through the Suez Canal, million tons [4]

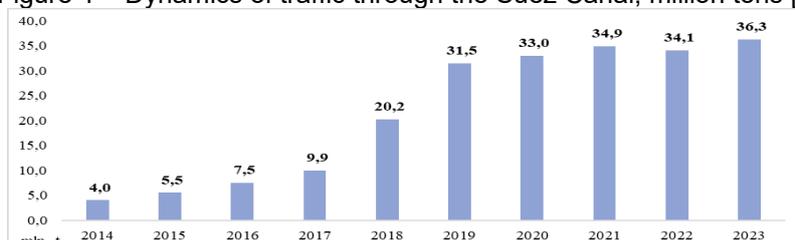


Figure 2 – Dynamics of traffic through the NSR, million tons [5]

At the time of the analysis, the total volume of cargo transported through the NSR is 40 times less than through the Suez Canal. It is worth paying attention to the increase in the volume of transported goods in the period from 2017 to 2019. (an increase of 21.6 million tons), this release in the overall picture is characterized by the beginning of an active phase of work on the development of the Yuzhno-Tambeyskoye gas field by Novatek.

Unlike the NSR, which operates in an Arctic climate with seasonal restrictions and geographical features, the Suez Canal is accessible year-round and does not require ships to have an «ice class» of strength. Secondly, the port infrastructure serving the Suez Canal is more developed and includes large ports (Port Said and Suez) and logistics hubs along the route, which increases the efficiency, safety and speed of cargo handling.

In the analyzed spectrum, the key problem of the Northern Sea Route transport system is the condition and accessibility of its infrastructure. In the Arctic zone of Russia, seven main ports are located along the NSR route (Murmansk, Sabetta, Dixon, Dudinka, Khatanga, Tiksi and Pevek), which require significant efforts for comprehensive technical modernization, including dredging, which will make it possible to service large-displacement vessels corresponding to the Aframax, Suezmax, Supramax classes, simultaneously with This requires updating existing infrastructure facilities (port cranes, docks), which is critically important to ensure efficient and safe operation of the NSR in the Arctic region.



Figure 3 – The route and key port cities of the NSR

Modernization approaches are also regulated by the provisions outlined in the Decree of the Government of the Russian Federation No. 21115-r dated 08/01/12 "Development Plan for the Northern Sea Route until 2035": modernization of 14 ports in the NSR, in particular the construction of two new terminals for the shipment of liquefied natural gas (Sabetta Port in the Yamalo-Nenets Autonomous District and Mezhdurechye in the Murmansk region) [1,6]. The development of LNG terminals and storage tanks is economically feasible based on the structure of cargo flows of domestic and import-export traffic (Figure 4) and the structure of cargo flow of international transit traffic along the NSR (Figure 5) [7].

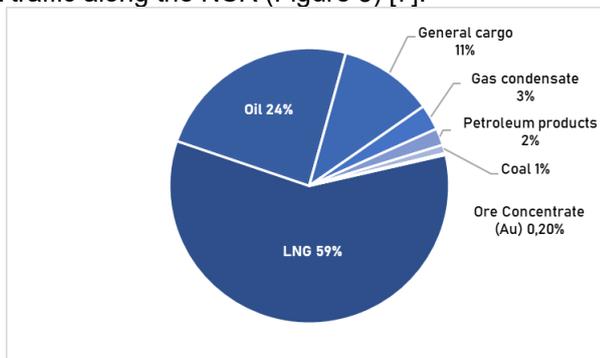


Figure 4 – Structure of cargo flows of domestic and import-export traffic along the NSR

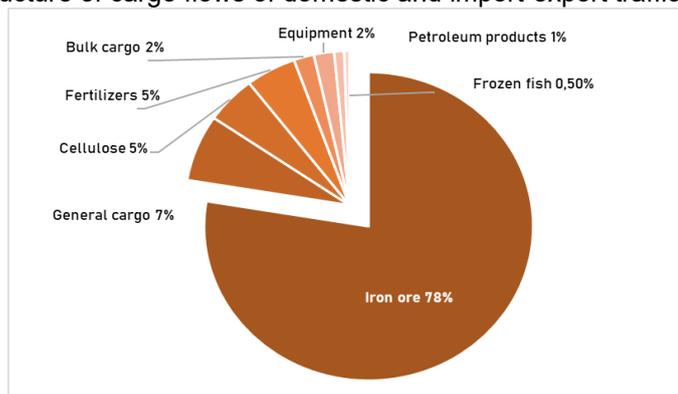


Figure 5 – The structure of the cargo flow of international transit traffic along the NSR

Despite the fact that the Arctic route is a relatively safe and reliable transit route for ships of the Arc4 ice class for four months of the year (August-November). In order to comprehensively solve the problem of providing year-round access to the transport and logistics route, in addition to modernizing the infrastructure of port cities, it is necessary to expand the icebreaker fleet. Thus, according to the decree of the Government of the Russian Federation No. 21115-r dated 08/01/12 "The Development Plan of the Northern Sea Route until 2035", the amount of financing for the development of the cargo and icebreaking fleet is determined in the amount of 539.06 billion rubles (276.76 billion rubles – extra-budgetary funds; 119.54 billion rubles – the federal budget; 142.76 billion rubles - other sources of financing) [1].

It is worth noting a number of inaccuracies outlined in the Government's order, as according to the assessment of the Russian customs portal, 14 more icebreakers must be com-

missioned to ensure year-round traffic along the NSR (41 icebreakers are currently in operation: 34 diesel and 7 nuclear) [8,9]. Currently, construction has been completed in Russia and three serial universal nuclear icebreakers of project 22220 have been commissioned, the fourth one has been laid down and is awaiting commissioning at the end of 2026. Among them are the lead icebreaker "Arctic", the first serial icebreaker "Siberia" and the second serial icebreaker "Ural". The estimated cost of one universal icebreaker of the 22220 project is 60 billion rubles, and the icebreaker of the Leader project is 120 billion rubles, respectively, 660 billion rubles are needed for the construction of 10 more icebreakers of the 22220 project and one flagship Leader, which is significantly higher than the planned amount of financing of 539.06 billion rubles [10].

Despite the possible excess of funding and deadlines for the delivery of ships, the expansion of the icebreaker fleet will have a constructive impact on the formation of the international attractiveness of the NSR for friendly states, which, combined with a developed port infrastructure system, can increase the volume of cargo flow of the NSR from 36.3 million tons in 2023 to the planned 220 million tons by 2035.

The project, implemented by Rosatom State Corporation in cooperation with DP World (UAE), is aimed at creating a regular container line for transit cargo transportation between the eastern and western parts of Eurasia through the Northern Sea Route. The implementation of the EDTA will have a constructive impact on the development of the Arctic region, contributing to the growth of the gross domestic product (GDP) of the northern regions of the Russian Federation and the creation of additional jobs, as well as improving environmental safety through the introduction of sustainable and safe shipping methods [11].

To assess the economic feasibility of organizing year-round traffic along the NSR, we will use data on the revenues of the Suez Canal, where the duty for transporting 1 ton of cargo is 10 US dollars, respectively, based on the statistics of cargo traffic (Figure 1), the budget was replenished by about 14.34 billion dollars [12]. When applying a similar pricing approach to the NSR, Russia can count on \$2.2 billion for the transportation of the planned 220 million tons of cargo.

It should be emphasized that the Northern Sea Route is not only a key transportation artery, but also a strategically important territory for the integrated development of natural resources concentrated in coastal zones and on the continental shelf of the Arctic zone, which includes rich hydrocarbon deposits (Attachment A), rare earth metals and other mineral resources [13]. The development of these resources, combined with the intensive modernization of the NSR's transport and port infrastructure, will ensure not only an increase in the efficiency of operation of this transport corridor, but also a synergistic effect that will deepen the integration of mining and logistics at the global level.

The financial assessment of the potential value of all natural resources within the continental part and the exclusive economic zone requires further research in this area, taking into account the instability of stock prices.

As part of the work, we will conduct a quantitative analysis of the volume of the resource base, so to determine the final approximate volume of minerals, reserves of classes A, B, B1, C1 and C2 will be taken into account, which are included in the analysis because they are characterized by the highest degree of exploration and reliability of data, which allows for high accuracy in estimating potential amounts of resources. These groups of deposits have sufficient geological validity and can be used to justify decisions on further development and exploitation. Deposits of lower grades (D) require additional research and cannot be considered at this stage of the analysis, since their resources remain hypothetical and uncertain.

Table 1 – Quantitative analysis of the volume of mineral reserves in the Arctic zone of the Russian Federation, compiled by the author on the basis of [14]

Group and type of mineral	Units of measurement	Reserves (A+B+C1, for hydrocarbon raw materials – A+B1+C1)	% of reserves in Russia	C2: for hydrocarbon raw materials – B2+C2	Total inventory
<b>Combustible minerals</b>					
<b>Liquid and gaseous fuels</b>					
Oil	million t	3 879,47	20,80	4 201,38	8 080,85
Flammable gases (free gas)	billion m3	37 417,49	76,30	16 898,31	54 315,80
Flammable gases (dissolved gas)	billion m3	390,67	25,20	645,66	1 036,33
Condensate	million t	1 352,20	58,00	1 303,03	2 655,24

<b>Solid fuels</b>					
Coal	million tons	7 162,71	3,6	2 062,96	9 225,67
<b>Metal minerals</b>					
<b>Ferrous metals</b>					
Iron ores	thousand t	1 700 811,00	2,90	1 127 994,00	2 828 805,00
Chrome ores	thousand t	6 811,00	37,00	5 380,00	12 191,00
Titan	thousand t	78 733,00	30,30	51 638,00	130 371,00
<b>Non-ferrous metals</b>					
Copper	thousand t	30 238,70	41,10	11 253,30	41 492,00
Lead	thousand t	580,60	5,70	508,70	1 089,30
Zinc	thousand t	1 325,30	3,20	1 162,60	2 487,90
Molybdenum	t	188 459,00	12,60	111 228,00	299 687,00
Tungsten	t	59 716,00	6,40	36 894,00	96 610,00
Tin	thousand t	802,50	50,50	164,12	966,61
Bauxite	thousand t	12 079,00	1,10	2 174,00	14 253,00
Antimony	t	44 020,00	27,10	43 605,00	87 625,00
<b>Rare metals</b>					
Zirconium	thousand t	1 039,30	16,90	1 162,00	2 201,30
<b>Scattered elements</b>					
Gallium (RsE)	t	74 522,10	71,80	9 962,80	84 484,90
Rubidium	t	273 824,10	57,00	43 007,40	316 831,50
Caesium	t	1 543,30	2,10	2 629,90	4 173,20
Selenium	t	30,90	0,10	31 565,50	31 596,40
Scandium	t	9 736,00	90,10	4 021,00	13 757,00
<b>Precious metals</b>					
Aurum	kg	1 109 126,00	12,60	592 312,00	1 701 438,00
Argentum	t	14 666,60	25,30	12 786,30	27 452,90
Platinoids	kg	8 977 758,00	78,60	3 568 662,00	12 546 420,00
<b>Non-metallic minerals</b>					
Apatite ores	thousand t	479 133,00	67,60	103 105,00	582 238,00
Diamonds	thousand carats	261 186,50	29,30	18 846,90	280 033,40

Based on the data in the table and Appendix A, a number of conclusions can be drawn:

- The Arctic zone of Russia has the largest reserves of combustible minerals, including oil, natural gas and coal. Oil reserves account for about 20.8% of Russia's total reserves, while free gas reserves account for 76.3%. This highlights the strategic importance of the region for ensuring the country's energy security and the global hydrocarbon market.
- Among ferrous metals, the Arctic is a major source of iron ores, which account for only 2.9% of Russia's total reserves, but a significant expansion of production can be expected on the shelf, especially taking into account promising deposits of chromium and titanium ores.
- The reserves of apatite ores and diamonds in the Arctic indicate the significant potential of the region in non-metallic resources. Apatite ores, with a share of 67.6%, and diamonds, 29.3%, provide Russia with strategic independence in the production of fertilizers, optical and laser equipment, as well as jewelry.

With the increasing pace of exploration and the growth of transportation volumes along the NSR, as well as its transformation into a year-round logistics corridor, the problem of ensuring the environmental safety of the Arctic region is becoming more urgent. Progress in the development of natural resources and transport routes (Figure 6) may lead to the formation of man-made risks that may lead to ecosystem degradation and deterioration of the economic feasibility of further development of the Arctic regions.

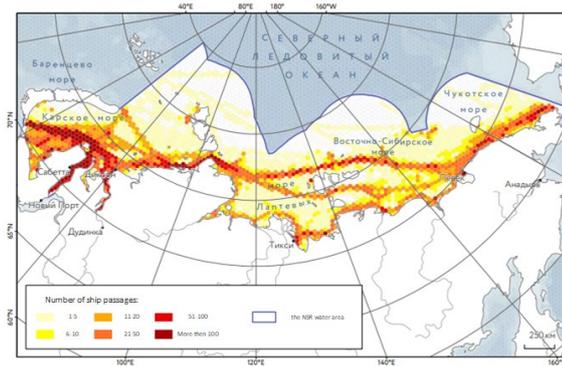


Figure 6 – Ship load on the NSR water area according to the results of the 4th quarter of 2021 [15]

According to the data shown in the figure above, the water area of the Kara Sea and its port cities, such as Dikson and Sabetta, are the most navigable and, as a result, the most susceptible to environmental risks. Sabetta is the mainstay of the Yamal LNG project, which determines the number of ship passes (more than 100 units) in this area.

The solution of these issues is possible only with an integrated approach, including the systematic application of regulatory regulations, as well as the introduction of innovative management, navigation and technological solutions. So in 2018, from the moment Rosatom State Corporation was designated as the infrastructure operator of the Northern Sea Route, work began in this direction. Thus, as part of the creation of information support for environmentally safe and sustainable development, the "NSR Environmental Monitoring System" operates (compiled by the author) [16].

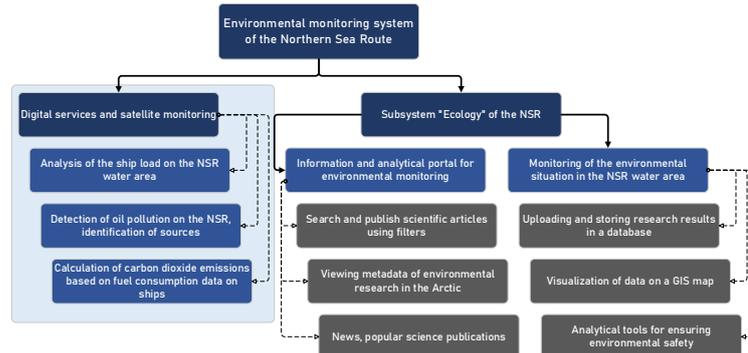


Figure 7 – Environmental monitoring system of the Northern Sea Route

One of the most effective methods of obtaining data on the state of the ecological situation in the Arctic region is environmental monitoring, which includes atmospheric air analysis, sampling of seawater and sediments, as well as studying the concentration of microplastics and measuring temperatures. Currently, there are 80 monitoring sites in operation (Figure 8), the number of which will increase in parallel with the increase in the pace of shipping and mining.

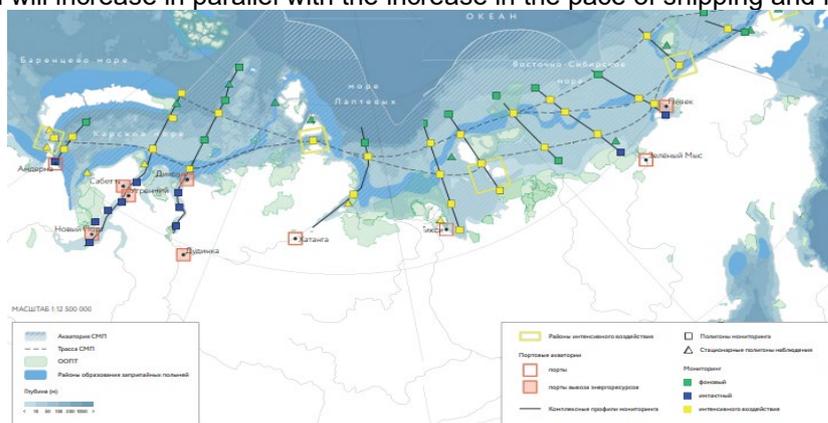


Figure 8 – Polygons of the integrated NSR monitoring program

All the results of environmental studies in the NSR water area confirm that the levels of pollutants in the atmospheric air, soil and aquatic environment do not exceed the established maximum permissible concentrations (MPC). This indicates the stability of the environmental situation in the studied areas, which is an important indicator of the effectiveness of environmental monitoring and compliance with regulatory environmental standards.

However, it is worth taking into account the uncontrolled risks of a nuclear accident associated with the use of nuclear icebreakers to organize traffic, and then their presence in ports. In addition to the current icebreaking fleet, the danger is posed by the Soviet nuclear submarines K-27 (Kara Sea), K-140, K-8 and K-159 (Barents Sea) submarines sunk in Arctic latitudes, in whose reactor compartments there was spent nuclear fuel, which can be considered potentially dangerous, both for shipping and for the biosphere of the Arctic region, since all attempts to raise them were unsuccessful.

To prevent emergencies at potentially dangerous facilities, it is necessary to create professional rescue teams in coastal cities. Rescuers should have at their disposal both transport and towing vessels, as well as means for decontamination and fire extinguishing in case of an emergency.

The research conducted within the framework of this work allows us to assert that the Northern Sea Route is an important strategic asset for Russia, having significant potential for both strengthening the country's economic and geopolitical position in the Arctic region. However, its successful development is associated with a number of challenges, both in terms of infrastructural, technical, and natural aspects.

One of the key factors limiting the competitiveness of the NSR remains its seasonality, which necessitates the use of icebreakers in the period from December to July. At the moment, traditional routes such as the Suez Canal remain dominant, which reduces the attractiveness of the NSR for the reorientation of global traffic flows. Nevertheless, with the necessary investments and timely modernization of infrastructure, the NSR has every chance of becoming a significant alternative route capable of effectively connecting the Eastern and Western parts of Eurasia.

In addition, it is important to note that the expansion of navigation along the NSR is inevitably associated with environmental risks, which requires not only the development of effective environmental monitoring systems, but also the development of measures and means to prevent emergencies, taking into account strict compliance with environmental regulations and standards. The preservation of the unique ecosystem of the Arctic, which is subject to significant impacts from human activities, is a prerequisite for the sustainable use of this region.

The projected scenarios for the development of the NSR show that with the implementation of an integrated approach, including infrastructure modernization, the development of the icebreaking fleet, and the involvement of foreign partners, it is possible to increase cargo traffic to 220 million tons by 2035. Otherwise, insufficient efforts in these areas may lead to a limitation of the NSR's potential, loss-making investments and a decrease in its competitiveness.

Thus, for the effective operation of the Northern Sea Route, a combination of economic, environmental and technological factors is necessary, which requires coordination of efforts by the state, the private sector and the scientific community. The implementation of the proposed measures will open up prospects for the sustainable and safe development of the NSR as an important transport corridor and a strategic resource for Russia.

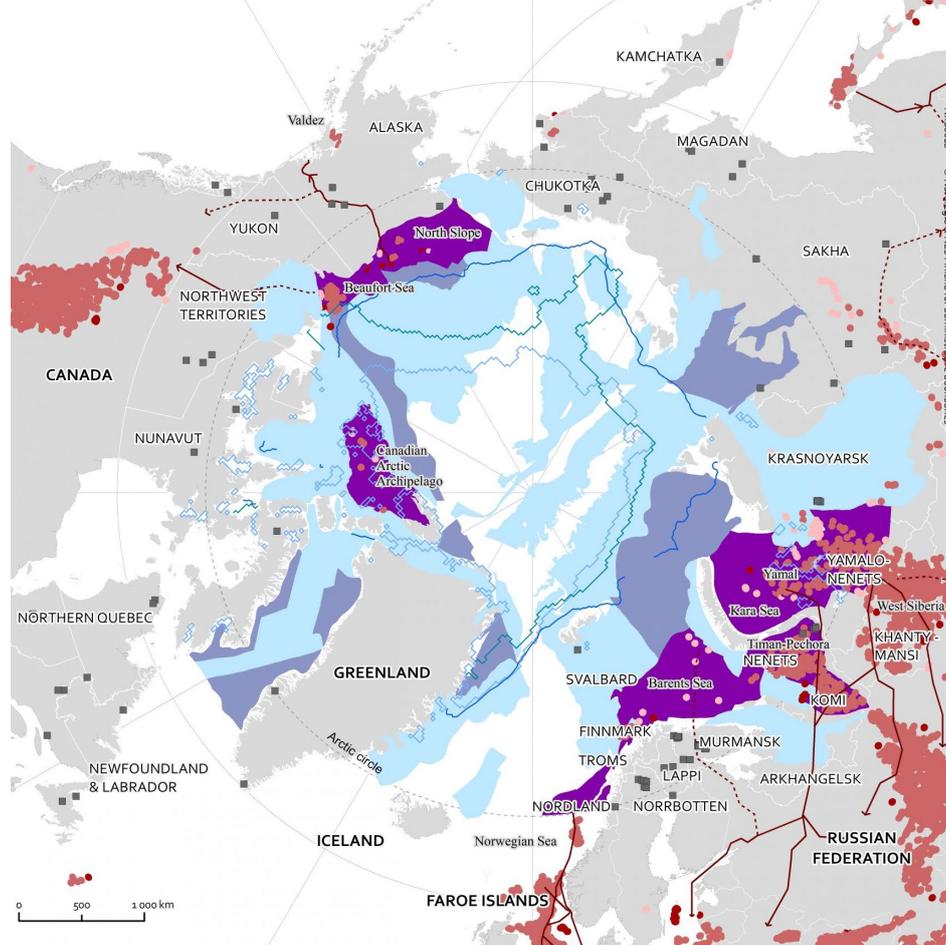
#### List of sources used

1. Распоряжение Правительства Российской Федерации № 2115-р от 01.08.2022. [Rasporyazhenie Pravitel'stva Rossijskoj Federacii №2115-r ot 01.08.2022]. – URL: <http://publication.pravo.gov.ru/Document/View/0001202208040008> (accessed 09.09.2025) – Текст: электронный.
2. Ten Years of International Shipping on the Northern Sea Route: Trends and Challenges. – URL: <https://arcticreview.no/index.php/arctic/article/view/2614/5113> (accessed 10.09.2025) – Текст: электронный.
3. Neftegaz.ru "Объем грузопотока по СМП в 2024 г. может не достичь 80 млн т/год" [Obem gruzopotoka po SMP v 2024 g. mozhet ne dostich' 80 mln t/god]. – URL: <https://neftegaz.ru/news/transport-and-storage/798875-obem-gruzopotoka-po-smp-v-2024-g-mozhet-ne-dostich-80-mln-t-god/> (accessed 05.09.2025) – Текст: электронный.
4. Official website of the Suez Canal Administration. – URL: <https://www.suezcanal.gov.eg/English/Pages/default.aspx> (accessed 05.09.2025) – Текст: электронный.

5. Северный морской путь: итоги 2023 года и неотложные задачи [Severnyj morskoy put': itogi 2023 goda i neotlozhnye zadachi]. – URL: <https://nsrassociation.ru/files/2d5805f26b3d4bd6bb4a7f32efeedcd6.pdf> (accessed 06.09.2025) – Текст: электронный.
6. За полярным кругом. Северный морской путь станет важнейшим транспортным коридором. Что это даст экономике? [Za poljarnym krugom. Severnyj morskoy put' stanet vazhnejshim transportnym koridorom. Chto jeto даст ekonomike?]. – URL: <https://lenta.ru/articles/2023/12/13/zapolyarnym/> (accessed 09.09.2025) – Текст: электронный.
7. Анализ состояния и развития транспортной системы северного морского пути. [Analiz sostojanija i razvitija transportnoj sistemy severnogo morskogo puti]. – URL: <http://arctica-ac.ru/docs/journals/46/analiz-sostoyaniya-irazvitiya-transportnoy-sistemy-severnogo-morskogo-puti.pdf> (accessed 09.09.2025) – Текст: электронный.
8. Сложности перехода: для развития Севморпути потребуется ещё до ста судов. [Slozhnosti perehoda: dlja razvitija Sevmorputi potrebuetsja eshhe do sta sudov]. – URL: <https://www.tks.ru/reviews/2024/09/02/03/> (accessed 09.09.2025) – Текст: электронный.
9. Ледокольный флот России: больше, чем у США, Канады, Финляндии, Дании и Китая вместе взятых. [Ledokol'nyj flot Rossii: bol'she chem u SShA, Kanady, Finljandii, Danii i Kitaja vmeste vzjatyh]. – URL: <https://salt.news/promishlennost/ledokolnyj-flot-rossii-bolshe-chem-u-ssha-kanady-finlyandii-danii-i-kitaya-vmeste-vzjatyh/> (accessed 09.09.2025) – Текст: электронный.
10. Россия активно обновляет свой флот: к 2035 году планируется построить более 1000 новых судов. [Rossija aktivno obnovljaet svoj flot: k 2035 godu planiruetsja postroit' bolee 1000 novyh sudov]. – URL: [https://www.vedomosti.ru/industry/infrastructure\\_development/articles/2022/12/15/955368-rossiya-aktivno-obnovljaet-flot](https://www.vedomosti.ru/industry/infrastructure_development/articles/2022/12/15/955368-rossiya-aktivno-obnovljaet-flot) (accessed 09.09.2025) – Текст: электронный.
11. "Росатом" – инфраструктурный оператор Северного морского пути. ["Rosatom" – Infrastrukturnyj operator Severnogo morskogo puti]. – URL: <https://atommedia.online/reference/rosatom-infrastrukturnyj-operator/> (accessed 12.09.2025) – Текст: электронный.
12. Сколько зарабатывает Египет на Суэцком канале. [Skol'ko zarabatyvaet Egipet na Sujecskom kanale]. – URL: <https://www.ixbt.com/live/offtopic/skolko-zarabatyvaet-egipet-na-sueckom-kanale.html> (accessed 09.09.2025) – Текст: электронный.
13. Resources in the Arctic 2019. – URL: <https://nordregio.org/maps/resources-in-the-arctic-2019/> (accessed 10.09.2025) – Текст: электронный.
14. Справка о состоянии и перспективах использования минерально-сырьевой базы арктической зоны РФ на 15.03.21. [Spravka o sostojanii i perspektivah ispol'zovanija mineral'no-syr'evoj bazy arkticheskoy zony RF na 15.03.2021]. – URL: <https://rosnedra.gov.ru/data/Fast/Files/202104/45bb8bcc7b844220954744c0149a86f4.pdf> (accessed 13.09.2025) – Текст: электронный.
15. Комплексные исследования и мониторинг состояния окружающей среды и биоразнообразия в акватории северного морского пути. [Kompleksnye issledovanija i monitoring sostojanija okruzhajushhej sredy i bioraznoobrazija v akvatorii severnogo morskogo puti]. – URL: [https://atommedia.online/wp-content/uploads/2023/12/booklet\\_rus\\_nsr\\_program\\_small.pdf](https://atommedia.online/wp-content/uploads/2023/12/booklet_rus_nsr_program_small.pdf) (accessed 15.09.2025) – Текст: электронный.
16. Создание системы экологического мониторинга Северного морского пути. [Sozdanie sistemy jekologicheskogo monitoringa Severnogo morskogo puti]. – URL: <https://dni-sibir-arctika.ru/wp-content/uploads/2023/12/Био-Создание-системы-экологического-мониторинга.pdf?ysclid=m721enbujx764025667> (accessed 15.09.2025) – Текст: электронный.

Attachment A  
 (reference)

Existing and potential deposits of minerals and energy resources in the Arctic region



**Main oil and gas resources & mining activities in the Arctic**

Oil/gas: exploration and production

- Gas
- Oil
- Oil and gas

Oil/gas: prospective areas and reserves

- <50% Probability that at least one accumulation of more than 50 million barrels of oil or oil-equivalent gas exists after USGS
- 50–99%
- 100% (including areas north of Arctic Circle)

- Main existing oil/gas pipeline (indicative direction)
- - - Main proposed oil/gas pipeline (indicative direction)
- Main mining site

- Sea ice extent in September 2012
- Sea ice extent in September 2018
- Average sea ice extent for September in 1981–2010

**Regions included:**

US - Alaska; CA - Yukon, Northwest Territories, Nunavut, Northern Quebec, Newfoundland & Labrador; GL; IS; FO; NO - Nordland, Troms, Finnmark, Svalbard; SE - Norrbotten; FI - Lappi; RU - Murmansk, Arkhangelsk, Komi, Nenets, Khanty-Mansi, Yamalo-Nenets, Krasnoyarsk, Sakha, Kamchatka, Magadan, Chukotka.

Data source: Nordregio, NSIDC, PRIO, United States Geological Survey USGS and several homepages for oil, gas and mining companies.